

**US-INDIA AGRICULTURAL COOPERATION:
PERSPECTIVES, ISSUES AND CHALLENGES, 1996-2012**

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DECLARATION

I declare that the dissertation entitled “US-India Agricultural Cooperation: Perspectives, Issues and Challenges, 1996-2012”, submitted by me in partial fulfilment of the requirements for the award of the degree of **DOCTOR OF PHILOSOPHY** of Jawaharlal Nehru University is my own work. The dissertation has not been submitted for any other degree of this University or any other university.


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CERTIFICATE

We recommend that this dissertation be placed before the examiners for evaluation.


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LIST OF ABBREVIATIONS

ABSP	Agriculture Biotechnology Support Project
ACDI/VOCA	Agricultural Cooperative Development International / Volunteers in Overseas Cooperative Assistance
AID	Agency for International Development
AIP	Agriculture Improvement Project
AMTP	Agricultural Marketing Transition Programme
AoA	Agreement on Agriculture
APEDA	Agriculture and Processed Foods Export Development Authority
APLU	Association of Public and Land Grant Universities
APMC	Agriculture Produce Market Committee
APP	Agricultural Production Program
ARC	Agricultural Risk Coverage
ASSOCHAM	Associated Chambers of Commerce & Industry of India
BARC	Bhabha Atomic Research Centre
BIFAD	Board for International Food and Agricultural Development
BIT	Bilateral Investment Treaty
Bt	Bacillus Thuringiensis
CESCR	Committee on Economic, Social and Cultural Rights
CGIAR	Consultative Group for International Agricultural Research
CII	Confederation of Indian Industry
CIMMYT	Centro Internacional de Mejoramiento de Maíz y Trigo (Spanish) International Maize and Wheat Improvement Center
CSIS	Center for Strategic and International Studies
CTC	Collaborative Training Centre
CUSURDI	Council of United States Universities for Rural Development in India
DARE	Department of Agricultural Research and Education
DDA	Doha Development Agenda
EPA	Environmental Protection Agency
ERS	Economic Research Service
ERTS	Earth Resources Technology Satellite

EU	European Union
EXIM	Export-Import
FACE	Food and Agricultural Centre of Excellence
FAIR	Federal Agricultural Improvement and Reform Act
FAO	Food and Agricultural Organization
FAOSTAT	Food and Agriculture Organization Corporate Statistical Database
FAS	Foreign Agricultural Service
FDI	Foreign Direct Investment
FFA	Freedom to Farm Act
FICCI	Federation of Indian Chambers of Commerce and Industry
FOA	Foreign Operations Administration
FSII	Federation of Seed Industry of India
FSSAI	Food Safety and Standard Authority of India
FTP	Foreign Trade Policy
FY	Financial Year
FYP	Five Year Plan
G-20	Group of 20
GATT	General Agreement on Tariff and Trade
GDP	Gross Domestic Product
GE/GMO/GM	Genetically Engineered/Genetically Modified Organisms/Genetic Modification
GHG	Green House Gas
GIS	Geographic Information System
GoI	Government of India
HYV	High Yielding Variety
IADP	Intensive Agriculture District Programme
IAFC	Indian American Friendship Council
IARI	Indian Agriculture Research Institute
ICAR	Indian Council of Agricultural Research
ICRIER	Indian Council for Research on International Economic Relations
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
ICT	Information and Communication Technology
IFPRI	International Food Policy Research Institute
INSA	Indian National Science Academy

IRI	International Research Institute for Climate and Society
IRRI	International Rice Research Institute
ISAP	Indian Society of Agribusiness Professionals
ISRO	Indian Space Research Organisation
IT	Information Technology
ITA	International Trade Administration
ITC	Indian Tobacco Company
JEC	Joint Economic Committee
JIFSAN	Joint Institute of Food Safety & Applied Nutrition
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KVKs	Krishi Vigyan Kendras
LGU	Land-Grant University
MANAGE	Indian National Institute of Agricultural Extension Management
MMT	Million Metric Tonnes
MSP	Minimum Support Price
MoU	Memorandum of Understanding
NABARD	National Bank for Agriculture and Rural Development
NAEP	National Agricultural Education Project
NAMA	Non-Agricultural Market Access
NAP	National Agricultural Policy
NARS	National Agricultural Research System
NASA	National Aeronauts and Space Administration
NCAER	National Council for Applied Economic Research
NDC	National Development Council
NEC	National Economic Council
NEP	New Economic Policy
NFSM/A	National Food Security Mission/Act
NGO	Non-Governmental Organisation
NHB	National Horticulture Board
NHM	National Horticulture Mission
NIAM	National Institute of Agricultural Marketing
NIFA	National Institute for Food and Agriculture
NIPHM	National Institute of Plant Health Management

NMSA	National Mission for Sustainable Agriculture
NOAA	National Oceanic and Atmospheric Administration
NSSP	Next Steps in Strategic Partnership
OECD	Organisation for Economic Cooperation and Development
OSU	Ohio State University
PAU	Punjab Agricultural University
PDS	Public Distribution System
PKVY	Paramparagat Krishi Vikas Yojana
PL	Public Law
PMFBY	Pradhan Mantri Fasal Bima Yojana
PMKSY	Pradhan Mantri Krishi Sinchai Yojana
PPP	Public Private Partnership
PSAC	President's Science Advisory Committee
PSAG	Private Sector Advisory Group
PTI	Press Trust of India
QRs	Quantitative Restrictions
RKVY	Rashtriya Krishi Vikas Yojana
SAU	State Agricultural University
SDT	Special and Differential Treatment
SFAC	Small Farmers Agribusiness Consortium
SHARE	Sustainable Harvest Agriculture Resources Environment
SHG	Self-Help Group
SMEs	Small and Medium Enterprises
SPS	Sanitary and Phyto-sanitary
SPs	Special Products
SRISTI	Society for Research and Initiatives for Sustainable Technologies and Institutions
SSI	Small Scale Industry
SSM	Special Safeguard Mechanism
STE	State Trading Enterprises
TBT	Technical Barriers to Trade
TCM	Technical Cooperation Mission
TII	Tobacco Institute of India

TPCC	Trade Promotion Coordinating Committee
TPF	Trade Policy Forum
UDHR	Universal Declaration of Human Rights
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
URAA	Uruguay Round for Agricultural Agreement
US/USA	United States of America
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
USIBC	United States-India Business Council
USINPAC	United States-India Political Action Committee
USIKIA/AKI	United States-India Knowledge Initiative on Agriculture/Agricultural Knowledge Initiatives
USTR	United States Trade Representative
WTO	World Trade Organization

PREFACE

The history of human existence has been paralleled by the primary concern of securing adequate food supplies. It implies that the survival of entire humanity rests on agriculture. Agriculture- *the art and science of cultivation of the soil for the production of crops*, is the foundation that supports the edifice of any country on a sustainable basis. Nations have sought to cooperate with each other to exchange the best practices of agricultural production and to trade the agricultural products based on comparative advantages. Their overarching objective has been to present their citizenry with ample choice to feed themselves.

Agricultural cooperation between the United States and India has had a long history. From what began as a donor-receiver relationship of food assistance to India in the early 1950s, it unfurled into formal partnership by the mid-1960s. The main protagonists of this latter phase of bilateral agricultural cooperation were the US Land-Grant Universities and State Agricultural Universities in India. The primary objective was to assist India to increase its productivity of basic food crops and to strengthen its institutions for sustained progress. It ushered in the Green Revolution, where India never again needed to depend on foreign food supplies to feed its population. A policy of combining high-yielding varieties of seeds with a package of complementary inputs was incorporated to ensure quick production gains and widespread adoption of these techniques by farmers.

Agriculture being the bedrock of the Indian economy, having half of the total population directly or indirectly dependent upon it for their livelihood, it has been imperative for the policymakers to put 'prosperity of farmers' at the core of the agricultural development strategy. Similarly, even though just one per cent of the American population is engaged in the agricultural sector, yet it has over three per cent contribution to the nation's Gross Domestic Product. Therefore, formulating policies conducive to the farm sector that would not just mean high yields, huge profits for the farmers, but also the availability of cheap food for the population, has been central to the sector's decision-making.

Despite the Cold War compulsions, agricultural cooperation between US and India continued to strengthen the bilateral understanding as well as contributed to the establishment of critical diplomatic, economic, and political ties. The economic reforms introduced by India in 1991

and the incidental end of the Cold War during the same time, served as factors for the explicit convergence of interests of India and the US. Over the various governments and administrations on both sides, bilateral cooperation in the agricultural sector has intensified. The following research considers a comprehensive understanding of the major domestic and bilateral developments in the relations between US and India since 1996 that enhanced their cooperation in agriculture. It underscores the role of the political leadership on both sides in reinforcing a new era of cooperation for Evergreen Revolution in India. This has been supplemented by statistical comparisons of exports and imports of major agricultural products by the two countries. It is noteworthy that since 2009 US-India agricultural cooperation has expanded to include assistance to least developed countries for improving their agricultural productivity, strengthening agricultural value chains, and supporting the market institutions by providing extension management, agricultural marketing, and agri-business training.

This research contends that the Indian urgency to promote its agricultural productivity met with the American keenness to facilitate and foster trade in agricultural products. The ways in which the promotion of agricultural cooperation with an economic emphasis overcame the political constraints has been elucidated, especially as contentious bilateral issues such as pace of economic reforms in India and issues of Genetically Modified (GM) food, as well as the challenges in the multilateral setting of the World Trade Organization, over issues of subsidies, sanitary and phyto-sanitary (SPS) measures continue to remain. This study details the causal factors that led to changes in the perceptions of the US Congress on matters concerning aid, assistance, and transfer of technology to India. Among others, the role of India-centric lobbies in the US and their counterparts in India, as well as the various institutional mechanisms, have been studied to ascertain their influence in bringing about change.

This study is conducted on the backdrop of US-India political relations to enable a better comprehension of the nuances in the cooperation or contestation between them on agricultural issues. A strengthened economic synergy between the two countries has been the underlying consideration in the research undertaken. In main, it highlights that by pursuing close agricultural collaboration, both countries would not just build up their own institutional capacity to sustain their populations through adequate food choices, but also would execute a grander global strategy to ensure food security for all.

CHAPTER 1

Introduction

Sections:

1.1 Background

1.2 Review of Literature

1.2.1 History of Agricultural Relations between US and India: US Land-Grant Universities in India

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1.3 Definition, Rationale, and Scope of the Study

1.4 Research Questions

1.5 Hypotheses

1.6 Research Methodology

CHAPTER 1

Introduction

The history of human existence on Earth has been one of the preoccupation of securing adequate food supplies that implied that the survival of entire humanity rested on agriculture. The term agriculture is derived from the Latin words “*ager*” and “*cultura*”, which implies the science and art of cultivation of the soil for crop production. It encompasses activities relating to the production, processing, marketing, distribution, utilisation and trade of food, feed, fibre, fuel (Firbank: 2010). This means agriculture has direct consequences on every person either as a consumer or a producer. There is international agreement on the significance of the agricultural sector as being essential to the economic growth of a nation, having strong linkages to human development (UDHR: 1948; CESC: 1999; Office of the United Nations High Commissioner for Human Rights: 2001; International Institute for Sustainable Development & United Nations Environment Programme: 2014).

Dramatic changes in agricultural production and productivity have been witnessed since the past century. This has been driven by public and private investments in agricultural research, which have had profound implications especially for the world's poor (Alston and Pardey: 2014). The establishment of Land Grant Universities (LGUs) in the United States is reflective of this argument. LGUs emphasised upon the importance of higher education in agriculture for producing more food for its citizens. The establishment of State Agricultural Universities (SAUs) in India with the partnership of the US LGUs had symmetrical objectives of relieving the people of India from widespread hunger and malnutrition. The Green Revolution of 1969-70 in India highlights the pattern of international cooperation and collaboration for agricultural research and development. Thus, a study of US-India agricultural collaboration becomes important and interesting to understand the nature, trends, and pattern of agricultural cooperation between the US and India. and a suitable case study to analyse US-India relations through the prism of agricultural cooperation that continued despite the ups and downs of the Cold War. Furthermore, such a focus would also help in linking it to the theory of explicit policy coordination that has occurred between the US and India since the 1950s and during the Cold War. Despite several political difficulties, cooperation in agriculture seemed to continue, raising the issue of causalities for such a continuance.

The end of the Cold War which also coincided with India's own economic reforms played a significant role in liberalising the agricultural sector of the country. The dismantling of the import controls, the abolition of licensing controls on private investments, slashed tax rates and public sector monopolies generated a renewed interest in the US to pursue greater engagement with India (Ahluwalia: 2002; Ciorciari: 2011; Stokes and Patel: 2012). Liberalisation of agricultural trade was put forward as an important step towards imparting efficiency to Indian agriculture. These arguments were derived primarily from the neo-classical trade theory perspective in which free trade and an open economy would maximise efficiency and gains (Gulati and Sharma: 1997). The New Economic Policy (NEP) reaffirmed its commitment to encourage public agricultural research (Ramakumar: 2009). This period also saw the spread of green revolution to other regions of the country through wider policy dissemination (Bhalla and Singh: 2001; Chand: 2004). As the gradual economic reforms in India were hailed by the US, they also dovetailed with the Clinton engagement strategy with India. The Farm Bill of 1996 legislated during the Clinton presidency called for greater agricultural policy ties with the developing countries, especially those that were making efforts to open their economies. This was a direct implication upon improving agricultural cooperation with India. The New Agricultural Policy of India that was later launched in 2000, unveiled a remarkable focus on strengthening international agricultural trade relations. This was interesting as agriculture remained for the India one of the fundamental core interests as it was linked to the food security for its people.

Therefore, the study attempts to understand how and why the Clinton administration put agriculture as an important focus-area in the US-India cooperation. The nuclear tests conducted by India in 1998 produced a nadir in the relationship that seemed to point towards a major confrontation. Political and strategic issues intervened and significantly affected the trajectory of Indo-US relations during the 1990s. The subsequent Talbott-Singh talks and Clinton visit in 2000 began to put the relationship on an even keel once again. Interestingly, agriculture remained insulated from these troubles and continued to be a subject of importance in the diplomatic negotiations.

The US-India agricultural cooperation experienced continuity during the two terms of the George W. Bush administration. The establishment of the US-India Knowledge Initiative on Agriculture (USKIA) brought to the fore the objectives to intensify cooperation in the areas

of food security; food processing; agri-business; farm-to-market linkages; biotechnology; sustainable agriculture; technology transfer; research and development; capacity development; agricultural extension and; weather and crop forecasting.

The Obama administration continued this focus and agriculture was included as a vital pillar and part of the strategic engagement between the US and India. This set the stage for an “Evergreen Revolution” and partnership to provide a leadership role in the US’ *Feed the Future* program. Thus, the origin and evolution of US-India relations in agriculture beginning with American agricultural assistance programs to a strategic cooperation in agriculture is an interesting case to be studied, and more so as there has been very little research tracing the trajectory of the agricultural cooperation between the two countries. This study attempts to fill the gap in the literature through rich theoretical approaches to the question of why nations cooperate and bilateral studies on various aspects of US-India relations.

1.1 Background

Theories of International Relations have often highlighted the theoretical basis of international cooperation between nations: they point out that international cooperation occurs when systemic institutional conditions are created in which interests converge (Krasner: 1982); and/or when nations adjust their behaviours according to the actual or anticipated preferences of other nations (Keohane: 1984). Agriculture was one of the very first areas of bilateral cooperation between the United States and India, since India’s independence in 1947. As India was an agrarian country and more than three-fourths of its population lived in the villages and worked on agriculture, the groundwork for development in India began immediately. Based on the premise that agricultural transformation and agrarian prosperity occur when economically viable technological package for increasing productivity per unit land, water time and energy, India supported a systemic package of public policies that was a part of the larger economic strategy in the 1950s India’s quest for greater productivity in agriculture to feed its people led it to also engage the US in this sector (Swaminathan: 1979). Since Truman years, and more specifically the Kennedy and Johnson era reveal how the US-India relations became “increasingly cordial” as America expanded its agricultural education through Land-Grant University cooperation and food assistance to India. Official and biographical materials of several US diplomats serving in India during

these years suggest that such cooperation helped stave off an imminent famine and to counter India's food distress (Bowles: 1971). Many scholars have also argued that the convergence of opinion on technological intervention in agriculture to India of Presidents Eisenhower, Kennedy, and Johnson would foster national security objectives of the country. It has been borne out in the policy advice given by close political advisors on the issue of agricultural assistance to India, by people like W.W. Rostow, William Bundy, McGeorge Bundy, Robert Komer, Dean Rusk, and Robert McNamara, who seemed to have "nurtured a belief in the transformative power of development led by the United States" (Ekbladh: 2002).

Beginning with the PL- 480 exports from the US in the early 1950s (Bjorkman: 2008), the two countries began their scientific agricultural cooperation with prominent collaborations with US LGUs in late 1950s. Prime Minister (PM) Nehru's emphasis on the use of technology and development of infrastructure for agricultural advancement in India was one of the primary reasons for cooperation between the Indian Agriculture Research Institute (IARI) and the US Atomic Energy Commission for "Atoms for Peace Program" of 1958¹. The 'Atoms in Agriculture' program demonstrated the potential uses of atomic energy in the development of new crop varieties, in controlling pests and in the field of food safety and storage (Swaminathan: 2009a). Eventually, the intensification of development cooperation between the US and India gave way to the 'Green Revolution', and India became self-reliant in food grain production by the 1970s (Siitonen: 1990). India's goals of boosting economic and agricultural productivity were focused on the staple food sector as essential for the substantial alleviation of poverty as well as succeed in attaining economic growth. Political scientists have pointed out that the development efforts for a Green Revolution in India was inevitably laden in political and moral aspects and ultimately contributed to significant enhancement in US-India agricultural relations (Siitonen: 1990).

India's goals of boosting economic and agricultural productivity and substantial alleviation of poverty can be explained by the modernisation theory put forth by W.W. Rostow in his *The Stages of Economic Growth: A Non-Communist Manifesto*. He listed five stages of economic growth, namely, a traditional society, the preconditions for take-off, the take-off, the drive to maturity, and the age of high mass-consumption (Rostow: 1960). India's agricultural sector broadly has traversed this trajectory, where during the traditional society after Independence,

¹Available at: Atoms in Agriculture [Online: Web] URL: <http://www.vigyanprasar.gov.in/Radioserials/atomtostar/atom-in-agriculture-eng.pdf>

was unable to cope with the challenges of famine and hunger. The pre-conditions for ‘take-off’ was created because of President Truman’s initiation of active food politics as an arena of developmental strategy and hence an instrument to foster US foreign policy objectives in maintaining its power in international relations (Perkins: 1997). As a result, with the help of the LGUs and the American research scientists, under the umbrella authority of the US government, the infrastructure of SAUs was created in the country. This in turn provided extensive information, training, education and extension services to Indian scientists and farmers. It was in the period immediately after the World War II that President Truman initiated the active food politics as a developmental strategy and an instrument to foster US foreign policy objectives in maintaining its power in international relations (Perkins: 1997). In the words of historian Nick Cullather, “*the construction of post-war order began with food*” (Cullather: 2010). Thus, the course of US food aid to India, mainly through exports of food grain (since US agriculture generated bumper yields in the 1950s), began with the implementation of PL 480 by the Eisenhower administration (Ahlberg: 2007). Subsequently, President John F. Kennedy renamed PL-480 as “*Food for Peace*” in 1961. The take-off stage arrived when Green Revolution was formally ushered in from the summer of 1967 onwards, where there was a surplus production of food grains, so much so that India became self-sufficient in food.

In theory, the Green Revolution encompassed the speedy makeover of agriculture through widespread adoption of agricultural technologies and practices in the 1960s that went beyond the newly independent and economically backward countries in Latin America and Asia (Pingali: 2012). It accompanied a "broad transformation" in agriculture because of "specific plant improvements" (Griffin: 1974). The next two stages are marked by the years after the Green Revolution and continue until this day. This has given rise to the argument that the food aid and agricultural knowledge partnership between India and the US led to the evolution of modern agriculture in India. Scholars have highlighted the need to carry forward the green revolution initiatives under climate change and food security challenges (Baranski: 2015).

It is noteworthy that as early as 1973, a Senate hearing on the *US Foreign Agricultural Trade Policy* was focused on the realisation of the country’s assurances to deliver international food aid and provide agricultural developmental assistance to countries like India. Thus, even though the political environment remained unfriendly as India’s leadership of Non-Aligned

Movement as well as its deep friendship with the then Soviet Union in the subsequent years was perceived negatively by the US, yet the US remained faithful in commitments. It was carried forward, during the visits of the three Indian Prime Ministers Morarji Desai, Indira Gandhi and Rajiv Gandhi to the US in 1978, 1982 and 1985. Agricultural issues were part of the discussions with the then Presidents Carter and Reagan. The US responded positively and the leaders called for enhanced collaboration in areas of fuel wood research, nitrogen fixation and efficient uses of fertilizers in irrigated lands and introduction of latest US weather modeling techniques for agricultural benefits to India. It raises the question of how despite political differences the US-India collaboration in agricultural research continued to progress.

The 1990s, while witnessing a severe economic crisis for India, also saw the end of the Cold War and the demise of the Soviet Union. The arrival of Bill Clinton in the White House coincided with the initial years of India's New Economic Policy. There was a change in the domestic and economic and foreign policy environment and the trade and investment relations between US and India began to improve. Meanwhile, the 1996 Farm Bill in the US took serious note of the need to help its farmers with greater exports. How the share of US agricultural exports in this improved trade climate grew thus forms a focus of the study.

The growth in the share of US agricultural trade with India was particularly significant as the US agricultural trade patterns, in general, showed both expansion and contraction. During 1991-2000, the value of agricultural exports exceeded the value of imports generating a trade surplus. Experts point out that while exports are critical to the US agricultural products, facilitating export opportunities would be a strong motivation to the American policy makers. Several reports by the Congress from 1990-2013, indicate the importance of agricultural exports to US economy and it remains a major motivation in pursuing an agreement for lower tariffs on agricultural products multilaterally, as well as ensuring that Sanitary and Phyto-Sanitary measures (SPS) are not used inappropriately in bilateral agreements with India.

From the Indian point of view, increasing trade interactions between US and India altered not only the trade climate but the overall bilateral relations as well. As US technological assistance to India was the negative part of the bitter legacy of 'Super 301' enlistment, the improvement in the atmosphere meant that technology denial regimes in the sphere of space and nuclear security were slowly being re-visited. Secondly, from the point of this study, the fact was that India and the US had specifically clashed in the multi-lateral fora of the last

Uruguay Round of the General Agreement on Tariffs and Trade (GATT), over agricultural subsidies. US Congressional debates had reacted by calling for greater opening of the Indian economy. It was at this juncture that the visit of President Bill Clinton in 2000 laid the foundation for a qualitatively new relationship between the two. Unveiling a '*Joint Vision for the 21st Century*', both countries pledged to expand trade relations while simultaneously supporting an open, equitable and transparent rule-based multi-lateral trading system. Not limited only to the nuclear or defence or high technology issues, the two countries recognised the importance of biotechnology and the contribution that this field of knowledge could make towards ensuring a safe and nutritious supply of food, and present farmers with viable options to address the challenges posed by pests and insects. It was also acknowledged by the two sides that biotechnology would contribute to environmental protection and subsequently enhance global food security (Clinton: 2000a).

In the subsequent years under President George W. Bush, other developments apart from 9/11 initially overshadowed the discussions on agriculture. While the dialogue on Next Steps in Strategic Partnership (NSSP) was focused on strategic convergences by 2005, attention was once again concentrated on the agricultural cooperation as a strategic priority evidenced by the signing of USIKIA. The stated objectives were to intensify cooperation in the areas of food security; food processing; agri-business; farm-to-market linkages; biotechnology; sustainable agriculture; technology transfer; research and development; capacity development; agricultural extension and; weather and crop forecasting.

The Obama administration continued this focus but with a significant change. The Strategic Dialogue process initiated in 2009 put agriculture and food security as one of the pillars of bilateral relations. Interestingly, economics, trade, and agriculture were linked overtly and as demonstrated by the US-India Cooperation in Economics, Trade and Agriculture 2009, a greater emphasis was placed on cooperation involving the private sector and agri-businesses. Subsequent strategic dialogues also emphasised cooperation as a framework for advancing mutual interests. The Obama visit to India in 2010 discussed further the issue of technology transfers that would set the stage for an Evergreen Revolution. However, several thorny issues remained. For instance, the issue of agricultural subsidies in the World Trade Organization (WTO) was also part of the same discussion. It is in this context that the proposed study seeks to examine the genesis, evolution, and developments of the US-India agricultural relations.

The study seeks to analyse the level of mutual imperatives that led to the promotion of agricultural partnership and attempt to establish causal factors that promoted progress by examining the nodal agencies on both sides: US Agency for International Development (USAID) and Department of Agricultural Research and Education (DARE)/ Indian Council of Agricultural Research (ICAR).

It is contended that Indian urgency to promote its agricultural productivity faced the US keenness to facilitate and foster trade in agricultural products. However, the ways in which promotion of agricultural cooperation with an economic emphasis overcame political constraints needs elucidation, especially as thorny issues such as transfer of advanced technologies and adverse policy approaches over trade and non-trade barriers, issues of subsidies and protectionism at both bilateral and multi-lateral levels remain. The present study details the causal factors that led to changes in the perceptions of the US Congress on matters concerning aid, assistance, and transfer of technology to India. Among others, the role of India-centric lobbies in the US and their counterparts in India have been studied in order to ascertain how influential were they in bringing about change. The study also focusses on how several mechanisms have been set up by the two countries to overcome difficulties as well as to enhance the scope of cooperation from bilateral to global.

1.2 Review of Literature

1.2.1 History of Agricultural Relations between US and India: US Land-Grant Universities in India

The story of Land-Grant University (LGU) System in India is one of a unique international experience in higher education involving two democracies, namely, India and the United States. As Read showcased in his book *Partners with India: Building Agricultural Universities*, it was a relationship *between their peoples who worked together in this unprecedented undertaking* (Read: 1974). US assistance to India in building their agricultural universities from 1949-1973 constituted an excellent example of the significant return to these kinds of investments given the remarkable advances in India's agricultural system that resulted.

As Lal has documented in his work *Educating Future Agricultural Scientists and Academicians in India*, the concept of having agricultural universities in India was the brainchild of Dr. S. Radhakrishnan- the then head of the University Education Commission in 1949 (Lal: 2014). It was acknowledged in the *Terminal report of the International Agricultural Affairs* that the Commission was instrumental in advocating the need for basic reforms in university education, and recommended the establishment of rural agricultural universities in India, to be patterned after the US LGUs (Terminal report of the International Agricultural Affairs: 1973). It coincided with the *Four Point Program* (Truman: 1949) called for by the then President of the United States Harry S. Truman, during his inaugural address on January 20, 1949. Experts like Read, Cummings Jr., Wortman have demonstrated how Truman's pledge to help and share the wealth of scientific advances of the US with new democracies like India enabled these countries to produce more food and fight poverty (Truman: 1949; Read: 1974; Cummings Jr.: 1976; Wortman and Cummings Jr.: 1978). The National Association of State Universities and Land-Grant Colleges, led by John Hannah committed themselves to assist the President in fulfilling his pledge. Read, Hearne and Niehoff cite in their works that this Association unequivocally offered to help make available the '*store of technical knowledge to benefit the peace-loving peoples*', as one of the *greatest contributions America can make to the improvement of living standards, elimination of hunger, and fostering of peace in certain parts of the world is by encouraging education in food production, food handling, food utilization, and better homemaking and family life among rural and urban people*" (Read: 1974; Hearne: 1965; Niehoff: 1989).

The major events and the outcomes in the history of Land-Grant university system in India are explained below:

The development assistance of the US to India began with a grant worth \$4.5 million, which was approved by the US as a relief gift for India in 1950. The report of the USAID Mission recognised the special significance of this grant to thrust Indian economic development (USAID Mission Report on the United States Contribution to Indian Development: 1964). During the 82nd Congress at its 1st Session in 1951, the *India Emergency Food Aid Act* was passed in the US making long-term loans available for food grain purchases (US Congress, Senate: 1951; Truman: 1951; Desai: 1992). This coincided with India's own First Five Year Plan (1951-56), where the plan periods were set to administer by the newly established

Planning Commission of India. Ray, et al. point that the planning process sought to rectify the post-partition deficiencies in the Indian economy and accorded the highest priority to agriculture (Planning Commission: 1951; Ray, et al.: 1979).

Propp, Shurtleff, and Aoyagi have highlighted that the US signed an agreement with India in 1952 to provide technical assistance in the field of agriculture, and support its Community Development Program through a stronger national and state agricultural extension system (Propp: 1968; Shurtleff and Aoyagi: 2010). Subsequently, a mission was established in New Delhi under the leadership of Clifford Willson, who had extensive experience in the Farm Security Administration.

Frank Parker, a soil scientist by profession at the US Department of Agriculture joined the US mission staff in India as the chief agriculturalist and advisor to the Indian Ministry of Agriculture in 1953. According to Larson and Medlin; Read; and Naik, he had an immense personal contribution to the partnership between India and the US. The Terminal report of the International Agricultural Affairs noted his role in initiating a series of informal discussions with Indian leaders that led to the signing of the *Operational Agreement Number 28*, a project for “*Assistance to Agricultural Research, Education and Extension Organizations*”, between the representatives of the governments of India and the US in 1954 (Naik: 1968; Terminal report of the International Agricultural Affairs: 1973; Larson and Medlin: 1973; Read: 1974). More evidence on this is also available in Naik’s historical analysis of US Universities in India. As a means of achieving the objectives of Operational Agreement Number 28, each of the five universities would work with agricultural colleges and selected agricultural research institutions in one of the designated India regions (Naik: 1968).

Naik in 1968 and Lal in 2013 have traced the foreign assistance programs of the US to India since 1955. All foreign assistance programs under the Foreign Operations Administration (FOA) were consolidated under the responsibility of the International Cooperation Administration, which was reorganised and renamed as the Agency for International Development (AID) in 1961. The US government's role in the India partnership was henceforth assigned to the AID and to its mission in New Delhi that is USAID. On the advice of Frank Parker and I.H.W. Hannah, the first joint Indo-American team chaired by K.R. Damle was established in 1955 (Naik: 1968; Lal: 2013). The reports of the team as well as of the five US LGUs were predictably favourable and strongly supported the evolving

partnership.² The Second Joint Indo-American Team was headed by M.S. Randhawa in 1959. Lal and Read highlighted that this committee emphasised upon the need to design a blueprint for agricultural university development in India, in order to attain the twin needs of increasing agricultural production and improving the farmer's life. As a result, several of US LGUs became involved in establishing SAUs in India. It is illustrated in the table below (Table 1) (Lal: 2014 and Read: 1974).

Table 1: US Land-Grant Universities in India

US-Land Grant University	Region Assigned	State Agricultural University, India	Year of Establishment
University of Illinois	I (which included Uttar Pradesh and Madhya Pradesh)	GB Pant University of Agriculture and Technology, Pant Nagar, Uttar Pradesh (now in Uttarakhand)	1960
The Ohio State University	II (which included present states of Punjab, Rajasthan, Himachal Pradesh and Haryana)	Punjab Agricultural University, Ludhiana (Haryana and Himachal Pradesh), Punjab	1962
University of Missouri	III (which included Orissa, West Bengal, Assam, and Bihar).	Orissa University of Agriculture and Technology, Bhubaneswar, Orissa	1962
Kansas State University	IV (which included Andhra Pradesh, Maharashtra, and Gujarat)	Andhra Pradesh Agricultural University, Hyderabad, Andhra Pradesh	1964
University of Tennessee	V (which included present states of Karnataka, Tamil Nadu, and Kerala)	University of Agricultural Sciences, Bangalore, Karnataka	1964
Pennsylvania State University	-	Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra	1968

Source: Mehta et. al., 2017.

Read talks about the working of the six US LGUs in India for nearly the next two decades (1956-73). The financial assistance (totaling \$ 42 million) from USAID helped India to improve her agricultural and veterinary colleges and established new agricultural universities

² OSU was the first university to translate the positive response in India into an official AID-university contract. In September 1955, less than four months after Dean Rummell and Associate Dean T. Scott Sutton returned from their survey trip. Sutton left for Punjab shortly after the contract was signed to become Ohio State's first team leader in Region II. The international guest house at PAU is named "Sutton House".

in India to improve its systems of agricultural research and education, including the creation of nine new agricultural universities (Read: 1974).

Given India's willingness to advance the prosperity of its agricultural sector amid the widespread sufferings and hunger of the people, and the continued relevance Non-Aligned Movement, the then US Ambassador to India Chester Bowles moved past John F. Dulles' description of non-alignment as 'immoral'. His remarks that the American Foreign Policy could not afford to base itself on 'frustrations and irritation', paved the way for building up of an understanding between the governments and the people of US and India (Bowles: 1971).

Congressional Quarterly Almanacs of various years have emphasised upon the long-term US assistance programs to promote economic and social development in India. The details of the *Foreign Assistance Act of 1961* (PL 87-195) and of *Foreign Assistance Act of 1966* (PL 89-583) reveal that priority assistance was accorded to large scale infrastructure and irrigation projects in India (Congressional Quarterly Almanac: 1961; Congressional Quarterly Almanac: 1977).

Wortman has traced the diversity of agricultural research programs that were gradually developing and complementing the Foreign Assistance Acts of the US through the Third Five Year Plan (FYP) (1961-66) period in India (Wortman: 1976). Ray et.al explain how the Third Five Year Plan of the Planning Commission supported the agricultural university development with a budget sanction of \$3 million. India, through its ICAR and its SAUs, was gradually developing diverse agricultural research programs. It projected self-sufficiency in food grains and increased agricultural production to meet industrial and export requirements (Ray, et al.: 1979).

With the overall objective to assist India to increase its productivity of the basic food crops and to strengthen its institutions for sustained progress, Wortman and Renne noted that the six US universities joined to form the Council of United States Universities for Rural Development in India (CUSURDI) to coordinate their technical assistance efforts in their partnership with Indian universities (Wortman: 1976; Renne: 1974). Read underscored that while these universities helped strengthen the institutions in India, they simultaneously contributed to the establishment of critical diplomatic, economic, and political ties with the US (Read: 1974).

As the partnership with the US LGUs began to take shape, the drought of 1965-66 in India proved to be a stumbling block in simultaneously carrying out agricultural research and facilitating production. Thus, as noted by the then Minister of Agriculture, C. Subramaniam, the agricultural sector acted as a limiting force to overall economic growth (Subramaniam: 1965). Hence, a new strategy for accelerating food grains production was needed to sustain economic progress. The New Strategy of Agricultural Development was incorporated in the Fourth Five-Year Plan (Planning Commission, Fourth Five Year Plan: 1969). This, according to Ray, et al. resulted in a policy of combining high-yielding varieties of seeds with a package of complementary inputs was incorporated to ensure quick production gains and widespread adoption of these techniques by farmers (Ray, et al.:1979). *Congressional Quarterly Almanac* evidenced that it was complemented by the Food for Peace Act of 1966 which authorised the USDA to enter into contracts with US universities to conduct research on agricultural development in the developing countries like India. Thus, agricultural research was prioritised and cooperative arrangements between US universities and research institutions were encouraged (Congressional Quarterly Almanac: 1966). Wortman and Cummings Jr. demonstrated that the foreign currency generated by US food assistance to India from the Food for Peace Program helped pay the costs of American agencies and the research institutions in the country (Wortman and Cummings Jr.: 1978). However, they also acknowledged that controversies such as US' geo-political interests in the South Asian region and utilisation of American food surpluses by disposing it to starving countries like India generated a phase of scepticism in US-India economic relations (Wortman and Cummings Jr.: 1978).

In the year 1966 itself, the Johnson presidency initiated the assessment of world food situation through the President's Science Advisory Committee (PSAC), under the leadership of medical and agricultural scientists Ivan L. Bennett Jr. and H.F. Robinson, respectively. The lengthy report released in 1967 was of special relevance to India as the country was in its second consecutive year of drought. The report concluded that food supply was directly related to agricultural development and in turn, 'agricultural development and economic development were critically interdependent in the hungry countries' (PSAC: 1967).

As time elapsed, the Indo-American efforts to improve India's agricultural productivity deepened. At the same time, as Read documented, differences also that emerged between the

two sides. The disagreements were mainly on account of miscommunication, lack of understanding of the problems faced by university staff members of the two sides and frequent lack of proper planning (Read: 1974). However, there was an explicit understanding between the two sides that it was the very nature of differences that generated the need for the partnership in the first place. Borthakur and Singh and Read highlighted that the five LGUs brought unparalleled resources of science, technology, thought leadership, and innovation to India (Borthakur and Singh: 2013; Read: 1974). This contributed significantly toward meeting their association's promise to President Truman-the promise that education in the various fields of agriculture could be one of America's greatest contributions to 'the improvement of living standards, the elimination of hunger, and fostering peace in certain parts of the world', and found appreciation in the National Agricultural Education Project (NAEP), of the Indian Council of Agricultural Research (Read: 1974; Indian Council of Agricultural Research: 2012a).

Wortman and Cummings Jr. have described how the era of agricultural development in the country began after India witnessed a revolution in food grain production by 1969-70 (Wortman and Cummings Jr.: 1978). Agricultural economists like Naik and Sankaram; Gordon; Wortman and Cummings Jr.; Morgan, et al.; Chandler; Rasmussen; Pinstруп-Anderen and Schiøler; Pingali; and Johl highlighted the important role played by the Ford and Rockefeller foundations, CIMMYT (*Centro Internacional de Mejoramiento de Maíz y Trigo* or International Maize and Wheat Improvement Center) and International Rice Research Institute (IRRI). They worked in consort with the US LGUs and Indian SAUs in fostering agricultural education, research, and extension in India by building new agricultural universities and improve new systems of research and extension and developing new and high-yielding varieties of wheat and rice that were disease resistant, thereby alleviating drought-induced starvation in India and in modernising Indian agriculture (Naik and Sankaram: 1972; Gordon: 1997; Wortman and Cummings Jr.: 1978; Morgan, et al.: 1979; Chandler: 1992; Rasmussen: 1985; Pinstруп-Anderen and Schiøler: 2000; Pingali: 2012; Johl: 2007).

As the personal papers of Ralph W. Cummings, Sr. (an agronomist by training and the then Director General of IRRI in the Philippines) show, the declining trend in the US-India relations after the Indo-Pak war of 1971 led brought the operations of the US LGUs in India to a standstill. Despite the political differences, Cummings, Sr. was urged to resign from IRRI

in order to assume the office of the founder Director General of International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). Wortman and Cummings Jr. and Chandler demonstrated that the demand for Cummings, Sr.'s resignation from IRRI was at the urgent behest of the government of Indira Gandhi as well as by the trustees of the newly formed organisation (Ralph W. Cummings Papers, Box 9: 1974; Chandler: 1992; IRRI-Our History; Wortman and Cummings Jr.: 1978).

The history of the creation of ICRISAT evidences the trust that Cummings wielded, with Indira Gandhi's confidence on him to successfully implement the objectives of ICRISAT in its war against hunger (International Crops Research Institute for the Semi-Arid Tropics (ICRISAT): 2007). Wortman and Cummings Jr.; and Dantwala appreciated his leadership capabilities, where the breeders, researchers, and scientists worked in concert with each other at ICRISAT. As a result, they attempted and produced widely adapted varieties as well as stocks with superior characteristics, drought-tolerant crops like chickpea, pigeon pea, groundnut, pearl millet, and sorghum, with disease and insect resistance being the major objectives of the breeding program (Wortman and Cummings Jr.: 1978; Dantwala: 1979). Since its establishment, as highlighted by DeWitt, ICRISAT has been involved in enabling inclusive market-oriented development mechanisms for farmers of Asia and sub-Saharan Africa, in their fight against poverty and food insecurity in the midst of the threat of climate change (DeWitt: 2013).

To understand the motivations behind the US venture in Indian agriculture, Hadley Read posed a few questions as to why did the US and India sign agreements for technical assistance; why did India want the participation of US LGUs in its program to improve higher education; why did the American public participate in the experiment; why did they consider the experience as the vital pillar of their professional careers (Read: 1974).

A rationalisation from the liberal paradigm, taking from the Ricardian theory of comparative advantage, shows that a country that is a specialist in producing certain goods tends to export those to other countries of which it has a minimum cost disadvantage. This leads to the broad understanding of what Griffin explains as the theory of adaptation of the Green Revolution techniques and practices, which raised policy considerations for the then policy makers in India, where the adaptation of science and technology would benefit the peasants of the country (Griffin: 1974).

The above questions can also be answered these from the prevailing American perspective present by Read. All the Universities and nearly all personnel who participated in the partnership gained greater satisfaction from participating in an experiment in international cooperation, in living and working in a different cultural environment, and in the understanding of their professional contributions that helped solve challenging problems. Read believed that these personal convictions contributed to reinforcing the faith in democratic ideals, reinforced the importance of higher education in achieving a democracy's promises, and an awareness that emphasised a '*universal similarity in the aspirations of mankind*' regardless of all socio-economic and political differences (Read: 1974).

According to Robert Keohane, this cooperation was a resultant of political compulsions generated by the Cold War, which required the US to engage in negotiations with India, through mutual adjustment of behaviour (Keohane: 1984). While '*common interests*' did exist, yet as Herbert pointed out, the potential for '*discord*' made cooperation a potential goal for states to pursue (Herbert: 1996). Morgan, et al. have remarked that the US had a commitment to advance international agricultural education, even though on a low-key emphasis, but with a focus on highly visible exchanges to promote good international relations for the US (Morgan, et al.: 1979). India recognised that through collaboration in higher education in agriculture with an experienced partner, it would harvest the gains of self-sufficiency in feeding its own population and lifting them out of abject misery and poverty.

The framework of modern agricultural research was seen by Cold War historians like Cullather and Westad as an international development theory (Cullather: 2010), which became an important trajectory for geopolitical intervention (Westad: 2005), amid which the fate of the farmers of India oscillated. There were foreign policy considerations of the US in helping India during the prevailing Cold War. According to the noted agriculture expert, Suresh Babu, the most important reason for the US and the six of its LGUs to assist India was simply because India asked for help. And US had the talent, resources to provide such help, and hence it wanted to share these. India needed to increase food production as rapidly as possible. To accomplish this objective, it was necessary to increase the supply of educated and professionally qualified manpower to conduct problem-solving research, teach young people, and administer agricultural production and community development programs. It

seemed for India that the US could help it with these needs by improving India's programs of agricultural research and education (Babu: 2015).

In essence, it was believed that the brilliant US-India partnership in agriculture would bring open up tremendous potential through the efforts of the population on both sides considering investing in the armament of peace. The collaborative studies and experiences contributed to better understanding and appreciation of each other's cultures, problems, and aspirations. This, according to McCain, promised to be an exciting harbinger of a new era of international good will and cooperation (McCain: 1970).

1.2.2 Phases of Indo-US Strategic Cooperation in the Agricultural Sector

Phase I: 1948-1971

Economic cooperation has been a part of international political relations especially after the end of the World War II. According to Feldstein, this reflects the fundamental changes in the world economy, which has become more interdependent; international trade has increased relative to production for domestic markets; and international markets have become larger and more active (Feldstein: 1988). Per the neo-liberal paradigm, most of the significant issues of international relations are political and economic. This is especially true in cases of economies having complementarity of interests; the benefits of international economic cooperation are more cognisable (Keohane: 1984; Herbert: 1996). Experts on international political economy like Helen Milner state that economic cooperation among nations, thus has come to occupy a central space in the systemic level of analysis over the last decade and has highlighted the sources of and constraints on cooperative behaviour among states as a function of the working of the international system (Milner: 1992; Tellis: 2006). Given the potential for the realisation of joint gains among states, scholars of international relations have emphasised greater desire to coordinate economic policies by evaluating the fine-prints of the substantive objectives to be achieved (Keohane: 1984), so that the policies are chosen to maximise the economic welfare of their populations (Feldstein: 1988).

A study of the political history of the agricultural partnership between US and India would highlight that successful coordination of policies in this arena helped strengthen political and

national security ties over the longer term. With agriculture being one of the strong pillars of economic cooperation between the US and India, the first phase of agricultural cooperation extended from 1952 to 1972. This period saw an intense commitment from the Indian and the American academia, scientists and the policy makers to improve India's people's access to adequate and nutritious food (Goldman and Smith: 1995; Basu and Scholten: 2013). It was also highlighted by President Obama during his visit to India in 2010 (Obama: 2010). The result of this cooperation in the years of India's independence led to a manifold increase in the productivity of rice and wheat per units of land and water. According to the statistics from the Ministry of Consumer Affairs, Food and Public Distribution, Government of India, the production of rice and wheat in 1950-51 was 20.48 million tonne and 6.46 million tonne, respectively. By 1970-71 it increased to 42.22 million tonne and 23.82 million tonne, respectively.

During the nineteenth meeting of the National Development Council (NDC), 1962, the then Minister of Food and Agriculture S.K. Patil informed the legislators of the Union Parliament and State legislatures that by June 1963 about 1.5 lakh tonnes of rice would be purchased from the USA under PL 480 and up to three lakh tonnes under normal marketing arrangements, and was under discussions with the US government to obtain larger imports (Planning Commission, Summary Record of the Nineteenth Meeting of the National Development Council: 1962)

The then President of India Dr. S. Radhakrishnan explicitly stated in the Parliament session in 1963 that a strong agricultural base was a prerequisite of national security and that the US-assisted Intensive Agriculture District Programme (IADP) had led to increases in per acre yields of rice, wheat, and barley vis-à-vis the previous years (Radhakrishnan: 1963). While the Indian and American scientists led by M.S. Swaminathan and Norman Borlaug were researching on the introduction of new dwarf wheat varieties in the country, consecutive famines and failure of crops since 1965 to 1967 compelled India to seek assistance from the US, to which the latter responded generously, food exports of about 4.7 million tonnes from January, 1967 to October, 1967 (Government of India, Ministry of External Affairs: 1968; Borlaug: 2000a). Historians have shown that the then PM of India Lal Bahadur Shastri and his Minister of Agriculture, C. Subramaniam were keen supporters of agricultural reforms, and advocated the use of High Yielding Varieties (HYVs) seeds, institutional, economic reforms and private investment (Berger: 2004; Guha: 2005; Brass: 2004). It was also evident

during the twenty-first meeting of the NDC, where Subramaniam urged the Union and State legislators to adopt scientific approaches and new techniques of production in agriculture. He stressed upon the need to produce and distribute better seeds to the farmers of the country and encourage them to diversify agriculture (Planning Commission, Summary Record of the Twenty-First Meeting of the National Development Council: 1964; Perkins: 1997). In the same year, Subramaniam restructured the Indian Council of Agricultural Research (ICAR) and put the Indian Agricultural Research under the former (Saha: 2012). Leaders from the Communist Party of India like A.K. Gopalan, Ravi Narayan Reddy, and others raised concerns in the Parliament over the \$ 50 million fertilizer loan that was granted to India by USAID claiming a deliberate attempt to subordinate India's position to the US, Subramaniam specified Indians were intelligent and vocal enough to see the best interests of the country, and that policy decision due to pressure from any quarter would not be taken (Subramaniam: 1965). In the words of historian Francine Frankel, thus began the era of the application of scientific techniques and knowledge of agricultural production (Frankel: 1969).

The then Indian Prime Minister Lal Bahadur Shastri wrote to the then President of the US Lyndon B. Johnson for urgent and immediate shipment of American wheat, but the food crisis in India was further escalated by political crisis that was caused by the death of PM Shastri (US Department of State, Office of the Historian: 1966), which elevated Indira Gandhi to power. She was of a firm conviction that agricultural development and soil fertility were instrumental for the progress of the economy (Patil: 1996). Despite her commitment to ease the sufferings of the people of India, it was criticised by the American media and charity organisations that the legislators were more concerned about their re-election (Praagh: 2003) rather than acting against starvation deaths and droughts (*The Kansas City Times*: 1968). During her visit to the US in March 1966, Johnson promised economic assistance and food aid. He adopted a 'short tether approach' to food assistance as a diplomatic tool and pressured PM Indira Gandhi to transform India's agriculture through a yield-oriented strategy and attain self-sufficiency in grain production (Central Intelligence Agency: 1966; Cohen and Tucker (eds.): 1994; Ahlberg: 2007).

During the discussion on the 'Calling Attention Motion' on serious drought condition in West Bengal in the Upper House of the Parliament on June 12, 1967, the then Minister of Food and Agriculture Babu Jagjivan Ram categorically denied the widespread media reports about starvation deaths, and that the Government was on its toes to feed its people (Ram: 1967). He

appreciated the work of non-Governmental Organisations (NGOs) like the Ramakrishna Mission, CARE and National Christian Council that undertook relief operations in the affected districts. Ram was hailed by the media as having contributed immensely towards the success of the Green Revolution in India and for modernising Indian agriculture (Malhotra: 2005; ANI News: 2015). During the Lok Sabha debate in May 1967, Ram was extremely critical of the Communist leader from Kerala A.K. Gopalan who rejected PL 480 and rice in the midst of severe food crisis in the state and instead had “*some political objectives*”, and called upon the state of Kerala and the Union government to work together to solve the situation. He pleaded in the House that “*food should not be treated as a party question and politics should not be brought into it*”. He extolled the brevity and the intelligence of the farmers of the country in the ways they adopted HYV rice and wheat (Ram: 1967). The fact that the grain shipments from “*friendly countries*” like the US took a while to reach India was due to the Suez crisis continued to create difficulties in the work against the food crisis by the Indian government (Ram: 1967). In a debate in the Lok Sabha, the Minister commended the benefits of Green Revolution and praised the grit of the agricultural scientists for evolving HYV seeds, which increased production manifold and had been primarily responsible for the agricultural breakthrough. He attached great emphasis upon irrigation for the continued success of this development in agriculture (Ram: 1969).

However, media articles as well as studies by historians showed that his attempt to foster better weather conditions in India to assist in the food production in India, annulled the prevailing opinion about tense relations between the US and India that was created by Johnson’s food policy, which led India to seek grains from the US as monsoon rains failed consecutively (Komer: 1966; Frankel: 1978; *The Economist*: 1966). The then US Secretary of State Dean Rusk stated that Johnson took upon himself the humane task of making India self-sufficient in food as well as supporting emergency food assistance to the country (Rusk: 1967), and that his posture reflected the “*extreme example of exercising presidential influence on another government*” (Hammond: 1992). In 1966, India and the US signed a fertilizer loan agreement worth \$50 to help satisfy India's urgent needs for the near future and encourage a further increase in agricultural productivity and avert the intensification of food crisis (Government of India, Ministry of External Affairs: 1966).

One of the narratives of the American help to India in its green revolution was the use of science as a tool of foreign policy in order to advance its national security goals. Subject

experts point out that while on the one hand it was the translation of President Truman's Four Point agenda into action, where humanitarian considerations were instrumental in the food aid to India, but ensuring its national security by building a network of countries that would not fall into the Soviet sphere of influence was inherently fundamental (Perkins: 1997; Doel and Harper: 2004). American historians specialising in the study of Johnson administration also explain that the while promoting cooperation, the US assistance to India to develop its meteorology for weather and crop forecasting in the 1960s to seemingly address its monsoon predictions largely was geared towards gathering sensitive and detailed knowledge about this geopolitically important nation, so that India could act as a safeguard against the Communist bloc (Doel and Harper: 2004). National Aeronautics and Space Administration (NASA) thus began its engagements with Indian Space Research Organisation (ISRO) to launch a satellite into orbit over the Indian Ocean for progress in the latter's meteorological expertise. The US space program, which was initiated after the Soviet Sputnik mission, sought to exhibit the importance of American science and technology as symbols of the vitality and dynamism of the West led Capitalist bloc and to convince the newly independent non-aligned nations to follow the West's lead (Bulkeley: 1991). Thus, the foreign policy goals were advanced by presenting the use science and technology for the benefit of India and tackle the country's basic problems of food, population, health and education (Hare: 1966). Along with this a classified meteorological project titled 'Joint US-India Precipitation Experiment' or *Project GROMET* was undertaken by the Johnson administration, a brainchild of the then Secretary of Defense R. McNamara and closely coordinated by the then Ambassador to India Chester Bowles. This weather modification project was stated as a technological fix to mitigate the drought in the Indian states of Uttar Pradesh and Bihar and the famine of 1966-67, with the overall objective of achieving US foreign policy goals in the strategically significant region (Harper and Doel: 2010). American diplomat and the then ambassador to India Chester Bowles said that under the cover of an agro-meteorological survey, the US Department of Defense sought to use classified military techniques for creating artificial clouds in India to prove that India's food and agriculture need not be dependent upon vagaries of monsoons (Bowles: 1967). However, the absence of cloud cover and some artificial rain by the Project Gromet in early 1967 (US Department of State: 1967) and subsequent successful monsoons in June 1967 coupled with the on-going technological innovations better fertilizers and improved seed varieties generated surplus yields for India, and the artificial rain-making project was quietly abandoned (Harper and Doel: 2010). Singh, in his analysis, affirmed that

during President Nixon's visit to India in 1969, Mrs. Gandhi presented her appreciation of the economic assistance received from the US (Singh: 1969).

Phase II: 1972-84

The next phase of agricultural cooperation between India and the US began after the LGUs were formally and abruptly asked to end their operations from various parts of India in the aftermath of India-Pakistan War in 1971 and the apparent US support to Pakistan. It was discussed in the Rajya Sabha by the then Minister of External Affairs, Sardar Swaran Singh on March 14, 1973, that US arms sales to Pakistan would jeopardise the security of the region, as well as its relations with India (Singh: 1973). Nevertheless, the desire to improve its understanding with the US was expressed at the highest level- the then President of India, V.V. Giri, in his remarks to the Parliament in 1973 stated India's desired to improve understanding and co-operation with the USA (Giri: 1973). It was reciprocated by the then US President Nixon. He was cordial to Indian desires and responded the desire for friendship and cooperation between the two countries (Nixon: 1973). As Frankel has analysed, the Twenty-Point Program of Indira Gandhi launched in 1975 paid emphasis upon an integrated agricultural production and enforce policies for basic social change and redistribution of land by implementing land ceilings and enhance agricultural wages (Frankel: 1986). Following the Economic and Commercial Sub-Commission held in Washington, D.C. in 1975, a joint communiqué was released that discussed ways of broadening the economic and commercial relationship between India and the US over a range of issues like trade, agricultural inputs, taxation, investment, and industry. Considering the importance of agriculture to the two economies the delegates formed a special working group to concentrate on the supply of certain agricultural inputs in short supply in India, including developing long-term Indian capacity for production of fertilizers and pesticides (Government of India, Ministry of External Affairs: 1975).

Having been elected to power on the democratic agenda, Morarji Desai, the next PM of India, visited the US in June 1978. Highly acclaimed for his principles in the US, the then President of the US Jimmy Carter celebrated India's agricultural prosperity, in that the country had surpassed the situation of mandatory food imports and that it had embarked on the process of becoming an exporter of food grains (Carter: 1978a). A few months earlier President Carter had visited India where the two leaders had called upon the need to jointly engage in efforts

to build stability through economic development not just in India but play a leadership role for the same in the continent of Africa (Carter: 1978b). According to scholars, this reciprocal visit by the heads of the governments of India and the US was representative of improved US-India ties that was also showcased through the statistics which demonstrated the US as having become India's largest trading partner (Chatterjee: 2010). Kohli and Basu showed that after Mrs. Gandhi came to power in 1980, she departed from her earlier socialist stance and focused on involving the private sector to improve the economic performance of the country (Kohli and Basu: 2014). During her visit to the US in July 1982, the then American President Ronald Reagan and herself acknowledged the odds that were created in the US-India relations in the previous decade and reaffirmed their commitment to improving the living and working conditions of those directly involved in the agricultural sector of India (Reagan: 1982).

Phase III: 1984 to Present

In the next phase of agricultural development in India after Rajiv Gandhi became the PM of the country, the overall agricultural productivity saw an increase, especially in the crops of oilseeds and pulses. Per the statistics of the Ministry of Consumer Affairs, Food and Public Distribution, the production of pulses rose from 8.41 million tonnes in 1950-51 to 13.36 million tonnes in 1985-86. Authors have noted that during his first visit to the US in June 1985, Gandhi affirmed his intentions to expand the bilateral trade and the two-way scientific and educational exchange cooperation, to facilitate greater expansion of India's agricultural sector (US Congress, House of Representatives, Congressional Hearings: 1985; Hoyos: 1985; Jayapalan: 2001). On his second official visit³ to the US, the then President of the US Ronald Reagan declared the renewal of Ronald Reagan-Indira Gandhi Science and Technology Initiative until 1991, and the jointly decided to work closely to expand initiatives to dismantle trade barriers. They called for jointly exploring the availability of irrigation for India's farms and water conservation technologies to be made available to these areas (Reagan: 1987). The Technology Missions approach⁴ that he introduced sought to link the production, consumption and marketing chain of oilseeds and dairy (Swaminathan: 2009a). Economist Y.K. Alagh credited him for his emphasis on resource-based agricultural growth (Alagh:

³ Available at: Visits By Foreign Leaders of India [Online: Web] URL: <https://history.state.gov/departmenthistory/visits/india>, Accessed on December 24, 2015

⁴ Available at: Technology Mission, [Online: Web] URL: <http://www.sampitroda.com/technology-missions/>, Accessed on December 24, 2015

2013). Authors have noted that as the Government of India had been in the process of liberalising its agricultural sector since the late 1980s (Cherunilam: 2008), it was evident from the then Minister of State in the Ministry of Commerce, A. Sreedharan's response in the Lok Sabha in 1990 that liberalisation of farms trade would have a beneficial impact on the export of agricultural and non-agricultural products (Sreedharan: 1990a). As Sanjaya Baru, the adviser to the then Prime Minister of India Dr. Manmohan Singh, pointed out in *Strategic Consequences of India's Economic performance*, that when India began its engagement with the global economy after 1991, its emphasis on re-building economic relations with the US constituted an important plank of India's economic policy since then (Baru: 2006). As a result, trade and commerce comprise a crucial component of the rapidly expanding multi-dimensional relations between India and US.

Kennedy and Bailey and Chaturvedi highlight that it was the Clinton Doctrine of 1993 that began to emphasise India as one of the market democracies with which the US must enlarge its reach (Kennedy and Bailey: 2009; Chaturvedi: 2009). As Mark Lagon of the Council on Foreign Relations argued, US interests in democracy's 'enlargement', a central concept in both national security strategy blueprints of the Clinton presidency, basically involved the belief that democracy enhances economic development with growth. The debate on the role that the US should play and what policy tools are appropriate clearly weighed in on improving economic relations especially through trade and investment with 'emerging markets' such as India (Lagon: 2011).

This broad thinking impacted US bilateral approaches. In particular, Heitzman and Worden show how bilateral dealings on trade, commerce, agriculture, investment and business partnership initiative expanded during the Clinton years (Heitzman and Worden (eds.): 1995). As trends of agrarian prosperity continued until the beginning of the 21st century, agricultural sector began to experience a fatigue with immense implications upon the environment, agriculturists like M.S. Swaminathan, Prabhu Pingali and others began exploring the scope of an Evergreen Revolution in the country that would be based on the basic tenets of sustainable development (Swaminathan: 2015; Pingali: 2015). Review of relevant Congressional Hearings shows that it prioritised expansion and strengthening of bilateral economic ties and ending sanctions imposed on India because of its nuclear tests (US Congress, House of Representatives, House Committee on Agriculture: 1998; Gilman: 2000; Feigenbaum: 2008). Literature of these years explain how with a favourable view of India, Presidents George W.

Bush and Barack Obama embarked on a greater engagement with India producing ‘tangible progress’ towards the two nations’ strategic partnership (Pallone: 2006; Tellis: 2012) on more equitable terms not based on a donor-receiver relationship of the past, but as partners for mutual benefit and also for the well-being of the global economy (Gupta: 2005; Blank: 2005; Tuteja: 2008; Philips: 2009; Burns: 2010). From the signing of the US-India Knowledge Initiative on Agriculture in 2005 (Government of India, Ministry of External Affairs: 2006) to including agriculture as one of the strategic pillars of the US-India bilateral economic cooperation in 2010 (US Department of State: 2010) is demonstrative of the dynamic momentum propelled by the foresight of the policymakers in pursuance of the global strategic partnership.

The hearings held by the House Committee on International Relations on ‘*The US and Indian Emerging Entente?*’ in 2005, unanimously accepted the expansion of bilateral economic ties which would boost trade and investment and bring more jobs for the Americans (US Congress, House of Representatives: 2005). According to the former Deputy Assistant Secretary of State for South and Central Asian Affairs, Evan Feigenbaum, the moment of transformation in the conceptual architecture of the India-US economic relations came in the form of bilateral investments and trade that constitute important elements in India-US bilateral relations particularly because of India’s emergence as a global economic player (Feigenbaum: 2008). Official statistics currently show how bilateral trade has seen an impressive 1023 per cent growth by 2012. Documenting the importance placed by the two countries on cooperation, official texts allude to it as a defining partnership of the 21st century (Kellerhals Jr.: 2010). Media reports have demonstrated that Indian capitalism is becoming increasingly visible by the increasing number of entrepreneurs doing their businesses in the US (*The Economist*: 2010) coupled with Indo-US business-to-business relations that have acted as the engine of growth for the overall relations (Rao: 2012). Recent Congressional approval to the US government to negotiate a Bilateral Investment Treaty (BIT) and even a free trade agreement with India (US Congress, House of Representatives, Resolution: 2008; Johnson: 2013) illustrates the wide scope of US-India economic relations, especially in the agricultural sector.

1.2.3 Agricultural Sector of the United States of America

According to the latest estimates of the World Bank, agriculture in the US accounts for 1.1 per cent of the nation's Gross Domestic Product (GDP) (World Bank: 2012) and the data from the Economic Research Service (ERS) of the US Department of Agriculture (USDA), shows that the percentage of population engaged in agricultural and related activities has declined to around 2 per cent from around 95 per cent during the time of American Revolution in 1776 (US Environmental Protection Agency: 2007; American Farm Bureau Federation: 2013; ERS of the USDA: 2013). In spite of this, American agriculture constitutes one of the few American commercial sectors to contribute a trade surplus for the economy. Data from the Agricultural Cooperative Development International/ Volunteers in Overseas Cooperative Assistance (ACDI/VOCA) shows that in the year 2010, it exported farm goods worth over \$108 billion (ACDI/VOCA: 2013). Thus, it is evident that the US agriculture is a major economic engine that runs the country and populations worldwide. Further, the US has always pursued policies that promoted phenomenal growth in the productive capacity of agriculture. Benson and Merchant studied that export markets, especially in the fast-growing economies of the developing world, were important to US agriculture, as they could absorb a substantial portion of the total production of many important commodities (Benson and Merchant: 1994). Studies by Ray et al. show that until the 1996 Farm Bill (Federal Agriculture Improvement and Reform Act) was enacted, the broad emphasis of the policies governing US agriculture was centred around the programs on production management, price support and price stabilisation (Ray et al.: 2003). Resources from the US Department of State and works of Nelson and Schertz; Womach; and Hansen-Kuhn reveal that the 1996 Farm Bill dismantled all vestiges of government price supports and annual supply controls with the effect of sustaining the persistence of low prices (Nelson and Schertz: 1996; Womach: 2005; US Department of State: 2008; Hansen-Kuhn: 2011). On similar lines, the 2002 Farm Bill (Farm Security and Rural Investment Act), signed by the then President George W. Bush intended to provide a safety net for farmers to facilitate them with long-term planning, by ensuring a more stable and predictable funding mechanisms (Bush: 2002), as far as market and weather conditions permitted (Ray et al.: 2003).

The role of agricultural lobbies in influencing the eventual policy outcome in the US has also been analysed. Scholars from the Centre for Responsive Politics, Washington, D.C. have traced the involvement of the big agribusinesses like Weaver Popcorns, Tyson Foods,

American Crystal Sugar, Monsanto and others in lobbying for favourable policies at the Capitol Hill (Vendituoli: 2013). Chen's research shows that the fact that large amounts of contributions made by these big agribusinesses for candidates running for office brings the commitment of the policymakers to assist them as well as the American farmers (Chen: 2014). An example of this is the establishment of the *Congressional Caucus on Modern Agriculture* as a result of Monsanto's lobbying efforts. According to the Committee on House Administration, US House of Representatives, this Caucus currently has two Republicans as the chair, namely Adrian Smith (R-Nebraska) and Joe Courtney (R-Connecticut) (US Congress, House of Representatives, Committee on House Administration: 2012). Thus, as was demonstrated by Frazier; and Bellemare and Carnes, this further establish the understanding that each member of the US Congress represents strong ties to agriculture in their constituencies (Frazier: 1990; Bellemare and Carnes: 2015).

An illuminating research *Evaluation of Agricultural Policy Reforms in the United States* by the Organisation for Economic Cooperation and Development (OECD) in 2008, showed that the Food, Conservation, and Energy Act, 2008, established the traditional objectives of stabilising agricultural production and supporting farm income besides focussing on sufficient nutrition, ensuring food safety, fostering environmental protection, expediting rural development and generating new forms of clean energy from corn and soybeans (OECD: 2011). The promising potential of American agricultural sector was set to bring about a 'transformational change' when the then Secretary of State Hillary Clinton and Secretary of Agriculture Tom Vilsack outlined the US zeal to improve food security worldwide through the 'Food Security Initiative' (US Department of State: 2009).

The vibrancy of US agricultural products has also been visible through its exports all over the world. According to media reports, the sector recorded \$115.3 billion worth of exports in 2008 (Neuman: 2010). According to federal estimates of farm trade and income, during 2009 when the overall economy of the country was facing challenges, it was the agricultural sector that continued to remain strong, which was augmented in part by a surge in exports. The total value of US' agricultural exports, according to the data of the US Department of Agriculture (USDA), was 98.5 billion dollars in 2009, which increased to 150.5 billion dollars. Several Congressional reports also pointed to the goal of export promotion that needed the expansion of market access as the solution for filling the gap between exports and imports (Hanrahan, et al.: 2011). The US Secretary of Agriculture Tom Vilsack underscored the massive

contribution of American agricultural exports to the US economy and cited the country's quest for new markets abroad by the removal of unfair, unscientific barriers as being fundamental to the success of its efforts to strengthen agricultural production (Vilsack: 2016).

1.2.4 Agricultural Sector of India

According to the *Economic Survey* released by the Ministry of Finance, Government of India in 2012, agriculture and allied activities contributed 13.9 per cent to the country's Gross Domestic Product (GDP), with an annual growth rate of 3.6 per cent, and provided employment to around 53 per cent of the workforce (Government of India, Ministry of Finance: 2012).

Agriculture has been central to the economic life of the people of India and has shaped the outlook and culture of the generations. As a result, it continues to be a crucial aspect of the nation's strategies for the planned socio-economic development of the country. A study by Blynn (1966) revealed that between 1891 and 1947, aggregate grain output in British India increased at an average rate of 0.11 per cent per year, which during the latter half of the year was a negligible 0.03 per cent (Blynn: 1966). This was the situation from where agriculture in independent India began. While the partition of the country distorted India's agriculture, it was further worsened by the series of droughts and famines, forcing India to depend on external food assistance to feed its population.

As evident from the literature on the subject, attainment of self-sufficiency in food grains points to the 'Big Push'⁵ for Green Revolution that helped India tide over its food crisis (Johnson: 1967; Sen: 1974; Hansara and Shukla: 1991; Ganguly and Gould (eds.): 1992). A study by Dantwala (1979) shows that between 1951 to 1971 food grains production increased from 55 million tonnes to 108.4 million tonnes. The growth rate of agriculture of 2.7 per cent was not smooth during 1966, 1967 and 1973, because of acute food shortage in the country, and food supplies were met through food aid program of the US. From 1973 to 1975, the food grains production increased from 97 million tonnes to 104 million tonnes, and staged a remarkable recovery until the late 1970s at over 120 million tonnes (Dantwala: 1979). Scientists of Green Revolution Wortman and Cummings Jr. have noted that the phenomenon

⁵ A policy put forth by the then Johnson administration for economic assistance to India drawing on the large stockpiles of wheat in the United States (Bowles: 1971).

was characterised by the creation and by genetic manipulation of more efficient crop varieties and animal strains; the development and use of chemical fertilizers and of science-based means to control diseases and insect pests; the development of agribusinesses; the expansion of road networks, power grids, and use of farm machinery; the development of means of mass communication of information and the hard work of farm entrepreneurs in agriculture (Wortman and Cummings Jr.: 1978).

Further, authors point out that, Indian agriculture entered into the realm of globalisation, when India joined the WTO and signed the Agreement on Agriculture (AoA) in 1995 and introduced a slew of trade, tariff, and administrative measures in order to bring about significant increase in trade in agriculture and agricultural exports (Tuteja: 2008). However, studies show that this trade liberalisation posed serious challenges to Indian agriculture. Some of these included increasing reliance upon government support mechanisms (Bhalla: 1994; Bhalla: 2004; Grossman and Carlson: 2011), and protectionism and import competition from the developed countries. As a result, as studies by Bathla and Nehru prove, there was a gradual reduction in the sector's production and productivity, on the other (Bathla: 2011; Nehru: 2012).

Despite the successes of Green Revolution, statistics and literature show that the agricultural sector has been experiencing a jolt continually over the past decade with a declining share of agriculture in India's GDP every year (Jenkins: 1999; Government of India: 2007), for instance, it was 19 per cent in 2004-05, which declined to 13.9 per cent in 2013-14 (Government of India, Ministry of Agriculture: 2015). Economists and agricultural experts like S. Mahendra Dev; Ahluwalia; Reddy; and Mittal, et al. have called for addressing serious challenges like infrastructural constraints, inefficiencies in supply chain and significant problems in the diffusion of and access to information, in order to achieve faster productivity growth (Dev: 2004; Ahluwalia: 2000; Reddy: 2007; Mittal et al.: 2010). India's increasing reliance upon technology to improve agriculture and agricultural productivity depended on agricultural policies that encouraged farmers to adopt improved technologies in dairy, fisheries and livestock sectors, and meeting the diversified food needs of India's growing population. Studies conducted by the International Food Policy Research Institute (IFPRI) reveal that there was a gradual policy re-orientation of this sector. Studies by Mullen, et al.; Birner and Anderson; Birner, et al.; and Fan, et al. show that there was a shift to an "*evolution of a production pattern in line with the demand pattern*" leading to an emphasis on other

agricultural commodities like oilseed, fruit and vegetables (Mullen et al: 2005; Birner and Anderson: 2007; Birner, et al.: 2011; Fan, et al.: 2000).

A study conducted by Karnik and Lalvani India's agricultural sector show that has also witnessed an enhanced role of the interest groups and farm lobbies in the determination of the extent of government intervention (Karnik and Lalvani: 1996). They found that the agribusinesses have indulged in getting favourable policies with respect to supply of subsidies and agricultural public goods by the governments at both Union and State levels. Vinayak, et al. and Mathew highlighted how the associations of seed companies and farmers' groupings like the Consortium of Indian Farmers' Association and Federation of Seed Industry of India (FSII) have proactively supported Foreign Direct Investment (FDI) in organised retail as it would bring investments in the farm sector (Vinayak, et al.: 2011; Mathew: 2016). Despite the expanding role of the farmer and seed organisations, lobbying in India is not legal. Therefore, as the study by C.S.C. Sekhar points out, the Union and the State governments have continued to perform a pivotal function in shaping the policy for the sector (Sekhar: 2005).

Over the years, Government of India has taken initiatives to counter the challenges in the agricultural sector. For instance, the National Agricultural Policy (NAP) of India of 2000, which intended to exploit the underutilised growth potential of Indian agriculture, by strengthening rural infrastructure for rapid agricultural development, promoting the growth of agribusinesses, creating employment opportunities in rural areas and thereby securing a decent standard of living for the farmers and agricultural workers (Government of India, Ministry of Agriculture: 2000). Further, as reports by the Ministry of Agriculture, Government of India as well as a study by M.S. Swaminathan show that in order to ensure to ensure a holistic development of agriculture and enhance its production and productivity to meet the food requirements of the country the National Agriculture Development Program and the National Food Security Mission/Act (NFSM/A) were launched in 2007, which had far-reaching implications for agricultural development and food security especially for the rural poor (Government of India, Ministry of Agriculture: 2007; Swaminathan (ed.): 2007).

An IFPRI study titled *2011 Global Food Policy Report* merited the National Food Security Act as being the world's largest anti-hunger program (Fan: 2011) that aims to provide rice, wheat, and coarse grains at low prices to more than half of India's 1.2 billion people.

Sustainable agricultural development and induction of technology revolution in the agricultural sector have been recognised as an urgent pre-requisite in order to achieve the above-mentioned policy objectives. The Planning Commission of India, in 2012, in the *Agriculture Policy: Vision 2020* recognised the challenges facing Indian agriculture and advocated solutions to foster bright avenues of expansion and growth of this sector (Planning Commission: 2012; Dev: 2012).

1.2.5 US-India Agricultural Cooperation in the 1990s: Collaborating for Global Food Security

Arthur Stein in his book *Why Nations Cooperate- Circumstance and Choice in International Relations* has demonstrated that nations choose to cooperate with each other depending upon the analysis of consequences on national interests and international system (Stein: 1990). The US pursued agricultural cooperation with India in order to expose its own farmers to a huge potential market as well as to ensure India's partnership in its geo-strategic pursuits in the Asia-Pacific region. India, on the other hand, was interested in partnering with the US to get access to the cutting-edge technology, research, and knowhow to develop its own agriculture.

The end of the Cold War facilitated a greater understanding of the strengths and weaknesses of each other's agricultural sector. Noted experts on US-India relations like Talbott, Tellis, and others point out that the end of the Cold War removed a key structural impediment that historically impeded the development of close US-India collaboration (Talbott: 2004; Singh: 2006; Tellis: 2006). Baru has suggested that the maturing of the Indian economy over the years has constituted a factor that is endogenous to the economic and political development of India to which the US had responded (Baru: 2006). Besides this, it has added significant impetus for the two countries to explore areas critical to the survival of humanity; the consequence of which, according to Tellis was the treatment of agriculture as a crucial component of the comprehensive cooperation agenda of Indo-US strategic dialogue (Tellis: 2013). Thus, the rich history of Indo-US cooperation in ushering the Green Revolution in India in the 1960s gradually intensified in areas like food security, food processing, farm-to-market linkages, agriculture extension, and weather and crop-forecasting.

While under the aegis of the Export Enhancement Program of the 1996 Farm Bill of the US gave authority to press its trading partners for major reforms in their domestic agricultural

policies (Schmitz, et al: 1998), the nature and scope of India's compliance to this has remained at variance, yet, as Blackwill and Tellis have pointed out, it has vocally expressed a strategic convergence in the agricultural cooperation especially during Bill Clinton's second term as the US President (Blackwill: 2005; Tellis: 2006). The overall positive political context in US-India relations further contributed to the signing of various agreements and led to the formulation of broad policies in the sphere of agricultural partnership. For instance, on the occasion of the fiftieth Independence Day of the country the then Speaker of the Lower House of the Parliament, P.A. Sangma, while recalling the important role played by the US in achieving food self-sufficiency in the country, warned against the complacency of the phenomenon. He called upon a fresh US collaboration to achieve freedom from hunger (Sangama: 1997). Similar views were expressed by then PM of India Atal Bihari Vajpayee in the Rajya Sabha. He called for action by all countries at the Conference of Parties (COP)-8 of the UN Framework Convention on Climate Change (UNFCCC) towards achieving sustainable agriculture that would tackle the problem of climate change (Vajpayee: 2002) and commended the efforts of the US in the Green Revolution that led to the consequent growth of Indian agriculture, enabling the country to become an exporter of food grains, that also lowered the incidence of poverty among the citizens (Vajpayee: 2003).

The year 2005 can be said to be a watershed year in the agricultural cooperation between the US and India. As noted previously, the USKIA was launched by Prime Minister Manmohan Singh and President George W. Bush in 2005 focused on the promotion of teaching, research, service and commercial linkages (US Department of State: 2005; Burns: 2005; US Department of Agriculture, Foreign Agricultural Service: 2006a). During President Bush's visit to India in March 2006, PM Singh argued that the USKIA would build upon the Green Revolution and would be a tribute to the farmers of both countries (Singh: 2005c), and would become the "*harbinger of a second Green Revolution*" in India (Singh: 2006a). Important bilateral documents like the 2006 Joint Record on Agricultural Accomplishments, the 2010 India-US Agriculture Dialogue released by the two governments, among others demonstrated that agricultural cooperation would establish itself as a major focus of the steadily improving economic relations. As the United Nations (UN) report on sustainable development of agriculture points out that feeding people require creativity and innovation to produce more food for the ever-growing population (Giovannucci, et al.: 2012), primary documents from the White House and USAID establish that the US and India are committed to an integrated system of plant and animal production practices that would satisfy human food and fibre

needs, enhance the environmental quality, sustain the economic viability of farm operations and enhance the quality of life for all the people (The White House, Office of the Press Secretary: 2009a; USAID: 2016).

Fan and Brzeska show that the US and India have expanded their cooperation in agriculture to avenues of knowledge dissemination to expand productivity and nutritional quality of food crops; to strengthen market institutions and promote investments in agribusinesses; and improve food security and access to adequate quantities and quality of food, particularly for women and young children (Fan and Brzeska: 2010). It was also affirmed through the Memorandum of Understanding (MoU) on US-India Agriculture Cooperation and Food Security that the objective of a sustained agricultural growth along with a commercial viability of the India farm sector would be vigorously undertaken (The White House, Office of the Press Secretary: 2009b; Government of India, Ministry of External Affairs: 2010).

Reiterating the criticality of India-US agricultural cooperation, the US-India Strategic Dialogue of June 2010 noted economics, trade, and agriculture as one of the five pillars of strategic cooperation. As a result, three Working Groups were set up, namely, for Strategic Cooperation in Agriculture and Food Security, Food-Processing, Agriculture Extension, Farm-to-Market linkages, and Weather and Crop-forecasting respectively (Government of India, Ministry of External Affairs: 2010; US Department of State: 2010b). Further, as Johnson showed, India through Indo-US collaboration received bipartisan Congressional support as members of the House of Representatives noted India's importance to US agriculture as a potential market as well as an important member of the world trading system (Johnson: 2013). Reports from USAID place US-India collaboration to foster agricultural development and herald global food security as a positive outcome of the research partnership between universities and scientists of both countries (USAID: 2016).

1.2.6 Institutional Framework for Bilateral Agricultural Cooperation

The overall agricultural cooperation between India and the US is stated as taking place at the governmental and business levels. Regular interactions have facilitated and strengthened the trade and economic interactions between the two countries. The US Department of Agricultural, the White House and the Embassy of India, Washington D.C., provide public documentation on how efforts to increase two-way agricultural trade between the two

countries are the ultimate objective. Elaborate institutional framework has been set in place such as the US-India Economic Dialogue, the US-India Commercial Dialogue, the US-India Working Group on Trade, the United States-India Trade Policy Forum (TPF) and its Focus Group on Agriculture, the Private Sector Advisory Group (PSAG), the Framework for Cooperation on Trade and Investment, the US-India CEO Forum and the US-India Business Council (USIBC). Commentators have pointed to the deep commitment of both sides to nurture agricultural cooperation (Babu: 2015). However, as Ramachandran has pointed to the working of the mechanisms needs further probes and is presently less studied (Ramachandran: 2000).

1.2.7 Issues and Challenges in Agricultural Cooperation between the US and India

The theoretical basis of international cooperation presumes the existence of conflicts between sovereign states in their attempts to create harmonious relationship amongst them (Moravcsik: 2010). Siitonen shows that it is implied that all bilateral or multilateral cooperation involves covert power struggles between the parties, and it could be a means of the dominance of one over another (Siitonen: 1990). With this understanding, foreign policy experts have noted that the impact of improved US-India economic and trade relations after decades of strained political relations plunged in the face of the slow and uneven progress of India's economic reforms. India's falling growth rates and rising inflation along with the constraints posed by India's political dynamics on economic reforms warrants a concern, especially of the US Congress (Bajpai and Sachs: 2000; Martin and Kronstadt: 2007; Kronstadt, et al: 2011; Subramanian: 2013). Many commentaries in influential American think tanks like the Centre for New American Security and Council on Foreign Relations argue that Indian politics is too fragmented and India's ability to push for reforms is a serious question (Bhagwati: 2010; Fontaine: 2013). Studies by Chanda; Thies and Porsche; and Swinnen point out at the differences between the US and Indian stance and their allegations against each other at the WTO led to the collapse of the Doha Development Round that has revolved around methods to reduce trade-distorting domestic subsidies, eliminate export subsidies, and increase market access for agricultural products (Chanda: 2006; Thies and Porsche: 2007; Swinnen: 2009) and also protectionism, trade in agricultural goods, non-agricultural market access (or NAMA) (US Department of Agriculture, Foreign Agricultural Service: 2006a; Mohan and Ayers: 2009; Perkovich: 2010).

As shown by Chanda, the US has expressed concern about India's application of SPS (Sanitary and Phyto-Sanitary Measures) regulations on certain of its exports that these were not in not in accord with internationally recognised standards, that negatively affects US agricultural exports (Chanda: 2006). Neefjes and Fowler and Prakash have shown that there has been vibrant resistance to the advent of GM crops in India that it would lead to a destruction of nature and intervene with the natural processes for food production (Neefjes and Fowler: 1999; Prakash: 2001). Purushothaman has documented that the US policy makers have suggested that genetic engineering is the technology of the future, needed to boost production and feed the ever-growing population of the world; as the basic attributes of the GM/GMO/GE crops are: they require fewer fertilizers and pesticides, are drought resistant, high-yielding and would consume less water (Purushothaman: 2011).

1.2.8 India-centric lobbies in the US in fostering US-India agricultural cooperation

With successive presidencies, Congressional records, as well as authors like Rubinoff and Fani, show that there is a bipartisan support in the Capitol Hill for stronger economic ties between the US and India (US Congress, House of Representatives, Congressional Hearings: 1995; Rubinoff: 2008; Fani: 2009). Gilman; Brown; Blake Jr. and others have evidenced how the Congress has also been willing for the resolution of some of the key economic and trade issues relating to agriculture and agricultural goods (Gilman: 2002; Brown: 2005; Blake Jr: 2011; Kronstadt: 2007). Experts have also pointed out the vital role played by the India-centric lobbies like the Congressional Caucus on India and Indian-Americans, US-India Political Action Committee (USINPAC) (Sutter: 2009; Freedman: 2009), Indian American Friendship Council, US-India Business Council and others; in creating a positive change in the Congressional attitudes towards the India (Schaffer: 2008). According to Fani, these have also acted as prime factors in establishing new categories of economic cooperation with India, thus bringing the two countries closer to each other (Fani: 2009). Further, as existing research by DeFazio; Reeves and Bennett; Bergman and others have shown, the Indian-American community has also enhanced the understanding between the two societies and contributed to the strengthening of commercial and cultural ties (Embassy of India, Washington D.C.: 2000; DeFazio: 2004; Reeves and Bennett: 2004; Bergman: 2010; Pew Research Social and Demographic Trends: 2012).

Thus, the literature reviewed clearly demonstrates that US-India partnership is and will continue to be crucial to the global economy in the 21st century, and affirms the views of the Chairman of the House Ways and Means Trade Subcommittee Devin Nunes who pointed that bilateral trade and investment ties along with strong bilateral agricultural cooperation between the two countries would help India amidst its tremendous domestic political challenges as it seeks to grow its economy and lift millions of people out of hunger and poverty (US Congress, House of Representatives: 2013; Johnson: 2013).

1.3 Definition, Rationale, and Scope of the Study

According to theorists of international cooperation, nation-states cooperate with each other over a domain of issues ranging from trade, finance, arms control, and environment and so on. Such cooperation is actualised when their behaviours are adjusted to the actual or anticipated preferences of other nations, through a process of policy coordination. In the post-Cold War years, it was the gradual reduction in the barriers to trade and a revolution in the information and communication technology around the world led to enhanced economic interactions and interdependence among nations.

The economic reforms introduced by India in 1991 served as a factor for the explicit convergence of interests of India and the US and over the years the two have transcended from their historic estrangement to a deep engagement at bilateral and multi-lateral levels causing intense discussion and debate. One aspect of this intense engagement that is becoming increasingly visible is the cooperation in the agricultural sector. The origins and evolution of US-India agricultural cooperation that began in the 1960s were largely in the realm of food assistance. By 1970s the emphasis had shifted to reforming India's agricultural policy and providing technologies that would enable a Green Revolution in India. However, deep-seated suspicion caused by the Cold War, despite the good intentions of US officials such as Ambassador Chester Bowles the US-India commitment to the development of Indian agriculture, the progress was buffeted by political ill-wills.

Recent declassified archival evidence starting from US presidential libraries especially the John F. Kennedy Library and Museum, Boston, Massachusetts and Lyndon B. Johnson Library and Museum, Austin, Texas, provide a degree of information that Congressional reservations were overcome in order to continue to assisting India not only with food grains but also with technology transfers. The 1980s saw a change in the emphasis of US approach to agricultural cooperation with India. The criticality of facilitating agricultural exports provided the backdrop for US-India discussions. With the demise of the Soviet Union, both countries were free from the historic legacy of estrangement and revisited the rules of engagement more positively. However, the Indian nuclear tests of 1998 halted this positive trend for a brief while. The altered geo-political security environment combined with growing economic linkages brought about by globalisation also played a part in re-focussing US-India agricultural cooperation.

From 2000-2010, major initiatives and policy guiding documents unveiled jointly after Presidential visits of Clinton, Bush and Obama to India seem to indicate that agricultural cooperation is back in track entailing the areas of food security; food processing; agri-business; farm-to-market linkages; biotechnology; sustainable agriculture; technology transfer; research and development; capacity development; agricultural extension and; weather and crop forecasting.

The study examined the shift in perceptions reshaping US-India relations and related them to the overall strategy of agricultural cooperation. This study proposes to examine the constraints and imperatives that help explain the sustaining of economic engagement amidst the political divergences between the two countries starting with the first Green Revolution with India, to the joint agricultural research collaborations planned in the 1970s and the 1980s. It seeks to ascertain the causal factors that contributed to a greater focus on the parameters of agricultural import-export regulations and the policy towards international collaboration in agriculture in both countries in order to establish their impact on the agricultural cooperation between US and India. In main, it would attempt to validate the assumption that political alignments and convergences influence strategy of economic cooperation. It would also include a focus on the active involvement of the India-centric lobbies in the US, like the Congressional Caucus on India and Indian-Americans, US-India Political Action Committee, Indian American Friendship Council, US-India Business Council and some the Indian lobbies like the Federation of Indian Chambers of Commerce and Industry (FICCI) and the Confederation of Indian Industry (CII) among others, in order to establish progress in this bilateral dialogue. With the help of trade figures, the study proposes to establish how America's overall strategy of trade promotion correlated positively to US-India economic relations as a whole and agricultural relation in particular. Finally, it would attempt to place and context the salience of agricultural cooperation in the overall strategic cooperation between the US and India.

The study proposes to outline the challenges and the prospects to the model of bilateral cooperation in order to achieve a positive outcome in foreign policy. A strengthened economic synergy between the two countries will be permanent considerations during the research undertaken to understand the fact that by pursuing an economic relationship and close agricultural collaboration, both countries can progressively build up their own

institutional capacity to develop and execute their grander strategy internationally, while simultaneously attending better to their key internal security challenges. The proposed research would be among the pioneering works on the subject as agricultural cooperation between the two has been understudied.

1.4 Research Questions

1. What was the political and economic context of US-India agricultural cooperation during the Green Revolution in India in the late 1960s?
2. How bilateral agricultural cooperation contributed to closer economic ties in the US-Indian relationship?
3. What are the causes of increase in agricultural trade and investment between India and the US depend on the continued focus on the transfer of effective technologies and production methods?
4. What is the role of Indian Council of Agricultural Research and US Agency for International Development in shaping collaboration that enlarged the scope of agricultural cooperation between the US and India?
5. What are the economic impediments in both countries make it difficult for the exports of either country to gain access to the market of the other?
6. To what extent have the US Congress, caucuses and lobbies supported agricultural cooperation with India?

1.5 Hypotheses

1. The US-India agricultural cooperation is the result of imperatives and constraints generated by mutual economic necessities amidst political divergences through explicitly negotiated policy coordination.
2. The US-India agricultural cooperation is significantly affected by the impact of ideas and collaborative research promoted by a cohesive scientific community that produced the Green Revolution along with the domestic agricultural policies of the two and multilateral commitments as in the WTO.
3. The US Congress, interest groups, and agricultural lobbies have significantly shaped the course of economic engagement between the US and India that have transformed the course of US-India agricultural partnership.

1.6 Research Methodology

The proposed study is based on historical, analytical and descriptive methods. In order to ground the study from the lens of the theory of international cooperation, the primary task of identification of the international actors in question, and the determination the yardsticks for cooperation among them has been elucidated, with the objective to study the partnership in agriculture between them, respectively. It deduces inferences from the data that help in establishing a reasonable explanation of the policy process in the US.

Given that a study of actors in international cooperation operates within a set criteria of conditions that affect their cooperation (Siitonen: 1990), the present study demonstrates two sets of structural environments within which the US-India agricultural cooperation developed and unfolded. The first is the end of the World War II, and consequent start of the Cold War, where the US sought to maintain its influence around the world, especially among those having newly won their independence from their colonial masters. Series of famines in India and a near-starvation situation obligated the leaders to seek American expertise in building US-styled LGUs as well as in shipping grains to the country. The second was the end of the Cold War and also the genesis of India's economic reforms. As a result, it began its moved towards a symmetrical economic environment of the US, thereby buttressing the scope for a

much greater agricultural partnership, anchored in the recognition that it requires the ingenuity and innovation to produce more food for the ever-growing population.

A field study for the dissertation has been conducted in the US during the Fulbright-Nehru Doctoral Fellow grant from August 2015 to May 2016. The hypotheses have been tested with the help of primary sources comprising of government publications from both the US and India have been the major source for this topic. US Congressional publications such as Committee Hearings, Debates and Records, Presidential Speeches and Statements, and Annual Reports of the Department of Agricultural Research and Education, Government of India and US Agency for International Development (USAID) have been consulted. Interviews with program officers and experts at Association of Public and Land-Grant Universities (APLU), Food and Agricultural Organization (FAO) of the United Nations (UN), USAID, World Bank, USIBC, ACDI/VOCA and Senators Richard Lugar and Sherrod Brown and Representative Joseph Crowley in Washington D.C., imparted a rich source of US perspectives and experiences for the study. Libraries in India and the US, particularly the Jawaharlal Nehru University library, American Center Library, library of the Lok Sabha Secretariat, New Delhi; Ohio State University library, Columbus, Ohio, Library of Congress, Washington, D.C., the Lyndon B. Johnson Library and Museum, Austin, Texas, the John F. Kennedy Library and Museum in Boston, Massachusetts, during the Fulbright grant provided access to invaluable archival resources and readings on US-India agricultural cooperation.

Data from internationally relevant sources, information from international organisations such as the World Bank (World Bank Statistics), reports and indices published by the Foreign Agricultural Service (FAS) of the US Department of Agriculture, Food and Agricultural Cooperation of the United Nations Stats (FAOSTAT), the World Trade Organization (WTO), India's Ministry of Commerce and Industry and Ministry of Agriculture and Farmers Welfare databases have been used. Relevant books and articles and other secondary sources have been extensively referred to. Secondary sources have been consulted with full caution of comparability and authenticity for the use of this study. Print and digital media have also been extensively used.

CHAPTER 2

Agricultural Sector and Agricultural Policies of US and India

Sections:

2.1 Agricultural Sector of the United States of America

2.1.1 The Political Power of Agribusiness

2.1.2 Farm Bills and their Importance to US Agriculture

2.2 Agricultural Sector of India

2.2.1 Role of Interest Groups and Farm Lobbies in Indian Agriculture

2.2.2 India's Agricultural Policy and Programmes

CHAPTER 2

Agricultural Sector and Agricultural Policies of US and India

Understanding of the agricultural sector of the US and India and their respective policies has been the subject of great interest for scholars and policy makers alike. Both countries share several commonalities, where agriculture has played a key role in both their economies. The agricultural sector has been a major focus of policy makers in both countries as it is regarded as the key to prosperity and growth. Both probably agree with a recent World Bank report which concluded that the increase in agricultural growth and prosperity is also the best way to reduce poverty (World Bank: 2016). India, in particular, whose two-thirds of the population is engaged in agriculture while also having the largest number of malnourished people prioritises policy in this sector. Importantly, evidence points to the share of agriculture and allied sectors to the GDP of the country to 13.7 per cent in 2012-13 at 2004-05 prices.

In the early years after Indian independence both the US and India had limited trade and assistance with each other in agriculture. This changed when India was faced with massive famines and requested urgent food assistance to the US government. This generated a sense of mutual understanding and acceptance of the crises at hand on both sides. A long-term cooperative arrangement was set in place that would cater to the shortcomings in the agricultural sector and help increase productivity by utilising the best practices and experiences of the US LGUs. Thus, agriculture was among the first and foremost areas of US-India bilateral cooperation.

Over the next three decades, the bilateral relations between the US and India remained subject to positive and negative developments. Commentators have attributed the stresses and strains in the bilateral relations to geopolitical, geostrategic and economic reasons of trade and trade practices. In particular, trade between the two countries was very low including trade in agricultural sector till 1990. It began to grow exponentially after India adopted economic reforms in the year 1991. While these beginnings augured well for realising the huge potential that existed for increasing trade in all sectors: defence, high-tech, amongst others, it was agriculture that became a major focus from 1996 onwards.

Since 1996, and through the decade of 2000, American interests in investing in Indian agriculture through a variety of measures including the seeds, fertilizers, amongst others pushed agriculture high on the agenda of US-India cooperation. While India's burgeoning consumer driven middle-class and market prospects motivated the US businesses, India's own growth trajectory and higher rates of GDP growth sustained these interests. For India, having witnessed first-hand lasting benefits of improved seeds and improved farming technologies from the first Green Revolution, the demands of fast growing population indicated the need to find international collaborations.

However, the fact that India's agriculture has been beset with problems of poor irrigation systems, lack of effective extension services, poor road and market infrastructure as well as excessive regulation (Dwivedy: 2011). A World Bank study found that despite India's impressive economic growth and accompanying socio-economic benefits to the country, the impoverishment of the people and food insecurity continued to remain a major concern. In order to meet the dual goals of ending poverty and ensuring food security to a largely agricultural population base of India, it was recommended that India needed to build a productive, competitive, and diversified agricultural sector and facilitate rural, non-farm entrepreneurship and employment. It was noted that by encouraging policies that promote competitive agricultural marketing would ensure that better prices for the farmers (World Bank: 2012).

It is in this context that President Bush and PM Singh announced the US-India Agriculture Knowledge Initiative (USIKIA) and by 2006 had agreed to expand ag cooperation between the two. the momentum was continued by the Obama administration. Today US-India agricultural cooperation has been acknowledged by both countries as a vital pillar in the strategic partnership.

Cooperation between the US and the Indian agricultural sector began in the 1990s. To understand why the two countries went beyond the reasons for strategic cooperation on issues such as Indo-Pak relations, nuclear issues, and the China factor and instead concentrated on agriculture, it is necessary to briefly survey the agricultural policies of both countries. In particular, it is useful to recall the early years of US assistance which not only provided food grains but also a comprehensive commitment to link India's universities and technical institutions for joint research and development and assess the impact of these programs.

This chapter provides an overview of the agricultural sector of US and India and discusses the policies that have been made in the two countries that govern domestic and international agricultural trade. In essence, it attempts to enable an understanding of the reasons and motivations of their interest in bilateral cooperation. It focuses on how the policies were framed and bilateral cooperation ensued from 1996 to 2012 and beyond.

2.1 Agricultural Sector of the United States of America

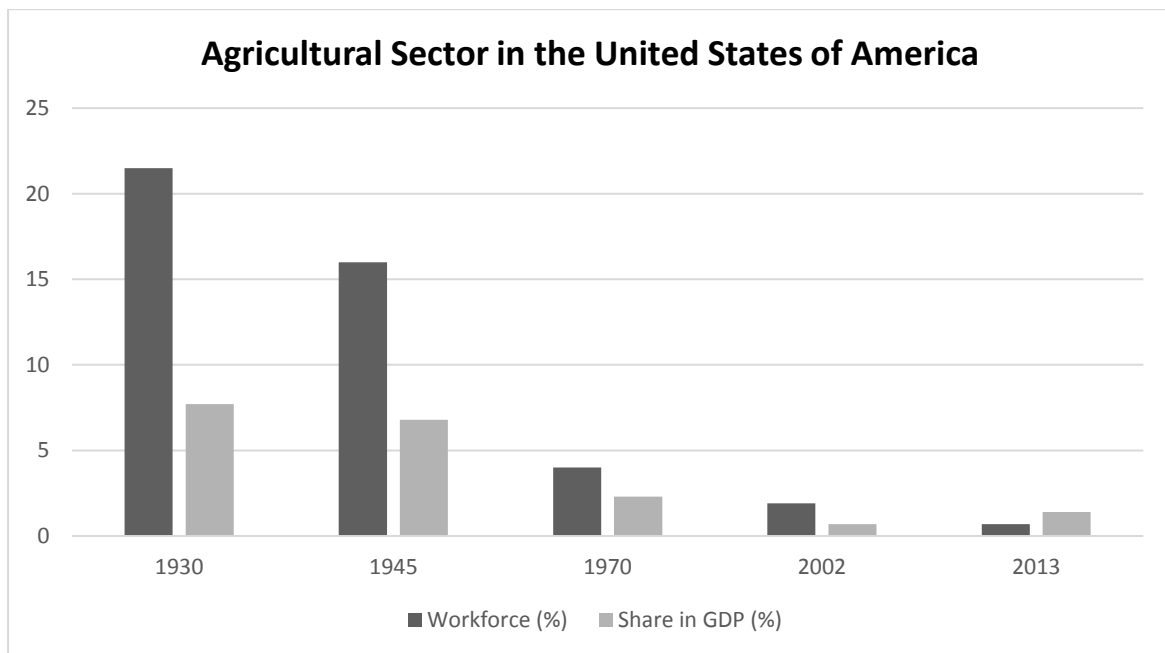
Agriculture is an indispensable part of America's security, economy, and way of life (Orr: 2002). There has been a tremendous transformation of American agriculture since 1776 when it became independent. It is evident from the fact that it has changed from being a labour-intensive sector to a capital and technology-intensive one. Until the early twentieth century, agriculture was practiced primarily on huge numbers of small but diversified farms in rural parts of the country, where the majority of the population lived. Gradual adoption of mechanisation and cutting-edge technology use in agriculture led to a steady decline in the number of people involved in this primary activity. In the year 1900, it employed 41 per cent of the total workforce (Dmitri, et al.: 2005). By 1930, 21.5 per cent of the workforce was employed in agriculture and contributed 7.7 per cent to the GDP of the nation. In the year 1945, 16 per cent workforce contributed 6.8 per cent to the GDP, while 4 per cent labour force were engaged in agriculture with a 2.3 per cent to the GDP. In 2002, 1.9 per cent of the employed labour force worked in agriculture while the share of agricultural GDP as a share of total GDP was 0.7 per cent. According to recent official estimates, agriculture in the US accounts for 1.9 per cent of the nation's GDP with 0.7 per cent of the total working population was engaged in the sector (Dmitri, et al.: 2005; World Bank: 2013; Mehta: 2014).

It is worth mentioning that the US has pursued policies that have promoted phenomenal growth in the productive capacity of agriculture. Developmental policies like the frontier expansion through redistribution of land, continuous government investments in agricultural research and education and productivity-enhancing technologies (Ray and Schaffer: 2007) contributed to the American agriculture as one of the few US economic sectors that reported a trade surplus, as it exported \$108 billion in farm goods in 2010 (ACDI/VOCA: 2013), \$141.5 billion in 2012 (ERS of the USDA: 2016a) and a trade surplus of \$19.5 billion by the

year 2015 (ERS of the USDA: 2016b; Daily and Baylis: 2016).

The following figure (Figure 1) illustrates the total workforce participation in agriculture in various years and the corresponding share of the sector in the GDP of the country.

Figure 1, Workforce (in %) and GDP Share of Agricultural Sector in the US, 1930-2013



Source: Adapted from the data of the USDA and the World Bank for various years.

The importance of agriculture in the US economy can be understood by the contribution it makes by ensuring safe and reliable supply of food, supporting a number of sectors and ancillary industries associated with farming like the farm equipment manufacturers and food processing companies (Lipton et al.: 1998; Joint Economic Committee (JEC) of the US Congress: 2013). Agriculture and its allied sectors contribute 4.7 per cent to the GDP and employ about ten per cent of the total employment of the country (Glaser and Morrison: 2015; ERS of the USDA: 2015). A US Senate report on the importance of agricultural exports for the nation pointed out that agricultural exports supported nearly a million jobs throughout the Continental US. Agriculture in the US carries deep-rooted political and emotional allegiance not only from the citizens but also from the Presidents of the country. A

snapshot of the views and outlook of some of the Presidents of the US on the country's agriculture are mentioned below:

As early as the first President, George Washington had said in his Congressional address that:

"It will not be doubted that with reference either to an individual or national welfare, agriculture is of primary importance. In proportion as nations advance in population and other circumstances of maturity, this truth becomes more apparent, and renders the cultivation of the soil more and more an object of public patronage."

(Washington: 1796).

President Thomas Jefferson had said in his letter from Paris to George Washington that:

"I am entirely a farmer, soul, and body, never scarcely admitting a sentiment on any other subject" (Jefferson: 1787).

In his address before the Wisconsin State Agricultural Society in 1859, President Abraham Lincoln had said

"...that no other human occupation opens so wide a field for the profitable and agreeable combination of labor with cultivated thought, as agriculture" (Lincoln: 1859).

During his Presidential campaign address at Boston, Franklin D. Roosevelt had remarked that:

"Prosperous farmers mean more employment, more prosperity for the workers and businessmen of every industrial area in the whole country" (Roosevelt: 1940)

Speaking in Kansas City after the World War II in 1948, President Truman complemented the contribution of the farmers in the war efforts and in the peace efforts that followed. He said that:

"It was the farm production, and the production of oil and minerals, which made it possible for this country to win the war (World War II) in as short a time as it did" (Truman: 1948).

As the Senator from the state of Massachusetts, John F. Kennedy assigned special importance to agriculture, which he carried forward during his Presidency. In his speech in South Dakota in 1960, he remarked that:

“For today American agriculture is in the grip of a technological revolution as vast and as rapid as any in history. It is a revolution, which has made the American farmer the most efficient in history. It has made his productivity the marvel and envy of every nation...Experts from all over the world come to see our farms, to study our techniques, and learn our methods. And the farm technology we have developed here in the United States holds out hope to the world for the first time that no man, woman, or child on earth needs to go hungry again” (Kennedy: 1960).

At the signing ceremony of the Food and Agriculture Act of 1965, President Lyndon B. Johnson bragged about the advances made by the American farmers and said that:

“The miracle of American agriculture is thus an example to all the world’s billions of the wisdom and the rewards of our democratic system. For more than a century, that system has encouraged the development of the family farm and the free and independent farmer” (Johnson: 1965).

In his remarks during a question-and-answer session with broadcasters and editors on the Food Security Act of 1985 and the Farm Credit Amendments Act of 1985, at the US Department of Agriculture, President Ronald Reagan said that

“...we’re nothing without the farmers. They’re the backbone of this country. And everything we do to help them helps our country and its future” (Reagan: 1985).

In his remarks in Springfield, Missouri, President George W. Bush stated that:

“We’re a blessed nation because we can grow our own food. A nation that can feed its people is a nation more secure” (Bush: 2002a).

It has been also observed that each member of the US Congress represents strong ties to agriculture in their constituencies (Frazier: 1990; Bellemare and Carnes: 2015)⁶. For instance,

⁶These were affirmed by Senators Richard Lugar and Sherrod Brown, former ambassador to India, Richard Celeste and former Governor of Ohio, Ted Celeste during the personal interviews that were conducted by the author during 2015 and 2016.

in terms of explaining the congressional ties, Senator Lugar when interviewed, explicitly stated his closeness to agriculture foremost as he himself was raised in a farm family that initially had 600 acres of agricultural land. Therefore, in his career as a Senator, he was instrumental in the advocacy and passage of several legislations on agricultural development and food security (Lugar: 2015). This also explains his continuing interest in shaping agricultural policy for which he introduced several legislations as a serving member of the Congress.

2.1.1 The Political Power of Agribusiness

Agriculture has ample political support in the Congress that has had a long history of representing agricultural interests (Thompson: 2005; Bellemare and Carsen: 2015). Due to electoral pressures, political considerations of the Congressional members contribute to the commitment towards assisting the American farmers (Chen: 2014). It has also been found that powerful lobbies have also played a significant role in shaping the congressional views. For instance, a study showed that many of the representatives in the Congress have strong ties to groups that lobby on behalf of farmers (Bellemare and Carsen: 2015). The belief that lobbying drives much of agricultural policy has a bipartisan acknowledgment (Nestle: 2013; Edwards and James: 2009). These powerful groups effectively lobby with firm ideas, which determines legislative action on agricultural policy (Swinnen: 2010). For instance, the income support to the farmers to offset the propensities of economic pressures due to free market operations that tend to reduce the relative price of farm products, on the one hand, is balanced with technological changes reducing the demand for farm labour on the other. However, lobbies have also focused on government intervention and government subsidies to meet high budget costs. An assessment of these factors also highlights the political clout exerted by the farm lobbies in the US policy making. (Matthew and Ingersent: 2001; Skogstad and Cooper (eds.):1990).

Studies suggest that for both Republicans and Democrats there is a significant influence of agribusiness or corporate contributions. The agricultural lobbies target funds at those legislators who have a demonstrated alignment with agricultural interests, especially those on the Agriculture committee (Gilbert and Oladi: 2012). Big agribusiness is among the nation's most powerful special interest lobbies. This is evident from the monetary support of the agribusinesses as campaign contributions to various candidates for federal elections. A 2011

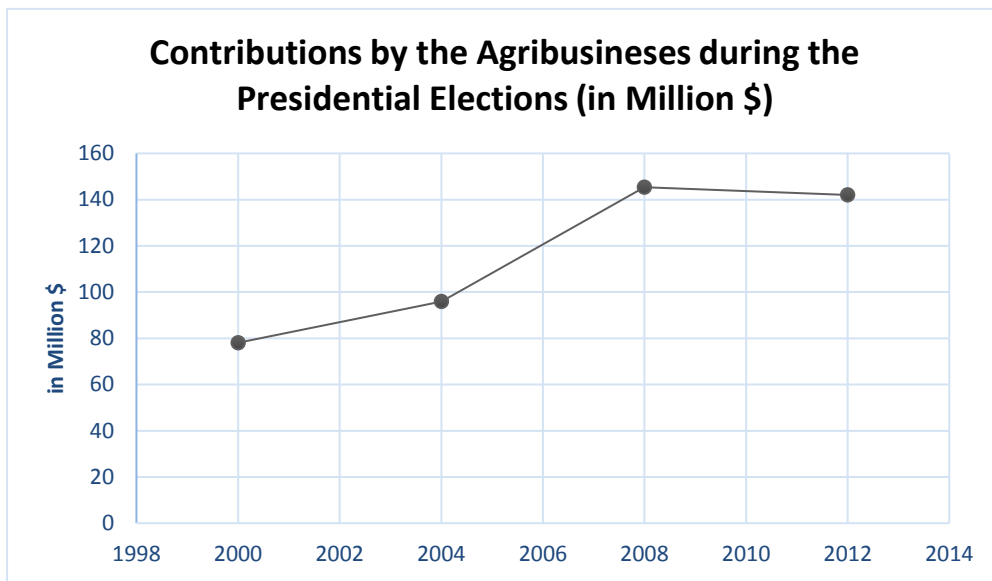
study in the US found that over the past decade, only ten agribusiness corporations or groups donated more than \$35 million in campaign contributions to congressional candidates. These were American Farm Bureau Federation, American Crystal Sugar, Dean Foods, Land O'Lakes, Monsanto, Archer Daniels Midland, ConAgra, Smithfield Foods, Cargill, and Tyson Food. Further, it was found that these agribusinesses contributed more than \$120 million to state-level candidates, party committees, and ballot measures, and spent more than \$127 million in lobbying the US Congress and federal agencies where there was at least one lobbyist for every four members of the House and the Senate (Madsen, et al.: 2011). The farm lobbies have also exerted influence on the US position at the WTO, and have called upon the government to act against developing countries like India and China who '*are routinely breaking international trade rules on agriculture*' (Miles: 2015). Agricultural lobbying firms like DTB Associates, LLP based in Washington, D.C. corroborated this evidence in its study *Agricultural Subsidies in Key Developing Countries: November 2014 Update* (DTB Associates, LLP: 2014).

From the data sourced from the Senate Office of Public Records, the Centre for Responsive Politics, Washington, D.C. reported that over seventy-five per cent of agribusiness contributions in the 2012 election cycle went to Republicans. The agribusiness sector has contributed a little more than \$624.5 million to federal candidates during the past two decades, with nearly 70 percent going to Republicans. Major issues these agribusinesses have been dealing with are on issues of importance to the sector include agriculture subsidies, environmental and safety regulations and trade policy.

The figure below (Figure 2) illustrates a number of monetary contributions by the top agribusinesses during the Presidential elections since 2000. It shows that between 2004 to 2008 there was a sharp increase in the money spent by the agribusinesses and a slight decline during the 2012 elections.

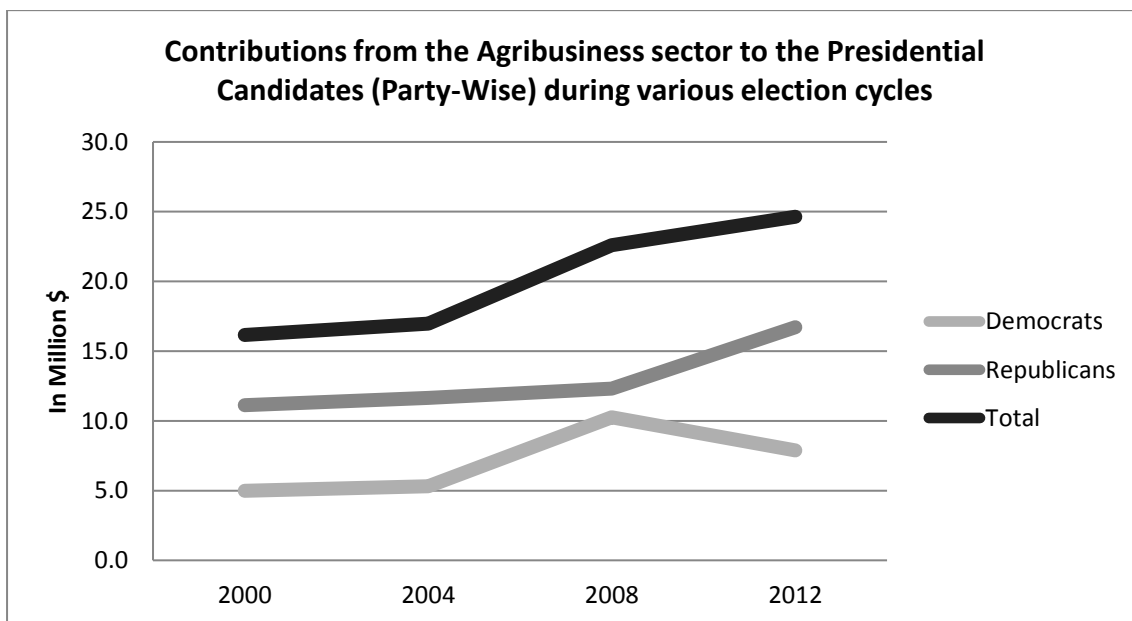
Data from the Centre for Responsive Politics, Washington, D.C. revealed that George W. Bush, as the Republican candidate received a major chunk of the contributions since the Presidential elections of 2000. The following figure (Figure 3) further illustrates the share of funds received by the Democrats and the Republicans due to efforts of the farm lobbies and the agribusinesses for their election campaigns. The top contributors have been Weaver Popcorn, American Crystal Sugar, Mountaire Corporation, National Cattlemen's Beef Association, Monsanto and others (Vendituoli: 2013).

Figure, 2 Contributions by the Agribusiness sector during the various Presidential Elections



Source: Adapted from the data from Centre for Responsive Politics for various years.

Figure, 3 Contributions of the Agribusiness sector to the Presidential Candidates (Party-Wise) during various election cycles



Source: Adapted from the data from Centre for Responsive Politics for various years.

The above discussion thus clearly indicates that agriculture has ample Congressional support (Thompson: 2005). The huge amount of contributions made to the candidates running for office along with the political considerations of the Congressional members contributes to their commitment towards assisting the American farmers (Chen: 2014).

The direct influences of the agricultural lobbies have tended to influence decisions on the farm bills. Before the 2012 Farm Bill was to be passed, Monsanto professed for the creation of a “modern agriculture” caucus in Congress. And within a short span of time, the Congressional Caucus on Modern Agriculture was established having two Republicans as the chair, namely Adrian Smith (R-Nebraska) and Joe Courtney (R-Connecticut) (Committee on House Administration, US House of Representatives: 2012). It is thus implicit that the Congress plays a definitional role and is the locus of both domestic and trade policies of the agricultural sector of the country. The next section studies the various legislations on farm bills by the US Congress and the importance they wield to the American agriculture.

2.1.2 Farm Bills and their Importance to US Agriculture

US agricultural policies are laid down by farm bills that are periodically legislated by the Congress (Johnson and Monke: 2016). These govern a wide range of agricultural and food programs, including farm commodity price and income supports, agricultural conservation, farm credit, trade, research, rural development, bioenergy, foreign food aid, and domestic nutrition assistance (Bakst and Katz: 2013). Farm bills in the US are the “legislative package that renews America’s farm subsidy entitlement system every five years or so” (Paarlberg and Paarlberg: 2011) and provide an opportunity for policy makers to comprehensively and periodically address agricultural and food issues.

The agricultural policy focuses on the renewal of the basic legislation of the Farm Bill, with competing bills being debated, discussed and introspected in the agricultural committees of the Senate and the House of Representatives. It has inputs from the Executive branch of agriculture or the US Department of Agriculture (USDA) and eventually gets passed on to the President for signature. It is customary for each President to get a new farm bill introduced, debated and passed after assuming office. Although the two parties- the Democratic Party and the Republican Party, have tended to take diverging views on certain issues, farm policy has been essentially non-partisan (Ray and Schaffer: 2001).

Several legislations have defined and provided for agricultural activities in the US (Edwards: 2016). The table below depicts some of the major laws passed by the US Congress having the Presidential assent.

Table 2, Legislations on Agriculture in the US

Year	Legislation
1949	Agriculture Adjustment Act, which extended price support for crops and expanded the subsidy policies to the dairy industry. This was the beginning of the farm legislations which called for Congressional authorisation every five years or so.
1954	Agricultural Trade Development and Assistance Act, which created export subsidy programs to encourage US exports into international markets.
1973 and 1979	Farm Bills adopted the usual subsidy driven programs for the domestic agricultural produce.
1985	Food Security Act added new farm subsidy programs, including the Export Enhancement Program and the Conservation Reserve Program, which incentivised farmers not to farm.
1996	Federal Agriculture Improvement and Reform Act- the “Freedom to Farm” Act was passed.
2002	The Farm Security and Rural Investment Act
2008	The Food, Conservation, and Energy Act
2014	The Agricultural Act, added two new subsidy programs, the Agricultural Risk Coverage program and the Price Loss Coverage program.

Source: Author

Agricultural policy of the US has thus continued to reflect the traditional agricultural interests seeking greater subsidies for the farming community. However, there has been an emergence of powerful, national groups, advocating conservation, nutrition and important commodities and products, which are seeking a drastic review of support for the agricultural sector where the domestic and trade policies have consequences extending beyond the farm sector, to US’ foreign policy. The discussion below highlights the Farm Bills passed by the US Congress with Presidential approval since 1996.

Following the Uruguay Round Agreement of 1994 and formation of the WTO in 1995, discussions on a New Farm Bill was underway. In April 1996, the Farm Bill or the Federal Agricultural Improvement and Reform (FAIR) Act (Matthew and Ingersent: 2001) was signed into law by the then President Bill Clinton. This FAIR Act sought tremendous transformation in its support to the farmers. It delineated gradual decline in the payments made to the farming community as subsidies over the next seven years, that is until 2002 (US

Congress, Public Law 104–127: 1996; *The New York Times*: 1996). Overall, the FAIR Act reinforced market-oriented policies, which had been initiated in 1985 and seeks to reduce government intervention. Among its main features, it decoupled income support payments from farm prices, replaces deficiency payments by direct compensatory payments, eliminates area reduction obligations and provides for greater planting flexibility (FAO Corporate Document Repository: 1996).

It is interesting to note that in the run up to the 1996 Farm Bill, the main Congressional actors were the chairmen of the respective Agricultural Committees of the House and the Senate Congressman, namely, Pat Roberts (R- Kansas), a strong supporter of traditional farm programs, and Senator Richard Lugar (R- Indiana), a free trader, a proponent of liberal markets and critic of conventional farm support programs (Josling: 1998). Senator Lugar introduced a bill in August 1995 and advocated cuts in the price support to the farmers. Simultaneously, Congressman Roberts launched the Farm Bill debate with a more radical proposal that was labelled as the Freedom to Farm Act (FFA), which would end all constraints on farmer planting decisions in return of guaranteed continued annual payments for seven years. In other words, US farmers would continue to be assisted with a guaranteed minimum support price called the ‘target price’ for their agricultural produce (Josling: 1998; Matthew and Ingersent: 2001).

In November 1995, the House of Representatives led by Newt Gingrich (R- Georgia) chose to put the provisions of the FFA into the budget bill and sent to President Clinton for his approval. In January 1996, this was vetoed subsequently by Clinton as he understood that these were not in line with the pragmatic and programmatic changes that he sought, which could adequately address the needs of the farmers (Clinton: 1998; Evans and Oleszek: 1999). By February 1996, it became urgent to reach a political agreement on agricultural legislation for the upcoming year, as the administration was running short of time in light of the previous veto. As a response to the situation, a fresh attempt was made to introduce legislation in the House and the Senate. An Agricultural Marketing Transition Programme (AMTP), containing major provisions of the FFA, including the ‘contract payments’ and ‘planting flexibility to the farmers’ was passed by the Congress in March 1996. It was approved by President Clinton in April 1996 and the new farm bill named the ‘Federal Agricultural Improvement and Reform Act’ (FAIR) was signed into law (Clinton: 1996; US Congress, Public Law 104–127: 1996).

Studies show that until the 1996 Farm Bill or the FAIR Act was enacted, the US agricultural policy was focused on managing the production, price stabilisation programs (Ray, et al.: 2003; Thompson: 2005). This new Act dismantled all remnants of government price supports and annual controls of farm supplies with the effect of sustaining the low prices (Nelson and Schertz: 1996; Womach: 2005; US Department of State: 2008; Hansen-Kuhn: 2011). Under this Act, the total budget for price support for the farmers was set at \$ 36 billion over seven years (with \$5.6 billion in 1996 falling to \$4 billion in 2002), and they could grow any commodity on the land with the exception of fruits and vegetables so as to ensure confirmed earnings.

The importance of the Farm Bill of 1996 cannot be underestimated. It contained few trade provisions that had a significant impact on the trade system of developing countries, especially the emphasis on export promotion, especially for items as dairy products (Josling: 1998; Levy: 2002). It had indications on an increasing reliance upon the market signals of the country and abroad. It thus reinforced market-oriented policies and sought to reduce government intervention in agriculture. It was important for the American farmers as it gave them greater planting flexibility. It also modifies provisions for price support as well as for stockholding, export subsidies and food aid programmes (FAO Corporate Document Repository: 1996). Scholars have noted the importance of Farm Bill towards a liberal international trade, which has implications on both the demand and supply of the agricultural market, in that it would encourage efficiency of the agricultural sectors of countries like India which were not only customers of US crop exports but also competitors in the area of harvests (Ray: 2001a).

It was expected during the legislation of the FAIR Act of 1996, which was also known as the Freedom to Farm Bill, the farm prices would remain relatively high for the duration of the new legislation. If these speculations were successful, farmers would enjoy the benefits of receiving high prices. In the event of any unpredictable challenges, like the decline in the market prices, it was suggested that the federal government would yield to the pressure of granting emergency financial assistance (Grynberg and Turner (eds.): 2003). Reports showed that the high farm prices reached in 1996 were not repeated in the next few years. For instance, the price of wheat fell from \$4.5 per bushel in 1995-96 to \$2.43 by 1997-98, and even lower at \$1.80 during 1999-2000 (Ray: 2001b). Policy reviews stated that the fall in these prices owed to weaknesses in world demand for American grains (Gardener: 2004).

Farm incomes followed similar trends, declining from a total of about \$59 billion in 1996 to only about \$47 billion in 1998 (ERS of the USDA: 2016c). In the prevailing situation, lobbies exerted considerable political pressure on the federal government, to respond to these trends (Tweeten and Zulauf: 2008). These representations were eventually successful and resulted in two temporary bailouts in the name of Emergency Supplemental Appropriations Acts⁷ (Grynberg and Turner (eds.): 2003).

It amended the Agricultural Trade Development and Assistance Act of 1954 (Public Law 480) to include private players within the scope of foreign agricultural assistance under such Act. It revised the assistance priorities, authorised US agricultural trade organisations (which promote the export and sale of an American commodity and does not directly profit from the specific commodity sales) for project development and implementation; authorised multi-year agreements to be made available under programs of agricultural commodity sales to developing countries; permitted assistance under the farmer-to-farmer program to be used for educational travel to the US and authorised the Foreign Agricultural Service to provide agricultural technical assistance and training, undertake “*measures for economic development, to improve food security and agricultural development, alleviate poverty, and promote broad-based equitable and sustainable development*” to other countries of the world (US Congress, Senate: 1998). This was an important legislation for the US which called for the reorganisation of the USDA, and trade became a focus to bailout the surplus in the agrarian produce. In this context, the US was looking for markets and international partnerships.

This clearly shows that distress in agricultural trade required a serious policy tweaking and required a legislation that had the support of both parties. The objective was to assist low-income migrant and seasonal farm workers; strengthen markets, income, and supply; and aid certain producers who incurred losses to a commodity due to disasters in crop years (US Congress, Public Law 106–31: 1999). The first bailout was worth \$6 billion and the second was worth \$9 billion paid in 1999 and 2000, respectively. In the year 2000, an Agricultural

⁷ Supplemental Appropriations Acts: Budget authority provided in an appropriations act in addition to regular or continuing appropriations already provided. Supplemental appropriations generally are made to cover emergencies, such as disaster relief, or other needs deemed too urgent to be postponed until the enactment of next year's regular appropriations act (Available at: https://www.senate.gov/reference/glossary_term/supplemental_appropriation.htm)

Risk Protection Act worth \$1.7 billion for the financial year 2001 was passed, to “*strengthen the safety net for agricultural producers by providing greater access to more affordable risk management tools and improved protection from production and income loss, to improve the efficiency and integrity of the Federal crop insurance program*” (Matthews and Ingersent: 2001; Just and Pope (eds.): 2002; US Congress, Public Law 106–224: 2000).

In 1997 Senator Lugar introduced another bill which was legislated by the Congress and was known as The Agricultural Research, Extension, and Education Reform Act of 1998. It expanded “*the knowledge of public and private sector entities and persons concerning genomes for species of importance to the food and agriculture sectors to maximize the return on the investment in genomics of agriculturally important species*”. It encouraged the Federal government to undertake international partnerships with for agricultural genome research as well as explore international trade opportunities for organically grown and processed agricultural commodities (US Congress, Public Law 105–185: 1998).

On similar lines, the 2002 Farm Bill (Farm Security and Rural Investment Act) governing Federal farm programs for 2002-07, was enacted on May 13, 2002 (US Congress, Public Law 107–171: 2002; Young: 2008). Scholars have noted that it was drafted in the early stages of the Doha Round of the WTO when the Congress was desirous of increasing support to farmers (Orr: 2002; Ayer and Swinbank: 2002; Thompson: 2005).

The 2002 farm bill renewed the direct payments enacted by the 1996 farm bill (Bellemare and Carnes: 2015), and intended to provide a safety net for farmers to enable them to plan for the future, by ensuring a stable and predictable capital backing (Bush: 2002b), to the extent market and weather conditions permitted (Ray, et al.: 2003). It introduced counter-cyclical payments that would be put into action when the prevailing prices fell below the pre-determined levels but paid based on historical acreage and yields (Organisation for Economic Cooperation and Development: 2011). While it addressed a great variety of issues related to agriculture, energy, trade, and nutrition (US Congress, Public Law 107–171: 2002), it paid special emphasis on ecology by introducing working-lands conservation payments through the Conservation Security Program and continued with the planting flexibility and program of direct payments of the 1996 FAIR Act based on historical production by allowing updating of historical base acres and adding historical soybean acres (Dmitri, et al.: 2005). President George W. Bush termed the 2002 Farm Bill as being “compassionate” because it allowed

legal immigrants who had been residing in the country for five years to become eligible for food stamp assistance (Bush: 2002; Capps et al.: 2004). Unlike the previous farm bills, which focused on helping the developing countries, this bill despite its various provisions did not offer much respite to the farmers of the developing countries by improving their economic welfare, whose production was either endangered by low-priced imports, or whose revenues are reduced by the distressingly insufficient prices for their exports (Ray et al.: 2003).

The 2008 Farm Bill also known as the Food, Conservation, and Energy Act, 2008 was enacted by the Congress on June 18, 2008. It re-authorised most programs of the 2002 farm bill with some modifications. It covered “*income and commodity price support, farm credit, and risk management; conservation through land retirement, stewardship of land and water resources, and farmland protection; food assistance and agricultural development efforts abroad and promotion of international access to American farm products; food stamps, domestic food distribution, and nutrition initiatives; rural community and economic development initiatives, including regional development, rural energy efficiency, water and waste facilities, and access to broadband technology; research on critical areas of the agricultural and food sector; accessibility and sustainability of forests; encouraging production and use of agricultural and rural renewable energy sources; and initiatives for attracting and retaining beginning and socially disadvantaged farmers and ranchers*” (US Congress, Public Law 110–234: 2008; ERS of the USDA: 2008). It set aside \$ 8 million for planning for the rapid distribution of food in emergencies in developing countries, and increased technical assistance for research on specialty crops (Harris, et al.: 2008).

An illuminating research by the OECD in 2008, namely, *Evaluation of Agricultural Policy Reforms in the United States* highlighted that the Food, Conservation, and Energy Act, 2008, established the traditional objectives of stabilising agricultural production and supporting farm income besides focussing on nutrition, food safety, promoting environmental protection, enabling rural development and generating new forms of clean energy from corn and soybeans (Organisation for Economic Cooperation and Development: 2011). It also mandated the creation of National Institute of Food and Agriculture (NIFA) which would be the centre for consolidating federal agricultural sector research to find innovative solutions to issues related to agriculture, food, environment and communities.

Interviews as part of the field research provided by the Fulbright grant to the author helped to clarify how NIFA has become a vital contributor to federal science policy decision-making, and leads the federal government efforts on global food security policies (it leads the international agricultural development programs) (NIFA Factsheet: 2014; Fulton: 2015).

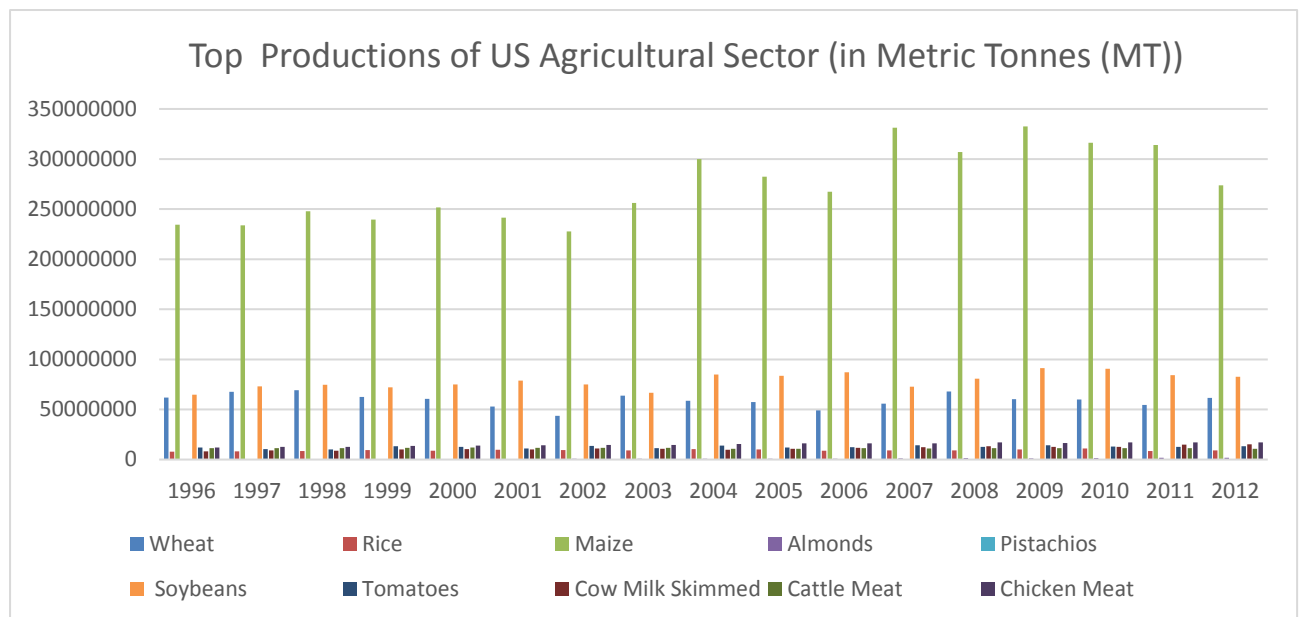
The promising potential of American agricultural sector was set to bring about a ‘transformational change’ when the then Secretary of State Hillary Clinton and Secretary of Agriculture Tom Vilsack outlined the zeal of the US to improve food security worldwide through the ‘*Food Security Initiative*’ (US Department of State: 2009). Vilsack agreed that it was in the long-term best interest of farmers of the country to have robust trading opportunities globally (Vilsack: 2009), as the vibrancy of US agricultural products has been visible through its exports all over the world. According to media reports, the sector recorded \$115.3 billion worth of exports in 2008 (*The New York Times*: 2010). *As it has been asserted by agricultural experts since the 1990s export markets especially in emerging economies in the developing world were important to US agriculture, as they had the potential to absorb a substantial portion of the total production of many important commodities* (Benson and Merchant: 1994). Several subsequent Congressional reports have also pointed out that the goal of export promotion needed a further expansion of market access as the solution for filling the gap between exports and imports (Hanrahan, et al.: 2011). Even though the overall economy faltered amidst signs of the financial crisis of 2008-09, the US agricultural sector continued to be profitable. It was augmented in part by a surge in exports. According to federal estimates of the share of the exports of US agricultural products, it was 17.1 per cent in the year 2009 and 19 per cent in the year 2010 (ERS of the USDA: 2010).

Senator Debbie Stabenow, chairing the US Senate Committee on Agriculture, Nutrition and Forestry approved 2012 Farm Bill that restructured farm support for traditional program crops by eliminating direct payments, counter-cyclical price payments. It established Agriculture Risk Coverage (ARC) program for crop years 2013-17 as those under direct payment program for wheat, corn, grain sorghum, barley, oats, long grain rice, medium grain rice, pulse crops (dry peas, lentils, small chickpeas, and large chickpeas), soybeans, other oilseeds, and peanuts (except cotton) (US Congress, Senate: 2012; Chite: 2012). Encouraged with an impressive trade surplus in agriculture, elimination of trade barriers was one of the primary objectives of the bill. The proposed Export Credit Guarantee Program would help to ensure the availability of credit to finance the exports of US agriculture to mainly developing

countries that have the adequate financial strength to make scheduled payments (FAS of the USDA: 2012). In consort with the Feed the Future initiative, the farm bill of 2012 took a preemptive stance on fighting global hunger, pledging more funds for food aid to high-risk regions, such as the Horn of Africa (US Congress, Senate: 2012; Grassi: 2012).

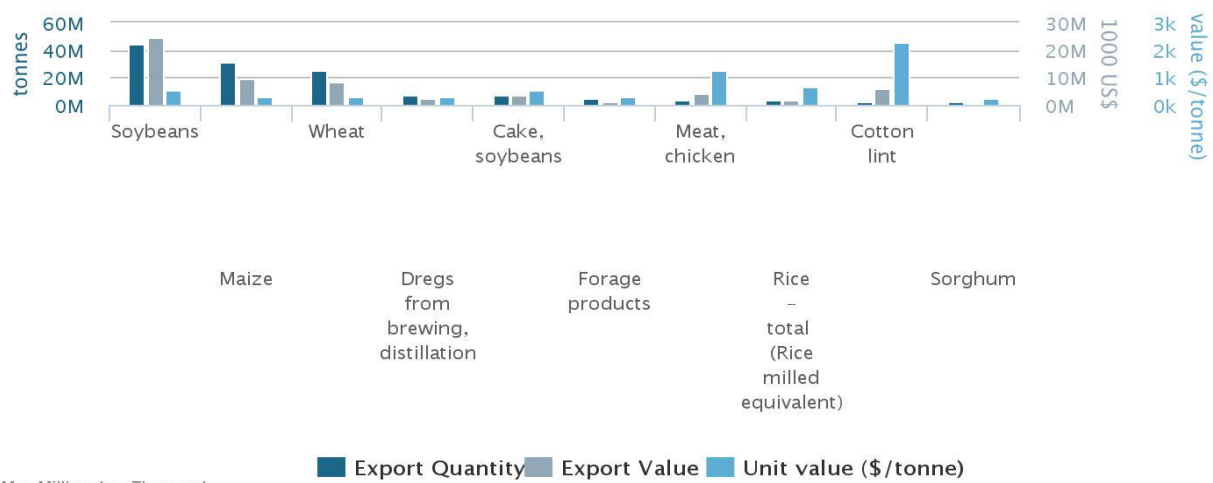
The following figures (Figure 4, 5 and 6) show the top agricultural productions in the US and the top agricultural and exports and imports, respectively, of the country in the year 2012.

Figure 4, Top Productions of US Agricultural Sector (in Metric Tonnes), 1996-2012



Source: FAOSTAT

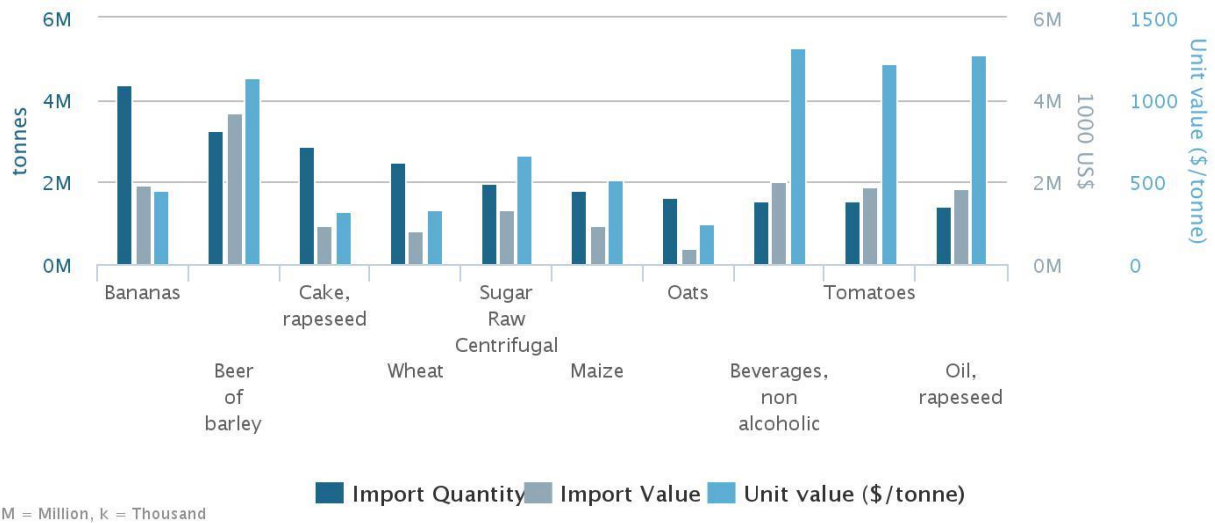
Figure 5, Top Agricultural Exports of the US, 2012 (in Metric Tonnes)



M = Million, k = Thousand

Source: FAOSTAT

Figure 6, Top Agricultural Imports of the US, 2012 (in Metric Tonnes)



Source: FAOSTAT

In all, the US agricultural industry is an economic engine that fuels the country and its people (The Hand that Feeds US: 2009). Both the President and the Congress have played a pivotal role in addressing the needs of farmers and agricultural policy. It is also clear that from 2000 onwards the role of agricultural exports and international trade in agriculture became the central focus of Farm Bills. The President and the Congress have taken several initiatives towards development of international agricultural markets. It is in this context that the US-India agricultural cooperation needs to be understood.

For instance, the L'Aquila Summit in 2009 conferred a 'partner-status' to India in the American goals to improve agriculture in the countries of Africa. This clearly implied an enthusiasm from the Indian research and farming communities knowledge and best-practices.

Thus, from the base of US-India policy of the 1960s when India was seen as a poverty stricken and food insecure country, the situation had changed dramatically to consider India as one the most desirable partners in research and agricultural knowledge.

India too has transformed internally in its agricultural sector. Its agricultural policy has not only been the result of economics (both domestic and international) and demographic reasons but also on account of political considerations. As statistics reveal, Indian agricultural sector not just contributes to around 14 per cent of the GDP, but also employs over half of the work

force of the country (Government of India, Ministry of Agriculture and Farmers Welfare, Department of Agriculture, Cooperation & Farmers Welfare: 2016). The contribution to the GDP has declined since the 1960s primarily due to a shift of the labour force to the manufacturing and service sectors (Papola: 2012). Yet, remarkably, these changes have been visible over time. It is, therefore, germane to study the agricultural sector of India and the policy changes therein. The next section details the changes in the policies related to the Indian agricultural sector in the domestic and international domain.

2.2 Agricultural Sector of India

For thousands of years, agriculture has shaped the economic life of the people of India and continues to be fundamental to all strategies for planned socio-economic development of the country (Rao: 2005). The importance of agriculture in the India finds mentions in the Hindu scriptures (Mehta, et al.: 2017). For instance, a hymn in the Atharva Veda devoted to Goddess Prithvi (Earth), reads thus

‘O Mother, with your oceans, rivers, and other bodies of water, you give us land to grow grains, on which our survival depends... may you, our motherland on whom grow wheat, rice, and barley ... be nourished by the cloud and loved by the rain’
(Atharva Veda 2.1).

In the Ramayana and the Mahabharata, agriculture was mentioned to be the way of life of the people, and efforts were made to ensure the prosperity of the farmers and happiness of the people (Guruge: 1991).

Years of colonial rule and the consequent partition of the country distorted India’s agriculture, it was further worsened by the series of droughts and famines, forcing India to depend on external food assistance to feed its population. Given these conditions, the leadership of Independent India was well positioned to bring about drastic improvements. The foresightedness of the leaders was evident (Mehta, et al.: 2017). The need to transfer the ownership of land by the cultivator and the provision of infrastructure facilities by the government were emphasised for augmenting production in agriculture during the first two decades after independence, as evident from the previous chapter, the need to take up modern

methods of cultivation, such as the use of machinery, high yielding variety seeds, superior technology and fertilizers and pesticides, was emphasised by the LGUs in India that led to the advent of the Green Revolution (Suri: 2006). Economists and scholars on the subject have shown how it led to quantum jumps in the productivity and production of cereals, pulses and other grains (Ahluwalia: 1996; Pain: 2007; Suri: 2006; Swaminathan: 2006) and consequently enabled India to attain self-sufficiency in food grains. It helped the nation tide over its food crisis through sustained growth in yields and output (Johnson: 1967; Sen: 1974; Hansara and Shukla: 1991; Ganguly and Gould(eds.): 1992; Rao: 2005; Persaud and Rosen: 2003; von Braun, et al.: 2005), and strengthened programs that supplied farmers with practical knowledge (Rao: 2005). Thus, as evidenced in the previous chapter, the 'Green Revolution' helped India "*gain a breathing spell during which it attempted to achieve a balance between population growth and the population supporting capacity of the ecosystems*" (Swaminathan: 2009b).

The population base involved in agriculture and allied activities has had political support in India, ever since the country faced massive food shortages in the 1950s. Partnership with the US LGUs for agricultural research and development that culminated in the Green Revolution in 1968, brought to the fore the importance of self-sufficiency in food-grain production. The policy thrust gradually shifted to the comprehensive development of the agricultural sector. Some of the perspectives of the policy makers of India is provided below:

Jawaharlal Nehru had said in a meeting of National Development Council in 1963 that:

"... agriculture is the basis of all our development work. If we fail in agriculture, it does not matter what we achieve- no matter how many plans we put up-our economic development will not be complete" (Nehru: 1963b).

Reminiscing the successes of Green Revolution, Indira Gandhi had once said that:

"The success of the intensive agricultural programme was popularly called the green revolution. However modern farming must cover a much larger area before we can really speak of a green revolution." (Gandhi: 1975)

At his inaugural speech at the 25th National Convention of the Bharat Krishak Samaj, Hyderabad, Rajiv Gandhi remarked that:

“If farmers become weak the country loses self-reliance but if they are strong, freedom also becomes strong. If we do not maintain our progress in agriculture, poverty cannot be eliminated from India. But our biggest poverty alleviation programme is to improve the living standard of our farmers. The thrust of our poverty alleviation programmes is on the uplift of the farmers” (Gandhi: 1988).

In order to ensure food security to the rapidly increasing population, the policy thrust in India has focused upon increasing domestic production in an efficient and sustainable manner. Viewed from this standpoint, India’s agriculture has made impressive advances since its Independence. In 1951, there was food deficiency that necessitated food assistance from the US. With food grain production of 50.82 million metric tonnes (MMTs) in 1951, it increased to more than 256 MMT in 2012 (Hoda and Gulati: 2013). This increase in productivity in the early 1970s can be largely attributed to technological, institutional and sharing of crop practices through a steady American cooperation (Gaudino: 1974). For India, the priority for agricultural policy and strategy since Independence has been to achieve sufficient supplies of food at affordable prices to the poorest of the poor (Planning Commission: 1997; Acharya: 2009). It is against the backdrop of ensuring food security, that backdrop that dynamics of India’s agricultural trade policy needs to be understood (Hoda and Gulati: 2013).

Indian agriculture has undergone a major transformation, from dependence on food aid to becoming a consistent net food exporter (World Bank Group: 2014). This has been complemented and driven by the technology breakthroughs of the 1960s, that hastened the growth rates in agriculture achieved in the 1990s (Ahluwalia: 1996).

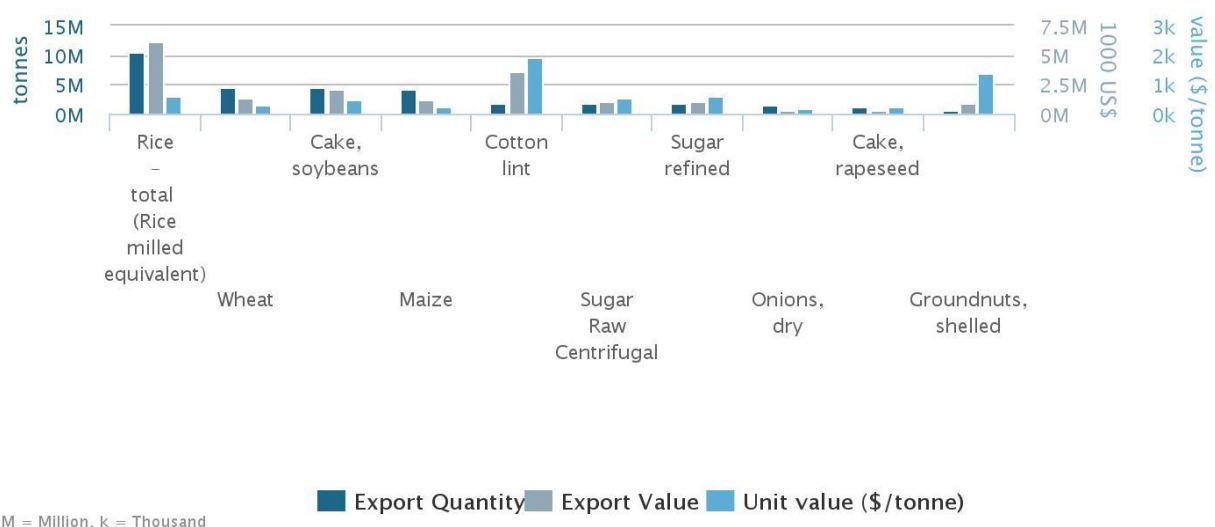
The New Economic Policy (NEP) of 1990-91 introduced major economic reforms (including exchange rate deregulation, trade liberalisation, export promotion, and decontrol of domestic manufacturing), with significant impact on agriculture. It resulted in a more liberal economy that significantly dismantled the protectionist regime of the past. This benefitted agriculture by improving its domestic terms of trade, thereby providing better motivations for investment in this sector (Chatterjee, et al.: 2011).

The initiatives undertaken through the NEP signalled changes in the policy intent and was followed by the Export-Import Policy of 1992-97. Some of the reforms for the agricultural

sector included the objective of abolishing restrictive licensing arrangements and lowering the number of quantitative restrictions (QRs) on imports and exports of agricultural products generally and decreasing basic tariffs to a significant extent. For instance, tariffs were reduced in most items from over 300 per cent to about 40 per cent (Chatterjee, et al.: 2011). During this time, while the nitrogen (urea) pricing remained unchanged due to resistance to reforms, the production of potassium and phosphate fertilizer was liberalised and the dairy sector witnessed the removal of marketing restrictions in the dairy sector.

By mid-1990s, it was felt that for agricultural growth to be around four per cent per year required the general framework of economic policy to impinge specifically upon agriculture and work towards achieving faster agricultural growth (Ahluwalia: 1996). By this yardstick, as data from FAOSTAT reveal, Indian agriculture achieved significant success, as since 1991, India has consistently remained a net exporter of agricultural products, with agricultural exports reaching \$40.7 billion and imports at \$20 billion in the fiscal year 2012-13, along with notable advances in food grain production (growing five-fold from about 51 MMT in 1950 to over 256 MMT in 2012). During 2012-13, India exported 22 MMTs of cereals and emerged as the biggest exporter of rice and buffalo meat. These figures are indicative of the growing international competitiveness in agriculture and gradual integration of the Indian economy with the global economy (Landes: 2005; Hoda and Gulati: 2013; World Bank Group: 2014). The graph below (Figure 7) shows the top exports of agricultural commodities by India in the year 2012.

Figure 7, Top Exports of Agricultural Commodities of India, 2012 (in Metric Tonnes)



Source: FAOSTAT

2.2.1 Role of Interest Groups and Farm Lobbies in Indian Agriculture

Indian agriculture presents a wide array of government controls combined with enormous subsidisation of inputs to the agricultural sector (Pursell and Gulati: 1993). In the determination of government intervention, the role of interest groups and farm lobbies has been increasingly recognised (Karnik and Lalvani: 1996). It has become more cognisable because of the involvement of large farm lobbies in the country, which have indulged in getting favourable policies with respect to supply of subsidies and agricultural public goods by the governments at both Union and State levels, given that agricultural income is income tax-exempt in the country (Government of India, Ministry of Finance, Department of Revenue: 2016). It has also been pointed out by economists that there has been evidence of the role of interest groups in subverting government policies for selfish ends (Karnik and Lalvani: 1996).

While lobbying in India is not yet legal, yet farmers and Indian and foreign multi-national agribusinesses have formed associations, who formulate their demands and place it before the policy makers. For instance, the *Bharat Krishak Samaj* (or the Farmers' Forum), a farmer's lobby group was set up in 1955 to represent the voice of the farmers of India. One of its stated objectives has been to “*assist in formulating and promoting national and international agricultural policies and progress in the interest of agricultural producers and to collaborate and cooperate with similar organisations of agricultural producers in this country or abroad for the furtherance of the said objective*” (Bharat Krishak Samaj: 2017). In an interview with *The Economic Times*, the Chairman of this organisation, Ajay Vir Jakhar, most benefits of the fertilizer subsidy and minimum support price are utilised by those farmers who have irrigation facilities, who are incidentally the large farmers (Krishnan: 2016).

As recent as August 2016, a Federation of Seed Industry of India (FSII)⁸ was formed by Indian and foreign seed MNCs. Some of these were Namdhari, Rasi seeds, Shriram Bio seeds, Monsanto, Mahyco, Syngenta, Bayer, Dow Agro, Dupont Pioneer and Metahelix. FSII aims at representing companies committed to Indian agriculture and research and development for the benefit of Indian farmers (Mathew: 2016). There have been instances of

⁸ Available at: <http://www.fsii.in/about.html>

differences between business lobbies, activists' lobbies. For instance, activists' lobbies contradict in their opinion with the scientific community with respect to Genetically Modified crops in India has also led to a continuing debate about their safety for human consumption as well as for the environment. The pressure from the former group has successfully stalled the field trials of several crops, which the scientific community holds vital for raising agricultural productivity and farmers' incomes (Qaim: 2014). Also, the anti-tobacco NGOs have been opposed to the cigarette manufacturers' lobby Tobacco Institute of India (TII) and have approached the courts seeking extreme and unreasonable regulations on tobacco manufacturing, which threaten the livelihood of millions of Indians dependent on tobacco farming (Press Trust of India: 2016).

Eminent economist C.S.C. Sekhar in a study evidenced that it was observed that output price support and input subsidisation benefited primarily the large farmers of the irrigated regions of the states of Punjab, Haryana and coastal Andhra Pradesh, resulting in the emergence of powerful farm lobbies in these states. He also raised the issue of the nexus between large farm lobby, industrialists, and political parties, where the latter depend on the funds from the first two for their election campaigns. As a result, the eventual policy and programs of the governments formed are therefore often guided by these interest groups that provide the necessary funding at the expense of the poor agricultural labourers (Sekhar: 2005; Pursell and Gupta: 1998). Farmer lobbies in India have also organised themselves to push for FDI in retail. One of the largest farmer lobbies in the country, Consortium of Indian Farmers' Association has proactively supported FDI in organised retail as it would bring investments in the farm sector. Similarly, the Bhartiya Kisan Union, another farmer grouping has supported the policy of allowing FDI in retail, with a caveat to take care of the smaller farmers who could be left out of the process (Vinayak, et al.: 2011). Despite the acknowledgment by most farmer lobbies and economists, the need to cater to the domestic constituency and populism has often been proved to be a delaying factor in enacting progressive laws like allowing 51 per cent FDI in retail.

The implication of around half of India's labour force being engaged in agriculture and its allied sectors has often been critical in deciding the results of the elections at both national and state levels. Therefore, even though there is evidence of big corporate houses entering the realm of agriculture, the Union, and the State governments have been pivotal in shaping the

policy for the sector. The next section details the major agricultural policy and programmes that have been vital in sustaining the backbone of India’s economy, i.e., agriculture.

2.2.2 India’s Agricultural Policy and Programmes

Agricultural economists have divided the agricultural policy in India into supply side and demand side policy. The former includes those that aim to improve the productive potential that would contribute to sustainable growth and enhanced employment (Wiggins and Brooks: 2010). Examples include land reforms and patterns of land use; development and dissemination of new technologies; increased investments in irrigation, rural infrastructure, cold chains and price supports (Bhide: 2011). On the other hand, the demand side policy needs to cater to the fact of farm households’ being net buyers of food, and therefore enhancing the agricultural prices would lower the welfare of this considerable section of Indian population. Examples include state interventions in agricultural markets as well as the operation of public distribution systems (PDS) and comprise of those activities, which influence the consumers’ behaviour and brings changes in their consumption patterns (Press Information Bureau: 2015). These have had larger implications in terms of their impact on government budgets, for instance, the impact upon the supplies of inputs to agriculture and the supply of agricultural materials (Mahadevan: 2003; Acharya: 1998). Rapid income growth following the economic reforms in the 1990s and some key policy changes that encouraged many potentially transformative developments like attracting significant private interest and investment.

Several legislations for agricultural growth have been enacted by the Indian Parliament since the opening of the economy in 1991. The successive governments have also initiated several programs and schemes that have provided a policy-push to reinvigorate the agriculture of the country. The table below depicts the most important laws passed by the Parliament since the early 1990s. Each of these is explained subsequently.

Table 3, Legislations for Development of India’s Agriculture

Year	Legislations/Policy
1991	The New Economic Policy (NEP) initiated liberalisation of the whole economy.
1992-97	Export-Import Policy, abolished restrictive licensing arrangements and lowered the number of quantitative restrictions (QRs) on imports and exports of agricultural products generally and

	decreased basic tariffs.
1995	With membership in the WTO, Indian agriculture entered the realm of globalisation.
2000	National Agricultural Policy (NAP) to strengthen the agricultural sector.
2001	QRs on agricultural imports was removed.
2002-2007	Export-Import Policy emphasised upon the importance of agricultural exports for the economy
2004	New Seed Policy allowed entry of private sector, including major international firms and made it easier to import and export seeds
2004-2007	Foreign Trade Policy (FTP) announced schemes for agricultural sector to boost the export of fruits, vegetables, flowers and minor forest produce
2005	The National Horticulture Mission (NHM) was launched.
2006	The Food Safety and Standards Act was enacted to prescribe scientific standards for safety of food items and to regulate the production, storage, distribution, sale, and import to assure the availability of safe and quality food for human consumption.
2007	The Rashtriya Krishi Vikas Yojana (RKVY) sought to achieve a four percent annual growth rate in agriculture and allied sectors through increased public investments.
2007	The Negotiable Warehouse Receipt and Warehousing (Development and Regulation) Act, 2007 was passed to enable farmers to avail banking services and encourage scientific warehousing of agricultural commodities.
2007	The National Food Security Mission (NFSM) was launched
2007	National Policy for Farmers, provided for the conservation of prime farmlands for agriculture except under exceptional circumstances (provided that the agencies provided with agricultural land for non-agricultural projects should provide compensation to the farmers) (Government of India, Ministry of Agriculture and Farmers Welfare, Department of Agriculture, Cooperation & Farmers Welfare: 2016).
2012	“Agriculture Policy: Vision 2020”, a Planning Commission report prescribed policy reforms for the agricultural sector of the country.
2013	National Food Security Act (NFSA) was passed by the Parliament.
2014	National Mission for Sustainable Agriculture (NMSA) was envisioned as one of the eight Missions under the National Action Plan on Climate Change for the promotion of sustainable agriculture by aiming to renovate it on the designs of a climate resilient production system using viable adaptation and mitigation measures in the sphere of crops and animal husbandry
2015	Pradhan Mantri Krishi Sinchai Yojana (PMKSY) to ensure assured irrigation to every field.
2015	Paramparagat Krishi Vikas Yojana (PKVY) (proposed)
2016	Pradhan Mantri Fasal Bima Yojana (PMFBY) to provide insurance coverage and financial support to the farmers in the event of failure of any of the notified crop as a result of natural calamities, pests, and diseases (India.gov.in- National Portal of India: 2016).
2016	National Agriculture Market, the e-trading platform that would usher in transparency which would benefit the farmers.

Source: Author

Under international commitments for agricultural trade liberalisation under the auspices of the Uruguay Round for Agricultural Agreement (URAA) and the ensuing WTO objectives, India embarked upon the process of addressing issues affecting market access, domestic support, export competition, subsidy and SPS, with a notable opening up of exports for common rice and subsequently wheat, in order to liberalise agricultural trade (Chatterjee, et al.: 2011).

Experts also point out that as Indian agriculture entered the realm of globalisation, when India joined the WTO and signed the AoA in 1995 and introduced a slew of trade, tariff, and administrative measures in order to bring about significant increase in trade in agriculture and agricultural exports (Tuteja: 2008). However, studies now show that this trade liberalisation posed serious challenges to Indian agriculture. Some of these included increasing reliance upon government support mechanisms (Bhalla: 1995; Bhalla: 2004; Grossman and Carlson: 2011), and protectionism and import competition from the developed countries. As a result, as studies prove, there was a gradual reduction in the sector's production and productivity, on the other (Bathla: 2011; Nehru: 2012).

Key policy changes were introduced over the next ten years. In 1997 led by the then H.D. Devegowda government, the bill to allow FDI in wholesale trade was passed by the Parliament (in, this bill was seen as infant steps towards the modernising retail business that led to allowing FDI of up to 51 per cent in single brand retailing in January 2006) (Parliament of India, Rajya Sabha, Department-Related Parliamentary Standing Committee on Industry: 2013). Further, the food processing sector also witnessed the de-licensing of Food Processing Industries (attracted considerable FDIs leading to a faster growth in processed food production) (Press Information Bureau: 2001; Birthal and Rao: 2011). Focusing on the need for India's agricultural sector to adapt to climate change, the then Prime Minister Atal Bihari Vajpayee had said:

“Food and nutritional well-being are priority issues for all of us. Agricultural sustainability is one of the key areas related to adaptation” to climate change (Vajpayee: 2002).

The New Seed Policy (2004) allowed entry of private sector, including major international firms and made it easier to import and export seeds, which would have traits of drought-tolerance, insect and pest-resistance and higher nutrient value and so on. It did not prohibit

the registration of GM seeds. Registration of transgenic seeds was however subjected to environmental clearance (Sharma: 2005; World Bank Group: 2014; Kolady, et al: 2012).

By the year 2001, India had accomplished the removal of QRs on agricultural imports (ET Bureau and Agencies: 2011). During 2001-2003, limitations on domestic and FDI (up to 100 per cent) in wholesale handling and storage were done away with and the Inter-Ministerial Task Force and Committee of State Ministers on Agricultural Marketing Reforms were applied. During this time the licensing requirements; stocking limits; movement restrictions on food grains and edible oils removed; and selective credit controls were lifted. These measures were aimed at strengthening agricultural marketing system in the country to benefit the farmers through the global market access opportunities, to encourage healthy competition among the market players and enhance the share of farmers in the determination of final prices of their agricultural produce. These reform measures sought to promote investment in market infrastructure, motivating corporate sector to undertake direct marketing and to facilitate a national integrated market (Press Information Bureau: 2002a; Government of India, Ministry of Agriculture: 2013; Patnaik: 2011).

The trade policy of 2004-09 announced new schemes for the agricultural sector to boost the export of fruits, vegetables, flowers and minor forest produce (Chatterjee, et al.: 2011). It allowed automatic approval for 100 per cent FDI for most processed foods, except alcohol and beer and those reserved for Small Scale Industries (SSIs). This comprehensive Foreign Trade Policy (FTP) was intended to create exports as effective mechanisms of economic growth by boosting job creation, especially in smaller towns and villages through enabling legislations. These policies included simplification of licensing procedures, reduction in transaction cost-neutralisation of incidence of taxes and duties on inputs meant for exports. For agriculture, the Vishesh Krishi and Gram Udyog Yojana (Special Agriculture and Village Industry Scheme) was launched that aimed to incentivise the export of Gram Udyog products i.e. village and cottage industry products (Government of India, Ministry of Commerce and Industry: 2004; Jain, et al.: 2010).

The National Horticulture Mission (NHM) of 2005 as a Centrally Sponsored Scheme was launched *to promote holistic growth of the horticulture sector through an area based regionally differentiated strategies* (Government of India, Department of Agriculture, Cooperation and Farmers' Welfare: 2016). Also, the Negotiable Warehouse Receipt and

Warehousing (Development and Regulation) Act, 2007 were approved by Cabinet. This would enable farmers to avail bank loans and avoid enforced the sale of their agricultural produce in the peak marketing season when there is a surplus in the market. It would encourage scientific warehousing of agricultural commodities (Department of Food and Public Distribution: 2015).

With an emphasis on reforms while speaking at the second Agriculture Summit (2006) in New Delhi, the then Prime Minister Manmohan Singh candidly acknowledged that:

“When we review our agricultural situation, it is clear that there are four deficits we need to bridge. These four deficits are (i) the public investment and credit deficit; (ii) the infrastructure deficit; (iii) the market economy deficit; and (iv) the knowledge deficit. Taken together they are responsible for the development deficit in the agrarian and rural economy. It will be the endeavour of our Government to bridge each of these deficits” (Singh: 2006c).

In furtherance of the objectives to bridge the gaps in food safety standard, the Food Safety and Standards Act was approved in 2006, was created for prescribing science-based standards for food articles and to regulate the production, storage, distribution, sale and import to assure availability of safe and quality food for human consumption (Government of India, Ministry of Law and Justice: 2006). The Rashtriya Krishi Vikas Yojana (RKVY) was launched in 2007 to reorient the agricultural development strategies in order to meet the various needs of the farmers and to enable the Central and State Governments to evolve a strategy to rejuvenate the agricultural sector (Goel and Bandopadhyay: 2014).

The National Food Security Mission (NFSM) was launched in 2007-08 to unveil a Food Security Mission for rice, wheat, and pulses. The objective of this Mission was to augment the production of rice by 10 million tonnes, wheat by 8 million tonnes and pulses by 2 million tonnes by the end of the Eleventh Plan (2011-12). Bans on the exports of wheat and rice during 2007-08 resulting from the global food crisis were lifted in the year 2011-12. The Mission was being carried forward in 12th Five Year Plan with new goals of additional production of food grains of 25 million tonnes of food grains comprising of ten million tonnes rice, eight million tonnes wheat, four million tonnes of pulses and three million tonnes of coarse cereals by the end of 12th Five Year Plan (National Food Security Mission: 2015). The main strategy for the National Food Security Mission was the adoption and promotion of improved technologies for nutrient management, soil-health improvement, pest management

and resource conservation (Hoda and Gulati: 2013). Some of the other initiatives undertaken by the Indian government for comprehensive agricultural growth include National Agriculture Development Programme, National Horticulture Mission, Cotton Mission, Oilseeds and Pulses Mission with objectives to expand the coverage of agricultural credit through banking, infrastructure for soil and fertilizer testing and marketing and food-processing. Sustainable agricultural development and induction of technology revolution in the agricultural sector have been recognised as an urgent pre-requisite in order to achieve the above-mentioned policy objectives.

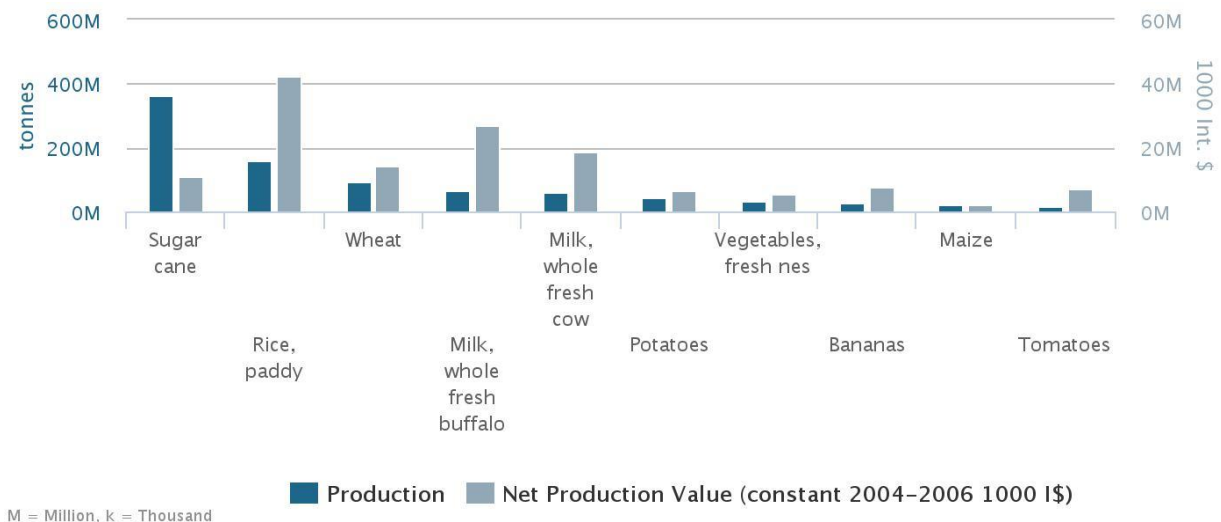
As a result of the combination of policies undertaken by the Indian government from time to time reflects India's ambitions to integrate itself into the global trading system while simultaneously aiming to feed its growing population well. India is the second largest producer of both wheat and rice in the world and, in the year 2012; it emerged as the largest exporter of rice in the world. It is also the world's largest producer of milk and the largest exporter of beef. India is also the largest producer of pulses, milk, tea, cashew and jute; and the second largest producer of sugarcane, wheat, rice, fruits and vegetables, cotton and oilseeds (Hoda and Gulati: 2013; World Bank Group: 2014; Pingali: 2015; India Brand Equity Foundation: 2014). The following graph (Figure 8) illustrate the leading producers of wheat, rice, milk, and beef in the world; and India's production of agricultural commodities in the year 2012 respectively.

Since the mid-1990s, the performance of the agricultural sector, however, has been inadequate, with a declining share of agriculture in India's GDP every year (Jenkins: 1999; Government of India: 2007). The following graph illustrates the share of agriculture and allied sectors to the total GDP of the country from 1995-96 to 2012-13.

The main causes of slow growth in agriculture that have been explained by economists are rapid economic growth and expanding urbanisation in India that has strengthened and diversified consumers' demands and placed pressure on existing agricultural production systems, marketing establishments, and related infrastructure (Landes: 2008a) leading to agrarian distress. Scholars have therefore suggested remedial measures on several areas like increased government expenditures on irrigation and rural roads, management and maintenance of irrigation systems especially in dry-land areas, a strengthened agricultural research and development system and more effective extension education, improvements in

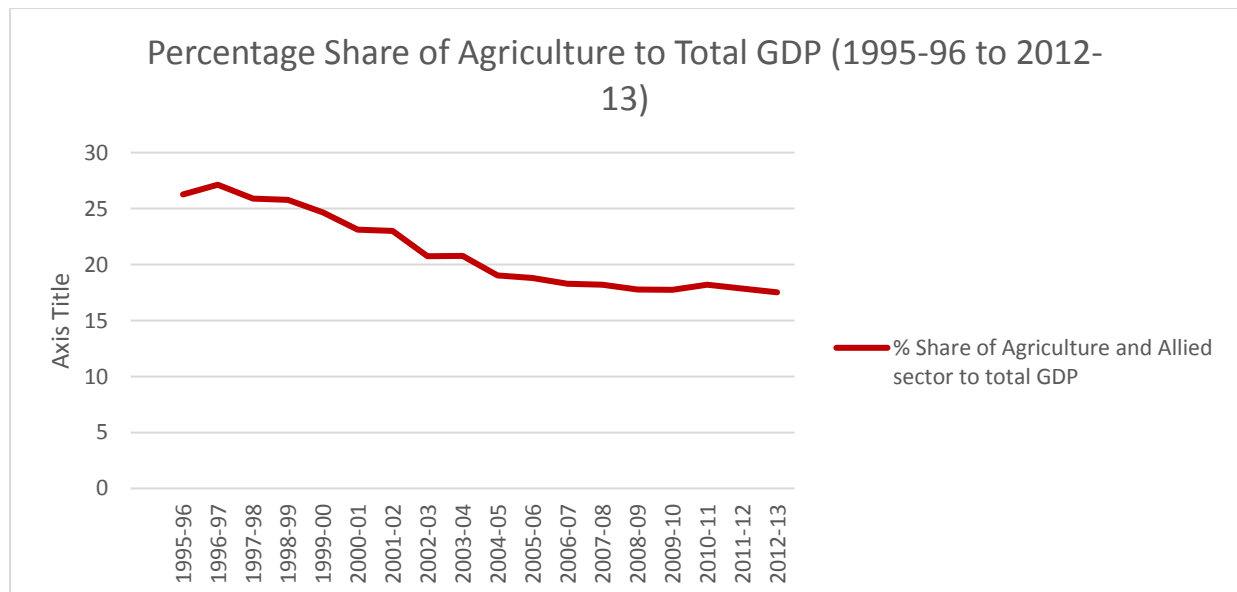
the production and distribution of quality seeds, and innovative steps in marketing and contract farming to support the diversification of Indian agriculture (Ahluwalia: 2005; Reddy: 2007; Lal: 2013; Puri: 2015). Also, in order to create a global agriculture in India, a strategy that promotes modification of the cropping pattern consistent with the evolving pattern of demand and development of marginalised and dry-land regions is needed (Reddy: 2007).

Figure 8, India’s Production of Agricultural Commodities, 2012



Source: FAOSTAT

Figure 9, Share of Agriculture and Allied Sectors to the total GDP of India (1995-96 to 2012-13)



Source: Central Statistical Organisation, New Delhi, and Ministry of Agriculture, Government of India

With an acknowledgment of the distresses in the agricultural sector, agricultural development and modernisation have remained the most important objective of Indian planning since the First Five Year plan. The strategy for reducing poverty and hunger has placed a great deal of importance on the agricultural sector, as the overwhelming majority of the population reside in rural areas and depend on agriculture as their primary source of income (Ahluwalia: 2005; Sharma: 2011). Planning for agriculture over the years has focused on the creation of rural infrastructure for providing scientific inputs and an outline of benefits for farmers to enable them to expand their production through the adoption of modern technology (Rao: 2005), faster diffusion of technologies and best practices among farming community through their participation in the developmental process (Sharma: 2011).

While the planning for agriculture has emphasised remedial measures to boost up the sector, yet Indian agriculture has been faced with a paradox. In spite of a high growth rate, India has more than 255 million food insecure people (Tandon and Landes: 2014). This has been attributed to the negligence of rural development and misallocation of resources. The average annual rate of growth in agriculture declined from more than 4 per cent per year during 1992-93 to 1996-97 to around 2 per cent per year during the period 1997-98 to 0.2 per cent in 2002 (The World Bank: 2016; von Braun, et al.: 2005), and continued to remain low at 2.5 per cent in 2012 (The World Bank: 2016). According to a study titled *India as an Agriculture and High-Value Food Powerhouse: A New Vision for 2030*, carried out by Confederation of Indian Industry and McKinsey, the actual potential of agriculture in India not been realised (CII-McKinsey Report: 2013). This gradual but notable decline in the growth rate of agriculture has necessitated the need to address the serious and imminent challenges that have adverse effects on food and nutritional security of the population along with food inflation (Sharma: 2011). Economists have called for addressing the serious challenges like infrastructure constraints, supply chain inefficiencies and significant problems in the diffusion of and access to information, in order to achieve faster productivity growth (Dev: 2004; Ahluwalia: 2000; Reddy: 2007; Mittal et al.: 2010).

As a result, one of the foremost important policy impacts was that the government initiated a National Agricultural Policy (NAP) in 2000 that emphasised upon the agriculturalists and farmers in order to give a comprehensive policy (Venkateswarlu: 1999). NAP acknowledged that agriculture had become a relatively unrewarding profession due to policy ignorance, unfavourable price regime and low-value addition, that has caused large-scale migration to

urban areas by abandoning the farming profession altogether. It was also understood that the situation was threatened as the integration of the agricultural trade in the global system unless immediate curative measures were taken (Suri: 2006). NAP aimed to strengthen the agricultural sector by attaining an excess of 4 per cent annual growth rate in agriculture based on efficient use of resources (Pain: 2007; Chand: 2005), with a focus on sustainable agriculture, food and nutrition security, generation and transfer of technology, inputs management, investment in agriculture and risk management (Chand: 2005). In order to counter these setbacks, NAP intended to exploit the vast underutilised growth potential of Indian agriculture, by strengthening rural infrastructure for rapid agricultural development, promoting agribusinesses, fostering employment opportunities in rural areas and securing a fair standard of living for the farming communities (Government of India, Ministry of Agriculture: 2000).

In order to boost agricultural trade, the 2002-07 Export-Import (EXIM) Policy of the Government of India emphasised upon the importance of agricultural exports and announced some vital measures to boost agricultural exports. For instance, there would be no export charges for all agricultural products (with the exception of onions and Niger seed); the procedural restrictions like for registration, packaging, etc. would be abolished; agricultural zones would be established to enhance access to international markets; governmental assistance would be provided for reducing costs incurred due to transportation, handling, and processing of export of selected agricultural commodities, as well as for packaging, strengthening of quality control mechanism and modernisation of processing units; and trade fairs and exhibitions would be organised periodically for greater awareness and participation (Krishnaveni and Gosh: 2005; Press Information Bureau: 2002b).

Further, in order to ensure a holistic development of agriculture and enhance its production and productivity to meet the food requirements of the country (Government of India, Ministry of Agriculture: 2007; Swaminathan (ed.): 2007), the National Agriculture Development Program and the NFSM were launched in 2007. The overall objective of both these programs was the improvement of agriculture and farmers' welfare, along with increasing the production of wheat, pulses, and rice for the nutritional security of the country's population (Press Information Bureau: 2014; Tuteja: 2011).

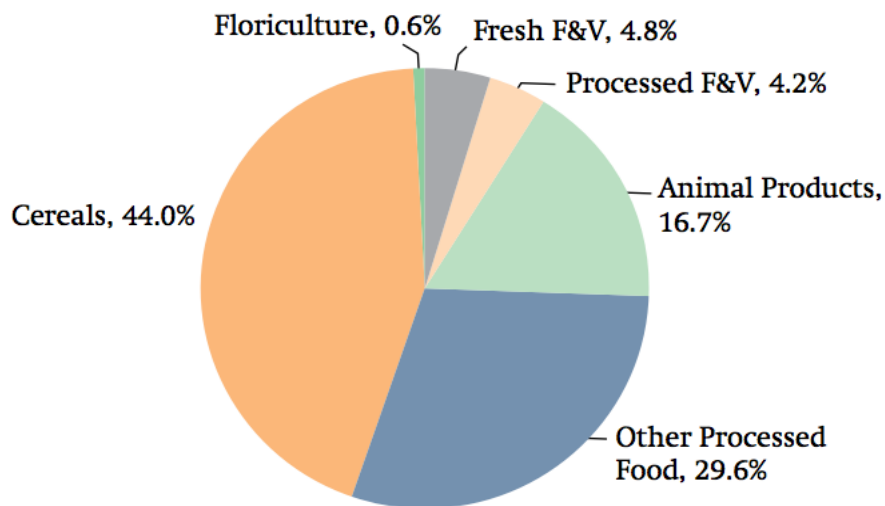
It was also realised that a well-developed food processing industry can stimulate higher agricultural productivity and growth through several channels. Examples include stable farm prices; reduced wastage as produce unsuitable for wet markets would be processed into more value-added consumption goods, increasing returns to farmers; and diversification into crops needed for processing, potentially transforming traditional “food” crops into “cash” enterprises. Also, processed exports are an important outlet for agricultural output. Exports of processed foods now constitute almost 48 per cent of rapidly expanding agricultural exports, almost doubling in (real) value over the past three years (World Bank Group: 2014). As a result, many government agencies like the National Bank for Agriculture and Rural Development (NABARD), National Horticulture Board (NHB) and Agriculture and Processed Foods Export Development Authority (APEDA) have been promoting agro-processing with various schemes. The policy steps for promoting growth of agro-processing included temporary removal of licensing requirements for stocking and movement of various food grains and oilseeds by some state governments, removal of plant scale restrictions on trading in some fifty-four commodities and setting up of new commodity exchanges, and amendments to Agriculture Produce Market Committee (APMC) Act in some states to facilitate direct procurement from farmers by the agro-processing entities that undertake contract farming, and development of private markets (Landes and Gulati: 2004).

The composition of exports and imports of India has revealed how food processing industry can stimulate higher agricultural productivity and growth. According to a World Bank report in 2014 titled *Republic of India: Accelerating Agricultural Productivity Growth*, it was highlighted that the food processing sector has the potential to transform traditional “food” crops into “cash” enterprises. The following diagram shows this: This has been illustrated by the following pie-diagram (Figure 10). Figure 11 depicts the top agricultural imports of India in the year 2012.

By 2006-07 India’s policy revealed an increasing reliance upon technology to improve its agricultural productivity. Indian agricultural policy sought to encourage farmers to adopt improved ways of farming and technologies in dairy, fisheries, and livestock and meeting the rapidly diversifying food needs of India's rapidly growing population. The National Commission of Farmers headed by Dr. M.S. Swaminathan recommended 2006-07 to be the ‘Year of Agricultural Renewal’ (Swaminathan: 2006). Studies conducted by IFPRI reveal that there was a shift to an "evolution of a production pattern in line with the demand pattern"

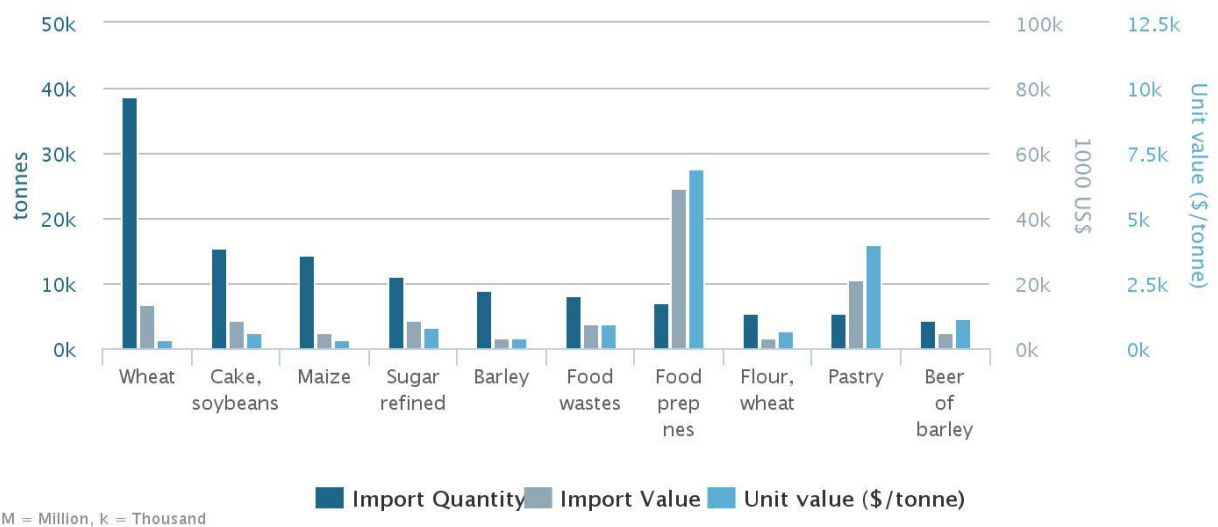
leading to an emphasis on other agricultural commodities like oilseed, fruit, and vegetables (Mullen et al: 2005; Birner, et al.: 2011).

Figure 10, Composition of Food Exports in India, 2012-13



Source: The World Bank Group (2014)

Figure 11, Top Agricultural Imports of India, 2012



Source: FAOSTAT

The meat and poultry industry has also witnessed rapid growth in India. Despite traditional vegetarian dietary preferences, economists suggest that it has played a significant role in the transformation of Indian agriculture, as this sector has received greater policy thrust. Studies suggest that around 20-30 per cent of Indian consumers have strict vegetarian preferences for food owing to religious considerations, and for the remaining around 70-80 per cent meat

consumption is limited more by factors of low-income than by religious preferences (Landes: 2005; Landes and Hjort: 2015). The Investor's Portal⁹ of Ministry of Food Processing Industries, Government of India has highlighted that due to favourable socio-economic factors such as changing eating habits and the health consciousness towards protein-rich diet, higher incomes, urbanisation, the demand for meat and poultry products has witnessed an increase in demand (Landes and Burfisher: 2009; Landes: 2005; National Council of Applied Economic Research (NCAER): 2014). Consequently, it has led to increasing the incomes of those in the business, created employment opportunities and also contributed to foreign exchange earnings through exports. It is interesting to note that it exported in 2013-14 \$ 4.3 billion worth of buffalo meat, \$ 0.11 billion worth of sheep and goat meat, \$ 1.11 million worth of processed meat and \$ 92.83 million worth of poultry products¹⁰.

In its report titled *Agriculture Policy: Vision 2020*, the Planning Commission of India, in 2012, candidly recognised the backwardness of Indian agriculture and put forth solutions, the implementation of which would open bright avenues of expansion and growth of this sector (Planning Commission: 2012; Dev: 2012). Some of the strategies that it put forth in the document were to enhance yield of major commodities, like rice, coarse grains, pulses and oilseeds, integrated nutrient management in the soil, stopping the deceleration in total factor productivity through public investment in irrigation, infrastructure development (road, electricity), research and extension and efficient use of water and plant nutrients; bridging yield gaps especially in states of Jharkhand, Bihar, Orissa, Assam, West Bengal and Uttar Pradesh; diversification of agriculture and value addition, post-harvest management, increased investment in agriculture and infrastructures; empowering small farmers and fighting poverty; use of remote sensing and Geographic Information System (GIS) technologies for land and water use planning as well as agricultural forecasting, market intelligence and e-business, contingency planning and prediction of disease and pest incidences (ICAR: 2015). The CII put forth its recommendations envisaging a target average growth of 4 per cent in the agriculture sector in the Twelfth Five Year Plan (2012-2017) period by exploring bio-agriculture technologies. Biotechnology presents numerous innovative procedures to develop high-yielding crops that have the potential to counter various stresses associated with Indian agriculture and combat food insecurity in the country.

⁹ Investor's Portal of MOFPI, Available at: <http://foodprocessingindia.co.in/meat-and-poultry.html>

¹⁰Directorate General of Commercial Intelligence and Statistics reports for Agricultural and Processed Food Products Export Development Authority, Available at: http://apeda.gov.in/apedawebsite/six_head_product/animal.htm

An Accenture-CII study found that in the public arena, the debates on biotechnology have often been limited to GM crops, and there was an urgent need to look at the complete array of solutions provided by this field of knowledge (Accenture-CII Report: 2013).

In the year 2013, the National Food Security Act (NFSA) was enacted by the Parliament, which would ensure food to over 60 per cent people in the country who either suffer or were likely to suffer food deprivation, and allow them a life of ‘*dignity*’ (Government of India, Ministry of Consumer Affairs, Food and Public Distribution, Department of Food and Public Distribution: 2013), by receiving subsidised food grains under Targeted Public Distribution System (National Food Security Mission, Government of India: 2013), and enable them to lead healthy and nourished lives (Yojana: 2013) Experts believe this legislation to have the capacity to address the problem of food insecurity, from the current welfare approach to a rights based approach (Government of India: 2013). It would cost the exchequer around 1 to 1.5 lakh crore Indian rupees (Parikh: 2013). There are scholars who question the impact of the Act and whether its benefits would truly reach the target citizens, and that it would be an enormous strain on the already burdened fiscal system of the country (Parikh: 2013; Gulati, et al.: 2012). Nevertheless, experts have underscored that a successful implementation of the NFSA would require political conviction and commitment to fight malnutrition (Bhushan: 2013; Swaminathan: 2013) to ensure that the truly needy people are not excluded from the system (Swaminathan: 2013). Thus, the NFSA marks the beginning of a long process that would require the governments to look at the dynamic factors affecting food security (Yojana: 2013). An IFPRI study titled *2011 Global Food Policy Report* merited the NFSA as being the world’s largest anti-hunger program (Fan: 2011) that gives the people of India ‘right to food’ (Yojana: 2013).

Hailing the Food Security Act, President Pranab Mukherjee remarked on the 85th foundation day of Indian Council of Agricultural Research (ICAR) that:

“To alleviate poverty, promote inclusive growth on a sustainable basis, sustain food security, increase employment opportunities and boost rural incomes, our agriculture sector must be robust” (Mukherjee: 2013).

National Mission for Sustainable Agriculture (NMSA) of 2014 has been is envisioned as one of the eight Missions under the National Action Plan on Climate Change for the promotion of sustainable agriculture by aiming to renovate it on the designs of a climate resilient production system using viable adaptation and mitigation measures in the sphere of crops and

animal husbandry (Government of India, Ministry of Agriculture: 2014; Swain: 2014). Other thrust areas include dry land agriculture, biotechnology and risk management guided by the objectives to transform agriculture into ecologically sustainable agricultural production, ensuring rightful access to food, enhancing livelihood opportunities and contributing to economic stability throughout the country and thereby attain food security for all (Government of India, Ministry of Agriculture: 2014).

The present government of Prime Minister Narendra Modi has focused on revamping India's agriculture and has repeatedly vouched for the development of India's agriculture. He stated:

“Research and innovation is a must in the field of agriculture and for a second Green Revolution, the aim has to bring together the agro-economists, agro-scientists and all stakeholders to meet the needs of India as well as global food security needs” (Modi: 2016a).

Apart from focusing on enhancing agricultural production and productivity, the present-day Government of India has focused on improving the soil health, access to irrigation, e-marketing and providing an improved crop insurance scheme that covers the entire gamut of risks at minimum premiums (Modi: 2016b). This elaborates the increasing focus of policymaking towards the agricultural sector, which is the pivot of India's economy and its growth.

Thus, the above description of the agricultural sector and the relevant policies governing it in both USA and India exhibited the importance of the sector in the economy. It reinforces the fact that the sector affects all aspects of health- human, animal, plant, environmental and economic-either directly or indirectly. Agriculture as an enterprise and activity underpin the foundations of the economies of both countries and promote socio-economic well-being for their populations. Given this background, India's drive for economic and social development, gradual modernisation, and development of agriculture and a history of exchanges of knowledge, skill and resources made it a fit case for a close interaction between the political and diplomatic establishments of India and the US to pursue a full-fledged agricultural cooperation in the 1990s. The next chapter (Chapter Three) incorporates a study and analysis of US-India agricultural cooperation that ensued with a realisation of mutual interests for both countries as a result of committed leadership and diplomatic negotiations, and how they are playing a leadership role in through their techno-scientific expertise in Africa in ensuring food and nutritional security for all.

CHAPTER 3

Diplomatic Negotiations and Progress in Agricultural Cooperation: Collaboration for Food Security

Sections:

3.1 Trends, Patterns and Nature of Agricultural Cooperation between US and India

3.1.1 US' Agricultural Imports from India

3.1.2 India's Agricultural Imports from the US

3.2 Acceleration in Bilateral Agricultural Cooperation

3.3 Deepening of Understanding on Agriculture between US and India

3.4 Contribution of USAID and ICAR in Promoting International Collaboration for Agricultural Partnership

3.5 Initiative for Food Security

CHAPTER 3

Diplomatic Negotiations and Progress in Agricultural Cooperation: Collaboration for Food Security

It has often been noted that some form of cooperation emerges between countries due in part to the will and in part the necessity of the circumstances. Cooperation was described as a goal-oriented action that would entail implicit and explicit negotiations and policy adjustments. In the early years of US-India agricultural relations, it was in the form of US technological assistance and food aid. The food aid, in particular, was directed towards helping the India realise its goals of alleviating hunger and poverty. The technological assistance was focused on the development of agriculture by engaging the US LGUs, USAID and the Ford and Rockefeller Foundations. During the Cold War period, this aspect of the relationship experienced crests and troughs. Despite the stresses and strains that characterised the US-India relations during the Cold War, deliberations on agricultural cooperation continued. Political irritants did not halt the pursuit of agricultural negotiations by the two countries, which is imminent from the visits of the three Indian Prime Ministers Morarji Desai, Indira Gandhi and Rajiv Gandhi to the US in 1978, 1982 and 1985 respectively. These visits provide ample illustration of the thinking on the subject. Agricultural issues were a part of the discussions with the then Presidents Jimmy Carter and Ronald Reagan respectively. PM Desai and President Carter unequivocally supported sustained economic growth in India through a strong agricultural base (Carter: 1978c). During the visit of the then Minister of External Affairs, Atal Bihari Vajpayee in April 1979, the India-US joint commission accorded utmost importance to agricultural cooperation and established the Agricultural Sub-Commission as an expert group of scientists and researchers (Government of India, Ministry of External Affairs: 1980). The focus of the discussions shifted from mandatory food imports and food aid to enhanced collaboration in areas of fuel wood research, nitrogen fixation and efficient uses of fertilizers in irrigated lands and introduction of latest US weather modelling techniques for agricultural benefits to India (USAID, New Delhi: 1983; Government of India, Ministry of External Affairs: 1988).

In main, agricultural was an area of cooperation that was poised to have implications for the future, where the benefits would not just be experienced in the US and India but would

accrue to other developing and underdeveloped countries as well. Both sides were convinced that they could “improve their understanding of their common interests and responsibilities in the equitable operation of the global economic system” (Carter: 1978b; Reagan: 1987; Ronald Reagan Presidential Library and Museum Archives: 1987). As a result of the initiatives of the leadership on both sides, joint projects in agricultural research, extension, education and water conservation technologies for Indian agriculture, among others were pursued. These leaders believed that continuation of collaboration in agriculture was both desirable and doable.

The end of the Cold War, which coincided with India’s own economic reforms, was the threshold that was set to pave the way for an era of close proximity in US-India relations (Tellis: 2007; Baru: 2006). This has been evidenced by the creation of a warmer climate for improving US-India ties with significant impetus being accorded to explore areas critical to the survival of humanity. While the terror attacks of 9/11 brought security cooperation into the headlines yet a reinvigorated trend for partnership in agriculture was observed during the Presidencies of George W. Bush and Barack Obama (US Department of State Archives: 2005a; The White House: 2010a). Persisting food shortages and challenges of hunger and food insecurity in India brought agriculture as a crucial component of the comprehensive cooperation agenda of US-India strategic dialogue. According to key policy officials in both countries, the reasons for positive progress in the negotiations was accredited to the candid discussions by both sides (Tellis: 2013; Sidhu: 2016). Therefore, since the year 2000, agricultural cooperation became a lead motif in bilateral discussions. More specifically, the focus changed to trade in agricultural products and the various modalities and mechanisms that may be required to bring it about. In order to gain a better understanding of the complex causalities that explain the agricultural trade policy followed by both countries, this chapter begins with an explanation of the trends and nature of agricultural cooperation between them. In particular, it focuses on the changing quality of agricultural cooperation between the two after the Cold War. It studies and tabulates the agricultural exports and imports between the two countries to enable an understanding of the criticality of the quantitative exchanges, establish the impact on the agricultural sector and the economies of both countries.

Further, this chapter analyses the accelerating trend in the bilateral agricultural cooperation and how that led to a deepening of the relationship in agriculture. It also traces the ways in which the pronounced bilateral character of agricultural cooperation expanded to encompass

other countries of the world as well on the issue of food security. Finally, this chapter also studies the instrumental role played by the USAID and ICAR since the first Green Revolution in facilitating the two governments' initiatives for the second Green Revolution and to address the challenge of global food insecurity.

3.1 Trends, Patterns and Nature of Agricultural Cooperation between US and India

The end of the Cold War set the stage for a warmer climate for the US and India to cooperate on the persisting food shortages and hunger in India. In 1991, the USAID established the Agricultural Biotechnology Support Project (ABSP) as the premier US-sponsored agricultural biotechnology program designed to assist developing countries like India in accessing and using biotechnology to alleviate local agricultural constraints (Brink: 2003). After India embarked on the process of economic reforms and joined the WTO in 1995, the US was convinced that India would prove to be a profitable market for its agricultural producers. Gradual liberalisation of India's agricultural sector over the next few years and positive changes in the outlook of the US about India (Celeste: 2015) generated considerable interest in the USDA. The USDA represented by the FAS established its office in New Delhi in the year 2000. The objective was to represent the interests of American agriculture and assist exporters of American agricultural products in assessing and developing markets in the country. It also assists Indian importers to find US suppliers for the required agricultural products (Mustard: 2013).

Since 2001, ERS of the USDA has been involved in carrying out research on Indian agriculture. The ICAR has pursued collaborative studies on a wide range of economic issues that affect the prospects for Indian agriculture with NCAER, New Delhi, and the Indian Statistical Institute. On both sides, the research has focused on topics related to the interests of US and Indian agricultural commodity markets, which include wheat, corn, pulses, poultry, oilseeds, oilseed products, cotton and apples (Landes: 2005; Chand: 2014).

In spite of the fact that agricultural cooperation began to play an increasingly important role in the US India relationship in the post-Cold War era, American view held that even though India had removed quantitative trade restrictions in the year 2000 that allowed import of a variety of foods, yet tariffs remained high, in the range of 30 to 60 per cent on most food

items (ERS of the USDA: 2000). This resulted in the rate of American agricultural exports to India remain low, reaching a mere \$260 million in 2004, where most of these were in the line of high-value consumer products, like processed and packaged foods (Landes: 2005). Thus, even as economic reforms by India raised expectations Indian agricultural market remained unprofitable for the US exporters. The primary reason cited for this was that many US agricultural products were not set on competitive pricing in India's market (US International Trade Commission: 2009).

In an interview¹¹, Maurice Landes, Lisa Ahremjian, and Marcella Wittings at the USDA, Washington DC (as part of the field trip by the Fulbright grant), these economists who were also key policy officials noted the positive environment of agricultural negotiations between US and India. They emphasised how there was immense scope for investment in production, distribution, and marketing that would offer plenty of food choices to millions of consumers in both countries (Landes: 2015; Ahremjian: 2015; Wittings: 2015). Further, they also pointed out how as the growth of Indian economy began to assume greater importance in the world, it was imperative for the US to pursue extensive studies on Indian agriculture. Similarly, during the interview¹² with Ramesh Chand (previously at ICAR, and now at National Institution for Transforming India (NITI) Aayog) it was clear that India has been receptive of the importance being accorded to it as a vital partner in pursuing agricultural research and development). Agricultural trade demonstrates the ways in which the comparative advantages of both countries are exploited (Ahmmad, et al.: 2015). The pattern of bilateral agricultural exports and imports between the US and India provides some evidence to show great potential for expanding US-India agricultural cooperation in the years to come. It further establishes that agricultural trade between the two has proven to be an important mechanism for growth and development of the agricultural sector on both sides.

3.1.1 US' Agricultural Imports from India

This section provides a brief description of the US imports of top products from India's agriculture and its allied products. Compiled from the USDA database, the statistics are

¹¹ Personal Interview with Maurice Landes, Lisa Ahremjian and Marcella Wittings on November 2, 2015 at US Department of Agriculture, Washington, D.C.

¹² Personal Interview with Ramesh Chand on December 5, 2014 at India International Center, New Delhi.

available from the year 1999 until 2014. For purposes of clear depiction of the value of imports of various items, these commodities have been grouped into three, in terms of their comparable values.

Figure 12 shows that the US has been importing essential oils for flavouring food and drinks, as well as in ingredients in perfumes, cosmetics and cleaning products from India. It has witnessed an over 6-fold increase in the quantity and hence value has increased from \$ 27 million in 1999 to \$ 173.4 million in 2014, so much so, India is the second largest exporter of these essential oils to the US after Ireland.

This figure also shows that the quantum of increase in imports of oilseeds from India (the uses of which include animal feed, flour, and meal) has been around 10 times, i.e. from \$ 17.1 million in 1999 to \$ 168.7 million in 2014, making India the third largest exporter of oilseeds to the US, after Canada and Brazil.

The US imports of Indian vegetable oils which are the sum of crude, refined and other vegetable oils like tropical oils, increased from \$ 40.5 million in 1999 to \$ 93.9 million in 2014 (Figure 12). The primary contenders of Indian exports in this category are Canada and South East Asian countries like Indonesia and the Philippines.

Although there has been a massive 1207 per cent increase in the total value of prepared fish and shellfish (which includes cured and smoked fish), imported from India to the US, i.e. from \$ 11.4 million in 1999 to \$ 149 million in 2014 (Figure 12), yet it ranks seventh after China, Canada, Indonesia, Chile, Vietnam, and Thailand.

India ranks fifth as the exporter of total grains and products (which is the sum of bulk grains, milled grain products and cereal and bakery preparations, with the exclusion of grain for seed use, potato flour, and meal). The value of US imports of these grains and products increased from \$ 44.7 million in 1999 to \$ 290.8 million in 2014, thereby registering a 550 per cent growth (Figure 9).

India is the second largest exporter of rice and its products to the US after Thailand. Figure 12 shows that the Indian exports have been steadily rising since 1999, with a notable decline between 2008-2008-2010, and has been rising thereafter. This decline can be attributed to the

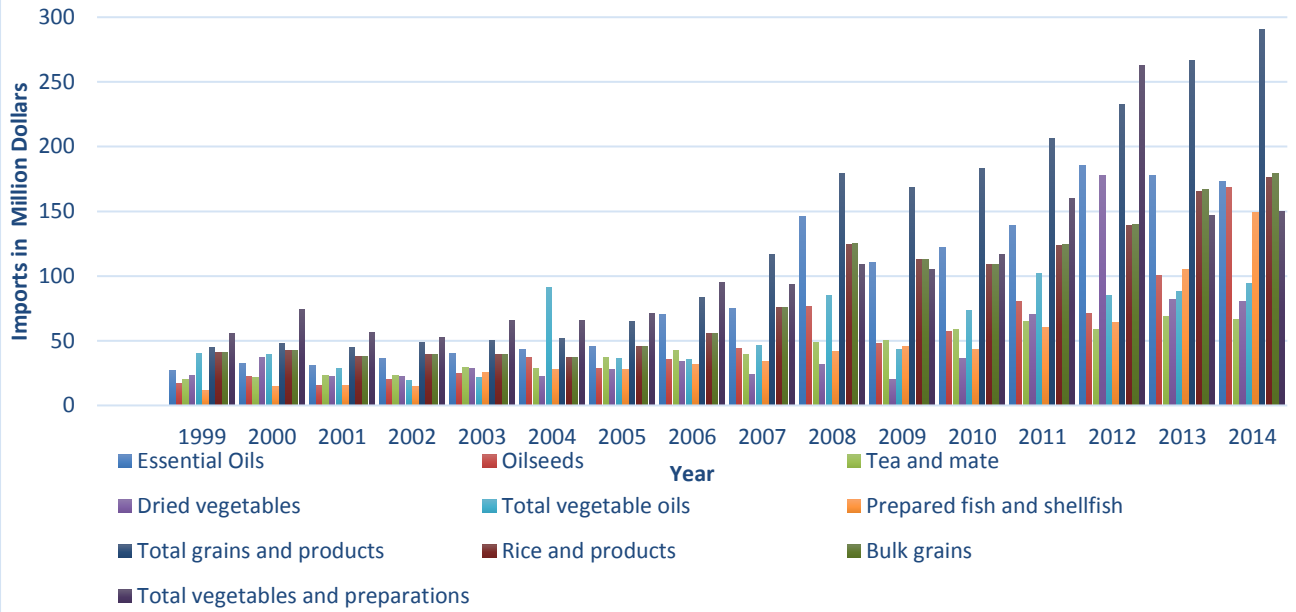
pressures generated by the global food crisis of 2008-09, which had severe food security implications for India too, given the fact that rice is a staple food for almost the entire country. US imports of bulk grains from India like wheat, corn, etc. also shows a similar trend, but nevertheless has demonstrated a 4.3 times increase in the value from \$ 41 million to \$ 179.1 million in 1999 and 2014, respectively.

Figure 12 shows that the exports of Indian tea and mate increased by over 200 per cent since 1999. Its exports to the US ranks fourth after China, Argentina, and Canada. India exports fresh, frozen, dried, preserved and prepared vegetables as well as legumes and pulses to the US. The total exports of vegetables and preparations increased from \$ 55.3 million in 1999 to \$ 150 million in 2014, making India the seventh largest exporter of these products to the US, after Mexico, Canada, Peru, China, Spain, and Guatemala. Exports of dried vegetables including legumes and pulses has seen a 3.5 times increase since 1999. It is interesting to note that India was the third largest exporter in this category (after Canada and China) to the US as of 2014. Although domestic food inflation and global food crisis caused the exports to dip to a meager \$ 20 million in 2009, it rose by an impressive \$ 178 million, by over 15,000 per cent in 2012. It was in this year that India was the largest exporter of dried vegetables to the US.

Figure 13 shows the value of US Imports other edible products, total fish and shellfish, spices, tree nuts and cashew nuts from India. Other edible products which include roots, leaves, seeds, herbs, mucilage and other plant parts used as medicaments, hop cones saps, extracts, natural gum and food thickeners, witnessed an impressive 94.05 increase in the US imports from India, i.e. from \$ 95.4 million to \$ 1340.90 million in 1999 and 2014, respectively. India is the leading exporter to the US in this category. Interestingly, the value of exports of these items to the US was at a high of \$ 3521.60 million in 2012, but as the data reveals, the value declined thereafter.

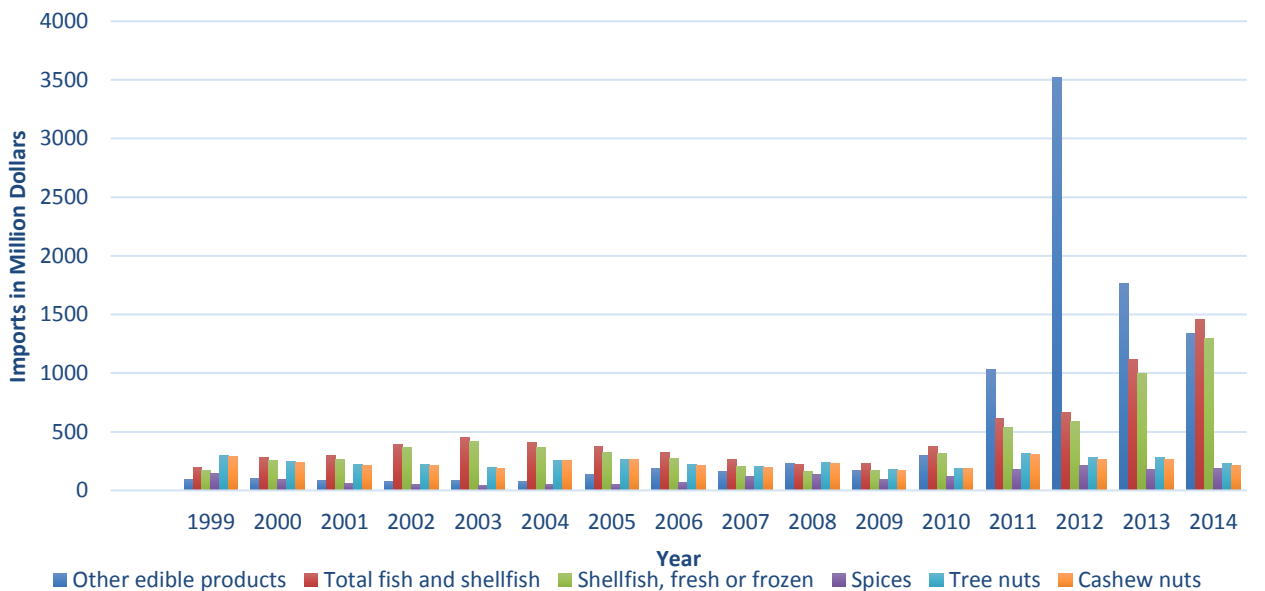
Figure 13 also shows that India is the seventh largest exporter of fish and shellfish (a sum of fresh, chilled, frozen and prepared fish, fish fillets, and shellfish, excluding live fish) to the US. The value of American imports from India has risen by over 600 per cent since 1999 until 2014. Similarly, fresh or frozen shellfish (with the exclusion of prepared shellfish) exports from India to the US witnessed a seven-fold increase during the above period. India is the second largest exporter to the US in this category after Canada.

Figure, 12: US Imports of Essential Oils, Oilseeds, Tea and Mate, Dried Vegetables, Total Vegetable Oils, Prepared fish and shell fish, Grains and products, Rice, Bulk Grains and Vegetables from India



Source: USDA

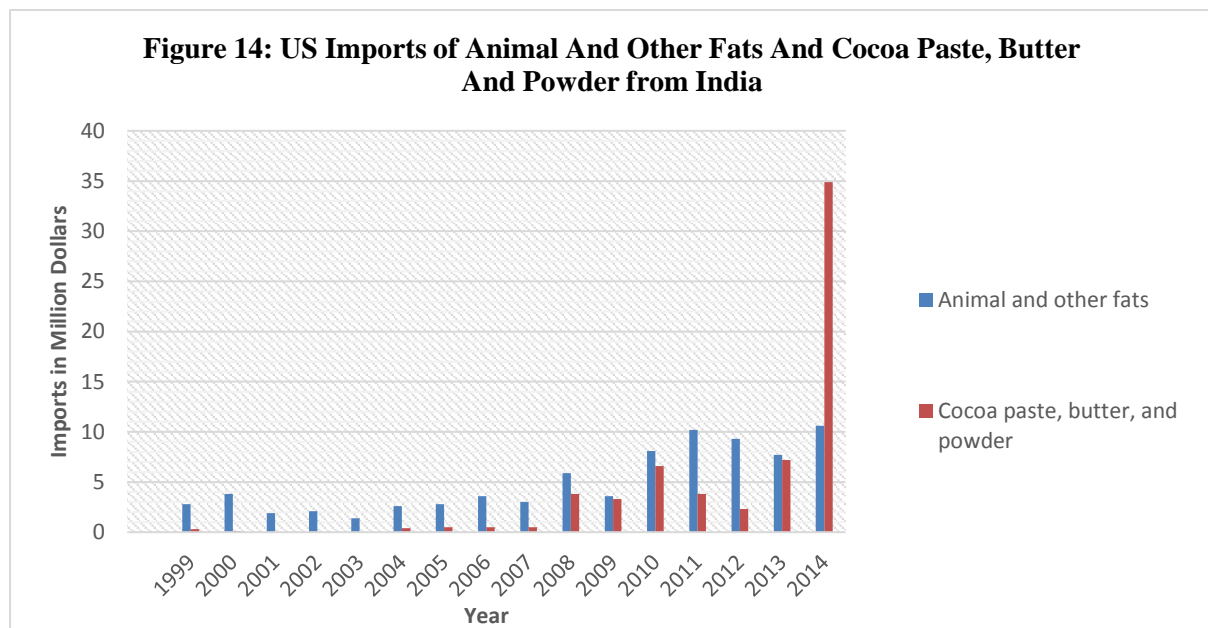
Figure, 13: US Imports Other Edible Products, Total Fish And Shellfish, Spices, Tree Nuts And Cashew Nuts from India



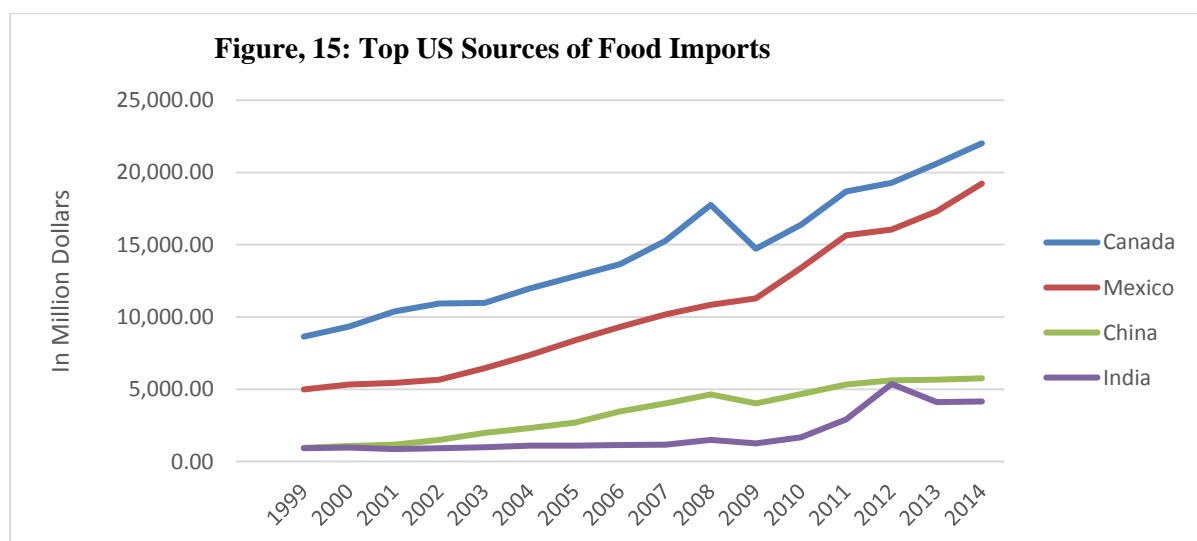
Source: USDA

As is clear from Figure 13, India’s export of spices to the US witnessed a decline in the value since 1999 to 2006, i.e. from \$ 144.6 million to \$ 66.6 million and almost doubled for the

next two years until 2008 and fell by \$ 36 million in 2009. From 2009 until 2012, the value of exports of Indian spices increased impressively by 113 times and then slowed down. It must be noted that from 1999 to 2013, India was the largest exporter of spices to the US and was overtaken by the Vietnamese exports in 2014. On similar lines, India has been faced with stiff export competition in the US market from Vietnam’s exports of tree nuts, both shelled and un-shelled. From 1999 to 2006, India was the leading exporter of tree nuts, but since then was overtaken by Vietnam. In the like fashion, from 1999 to 2007, India was the largest exporter of cashew nuts to the US but was overtaken by Vietnam thereafter.



Source: USDA



Source: USDA

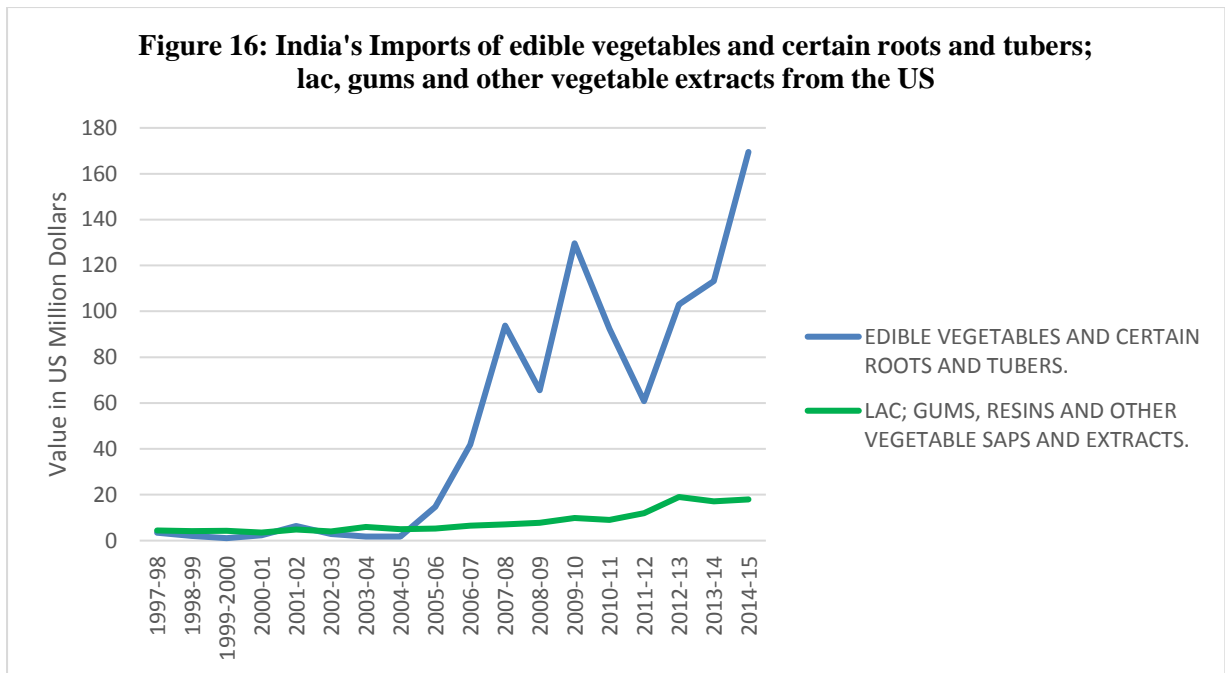
Figure 14 shows the US imports of animal and other fats and cocoa paste, butter and powder from India from 1999 to 2014. From 1996 to 2006, India was the second largest exporter of animal and other fats like fish, margarine and vegetable fats after Canada. In 2014, it became the fifth largest exporter after Canada, Mexico, Peru and New Zealand. Nevertheless, India's own exports have witnessed a gradual increase by around four times since 1999 until 2014, i.e. from \$ 2.8 million to \$ 10.6 million. The figure also shows that India has demonstrated an exemplary 116.3 times rise in its exports of cocoa paste, butter and powder to the US. From a meager value of \$ 0.3 million in 1999, it increased by over 3,300 per cent to \$ 34.9 million in 2014.

In all, India is one of the top sources of US food imports. It ranks fourth after Canada, Mexico, and China. Figure 15 below evidence this.

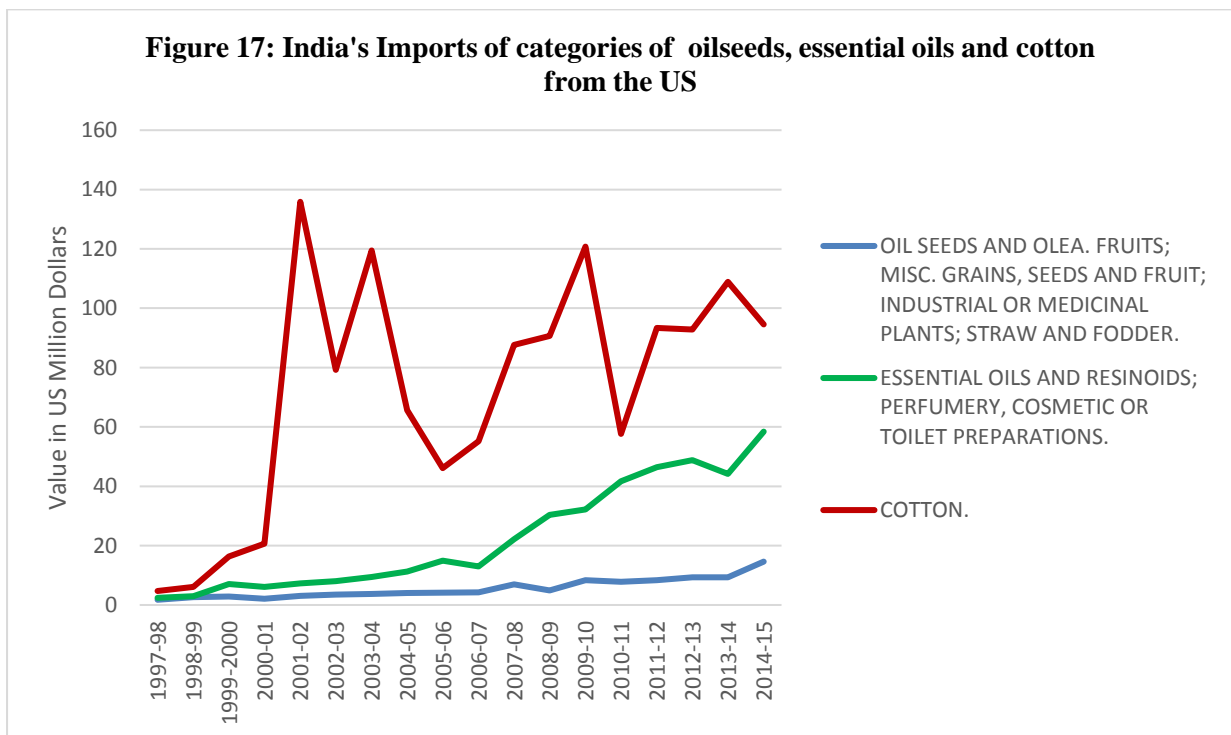
3.1.2 India's Agricultural Imports from the US

This section provides a brief description of Indian imports of the top products from US' agricultural and its allied products. Compiled from the database of Export-Import (EXIM) Data Bank of the Department of Commerce, Government of India, the statistics from 1997-98 until 2014-15 have been incorporated. For purposes of clear depiction of the value of imports of various items, these commodities have been grouped into five, in terms of their comparable values.

Figure 16 shows the imports of edible vegetables and certain roots and tubers; lac, gums and other vegetable extracts from the US. With a meager value of around \$ 4 million in 1997-98, the US exports of edible vegetables and certain roots and tubers to India, there was an increase by 154 times to \$ 169.53 million in 2014-15. There has been a consistent increase over the years in the value of the exports of lac, gums and other vegetable extracts from the US to India. It increased by over thirteen times from \$ 4.42 million in 1997-98 to \$ 17.97 million in 2014-15.



Source: Export-Import Data Bank, Department of Commerce, Government of India

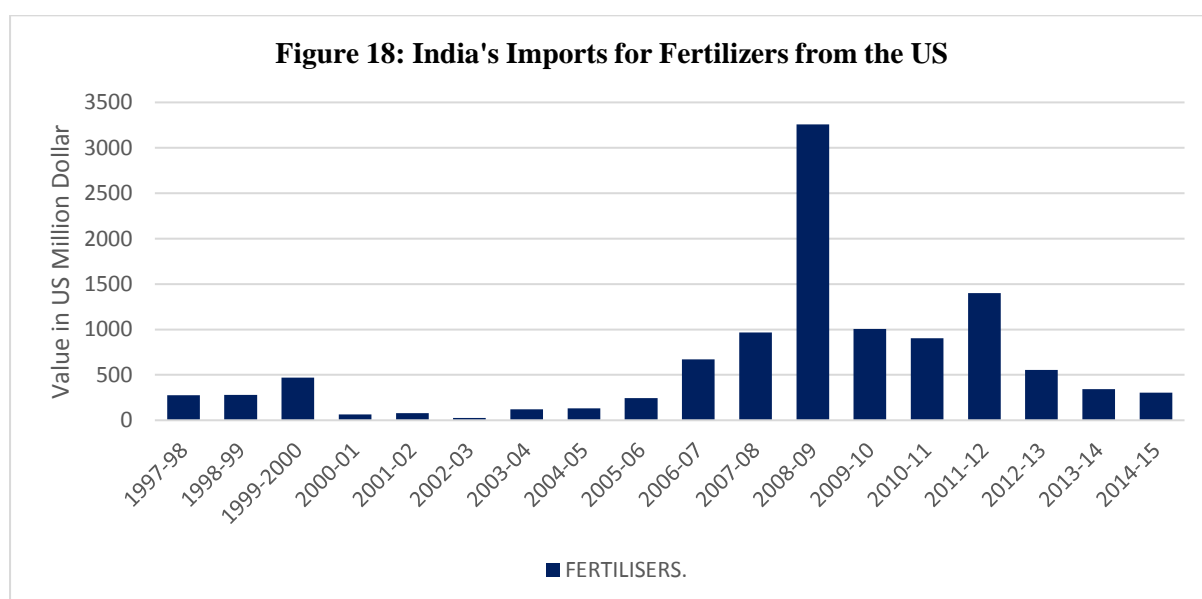


Source: Export-Import Data Bank, Department of Commerce, Government of India

Figure 17 shows a gradual increase in the import of oilseeds and olea, fruits, miscellaneous grains, seeds and fruits, industrial or medicinal plants, straw, and fodder. This category

witnessed an eight-fold increase from \$ 1.75 million to \$ 14.61 million in 2014-15. The Indian demand for essential oils for perfumery, cosmetic or toilet preparation has seen a twenty-four-fold increase since 1997-98, i.e. from \$ 2.41 million to \$ 58.2 million in 2014-15. The figure also demonstrates the tremendous increase in the export of cotton to India by the US. It increased from \$ 4.71 million in 1997-98 to 135.87 million in 2001-02 but declined thereafter. But as the figure shows, it continues to remain an important source of Indian imports.

India's import of fertilizers from the US is depicted in the bar-graph in Figure 18. Fertilizers, an important input of maintaining India's agricultural health, witnessed a seventy per cent increase from 1997-98 to 1999-2000, valued at \$ 468.42 million, but declined to \$ 26.56 million in 2002-03. After this, the imports picked up and reached the peak of import demand in 2008-09 at \$ 3256.24 million. By 2014-15, the import of fertilizers from the US was valued at \$ 303.99 million.



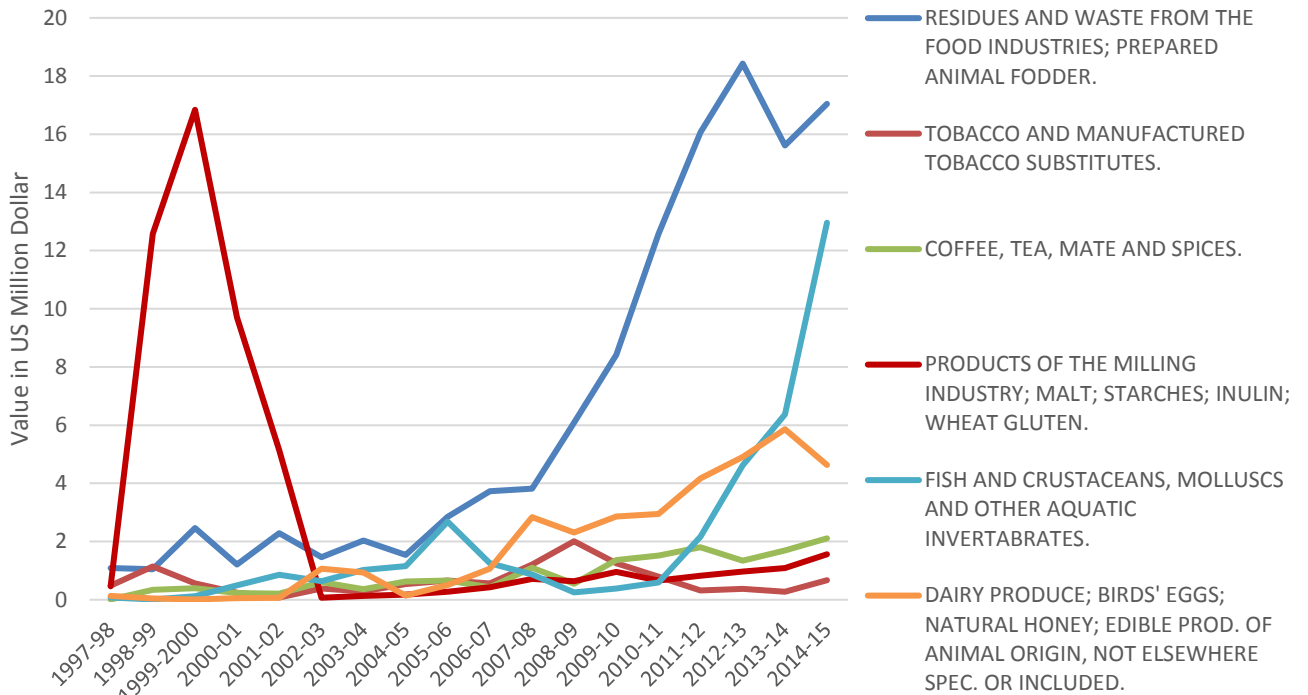
Source: Export-Import Data Bank, Department of Commerce, Government of India

Figure 19 shows that residues from the food industries that are used as animal feed gradually increased from 1997-98 until 2007-08, i.e. from \$ 1.09 million to \$ 3.8 million. From 2008-09 until 2014-15, the value of these imports by India increased sixteen-fold to \$ 17.04 million. The imports of tobacco and manufactured tobacco substitutes witnessed a gradual increase from \$ 0.48 million in 1997-98 to \$ 0.56 million in 2006-07, and increased by more than twice in 2008-09 and began to decline thereafter. Imports of coffee, tea, mate, and

spices, produce of the milling industry, malt, starch, dairy products, natural honey, etc. from the US have also witnessed a consistent increase in the import demand from the US by India. Products of the milling industry, malt, starches, inulin and wheat gluten, in particular, witnessed a sharp increase from 1998 to 2000 but experienced a sharp decline soon after. The figure also shows that India's imports of fish and crustaceans, molluscs, and other aquatic invertebrates increased gradually from 1997-98 to 2010-11, but experienced around twelve times increase by 2014-15 to \$ 12.96 million.

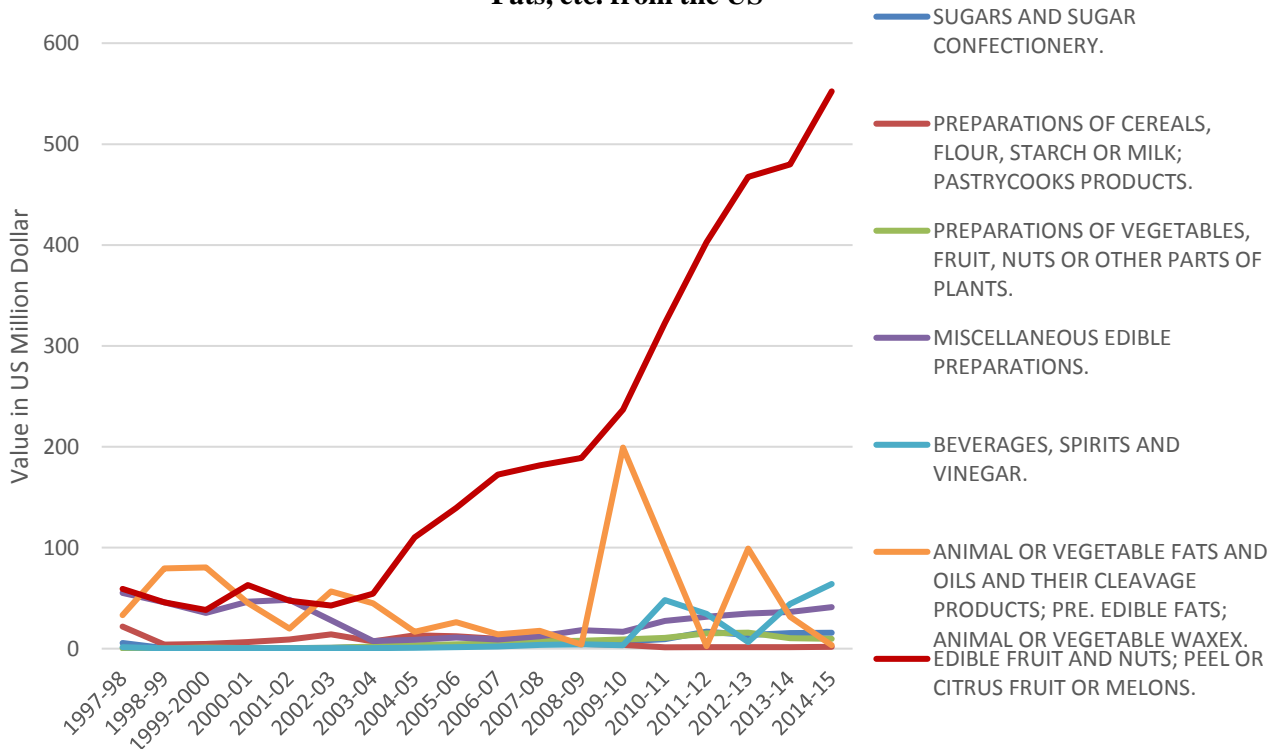
Figure 20 shows that the import of sugar and sugar confectionaries increased gradually until 2008-09 and witnessed a sharp fourteen-fold increase since 1998-99 reaching to \$ 15.62 million in 2014-15. Imports of Edible fruits, nuts, citrus fruits, melons also increased rapidly and witnessed an impressive 834 per cent increase since 1997-98 at \$ 552.25 million in 2014-15. The imports of the preparations of cereals, flour, starch, milk, pastrycooks products were at \$ 21.89 million in 1997-98, but declined over the years and stood at \$ 1.83 million in 2014-15. The preparations of vegetables, fruits, nuts, etc. increased by over 58 times from 1997-98 to 2012-13 (from \$ 0.27 million to \$ 15.85 million) and declined over the next two years, standing at \$ 9.67 million in 2014-15. The imports of miscellaneous edible preparations declined gradually until 2001-02 and fell sharply for the next two years before picking up from the 2007-08 onwards reaching to \$ 41.06 million in 2014-15. The figure also shows that the imports of animal or vegetable fats and oils and their cleavage products; edible fats; animal or vegetable wax has witnessed sharp rises and declines over the years, for instance, in 1997-98, it was valued at \$ 33.34 million which increased to \$ 80.41 million in 1999-2000, fell by round half in the next year (2000-01), and increased nominally over the next two years, before witnessing a sharp fall in 2006-07 to \$ 1.96 million and again in 2008-09 to \$ 4.05 million. The next fiscal year saw an import surge by around fifty times to \$ 199.26 million and a drastic fall in 2011-12 to a mere \$ 2.51 million and increasing to around \$ 100 million in 2012-13 but declining again to \$ 3.36 million in 2014-15.

Figure 19: India's Imports of Food Industries Residues, Tobacco, Tea, Coffee, Spices, Producers of the Milling Industry, Fish and Dairy Produce, etc. from the US



Source: Export-Import Data Bank, Department of Commerce, Government of India

Figure 20: India's Imports of Edible Fruits and Nuts, Preparations of Cereals, Vegetables, Sugars and Confectionery, Beverages and Spirits, Animal or Vegetable Fats, etc. from the US



Source: Export-Import Data Bank, Department of Commerce, Government of India

India had been a reasonably important source of demand for US soybean oil exports, valued at \$35 million in 2001-02, which accounted for about 8 per cent of the total US soybean oil exports and dropped to about \$30 million in 2002-03. While the US is the second largest producer of soybean oil after China, India ranks sixth, yet the latter remains the top importer at 1086 MMT in 2012-13 and 3300 MMT in 2016 (FAS of the USDA: 2016). The share of imports of vegetable oil has persisted under 3 per cent since 1994-95, and the predictions for enhanced exports have been bounded by a number of reasons like competition from cheaper palm oil from South East Asian neighbours like Indonesia and Malaysia. India remains the largest importer of palm oil and ranks first in the domestic consumption as well at 8250 MMT in 2012-2013 and 10,500 MMT in 2016. Price competition of soybean oil from Brazil and Argentina soybean oil exports to India simultaneous reduction in the discounted sales to India by the US, which previously constituted an important source of US exports (Dohlman, et al.: 2003; US International Trade Commission: 2009). While India has increased its domestic oilseed production and has become the fifth largest in the world since 2012-13 (FAS of the USDA: 2016), yet in the case of processed vegetable oils, it is imported reliant. It is the largest importer of vegetable oils in the world, with 10.73 MMT imported in 2012-2013 and 15.99 MMT imported in 2016 (FAS of the USDA: 2016). As statistics reveal, India ranks third in the world for domestic consumption of vegetable oils, and despite being one of the largest oilseed producers, it remains the top importer. These indicate an acute shortage of proper infrastructure to process its oilseed produce, which makes the country dependent on imports. In all, according to the latest data available from the USDA and Government of India, as of 2014-15 the major agricultural products that India imports from the US are almonds (\$ 435 million), apples (\$ 75.74 million), peas (\$ 90.48 million), shelled almonds (\$ 21.54 million), lentils (\$ 66.87 million), protein concentrates (\$ 21.44 million), food preparations (\$ 14.01 million), ethyl alcohol (\$ 54.47 million), and cotton (\$ 16.35 million), among other commodities. Similarly, the major imports by the US from India are frozen shrimps and prawns (\$ 1334.43) natural honey (\$ 72.21 million), cashew nuts (\$ 230.39 million), pepper (\$ 47.85), other seeds (\$ 100.91 million), other vegetable extracts (\$ 140.88) and castor oil (84.96 million), among other categories.

The nature and scope of US-India agricultural cooperation were further explicated during interviews conducted during the field work for the study. Patrick Hayden, the Director of

Agriculture at US-India Business Council (USIBC), in a personal interview¹³, emphasised on the vast opportunities in US-India agricultural cooperation. These are particularly in the areas of biotechnology regulatory policy, regulations and policies on agricultural production, integration of agribusinesses, the considerations of cotton quality, marketing efficiency of food grains, agricultural supply response, and food processing. A USDA research emphasised that the primary objectives of the collaborative research programs between the two countries have been to expand the quality of information available to scholars and decision makers in both public and private sector; to explore the prospects for bilateral agricultural trade; and to develop long-term partnerships between ERS and Indian research institutions (Landes: 2008b).

Studies by NCAER and USDA point that there are opportunities for bilateral investments in input sectors like production, medicines, feed, and equipment, as well as food processing, especially in India. This is evident from the available data that indicate that from 1993-94 to 2009-10, there has been an increase in the production and consumption of poultry products by around 15 per cent, and consumption specifically from 240 grams to 1500 grams in rural households and 370 grams to 2200 grams in urban areas, respectively (Landes and Gulati: 2004; NCAER: 2014). It has been studied that there has been an expansion in the poultry production in India, which is the result of rising incomes, rapidly urbanising population and larger supplies because of introduction of improved breeding stocks, larger availability of feed stocks such as maize and soybean meal, declining real poultry prices and better marketing infrastructure (Mehta and Nambiar: 2007).

Significant opportunities for investment are possible in the Indian markets which have demands for both basic and high-value foods and are determined by rising incomes and price reductions due to enhanced integration and efficiency in the supply chain (Chakravarti: 2006; Mehta and Nambiar: 2007). While FDI in these activities is permitted, yet, investments are inhibited by market and policy uncertainties, poor infrastructure, non-scientific application of phytosanitary measures on non-scientific lines and high taxes on processed food (Landes and Gulati: 2004). In the field of trade in legumes, experts have pointed out that the keys to improving the US position in the Indian pulse market fall under two categories, namely, expanding US supplies (both of existing and new varieties) and increasing price

¹³ Personal Interview with Patrick Hayden, December 1, 2015, US India Business Council, Washington, D.C.

competitiveness. The 2002 Farm Act provided dry pea, lentil, and small chickpea growers access to marketing loan benefits, which reduced price risk and helped stabilise producer revenue when prices were low (Price, et al.: 2003). It has been estimated that India's food consumption demand is poised to increase with the rise in the nation's per capita GDP increases over the next 20 years, agricultural output (at farm-gate prices) could grow from 13 trillion rupees to around 30 trillion rupees by 2030. The value of food processing could grow from 1 trillion rupees to over 5 trillion rupees by 2030 while India's food exports would grow from over 1 trillion rupees to approximately 8 trillion rupees by 2030 (ET Bureau: 2013; Food and Agriculture Integrated Development Action 3: 2013).

In main, it is evident that although India's demands for imports of agricultural products from the US would remain price-sensitive for reasons of its own nature of the agrarian economy, yet it would yield positive benefits due to enhanced consumption, competitiveness, and productivity. There remain enormous opportunities for investments in the modernisation of agri-businesses, supplies of inputs, distribution, and marketing, and food processing offers promising prospects for business interests in the US and India (Landes and Gulati: 2004). This reveals a shift in an understanding of the perspectives of each other as an equal partner in engaging in bilateral cooperation in the sphere of agriculture. This is an implication of explicit coordination resulting out of greater reciprocity at the political and diplomatic levels. This is elucidated in the forthcoming sections.

3.2 Acceleration in Bilateral Agricultural Cooperation

Since mid-1990s US-India agricultural cooperation began to assume greater complementarity. As evidenced above, this period witnessed a numerical increase in the agricultural exports and imports between the two countries. In addition, the end of the Cold War provided a better political context for pursuing more substantial agricultural cooperation by creating bilateral agreements. Evidence reveals that these agreements were entered fairly regularly from 1991 to 2010. The spirit of cooperation generated as a result of these agreements has continued till, most importantly through the regular high-level dialogue processes and other institutional framework established by these agreements. The most important ones are depicted below:

Table 4, US-India Bilateral Agreements on Agriculture

Year	US-India Bilateral Agreements on Agriculture
1991	Agricultural Bio-Technology Support Project
2000	Reaffirming the Vision for the 21 st Century
2004	Agreement to revitalise the US-India Economic Dialogue
2005	USAID Grant for Joint PAU-OSU project on the Diversification of Indian Agriculture
2005	Joint Declaration of the Ministry of Agriculture, Government of India and US Department of Agriculture for the US-India Knowledge Initiative on Agriculture (USIKIA)
2005	US-India Science and Technology Agreement
2006	Partnership for Evergreen Revolution
2008	National Institute of Food and Agriculture (NIFA)- National Institute of Agricultural Marketing (NIAM) Collaboration
2009	MoU on Agricultural Cooperation and Food Security
2010	US-India Strategic Dialogue (Which listed Agriculture as one of the five the main pillars of US-India cooperation)

Source: Author

It may be recalled that the first Green Revolution had led to definitive changes in the process of Indian agriculture. Indian farmers began to diversify their farming operations with new crops and livestock products, particularly dairy and poultry. Green Revolution continued in Indian agricultural practices leading to what agricultural economists have pointed out as the ‘mature green revolution period of the 1980s’ (Kannan and Sundaram: 2011). Gradually in the late 1980s agricultural growth in India rose to three per cent (Chand: 2003; Dev: 2000). This was also the first time when agricultural growth overtook the rate of growth of population for the first time since India’s Independence, which was 2.3 per cent in 1980 and 2.11 per cent in 1989 (World Bank: 2016). It has also been demonstrated that rural poverty dramatically decreased to less than 40 per cent, which was at staggering 65 per cent in 1970, and much of it was attributed to agricultural growth (Datt and Ravallion: 2009; Datt, et al.: 2016). The premier Indian agricultural research institution Indian Council for Agricultural Research (ICAR) described the spectacular increase in food grain production from 51 million tonnes in 1950 to 245 million tonnes in 2011-2012 due to the First Green Revolution. It described it as an *achievement unparalleled in the history of world agriculture* (ICAR: 2012a). American officials also believed that the US-India cooperation for a "revolution" of joint scientific, educational exchanges and applied agricultural technology made India self-sufficient in food production and constituted a foundation for full-fledged people-to-people

and diplomatic ties from the 1990s (Mulford: 2004). These mutual perceptions perhaps explain the pursuit of an agreement for a second Green Revolution later.

The Farm Bill of 1996 changed American agricultural practices in a way similar to what the first Green Revolution did for Indian agriculture (FAO: 1996). This Bill was instrumental in not only reforming its domestic agricultural practices but also focused on the practices of its trading partners (Schmitz, et al: 1998). For instance, under the aegis of the Export Enhancement Program of the 1996 Farm Bill, the US emphasised on major reforms in the domestic agricultural policies of its trading partners. American observers noted that while India did not fully comply with these provisions, it expressed support for continuing agricultural cooperation during Bill Clinton's second term (Ray: 2001b; Thompson: 2005; Narayanan: 2000). His visit to India in March 2000 was hailed as the beginning of "*a new voyage*" in a new century by two countries that had all the potential to become natural allies (Vajpayee: 2000a; Mansingh: 2002; Inderfurth and Riedel: 2008). It provided a boost to agricultural cooperation between the two countries as it was decided to institutionalise the bilateral economic interaction at various levels. This visit also witnessed business agreements of over \$ 4 billion between the US and Indian companies, with American corporations committing investments in areas of food processing, biotechnology, and agri-businesses. It demonstrated Clinton's commitments to utilising trade as a conduit for building long-lasting prosperity between India and the US (Symonds: 2000; The White House: 2000). The then US Secretary of Commerce, William M. Daley, remarked that the President's visit to India demonstrated his commitments to utilising trade as a conduit for building long-lasting prosperity between India and the US (Nayan: 2000; Press Information Bureau: 2000).

The highly successful mission of President Clinton was followed by PM Vajpayee's visit to the US in October 2000. During this visit, Vajpayee addressed the 106th session of the US Congress and significantly focused on trade and business (Embassy of India, Washington D.C.: 2000a; US Department of State: 2000). Vajpayee and Clinton recognised that biotechnology could contribute towards ensuring sustained food supply and offer newer options to cultivators to address the problems of pests and diseases, while simultaneously protecting the environment and expanding global food security. The necessity to map methods of enhancing cooperation and exchange of information, prospects of establishing collaborative projects and training of scientists in agriculture biotechnology research were also explored. This visit reiterated the bilateral commitments to partner in fighting hunger,

poverty, illiteracy, disease and pollution of the world (Embassy of India, Washington D.C: 2000a; Clinton: 2000b; Narayanan: 2000). In his remarks at the influential Carnegie Endowment for International Peace, the then-Under Secretary of State for Political Affairs, R. Nicholas Burns highlighted how Clinton's vision led to closer Indo-US relations and made them global partners while the Indian Foreign Secretary Shiv Shankar Menon was hopeful of the second Green Revolution in India by the adoption of modern agricultural technologies and know-how in partnership with the US LGUs (US Department of State Archives: 2007; Jayashankar: 2016).

The following years marked a paradigm shift towards building a constructive impression about India. The US Congress became bipartisan in its support for continued engagements with India. For instance, a resolution calling for closer ties between the US and India passed the House of Representatives on September 13, 2000. It was authored by Benjamin A. Gilman (R- New York), who was the then Chairman of the House International Relations Committee. The Gilman resolution called for intensification of cooperative programmes between India and the US in the fields of education, science and technology, information technology, finance and investment, trade, agriculture, energy, the fight against poverty, improvement of the environment, infrastructure development among others (Gilman: 2000; Nayan: 2000). This Resolution was significant and symbolic in that it received a bipartisan support in the House and its passage was without any objections. It highlighted a significant step forward towards the beginning of an era of optimism and determination for cooperation in diverse fields (Gilman: 2000). The resolution explicitly noted the need for a special relationship to share the knowledge and skills mutually in order to successfully confront the challenges of future (US House of Representatives: 2000; Vajpayee: 2000; Jaisingh: 2000).

The bipartisan support for closer US-India relations in the US Congress generated during the Clinton administration experienced continuity during the George W. Bush as well (Inderfurth and Riedel: 2009). In fact, former officials of the Clinton administration noted that after assuming office in 2001, George W. Bush vigorously pursued improvement in US-India relations which culminated in extraordinary agreements relating to civilian nuclear power, trade, science, and agriculture with the then PM of India Dr. Manmohan Singh (Inderfurth and Riedel: 2008). Thus, agricultural cooperation remained on the agenda alongside areas of civilian nuclear activities, civilian space programs, and high-technology trade.

The Bush administration decided to assist India to address problems, particularly in agriculture, along with education and healthcare. Simultaneously, Indian policymakers saw in the US a 'valuable development partner' towards attaining the objectives of social development as it increasingly became the center of Indian national policy, where agriculture was listed as a high-priority area (Embassy of India, Washington D.C.: 2010a; Cohen: 2008). Instances of the continued tradition of the cooperation between the US Land Grant Universities and Indian State Agricultural Universities (SAUs) include the US Agency for International Development (USAID) grant support in 2003 for joint work by the Punjab Agricultural University (PAU) and Ohio State University (OSU) on diversification of markets and value-added agricultural products, development of a food industries' centre, and cooperation with researchers on agribusinesses for exploring food processing methods. It underscored the need to maintain stable improvement in the quality of seeds using biotechnology, which has been stated as being instrumental in achieving sustained productivity, reducing rural poverty and contributing to food and nutritional security (UN Sustainable Development Solutions Network: 2013). The potential of horticulture and livestock enterprises have the capacity to stimulate the sector (World Bank: 2011).

In 2004, the then Economic Adviser to the then PM Atal Bihari Vajpayee, S. Narayan, and the then Under Secretary for Business and Agricultural Affairs, of US Department of State, Alan Larson, led an extensive bilateral discussion to revitalise the US-India Economic Dialogue, where interests of the agricultural community were agreed to be focused upon (Mulford: 2004).

Recognising the enormity of the role of agriculture in the development of Indian economy and its enormous potential in enhancing mutual trade relations with the US, as well as its capabilities to contribute globally, the US and India decided to move to a higher level of strategic partnership for the next generation agricultural development. A successful step towards this direction was made when PM Singh visited Washington, D.C., and met with President Bush in July 2005. They expressed a strong desire to agree to strengthen the bilateral agricultural cooperation and work together on a second green revolution geared especially to help India's rural poor (US Department of State Archives: 2005a; Burns: 2005). Reminiscing the extraordinary role played by the Americans such as Norman Borlaug- the father of Green Revolution, who were key factors in India's first green revolution, PM Singh suggested that the US' LGUs could contribute towards enabling market-oriented agriculture,

fostering scientific agricultural methods, and utilisation of public-private partnerships in bringing about second green revolution in the country (Mehta, et al.: 2017). The expertise of the US private-sector, as well as their investments, could support India in creating infrastructure for cold-storage abilities, supply chains, and food-processing technology that formed the foundations of a sophisticated agricultural market; in managing the delivery chain from farmer to consumer in an organised manner. The possibilities for bilateral collaborations to spread environmentally sustainable and 'climate smart' farming practices, like land conservation and water-resource management were also explored (Burns: 2007; Cohen: 2008; FAO: 2013). Analyses show that these would not only impact India's long term security and prosperity, but also, although indirectly, influence US' long-term prosperity and security (Cohen: 2008).

However, it has been recognised that it is critical for India to view its agricultural sector from a global standpoint wherein it needed emphasis on advancing its agricultural industries including animal husbandry, fisheries, forestry and food processing (Swaminathan: 2005a). A study by the ERS of the USDA supported the notion that the key factors contributing to India's developed agricultural future lay in rectifying the investment scenario in agriculture and agribusiness. Given the size of the sector and the large population dependent upon it the role of private investment was pertinent (Landes: 2005). It is also argued that modernising the food chain would foster a food revolution, leading to rising in yields and incomes. This would not only benefit the industry but the nation as well (Swaminathan: 2005a). Experts suggest that the US and India have wide scope to intensify their efforts towards building partnerships and build networks for sustaining an ever-green revolution on the farms in India (Markandey: 2015; Gautam: 2015).

A step towards this direction was the reinforcement of the strategic cooperation between the US and the Indian Government, through the 'US-India Knowledge Initiative on Agricultural Education, Teaching, Research, Service and Commercial Linkages' (AKI). This had been discussed during PM Singh's visit to the US in July 2005 and signed into effect in November, 2006 by the then Director General of Indian Council of Agricultural Research (ICAR), Dr. Mangala Rai and the then Under-Secretary for Farm and Foreign Agricultural Services (FAS), United States Department of Agriculture, J.B. Penn; and formally launched during President Bush's visit to India, on March 2, 2006. In his address to the Joint Session of the US Congress, PM Singh remarked that the AKI would form the second generation of India-

US collaboration in agriculture. This enterprise would “*focus on basic and strategic research for the sustainable development of agriculture to meet the challenge of raising productivity in conditions of water stress*” (Singh: 2005). It sought to implement the information and knowledge directly to the farming community and promote technologies that would minimise the post-harvest wastage, reduce drudgery and improve food storage. It would also help Indian farmers to meet the scientific parameters of phyto-sanitary conditions and enable them to participate fully in global agricultural trade (Singh: 2005; Shelby: 2005; Mohan and Ayers: 2009). Official documents espoused this as the initiation of a new relationship between two of the great countries of the world, which would have ‘obvious’ benefits for the US and its strategic interests (Burns: 2005; US Department of Agriculture: 2005; Joint Declaration-USIKIA: 2005; K-State Research and Extension: 2015).

To lead the USIKIA, both countries established a Knowledge Initiative Board comprising eight to nine members from both sides drawn from the academia, government and private sector representatives from the United States and India. The Board was co-chaired by the then FAS administrator Ellen Terpstra and Mangala Rai (Gaur: 2006).

USIKIA had a three-year financial commitment to link the universities and technical institutions of the two countries, and businesses to support agriculture extension and education, joint research, and capacity building projects, including in the area of biotechnology, with a \$24 million commitment from the US over three years (The Trade Promotion Coordinating Committee (TPCC): 2006; Neufville: 2015; Hansen: 2015). Building upon the rich history of US-India collaboration for India’s Green Revolution, AKI was intended to cater to the latest challenges and explore opportunities of modern day agriculture and provide the energy needed to revitalise the proven tradition of knowledge exchange, and find creative and realistic ways to structure the agricultural programs at the colleges and universities, so as to enable them to better respond to the present and long-term needs of the populations on both sides, and simultaneously to offer opportunities for the vibrant private business environment and commercial linkages to address contemporary challenges (TPCC: 2006), as well as the implementation of international food safety and sanitary requirements.

A key feature of this Initiative, according to the Joint Declaration of the Ministry of Agriculture of India and the USDA, which was signed on November 12, 2005, was “*a public-*

private partnership where the private sector would help identify research areas that have the potential for rapid commercialisation, with a view to develop new and commercially viable technologies for agricultural advancement in both countries” (Joint Declaration-USIKIA: 2005). These, in turn, would contribute to enhanced prosperity for farmers and lead to sustainable agricultural growth. The key priority areas identified for partnership under AKI were:

- a) *Teaching – The AKI would consider new and existing mechanisms to strengthen the curricular design, course content and delivery, and degree attainment in both countries to internationalise the student experience. It would also look for ways to enhance the structure and sustainability of agricultural programs at universities.*
- b) *Research – The AKI would examine and prioritise key collaborative research approaches, topic areas, and impact assessments. Possible areas of focus included improved bio-products; more sustainable use of water and other resources; strengthened systems of pest management; and a better understanding of economically viable and environmentally sustainable production systems.*
- c) *Service - The AKI would identify effective, innovative and collaborative approaches that link research results to those who use them such as producers, processors, and marketers of farm goods. Public and private advisory services would be considered.*
- d) *Commercial Linkages – The AKI would look for ways to include private sector suppliers and vendors as participants and funding partners* (US Department of Agriculture: 2005; Joint Declaration- USIKIA: 2005).

Building on the shared values and mutual vision for the US-India relationship, the personal efforts of President Bush and PM Singh to establish USIKIA demonstrated their resolution to strengthen the bilateral relationship in agriculture. Decisions to further intensify joint efforts to promote teaching, research, and commercial linkages that would foster innovations and deepen the cooperation to achieve economic, social, and environmental benefits for both sides, were taken. The next section analyses the further intensification of understanding on agriculture between US and India.

3.3 Deepening of Understanding on Agriculture between US and India

During PM Singh's visit to Washington, D.C. in July 2005, a *Science and Technology Agreement* was signed with the US. In lucid terms, it referred that the Green Revolution of the 1960s was the beginning of the US-India cooperation in India. Further, the MoU on Science and Technology under the Science and Technology Agreement, 2005 made it clear that teaching and research would focus on biotechnology or genetic engineering as the pivot towards attaining the second Green Revolution, which would make use of modern advances in biotechnology and other frontier technologies to usher in a new phase of expansion. It also highlighted the need for commercialisation of agriculture that would give farmers the access to more and better commercial inputs, and enable them to receive highest rates of return, by making agricultural credit easily available through the creation of new marketing opportunities (Purushothaman: 2011).

The outcome of the revamped strategic decision for advancing agricultural ties generated a bipartisan support in the US. Similar sentiments were echoed in India, except for a few left-of-center political parties as well as few activists who continued to view the bilateral relationship from the lenses of the US being a hegemonic power and the chief of neo-imperialism. For instance, Prabodh Panda, a Member of Parliament from the Communist Party of India (CPI) voiced the dissent of his party in the Lok Sabha, referred to the USIKIA as a "*US-driven agriculture agenda being imposed on India*" (Panda: 2005). Countering his position, Pawan Kumar Bansal from the Indian National Congress (INC) reiterated PM Singh's views of modernising Indian agriculture and improving the infrastructure related to it. USIKIA would facilitate a new generation of research and agricultural practices as well as cooperate in areas of genetic engineering and bio-technology on equal terms (Bansal: 2005). The Bharatiya Janata Party (BJP) represented by Manvendra Singh argued that the expansion of agricultural cooperation between India and the US was only an extension of the foundation laid by the NDA government led by Atal Bihari Vajpayee and welcomed the USIKIA in that it would pave the way for greater agricultural research and development as well as improve the infrastructure related to it (Singh: 2005a). In his address to the Parliament, PM Singh categorically denied the opposition over unrestricted flow of American exports under the USIKIA, and that preserving the livelihood securities of the small and marginal farmers was of bore utmost importance in the agreement (Singh: 2005b), and was confident to pursue the

initiative in order to deal with the prevailing stagnation of the agricultural sector (Singh: 2006b).

During further debates on the need for a second green revolution in India and the accompanying USIKIA generated continued support among the Members of Parliament. They highlighted the need to transfer the emerging technologies in bio sciences, space science, water conservation and precision agriculture and others to the smallholder farmers in India (Thomas: 2005; Chitthan: 2007), and urged the Union government to double the fund allocation for agriculture (Thomas: 2005). The BJP, which played upon the populist tendencies, called upon the ruling party to discuss the agrarian crisis before embarking upon the second Green Revolution agenda (Singh: 2009). It was followed by an outright rejection of Genetically Modified (GM) crops as being the agents of destruction of India's agriculture, and completely disregarding the efforts of the scientists and experts towards providing affordable and accessible solutions for food security amid looming challenges of climate change, soil degradation, rapid loss of biodiversity, water insecurity and challenges to human security (Swaminathan: 2005b; Lal: 2015; FAO: 2015).

Given the cropping patterns in the Eastern regions of India, both governments agreed that there was considerable scope for both increased productivity as well as substantial scope for increased absorption for labour in agriculture (Joint Declaration-KIA: 2005). Proper investments towards providing the farmers with irrigation, farm implements, seeds, fertilizers, etc. would create further opportunities for food processing, proper marketing, information and communication technologies and thereby ushering in further agricultural development and prosperity in the country (Markandey: 2015; Mehta: 2016).

In furtherance of the activities of the Board of USIKIA, and as part of the first Board Meeting Cornell University led by Susan A. Henry and Mangala Rai from India signed a renewed memorandum of understanding for agricultural development in December 2005 for bilateral exchanges of scientific knowledge, shaping joint research, hosting Indian executives, students and faculty to the campus, and sharing the knowledge of agricultural biotechnology to promote the development and use of drought- and pest-resistant crops. It needs to be pointed here that Cornell University has had a very active agricultural research presence in India since the start of US-India agricultural partnership in the late 1950s. Some of the continuing Cornell-India joint efforts were in the fields of extension services to Indian farmers on

agricultural technologies; the Agricultural Biotechnology Support Project to address issues of pest control, drought, and intellectual property, technology management in India among others (Lang: 2005).

In February 2006, during the Second Board Meeting held in National Agriculture Science Centre Complex on Pusa Campus, New Delhi, the Board agreed to a detail work plan with four focus areas: University Capacity Building, Water Resource Management, Food Processing and Marketing, and Biotechnology (US Department of Agriculture: 2006a; US Department of Agriculture: 2007a). Following a meeting on February 13–14, 2006, the board agreed to embark on a three-year work plan that would support the envisioned “Evergreen Revolution”, which would increase productivity in perpetuity, established in sustainable environmental principles in technology development and dissemination, and market-oriented agriculture. The board also recognised the importance of strong market institutions and a facilitating environment for investment in agribusiness (TPCC: 2006; Swaminathan: 2009a). The Honorary Advisor to Board Dr. Norman Borlaug addressed the third Board Meeting in the premises of the USDA, Washington, D.C. in June 2006. He lay emphasis on the continued relevance of sustainable agricultural practices to support a stable and secure supply of food. He highlighted the crucial role of biotechnology in ensuring food security, as improved agricultural productivity, through biotechnology and other means, would help to feed the world's growing population¹⁴. The then US Secretary of Agriculture, Mike Johanns underlined that the USIKIA offered a unique opportunity to revitalise the US-Indian partnership in agriculture. It would foster agricultural productivity to promote food security, through increased transfers of technology; build a comprehensive policy and regulatory environment; develop trade and investment and promote integration of India into the global economy; ensure a key role for the US and Indian private sectors and; revive US-India university partnerships (US Department of Agriculture: 2006a; US Department of Agriculture, Foreign Agricultural Service: 2006).

During the fourth USIKIA Board Meeting held on November 17, 2006, in New Delhi, the US side participated in a one-day field trip to livestock and wheat breeding centers. Some of the key areas for action that were emphasised were, human resource and institutional capacity building, food processing and marketing, harnessing the benefits of biotechnology, and water

¹⁴ Available for download at: <http://www.grains.k-state.edu/spirel/docs/conferences/india/usda-aki/AKI%203rd%20Board%20Mtg%20June%202006%20minutes.doc>

resource management. The meeting reviewed the progress of USIKIA, and resolved to address the sanitary and phyto-sanitary issues. Within the short period of five months with formation of the Knowledge Initiative Board, training of a total of nineteen scientists from National Agricultural Research System of India (NARS) received training in leading US laboratories in the areas of biotechnology, water management, food processing distance learning and library system (US Department of Agriculture: 2006b).

The fifth USIKIA Board Meeting was held in Washington, D.C. in June 2007. The Indian participants visited OSU prior to board meeting. It was decided that the American experts would train the Indian counterparts in cross-cutting areas like climate change, nanotechnology, bio-prospecting, carbon sequestration and carbon-trading. Some of the collaborative research projects identified to be worked upon were- drought tolerance in rice and wheat; salt tolerance in rice; thermo-tolerance in wheat; virus resistance in papaya, potato, banana and; diagnostic and vaccines for important diseases of livestock and fish. A site visit by OSU was also planned during June/July 2007 to PAU, Ludhiana, Jawaharlal Nehru Agricultural University, Jabalpur, and M.S. Swaminathan Research Foundation, Chennai. The site visit was planned to finalise land use and management treatments in partnership with American universities. The Board meeting contributed to productive discussions about the endeavours and future activities. In addition, both sides agreed to set the dates of the next meeting in late February 2008 (US Department of Agriculture: 2007b).

With President Obama assuming office in January 2008, his administration continued to expand the legacy of the Bush administration's push to strengthen US' relations with India. India became an important country for US foreign policy, as was evidenced by the time and energy spent by the US Presidents and Secretaries of State and other high-level delegations from both sides undertaking official visits (Shuja: 2006). It has increasingly been recognised by the US Congress that bilateral cooperation in agriculture would be one of the big issues of the decades to come, which would establish itself as a major focus of the steadily improving economic relations. Hence, the US acknowledged the need to work towards collaborative mechanisms with India in further developing them (Cohen: 2008).

Research by the USDA has suggested that stimulating private agribusiness investment in India, both domestic and foreign, would require public investments in market infrastructure, price and trade policy reforms and comprehensive development of public market regulations

and institutions. Since 2005, India has placed a high priority on bolstering growth in the agricultural sector and has begun to make several changes in agricultural policy in order to stimulate both research and investment. This Indian priority, together with US interests in supporting the long-term growth of the Indian economy, created a renewed opportunity for US-India cooperation under the USIKIA. This had the prospects of substantial dividends that would strengthen the research capacity in agriculture, and develop and strengthen market institutions (Landes: 2008b).

The success in the cooperation in agriculture between USA and India have been realised by the efforts of successive governments on both sides to cement their ties. This was further reiterated by the then US Secretary of State, Hillary Clinton that the US was committed to working with India as part of a collaborative effort centred upon improving food security, by working with stakeholders to advance action that would address the needs of small-scale farmers and agribusinesses, and be gender-friendly to drive economic growth. The objective was to increase the investment in agricultural development within the overall framework of maintaining US' support for humanitarian food assistance (Clinton: 2012). This led to a MoU on Agricultural Cooperation and Food Security in July 2009, which paved the way for a "*robust cooperation between the governments in crop forecasting, management, and market information; regional and global food security*" (The White House, Office of the Press Secretary: 2009a).

The synergies in bilateral space cooperation established during the 1960s for building Indian satellite networks had been utilised for gathering data on the management of water, food and agricultural resources, through the help of Earth Resources Technology Satellite (ERTS) of National Aeronautics and Space Administration (NASA) (Lele and Sharma: 2014). A discussion in the Lok Sabha highlighted the massive destruction that cyclones brought each year to the east coast of India to human lives, livestock, and birds. Each year the US granted thousands of dollars in favour of Prime Minister's Relief Fund, and the MPs were appreciative of the humanitarian gesture (Deo: 1990; Gajapathi: 1990). To take the partnership to a new level, it was during the visit of the American delegation led by the then Under Secretary for Economic, Energy and Agricultural Affairs of US, Robert D. Hormats, where negotiations for enhanced crop and weather forecasting were carried out (Embassy of the USA, New Delhi: 2010). This was held under the auspices of the inaugural meeting of US-India Agricultural Dialogue, which was established by the MoU on Agricultural

Cooperation reached at in July 2009. Hormats remarked that an area of cooperation that requires “*the participation of not only our governments but our businesses, farmers, NGOs, scientists and economists, which is agriculture*” (Hormats: 2010). Efforts for partnering to improve weather forecasts of the monsoon season were also pursued by with the partnership between International Research Institute for Climate and Society (IRI) of the Columbia University, and Ministry of Agriculture, Government of India (Fiondella: 2010). This project was titled “Extended Range Forecast System for Climate Risk Management in Agriculture”, and was aimed at improving the forecasts of monsoons, and enabling farmers and government to organise in advance in cases of adverse predictions. Further, another milestone achieved in the cooperation was an agreement for weather and crop forecasting, signed between Indian Space Research Organisation (ISRO), Department of Earth Sciences, Government of India and the National Oceanographic and Atmospheric Administration (NOAA) of the US (Embassy of India, Washington D.C.: 2010b). *The major objective of this agreement was to enable predictability of India’s seasonal and weather patterns, especially that of the highly erratic monsoons, over which much of the Kharif sowing in the country depended on.* Through the weather and crop forecasting cooperation, which combines oceanographic and atmospheric sciences, crop and earth scientists have could use the forecasting model, and district-level predictions of crop sowing, harvesting have also been facilitated. Soon after coming into effect, an “India” section of the Climate Prediction Center of National Oceanic and Atmospheric Administration (NOAA) was established that provides round the clock analysis of temperature and precipitation for the whole country¹⁵. ICAR officials have pointed out that the immediate impact of the weather forecasting agreement was the alerts provided weeks before the cyclones *Phailin*, *Nilam* and *Huhud* hit the east coast of India in 2009, 2012 and 2014 respectively, as a result of which the government and the administration took necessary steps to minimise the loss of lives, material, and livestock (Chand: 2014). Using household panel data, studies conducted by the Yale University found a direct correlation between improved rainfall forecasts and their investment decisions for the cropping season (Rosenzweig and Udry: 2013) and the profits of the cultivators in India (Rosenzweig and Udry: 2014).

The sentiments to further enable the farming communities to utilise water efficiently and increase their productivity, improve food processing to avoid spoilage, through enhanced

¹⁵ National Weather Service, India, Climate Prediction Center, NOAA, USA, Available at: http://www.cpc.noaa.gov/products/JAWF_Monitoring/India/index.shtml

climate and crop forecasting to avoid losses that devastate communities and drive up food prices, were voiced by President Barack Obama during his first visit to India in November 2010 (The White House: 2010a). He called for strengthening the economic relationship between India and the US on a mutually beneficial basis deliberating a higher priority to agriculture. The evolving scientific progress on the farms is termed as an 'Evergreen Revolution', to emphasise that the productivity advancement is sustainable over time because of its roots in the principles of ecology, economics, social and gender equity and employment generation. In his visit to an exhibition of the latest techniques innovated by the ICAR, especially for women farmers to reduce drudgery, like that of corn de-husking and groundnut decortication drew considerable interest and called for enhanced American investment for the promotion of those small-scale innovative projects (ICAR: 2010). As part of the India-US Strategic Partnership, the then PM of India Manmohan Singh and President Obama agreed to use the skills of both countries to build support capacity of agricultural to extend food security to interested third countries (The White House: 2010a; India Education Bureau: 2013). They launched the *Partnership for an Evergreen Revolution* that was built on the Indian and American agricultural collaboration to raise India's agricultural productivity to bring Indian technology, expertise to other parts of the world, and achieve global food security (The White House: 2010b; Zee Business: 2013).

Reiterating the criticality of India-US agricultural cooperation, the US-India Strategic Dialogue of June 2010 noted economics, trade, and agriculture as one of the five pillars of strategic cooperation. Three Working Groups were set up, namely, for: Strategic Cooperation in Agriculture and Food Security, Food-Processing, Agriculture Extension, Farm-to-Market linkages, and Weather and Crop-forecasting respectively (US Department of State: 2010b). Official communiqués also reveal that the US and India have expanded their cooperation in agriculture to avenues of knowledge dissemination to improve productivity, safety, and nutritional quality of food crops; to support market institutions and promote investments for agribusinesses and improve food security and access to adequate quantities and quality of food, particularly for women and young children (US Department of State: 2015; Fan and Brzeska: 2010; Dorman: 2011; Government of India, Ministry of External Affairs: 2016). It was also affirmed through the MoU on US-India Agriculture Cooperation and Food Security that the objective of a sustained agricultural growth along with a commercial viability of the India farm sector would be vigorously undertaken. Further, Indo-US agricultural collaboration received bipartisan Congressional support as members of the House of

Representatives noted India's importance to US agriculture as a potential market and as an important member of the world trading system (Johnson: 2013). In his statement before the House Committee on Foreign Affairs, the Chair of the Committee, Steve Chabot (Republican from the state of Ohio), stated the importance of agricultural exports to the US. Quoting the statistics from the USDA, he noted that exports to this sector in 2012 topped \$440 million, where exports in tree nuts alone were worth \$324 million. Therefore, he called for opening up India's markets to American goods and services certainly as being of strategic significance to the US. He stressed upon the need to continue to expand the economic relationship as and deepening the strategic significance which would be in US interest in promoting peace and international security (Chabot: 2013)

Another USDA institution 'National Institute of Food and Agriculture' (NIFA), in Washington, D.C. is engaged in developing international partnerships with a number of organisations. During a visit to NIFA on December 2, 2015, it was informed to the author by that the institution is funded by the USAID or USDA and the FAS of USDA to develop and implement programs overseas. It also utilises the funds received to support partners from US universities and colleagues as they implement the internationally-focused extension, research, and teaching programs. Since 2008 NIFA supported the Structuring Agricultural Marketing Systems project in India in collaboration with India's National Institute of Agricultural Marketing (NIAM), Jaipur, and were responsible for the training and promotion for agricultural marketing. In partnership with the Foreign Agricultural Service of the USDA and Agricultural Marketing Service, it provided technical assistance to NIAM and other state agencies for the development of suitable agricultural practices, post-harvest handling techniques, and marketing extension. News information related to agricultural marketing and marketing extension systems were improved to serve the farmers. This was achieved through the development and implementation of 'train-the-trainer' workshops for NIAM and other staff, which were conducted by experts from several US LGUs (NIFA: 2015).

Under the *Feed the Future* initiative, which formed a key global hunger and food security initiative (discussed in detail in the forthcoming section) of the Obama administration, India was acknowledged as a partner country in leading US government's efforts towards ensuring food security for all. Towards this, an Indo-US-Africa trilateral agreement on agriculture led by USAID and the Indian National Institute of Agricultural Extension Management (MANAGE), Hyderabad, three-year training program was initiated with the aim to improve

agricultural productivity, strengthen agricultural value chains, and support market institutions in Kenya, Liberia, and Malawi (Government of India, Ministry of External Affairs: 2013), by providing extension management, agricultural marketing and agri-business training at MANAGE in Hyderabad and at NIAM in Jaipur (Consulate General of the United States of America: 2013). The training included classroom sessions, group work, field trips, and interaction with industry experts, and address the domestic challenges in food and nutrition security in the respective countries. The study materials developed by the faculty in MANAGE also covered basic skills in information and communication technology (ICT) (Government of India, Ministry of External Affairs: 2013).

According to the then US Department of State Special Representative for the Office of Global Food Security (Acting) Jonathan Shrier, the trilateral partnership marked “*an important moment in the long history of food security collaboration between the United States and India. It represented another important step in the ever-broadening bilateral strategic partnership on global food security and nutrition*” (Shrier: 2013). In order to usher in the era of Green Revolution 2.0 (Pingali: 2012), he remarked that as part of the overall US-India Agriculture Dialogue, the triangular engagement would “*share proven innovations from India’s private and public sector to address food insecurity, malnutrition, and poverty in the target African countries*” (Consulate General of the United States of America: 2013).

During the first phase of this three-year training program (2013 to early 2015), US and India worked in trilateral training programs. Experts from both sides trained in both public and private sectors in extension and agricultural technology helped in the capacity-building of a total of 180 agriculture professionals from the three African countries by providing them with lessons on extension management, agricultural marketing, and agri-business at MANAGE in Hyderabad and at NIAM in Jaipur. During the personal interview at the USAID headquarters, Washington, D.C., with Devi Ramkissoon, the Program Officer in the Bureau of Food Security of USAID, it was informed that the outbreak of Ebola in Liberia could not make the training feasible for most of the contract period and most efforts became concentrated in Kenya and Malawi (Ramkissoon: 2015).

Even though this first phase was short, yet it created new prospects in sharing of knowledge and capacity building of the officials of agriculture from these African countries, to play an important role in meeting the challenges of food security and globalisation. For instance,

Edwin Nimley, a professor at the University of Liberia, learned the technology, agglomeration and the trilateral partnership would help in reconstructing agrarian economy of Liberia (Yadav: 2013). Some other examples of success include the recognition of the fact that information and communication technology (ICT) could be applied in the fields of e-governance, agricultural marketing, etc., and that ICT could be pivot of change in these counties of Africa by providing customised market-led extension services to the local farmers (Yadav: 2013; Government of India, Ministry of External Affairs: 2013). Some testimonies of the trilateral efforts include successful hosting and managing of an international training program by NIAM for ninety participants from Kenya and Malawi funded by USAID for three months from September 16, 2014, to December 15, 2014. However, there were some initial challenges for both India and the US. These included reaching to a common understanding of the objectives of the partnership and moving ahead with an MoU with the MEA and USAID; ironing out the details, agreeing to the partner focus countries, logistical problems like travels of the African counterparts to India and; the outbreak of Ebola in Liberia. Nevertheless, even in a short span of around two years, with a much stronger relationship between USAID and Ministry of External Affairs (MEA), there was a better understanding and led to a cordial ambiance for spearheading the working of the tripartite program. Ms. Ramkissoon emphatically stated that the participants of the program have been successfully implementing the lessons in their home countries. They were in constant communication with their US and Indian counterparts for any additional development-oriented agricultural activities (Ramkissoon: 2015). For instance, in Malawi, Indian agriculture expertise has seen a growth in its presence and reaching out to help local farm communities. Catalysing the expanding engagement is a collaborative tri-partite effort between Sathguru Management Consultants, Hyderabad; Cornell University, US, and the Lilongwe University of Agriculture and Natural Resources (LUANAR), in Bunda (the capital of Malawi), with funding from USAID. This trilateral effort has been working to bring together innovation and agriculture technology to reach resource-less farmers.

Some of the other examples of the USAID partnership with private Indian companies to launch Indian agricultural innovations in Africa are (Addleton: 2015) listed below:

The Lilongwe University (Malawi) recently imported a seed processing unit from Fowler Westrup, Bengaluru, to give a push to the industry. In addition to supporting the Lilongwe University in accelerating their breeding programs in collaboration with Cornell, Sathguru is

encouraging small enterprises to come up with the value chain in agriculture. The presence of Mahindra Farm implements and Mahyco seed is already helping. Cotton is emerging as a big interest in entire Africa as well as Malawi. The Agriculture Improvement Project (AIP) launched in April 2014 to improve seed science and technology curriculum; introducing e-learning tools, creating a seed processing facility and supporting seed entrepreneurs and the seed enterprise development, under the *Feed the Future* initiative has successfully endeavoured to increase food security and improve the quality of life of Malawi farmers (Somashekhhar: 2015). The successes of the first phase of AIP for Malawi was highlighted at the beginning of the second phase in July 2016, where the Malawian agricultural practitioners would gain exposure to the intricacies in certified seed production; seed processing and seed treatment; along with the essential skills; sales, distribution and management of stocks through online courses for extension learning (Kurmanath: 2016).

Cooperation between USAID and Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI), Ahmedabad, was started in October 2013. It was focused mainly on the transfer and indigenisation of three kinds of low-cost mechanisation and processing equipment to Kenya, namely, the Bullet Santi (rechristened as Shujaa in Kenya), the multipurpose food processing machine and the seed and fertilizer dibbler.

The *Bullet Santi* is a three-wheeled multipurpose farming machine that can plough sandy loam soils, spray pesticides, help in ridge making, weed and inter-culture. It is an affordable alternative which would help in significant improvement in productivity. The technology has been adopted to have four wheels to increase the stability in the undulating farm terrain of Kenya. The Multipurpose food processing machine is an economical solution for post-harvest value-addition at the farm. The machine can help the farmers to augment their income at the source by selling value-added products like juice, jam, jelly and essential oil. The seed dibbler is a useful implement to sow seeds and apply fertilizer while reducing drudgery. Because of its easy access, the implement can be used for gap-filling, thereby maintaining the crop density.

SRISTI also partnered with Jomo Kenyatta University of Agriculture and Technology (JKUAT), in Juja, Kenya, for conducting demonstrations, training and capacity building as well as building an ecosystem of stakeholders around these technologies. The team has been engaged in promoting local manufacturing/assembly to ensure long-term sustainability.

Ms. Devi Ramkissoon apprised that the second phase of the program was under discussion and was expected to take off in the summer of 2016. The negotiations were being based on their experiences and lessons learned in the first phase, and the success is evident from the fact that early results of the discussions point towards expanding to more countries. This, according to Susan Owens, the Executive Director of the Board for International Food and Agricultural Development (BIFAD), USAID, was precisely the scope of the strategic partnership which ensured that they leverage their knowledge and expertise with countries that are in need of the know-how (Owens: 2015).

Also, in September 2013, the Indian Ministry of Agriculture, the USAID and USDA launched the first collaborative international training course (five-day course) at the National Institute of Plant Health Management (NIPHM) campus in Hyderabad. The aim was to jointly develop training programs that promote science-based plant health management. Thirty-five participants from India, Bangladesh, Sri Lanka, Kenya, Malawi, Mozambique, and Tajikistan were to be trained by the faculty at NIPHM and specialists from the USDA's Center of Plant Health Science and Technology on the legal and regulatory framework that has been engaged in supporting and guiding the application of PRA, both nationally and internationally. The collaboration recognised NIPHM as a global center of excellence in the area of plant health management to address regional and global training needs (Government of India, Ministry of Human Resource Development, India Education Bureau: 2013).

Under the Consultative Group for International Agricultural Research (CGIAR) Consortium, there are several international organisations working towards the development of agricultural research in India, with the goal to tackle poverty, hunger and major nutrition imbalances, and environmental degradation (Consultative Group for International Agricultural Research (CGIAR): 2014). One of them is *HarvestPlus*, which is a part of the CGIAR Research Program on Agriculture for Nutrition and Health (A4NH) that enables the realisation of the potential of agricultural development to deliver gender-friendly health and nutritional benefits to the poor. It plays a leadership role in the world to advance nutrition and public health by developing and distributing staple food crops fortified with vitamins and minerals. The programs of *HarvestPlus* are coordinated by the International Center for Tropical Agriculture (CIAT) and IFPRI.

Iron deficiency is a serious challenge in India and affects over seventy per cent of children under the age of five, and more than fifty per cent of women in India (International Institute for Population Sciences: 2006). In response to this, the novel approach of bio-fortification was pioneered by *HarvestPlus*, based upon the study led by Division of Nutritional Sciences at Cornell University, which suggested that pearl millet that is produced to contain increased levels of iron, or “iron-bio-fortified pearl millet,”. Pearl millet is a staple food for nearly 100 million people in Africa and Asia, who live in arid and semi-arid climates. In India, pearl millet forms a staple diet of about 50 million people especially in the western states of Rajasthan, Maharashtra, and Gujarat. Prabhu Pingali, during a telephonic interview, underscored the importance of focusing on the quality of food and emphasised that this could be instrumental in reducing iron deficiency (Pingali: 2015). Using the technology of selective breeding, the iron-zinc-rich pearl millet was developed by *HarvestPlus* in partnership with the ICRISAT in India (Paul-Bossuet: 2013; Sangareddy: 2015; Kurup: 2013). The goal is that more than 350,000 Indian farming households would be growing and eating iron pearl millet by 2018. *HarvestPlus* is also engaged in advocacy that seeks to strengthen central and state-level ownership of biofortification through effective integration into nutrition and agricultural policies.

HarvestPlus partners with governments, businesses, and civil society to promote iron pearl millet to Indian farmers and consumers. Some of these are ICRISAT, IFPRI, CIMMYT, IRRI, Astha Beej Pvt. Ltd., Bayer BioScience Pvt. Ltd., Bioseed Research India Pvt. Ltd., Birsa Agricultural University, Cornell University, Harvard School of Public Health, Johns Hopkins Bloomberg School of Health, North Dakota State University, Ohio State University and a host of others. *HarvestPlus* supports the National Agricultural Research System in India to breed, test, and release bio-fortified pearl millet developed through a partnership with ICRISAT. Public awareness campaigns through the use of print and digital media and public health experts have highlighted micronutrient deficiencies and promote adoption of nutritious crops (*HarvestPlus*: 2015).

Crop scientists in the US and India believe the solution to the current food crisis lies in a second green revolution, based largely on the knowledge of the gene (Lal: 2016). Driven by the intentions to give agriculture a renewed impetus, the then President of India Pratibha Patil highlighted the urgency of a Second Green Revolution that would enhance the country’s agricultural productivity and transform it into ‘an agrarian superpower’ (Patil: 2008). Plant

breeders acknowledge that genetic sequencing of nearly all of genes in corn and soybean plants were inconceivable four or five years ago. Eminent crop scientists like Robert Fraley was convinced that through genetic modification, scientists and farmers would be able to augment the yields of those crops that have beneficial characteristics from other species and create new varieties with higher yields that would have reduced fertilizer needs, and drought tolerance. He believed "*We're now poised to see probably the greatest period of fundamental scientific advance in the history of agriculture*" (Bourne Jr.:2013). Committed to the objective of doubling the agricultural yields in India by 2030 as well as to sustainable agriculture, the US agribusinesses like Monsanto have adopted a vision for agriculture built upon three pillars of advanced breeding, biotechnology, and improved agronomic practices. Examples include, soil conservation practices like reduced-tillage methods that lessen the need to till the soil before each cropping season, managing planting populations, which ensures optimal growing conditions for the crops, and other farm management systems to administer water usage, manage crop residue and improve the environment through better fertilizer management (Monsanto: 2015a). It has been reinforced through recent research that there was an urgent necessity for increased investment in research and development for sustainable food production becoming more effective (DeLonge, et al.: 2016).

Despite these laudable objectives, such as the adoption of a joint vision for agriculture built upon three pillars of advanced breeding, biotechnology and improved agronomic practices, Monsanto's actual operations have invited sharp criticisms in India across ideological-political and technical-commercial lines. This has now become a major challenge in the agricultural cooperation between India and the US. (This challenge has been discussed elaborately in Chapter 5 of this dissertation).

Feeding a population of nine billion in 2050 would require producing more food with fewer resources while reinvigorating rural economies. Similar points were resolved at the Singh-Obama Summit of 2013, where PM Singh and President Obama applauded their countries' work together with African partners Kenya, Malawi, and Liberia to provide capacity building and exchange best practices for food security (The White House: 2013). Further reinvigoration could be achieved through collaboration, investment, and innovation among the two largest democracies that are committed to the cause of ensuring food security to the world population (CII Conference Proceedings: 2013). For instance, the scientists India and the US have invented a tool that seemingly is a promising solution and the food crisis can be

averted. It is called CRISPER-Cas9, where the plant genetic processes can be examined and manipulated, and unlike its precursors in the world of genetic modification, it was highly specific, which allowed scientists to arrive at a single gene and activate or deactivate it, remove it or exchange it for a different gene (Parrett: 2015). GM potato seedlings are already being grown at the National Center for Plant Genome Research in New Delhi. Biologists and geneticists are confident that the gene-editing CRISPR technology would help them build a second Green Revolution. The rapidity and easy processes of CRISPR have meaningful effects on agriculture, where the results would lead to the creation plants that can withstand heat, result in a more nutritious yield, would be easier to ship, and less needy of water (Parrett: 2015). It would also be an answer to the anti-GMO lobby, as the NITI Aayog has been tasked by the PM Office, Government of India to develop a forward-looking biotechnology regulatory policy, and accommodate the advances in technology and facilitate commercialisation of safe and appropriate technologies for the economic progress of the country (Shantharam: 2015).

Weighing in on the subject, the renowned magazine *The Economist* has pointed out that unlike the Green Revolution, the Second Green Revolution would depend not on a few miracle varieties but on tailoring existing seeds to different environments. It would help mechanise and move more people off farms and into more productive labour. It holds on to the promises of bringing similar benefits, to the previously ignored parts of India and the poorer farmers that the first Green Revolution generally overlooked (The Economist: 2010). Despite these developments, as remarked by Ambassador Mulford in 2004, the argument that managing the new era of Second Green Revolution would require timely and careful review and transparent, scientific regulatory systems still hold true (Mulford: 2004).

The role played by USAID and ICAR highlight the extent to which both governments answered the challenge of ensuring agricultural cooperation that sustained agricultural base within the country while engaging in foreign trade. They have in fact been the premium institutions that have set up mechanisms in the form of grants for joint research that would have a formidable impact on the future of agro-economy of both countries. The next section deals with how their role promoted agricultural promotion between the two.

3.4 Contribution of USAID and ICAR in Promoting International Collaboration for Agricultural Partnership

a) United States Agency for International Development (USAID)

USAID is the world's largest provider of international food assistance. It has had a long history of partnership with India. During the *Partners' Day* celebrations at the USAID headquarters on December 1, 2015, Washington DC, it was reiterated that the food assistance to India brought confidence and nourishment to the food insecure people of the country (USAID: 2015a). Ever since President Harry Truman signed the *India Emergency Food Assistance Act* in 1951, the program of USAID evolved progressively over the decades.

All foreign assistance programs under the Foreign Operations Administration (FOA) were consolidated under the responsibility of the International Cooperation Administration, which was reorganized and renamed as the Agency for International Development (AID) in 1961. The US government's role in the India partnership was henceforth assigned to the AID and to its mission in New Delhi, which came to be known as USAID.

On the advice of Dr. Frank Parker and Dr. I.H.W. Hannah, the first joint Indo-American team chaired by Dr. K.R. Damle was established in 1955 (Lal: 2013). The reports of the team as well as of the five US LGUs were predictably favourable and strongly supported the evolving partnership.¹⁶

For nearly the next two decades (1956-73), six US land-grant universities with financial assistance (totalling \$ 42 million) from USAID helped India to improve her agricultural and veterinary colleges and established new agricultural universities in India to improve its systems for agricultural research and education, including the creation of nine new agricultural universities (Read: 1974).

USAID-sponsored Agricultural Production Program (APP): By the year 1965, there was ample evidence that farmers could record major production increases when provided with the

¹⁶ Ohio State University was the first university to translate the positive response in India into an official AID-university contract. In September 1955, less than four months after Dean Rummell and Associate Dean T. Scott Sutton returned from their survey trip. Sutton left for Punjab shortly after the contract was signed to become Ohio State's first team leader in Region II. The international guest house at PAU is named "Sutton House".

proper combinations of inputs and the guidance for using them. In 1965 the GoI requested additional assistance from USAID to implement the strategy for expansion of the intensive district concept, concentration on new high yielding varieties (HYV) of cereals, double cropping patterns, special assistance to small and marginal farmers, and new techniques to increase production in dry land areas, farm machinery, plant protection, enhancing soil fertility, soil conservation, farm management and extension education. A special request was made to provide teams of American scientists for those Indian states, which would make a specific request for it. These advisors would help build effective relationships between university and department of agriculture research scientists and extension workers. They would also help initiate needed programs of adaptive research and assist with extension demonstration projects. This new project was labeled as the 'Agricultural Production Program (APP)'.

USAID turned to LGUs already involved in assisting India's new agricultural universities. Through the USAID, APP would provide personnel to bridge the gap between the Indian universities and the Indian state departments of agriculture to strengthen assistance in increasing agricultural production, by jointly identifying the most urgent technical problems in the way of increased production. Three-member teams would be formed for each thematic area, consisting of an expert from the US, a member of state agricultural department, an agricultural university representative, who would then set the priorities for problem-solving research and extension efforts. The renewed USAID contracts also provided for Indian staff members to participate in short-term non-degree training programs in the United States, for further improving their skills (Read: 1974).

The general purpose of US LGU/USAID program of assistance to Indian states in the development of agricultural universities was to assist them in developing policies, plans and programs and advise on the organization, administration, and operation; develop instruction, extension and research programs on ways and means by which the sons and daughters of rural people and others would be provided opportunities for training in modern agriculture; and help in the construction and maintenance of physical facilities and equipment of the universities. The above description of the US' eagerness and ensuing modus operandi to help India in the midst of its agricultural adversities and consequent development of a partnership between the two countries for the establishment of State Agricultural Universities (SAUs) in India, willingness to partner with international agricultural research institutions for raising the

productivity of food grains through the application of latest available technology, a tacit appreciation of the cultural differences and readiness to overcome the challenges is but an episode that has gone down in the annals of the strongest phase of US-India relations.

In the late 1970s, the USAID projects in India included building rural infrastructure, fertilizer promotion, control of diseases especially malaria, provisions of agricultural credit, integrated health and population programs, irrigation schemes and community forestry. By the mid-1980's, the program's emphasis shifted towards science and technology with a focus on policy and institutional reforms. From 1992 to 2002, approximately 65 per cent of the annual US foreign assistance funding for India was dedicated to food assistance, where the programs of agricultural research, alternative-energy technology development; biomedical research, water resources management and family planning were integrated with transfers of technologies, institutional capacity building. The sixty-year-old India food aid program ended in 2011, and since 2012 the USAID budget request has had no demands for food aid to India (USAID: 2016).

In his remarks at a luncheon address hosted by the Confederation of Indian Industry (CII), Chandigarh, India in April 2004, the then US Ambassador to India David C. Mulford highlighted the prevailing partnership between India and the US and charted the contours of the prospects. He lauded the USAID funding in keeping with the '*stellar tradition*' of American-Indian university cooperation. He emphasised that these grants would focus on next-generation issues in agriculture. For instance, the Punjab Agricultural University and Ohio State University were granted support for joint work on market diversification and value-added agricultural products (Mulford: 2004).

As noted above, the USAID has assumed a key role in partnering with the National Institute of Agricultural Extension Management (MANAGE) of the Ministry of Agriculture, Government of India, to train over 1,500 agricultural practitioners from seventeen countries across Africa and Asia on specialised farming practices to improve productivity and income; help the Banaras Hindu University, Sardar Vallabhbhai Patel University of Agriculture and Technology, and Assam Agricultural University to adopt state-of-the-art agricultural education curriculums, including extension management training programs; and established Cereal System Initiative for South Asia (CSISA) to help India's smallholder farmers adapt to climate change and rainfall variability (USAID: 2017).

Thus the USAID has partnered with Government of India for advancing food security and improving environmental sustainability to enable the farmers of India to have access to specialised farming practices that would increase the productivity and raise their incomes.

b) Department of Agricultural Research and Education (DARE)/ Indian Council of Agricultural Research (ICAR)

After Independence, through concerted cooperation with US LGUs, India witnessed significant intensification in the production of food grains production (green revolution), oilseeds (yellow revolution), milk (white revolution), fish (blue revolution), and fruits and vegetables (golden revolution). The reasons that were cited for these phenomenal successes in Indian agricultural sector were the application of sophisticated and cutting edge science and technology combined with appropriate policy measures, and hard work and grit of Indian farmers (Read: 1978; Indian National Science Academy (INSA): 2001; ICAR: 2012a).

It was realised that the relationship between education, research, and agricultural development was intricate, and both education and research influence development and in turn influenced by it (Chaudhri: 1975; Raina: 1999). India adopted a modified version of the US LGU model to suit Indian agricultural demands and expanded the research capabilities, called upon the university scholars to conduct need-based research in the states, and the Indian institutions would act as bases for transfer of technology (Senanayake: 1990). Therefore, following the recommendations of expert committees, the National Agricultural Research System (NARS) was set up in India which comprised of the Department of Agricultural Research and Education (DARE) established in the Ministry of Agriculture in December 1973. The function of DARE has been to coordinate and promote excellence in agricultural research and higher education in the country. It provides the necessary government linkages for the Indian Council of Agricultural Research (ICAR), which is the apex research organisation of India for co-ordinating, guiding and managing research and education in agriculture and allied sectors, which includes horticulture, fisheries, and animal sciences. It has hundreds of institutes and agricultural universities spread across the country and thus becomes one of the largest national agricultural research systems in the world¹⁷.

¹⁷ Department of Agricultural Research and Education, About Us, [Online: Web] URL: <http://dare.nic.in/>

The ICAR has been referred to as the 'strongest example of a managing council in the developing world', which has had a relatively long evolution (Senanayake: 1990). It began its operations as the Imperial Council of Agricultural Research, an autonomous body (a registered society) in 1929 (INSA: 2001) and commenced its operations in 1930 as an attached office within the then Imperial Department of Agriculture (Raina: 1999). ICAR has witnessed two major reorganizations, first, in 1966, which expanded the size of funds, the number of institutes, and expanded the scope of disciplines and regions, and also elevated the Council to an extensive functional research organisation directly funding and implementing research in its own research institutes (Desai: 1979). ICAR was transformed and given a separate bureaucratic identity with the name of Department of Agricultural Research and Education (DARE) in 1974. This enabled ICAR to bypass the Department of Agriculture when it needs to consult the higher echelons of government (Senanayake: 1990).

The reorganisation of ICAR in 1966 was based on the recommendations of three External Review Teams. The First Joint Indo-American Team was constituted in 1954 following the Technical Cooperation Mission (TCM) agreement between the USA and India. However, due to the non-implementation of the recommendations made by the First Team, the urgent need to organise, support and co-ordinate research 'prompted the appointment of a Second Team in 1959 (ICAR: 1960). The Second Team's recommendations corresponded to those made by the First Team and both asked for complete integration of all existing research institutes for effective research to be carried out in order to substantially increase domestic wheat and rice production. The Third Team, led by Marion Parker, designated the agricultural scientists as a client group which could make its own demands on the research system. As a result, *ICAR was made responsible for all research institutes under the Ministry of Agriculture, Government of India, including some state government research stations, and all the research projects co-ordinated by and under the Union government* (Raina: 1999).

Thus, the evolution of the ICAR is marked by three phases, namely, 1929–66; 1966–74; and post-1974. Each of these phases is marked by the size of resources at its disposal and the nature and extent of public sector participation in research (Trigo: 1984). Resource allocation for research during 1930-40 was primarily in response to urgent commercial concerns and provided recommendations on sugar, locusts, oilseeds and manures. ICAR was reorganised in 1966 with the aim to achieve specific impacts upon food production. According to M. S. Swaminathan, the dwarf wheat breeding programme needed to be shifted in order to obtain

full benefits from the fertilizer and water components of the package programme introduced under the IADP (Swaminathan: 1969; Schutjer: 1970). By 1966, ICAR was able to develop intricate systems and procedures in the form of regular scientific staff, systems of peer-refereeing of research and a large body of senior scientists in the form of Scientific Advisory Committees for the monitoring and evaluation of the project proposals (Acharya: 1986).

With scientists now given the controlling power of ICAR system along with a substantial expansion of its research resources and international collaborations, the ICAR is currently the single largest research organization in the country (Raina: 1999). DARE/ICAR is involved with the supervision and management of resource sharing between several SAUs, special commodity research stations, private research organisations, and other universities (Randhawa: 1987). *The successes of proper implementation of the government policies as well as high receptiveness from the farming community were the establishment of agricultural universities patterned on the LGUs of the US (Indian Council of Agricultural Research (ICAR): 2012a). The system of education in the SAUs that were taken from these US universities prominently enabled the incorporation of a number of diverse subjects in the courses and also included the provisions practical experience for the students and farmers.*

It is noteworthy that the US-India cooperation paved the way for improving the quality of agricultural education through the ICAR. ICAR has closely collaborated with USAID for food security initiatives not only in India but also in countries of Asia and Africa. It has played an important role in setting up Krishi Vigyan Kendras (KVKs) across the country to undertake farm demonstrations of location-specific modern agricultural technologies, train the farmers and the extension personnel in accessing latest technologies and work as resource and knowledge dissemination centre of agricultural technology for supporting initiatives of public, private and voluntary sector for improving the agricultural economy of the area.

It is well known that agricultural education enabled the farmers to be innovative, allocative and productive, and highlights the overall need for modernising agriculture of the country (Chaudhri: 1979). It is noteworthy that the US-India cooperation paved the way for improving the quality of agricultural education through the ICAR. The need for agricultural research and education in the country was evidenced by a study that examined the relationship between cultivators' education, their research on the adoption of HYV seeds and agricultural productivity in Punjab and Haryana during 1966-72. It was found that 6-7 per

cent of the agricultural growth of the region during this time could be safely attributed to better knowledge and understanding of seeds, fertilizers and water usage (Chaudhri: 1975). Therefore, improving the quality of agricultural education held the key for not only driving agricultural growth but also in fostering the development of technologies for sustainable agriculture that would lead to livelihood and nutritional security. Thus, the significance of agricultural education as responsible for sustaining, diversifying and realising the potential of agriculture cannot be underrated.

As per the preamble of the ICAR, the Union Minister of Agriculture is by convention the President of the ICAR Society. The Director-General (DG) is the Principal Executive Officer and is also the Secretary of the Department of Agricultural Research and Education (DARE). DARE is the main department for all related scientific and development activities and bilateral scientific collaborations with other countries (INSA: 2001). ICAR is vested with the authority to promote and ensure quality assurance in agricultural education, as per the decision of the Union Cabinet in 1973. In the discharge of this function, the ICAR has undertaken a number of initiatives for agricultural education. During Agricultural Human Resource Development Project (1995-2000), many reforms were introduced which among others include establishment of the Accreditation Board for quality assurance, measures for reducing inbreeding, new curriculum and delivery, faculty competence enhancement, infrastructure development in select universities, access to information, modernisation of libraries, emphasis on technology education, etc. (ICAR: 2012a).

The ICAR played a leading role in encouraging the establishment of the agricultural universities in the first place, and in channeling the Union government's support to them once they were established. The establishment of the agricultural universities contributed to the perceptible improvement in the quality of education, with more competent teachers, better-equipped libraries, laboratories and farms and better curricula (Gautam: 1972). Under its aegis, there are SAUs, deemed-to-be-universities, central agricultural universities, *Krishi Vigyan Kendras* (KVKs) and staff training centers across the country (INSA: 2001).

Further, ICAR realised the emerging complex challenges in agricultural research and vowed to attain a 'Rainbow Revolution' covering the entire spectrum of activities in agriculture which would make India a developed nation free of poverty, hunger, malnutrition, and environmental safety. Towards this goal, it has sanctioned two projects, namely, the *National*

Agricultural Technology Project, which emphasises on production system research, organisation and management reforms and innovations in technology dissemination; and *Agricultural Human Resource Development Project* with an emphasis on improving the quality of agricultural education (INSA: 2001).

The prime mandate of the ICAR is “*to plan, undertake, aid, promote and coordinate education, research and its application in agriculture, agroforestry, animal husbandry, fisheries, home science and allied sciences*” (INSA: 2001). Some of its major divisions are:

- a) **Crop Science Division:** it played an important role in ushering in the era of Green and Pulses Revolutions in the country. It has played the key role in the development, release, and notification of over two thousand high-yielding varieties and hybrids of field crops for their commercial cultivation. Other achievements of this division include the development of hybrid cultivars of cotton, grain pearl millet, pigeon pea, castor, safflower, rice, sorghum and hybrid cotton, which are landmark achievements in hybrid research. These have been instrumental in sustaining the momentum of productivity enhancement in post-green revolution period. The Crop Science Division has also developed new breeding methods, mating designs and analyses, and germplasm screening techniques for evaluation of resistance/tolerance to biotic and abiotic stresses and established the National Gene Bank at the National Bureau of Plant Genetic Resources, New Delhi, one of the World’s leading gene banks, for long-term storage of seed and other planting materials (INSA: 2001). During a personal interview with Dr. Jeet Singh Sandhu, Deputy Director General (Crop Science), Division of Crop Science, Ministry of Agriculture, it was found that ICAR was actively involved in partnering with US universities in creating farmer-friendly, cost-efficient seed varieties that suited Indian conditions (Sandhu: 2016).

- b) **Horticultural Science Division:** through its research institutes, research centers and projects, the Horticulture Division vested with the responsibility of overseeing the overall accelerated development of horticulture in national perspective for improving nutritional, ecological and livelihood security. The focused attention on horticulture has paid a dividend and resulted in increased production and export. Globally, India is the second largest producer of fruits and vegetables, the largest producer of mango, banana, coconut, cashew, papaya, pomegranate etc., and largest producer and exporter of spices ranks first

in productivity of grapes, banana, cassava, peas, papaya etc. Studies have shown the high potential for increasing Indian exports of horticultural products to the US markets (Nanda, et al.: 2008). Export growth of fresh fruits and vegetables in term of value is 14% and of processed fruits and vegetables is 16.27% (Indian Council of Agricultural Research (ICAR): 2010b).

- c) **Animal Sciences Division:** With the vision to develop technologies to support production enhancement, profitability, competitiveness and sustainability of livestock and poultry sector for providing food and nutritional security to Indian masses, the Animal Science Division of ICAR coordinates and monitors research activities in its 19 Research Institutes and their Regional Centers. The Division also coordinates and monitors the Results Framework Document (RFD) Coordination Unit of DARE/ICAR (Indian Council of Agricultural Research (ICAR): 2010c). It has succeeded in enhancing the nutrient requirements of various categories of livestock for different production functions, and Processes, techniques, and equipment for the manufacture of quality milk and dairy products with reliable quality testing methods have been developed. A number of studies have been undertaken by the USDA and FAO on India's livestock and poultry sector (Landes: 2005; Mehta and Nambiar: 2007). A 'giant leap forward' of the Animal Sciences Division has developed a number of new genotypes in cattle like the *Karan Swiss*, *Karan-Fries* and *Frieswal* and buffaloes like *Murrah*, *Nili*, *Ravi* and *Surti* for increased milk production (INSA: 2001; Indian Council of Agricultural Research (ICAR): 2012b).
- d) **Agricultural Engineering Division:** To make Indian agriculture sustainable, profitable and a competitive enterprise through engineering interventions of farm mechanization, value addition and energy management in production and post-harvest operations (ICAR: 2010e), the Agricultural Engineering Division provides engineering inputs for mechanisation of conventional and protected agriculture, conservation of produce and by-products from quantitative and qualitative losses, and value addition and agro-processing enterprises for additional income and employment, energy management in agriculture and rural living for increasing production and productivity, and reducing drudgery (INSA: 2001). Among its several achievements include the development of improved machinery such as laser land leveler, self-propelled sprayers, precision seeders and planters, transplanters for rice and vegetable seedlings, multi-crop threshers, harvesters for cereals

and sugarcane etc. for efficient farm operations and resource conservation (ICAR: 2010e; INSA: 2001).

- e) Natural Resources Management Division: This Division aims at the sustainable management of natural resources for achieving food, nutritional, environmental and livelihood security in the country. Towards this, it is engaged in developing location specific, cost-effective, eco-friendly conservation and management technologies for higher input use efficiency, agricultural productivity, and profitability without harming the natural resource base (ICAR: 2010f). It has been highly successful in achieving its objectives. Some of the major accomplishments are in the area of Land Resource Characterisation, Management and Land Use Planning, it has Prepared soil maps of the country, pursued on an integrated strategy of managing rainfed areas through watershed development projects in several parts of the country, launched soil test based on-line fertilizer recommendation system for different cropping systems, developed agroforestry models for bio-amelioration of salt-affected lands and developed integrated Farming systems involving crops, horticulture, agroforestry, fisheries, poultry, piggery, mushroom cultivation and bee-keeping etc. with potential to increase productivity by multiple times (INSA: 2001; ICAR: 2010f).

- f) Agricultural Education Division: The Agricultural Education Division works to strengthen and streamline higher agricultural education system to enhance the quality of human resources in the agricultural supply chain to meet future challenges in the agriculture sector in the country. It provides administrative support to all the universities associated with the ICAR, to support and strengthen the Higher Agricultural Education in the country (INSA: 2001; ICAR: 2010g).

- g) Agricultural Extension Division: this division has been the backbone of ICAR for technology assessment, refinement and transfers to the farmers (INSA: 2001), through the 642 KVKs established until 2010. It has trained more than a million women and men farmers and extension personnel in agriculture and allied sectors such as crop production, plant protection, livestock production and management, soil and water management, farm machinery and tools, and home science and provided vocational training to around 50,000 rural youth in the occupations of poultry, dairying, piggery, beekeeping, fisheries, fruit

and vegetable preservation, maintenance and repairing of farm machinery and tools, and hybrid seed production (INSA: 2001; ICAR: 2010h).

The ICAR has been at the helm of providing scientific, professional and partial financial support to the farming communities for improving the quality, relevance and access to higher agricultural education (ICAR: 2012a). The ICAR has had a close working and monitoring relationship with USAID and other research organisations like the ICRISAT and CIMMYT. They have facilitated improved crop productivity and food security, thereby helping to reduce poverty and malnutrition in the country. Apart from undertaking joint agricultural innovation programs, these premier research institutions have also set up genome-sequencing laboratories, led to the adaptation of new cultivars in view of climate variability and helped improve the adaptive capacity of farmers in Asia and sub-Saharan Africa and developed heat-tolerant wheat for South Asia (USAID: 2014; ICAR/DARE Annual Report (2014-15): 2015; ICRISAT: 2014).

Fresh initiatives have marked the ongoing US-India agricultural cooperation. As noted earlier, the end of the era of food aid to India did not end the concerns about food security. Not only that, this concern went beyond the bilateral understanding and began to include global food security. The growth of the Indian economy and its growth along with the success of its bilateral cooperation in agriculture has in part been responsible for this development. The following section examines how the then President Obama's *Feed the Future* initiative and India's interests in agriculture began to occupy a critical space in the overall US-India agricultural cooperation.

3.5 Initiative for Food Security

For generations, the United States has led development assistance worldwide to alleviate suffering and build shared progress and prosperity. Global food security received significant attention since the start of the first Obama administration. In the year 2009, amid the escalating food prices around the world especially in Asia, and the impending food crisis, there was a resurgence of interest in agriculture and food security, which came to occupy a central position in all policy debates (Ramkissoon: 2015). President Obama in his inaugural

address committed working along with the poor nations to make their farms flourish, in order to ‘*nourish the starved bodies and feed the hungry minds*’ (USAID: 2015b).

The 2009 G-8 Summit in L’Aquila, Italy, was a crucial moment for global efforts to reduce poverty, hunger and undernutrition. It was here that President Obama urged the leaders of the world to make significant investments in investment in agriculture and to “*do business differently*” by taking an all-inclusive approach to guaranteeing food security, through effective coordination, support to country-owned processes and plans for agricultural development, engaging with multilateral institutions in pressing forward the efforts to promote global food security, and standing responsible and answerable on sustained and accountable commitments. He laid the foundations of the *Feed the Future initiative* by announcing the initial US investment of \$3.5 billion in global food security. This initial US commitment helped to leverage more than \$18 billion of corpus funds from other G-8 countries and other donors at the Summit (*Feed the Future: 2012; Ramkissoon: 2015*).

Led by the USAID, *Feed the Future* has been referred to as being President Obama’s signature initiative to combat global hunger, food insecurity and malnutrition, which leverages the expertise and programs of ten additional US Government departments (namely, US Department Of State, US Department of Agriculture, US Department of the Treasury, US Department of Commerce, Millennium Challenge Corporation, Overseas Private Investment Corporation, Office of the US Trade Representative, US African Development Foundation, Peace Corps and US Geological Survey) and agencies to work in collaboration with host-country governments, businesses, smallholder farmers, universities, research institutes and civil society to promote a broad approach to global food security and nutrition (Owens: 2015). The Bureau for Food Security, which leads the *Feed the Future* initiative, draws upon the strengths of American partners, multilateral organisations, NGOs, the private sector and corporations and universities to support country-specific strategies, that reinforce growth in the agricultural sector (USAID: 2012; Ramkissoon: 2015). With an emphasis on smallholder farmers, particularly women, *Feed the Future* supports 19 focus countries, namely, Bangladesh, Cambodia, Ethiopia, Ghana, Guatemala, Haiti, Honduras, Kenya, Liberia, Malawi, Mali, Mozambique, Nepal, Rwanda, Senegal, Tajikistan, Tanzania, Uganda, and Zambia, that are making progress toward sustainably developing their own agriculture sectors as a catalyst to economic growth and trade to reduce poverty and hunger. Since then, *Feed the Future*, or the global hunger and food security initiative as a presidential initiative has

contributed financially towards direct assistance and private resources to deliver on that promise by unlocking the transformative potential in agriculture to connect more people to the global economy and pave a path out of poverty (USAID: 2015c).

India was hailed as a strategic partner in attaining US government's objectives of the *Feed the Future* initiative, as it had the experience of having achieved agricultural resilience which could help other developing countries. In particular, India has gained significant expertise due in part to the long experience with the US in agricultural cooperation. The US-India Strategic Dialogue on Agriculture was initiated and this administration made India a key partner in President Obama's '*Feed the Future*' initiative to provide its expertise as well as play a leadership role in achieving food security in a select nineteen countries of the world. This intervention in terms of a new policy framework has been received well by all the stakeholders, including the *Feed the Future*-recipient countries, with the obvious sceptics whose rationality does not conform to that of the rest that opine India's engagement with the US as undermining India's sovereignty (Sridhar: 2014).

The focus countries of under the Indian expertise are Malawi, Kenya, and Nigeria which would be under the supervision of USAID India, US government and Ministry of External Affairs, India (Ramkissoon: 2015), which would work in collaboration with each other to achieve the food security goals in these countries.

Feed the Future initiative reflected a coordinated focus of the US Government towards building more productive, resilient agricultural systems through country ownership, accountability and partnership, through both public-sector and private-sector commitment. This was reiterated by Bill Gates, former chairman of Microsoft, in his testimony before the Senate Committee on Foreign Relations, that a combination of scientific innovation and partnerships forged by the US with leaders around the world working on behalf of the world's impoverished and marginalised people had promising prospects of improving the human condition. With objectives in line with those of achieving global food security of the *Feed the Future* initiative, the Global Development Program of the Bill and Melinda Gates Foundation, aims to explore the best opportunities to help the world's underprivileged people to lift themselves out of hunger and poverty. These also fulfill the President's historic G-20 commitments on global food security and commit resources to the tune of \$1.5 billion to America's Global Hunger and Food Security Initiative. He hailed the leadership role of

Ranking Member of the Senate Richard Lugar, Senator Robert Patrick "Bob" Casey Jr., on the issue of food security, and that they would require Congressional resolve to bring to fruition (US Congress, Senate Committee on Foreign Relations: 2010).

In 2014, *Feed the Future*-supported farmers experienced more than half a billion dollars in new agricultural sales, representing a 200 per cent increase over 2013. The number of individuals who were recipients of agriculture and food security training through this initiative increased by over 40 per cent, public-private partnerships in agriculture increased by 90 per cent, and the number of people trained to support child health and nutrition had increased by 150 per cent. *Feed the Future* also extended to more than 12 million children with nutrition interventions and helped nearly seven million farmers gain access to new tools or technologies such as high-yielding seeds, fertilizer application, soil conservation and water management. These increases represent the maturation and full mobilization of the initiative through its many partnerships with host-country governments, the private sector, the research community and others.

Teaming up with more than sixty US universities (like the OSU, Cornell University, Columbia University, Washington State University, University of California, Davis, University of Hawaii, Louisiana State University, and others), and collaborating with partner-country research and educational institutions, including India's National Institute of Agricultural Marketing (NIAM) and National Institute of Plant Health Management (NIPHM), the *Feed the Future* Innovation Labs undertook efforts for cutting-edge research, and developed safe and effective technologies to address the prevailing and future challenges presented by climate change and the urgent need to feed a growing global population while training the next generation of scientists. Using advanced genomics, integrated pest management, and other new tools, the Innovation Labs are developing stress-tolerant wheat, sorghum, millet and legume crops, and improved livestock, aquaculture and horticultural systems. These innovations boost production, decrease post-harvest losses and increase food safety to provide smallholder farmers with better market linkages. Better market linkages in turn raise incomes, increase food security and improve household nutrition.

One of the *Feed the Future* Innovation Labs for Applied Wheat Genomics, led by Kansas State University, works with the CIMMYT and the Borlaug Institute for South Asia to cultivate new wheat varieties that can withstand unfriendly growing environment that is

otherwise hindered by traditionally labour-intensive and time-consuming breeding processes in the context of climate change, growing population, food insecurity and economic welfare, which is heavily dependent on wheat for its nutrition and income. It has been successful in finding solutions and appropriating technologies to get high-yielding, climate-resilient wheat varieties into the hands of farmers in India. In this effort, the Applied Wheat Genomics Innovation Lab developed three new data collection technologies that are designed to speed up phenol-typing (the affordable process of gathering field data on plant characteristics), thereby enabling scientists to develop climate-resilient varieties at a much faster pace, with the goal to tackle some of the world's largest problems, like the task to feed nine billion people by the year 2050 (Feed the Future: 2015).

Thus, it can be concluded that the on-going extensive research collaboration between India and the US led to levels of agricultural productivity increases. It has fostered quality education for farmers in general and in areas especially relevant to farming, which became essential for the implementation and consolidation of the new technologies and methods. Improved soil tilling techniques, weed control measures, ways to combat pests and diseases, and the adequate use of fertilizers and irrigation, and use of biotechnology promoted the best possible development of plants are now part of the training and research in India. As a result, new crop varieties have become significant, thereby creating a demand for the need for a second-generation Green Revolution across the country (Beckmann: 2000). The argument that the first Green Revolution led to a social dilemma of unequal prosperity in certain pockets of the country, leaving the rest of the areas worse off provided a critical space which examined the need for a renewed agricultural partnership between India and the US. In a rare instance of close partnership, these critics witnessed the unveiling of the US-India Knowledge Initiative on Agriculture in 2005, by then US President George W. Bush and the then PM of India Dr. Manmohan Singh, which focused on promoting teaching, research and commercial linkages and a second 'Green Revolution'. Experts opine that the US and India have wide scope to intensify their efforts towards building partnerships and build networks for sustaining an ever-green revolution on the farms in India (Markandey: 2015; Gautam: 2015). Shifting policy of the government and evolving role of the private sector in agriculture is an important aspect that needs to be understood. The next chapter would study the involvement of the private sector along with the various institutional framework set up by the governments on both sides that have played a very important role in taking the agenda of US-India strategic cooperation in agriculture forward.

CHAPTER 4

Institutional Framework for Bilateral Agricultural Cooperation and Role of the Private Sector

Sections:

4.1 US-India Economic Dialogue

4.1.1 US-India Commercial Dialogue

4.1.2 Focus Group on Agriculture of the United States-India Trade Policy Forum (TPF)

4.2 US-India CEO Forum

4.3 Role of Lobbies and the Private Sector in Augmenting US-India Partnership in Agriculture

4.3.1 Congressional Caucus on India and Indian Americans

4.3.2 US-India Political Action Committee (USINPAC)

4.3.3 US-India Business Council (USIBC)

4.3.4 Federation of Indian Chambers of Commerce and Industry (FICCI)

4.3.5 Confederation of Indian Industry (CII)

CHAPTER 4

Institutional Framework for Bilateral Agricultural Cooperation and Role of the Private Sector

In the decade 2000-2010, the overall economic cooperation between the US and India has been steadily growing at the governmental and business levels. Regular interactions at these levels have facilitated and strengthened the trade and economic interactions between the two countries. It has also been acknowledged by the USDA, the Embassy of India, Washington D.C. and India's MEA that the efforts to increase two-way agricultural trade between the two countries and ensuring food security have been the major objective of the governments and businesses in both US and India (Ahramjian: 2015; Government of India, Ministry of External Affairs: 2014). In pursuit of this, the US-India Knowledge Initiative on Agriculture of 2005, concentrated on promoting teaching, research, service, and commercial linkages, efforts to link universities, technical institutions and businesses to support agriculture education, joint research and capacity building projects especially in biotechnology. Indo-US agricultural collaboration had received bipartisan Congressional support too since 1996. Led by many Congress members like Bill Barret (R- Nebraska), Calvin Dooley (D- California) and Richard Lugar (R- Indiana), the US Congress underscored India's importance to US agriculture as a potential market and as an important member of the world trading system (US 144 Congressional Record: 1998; Lugar: 2015).

Over the past decade 2000-2010, analysts and scholars have pointed out that the US-India economic relationship has expanded dramatically (Inderfurth and Khambatta: 2013). More particularly, agriculture as an area of economic activity has generated considerable support from the private sector of both countries, and there has been a tremendous rise in the rise of investments for agri-businesses, in agriculture, cold storages, food processing and others. This has received encouragement from the governments on both sides, as the cooperation has been institutionalised over the years, especially since 2000. Elaborate institutional frameworks such as the US-India Economic Dialogue, the US-India Commercial Dialogue, the US-India Working Group on Trade, the United States-India Trade Policy Forum (TPF) and its Focus Group on Agriculture, the Private Sector Advisory Group (PSAG), Framework for Cooperation on Trade and Investment, US-India CEO Forum and the US-India Business

Council (USIBC) were constituted to realise the objectives of building greater understanding in negotiating for agricultural cooperation. It has been understood that through the institutional set-ups, a strong agro-processing sector in effect generates a positive feedback on agriculture, provides farmers with assured demand and good prices, and encourages absorption of improved agricultural technology producing varieties suitable for agro-processing (Ahluwalia: 2006; Sibal: 2009). These also represent a vital ascendancy in the US-India political relations, during the second term of President Bill Clinton, whose friendly posture towards India was well driven by the then Indian Prime Minister Atal Bihari Vajpayee.

Agricultural Dialogue between the US and India that began in July 2005 during the then Prime Minister Manmohan Singh's visit to the US was the prelude to the US-India Knowledge Initiative on Agriculture. It was enthusiastically received by the Indian business communities, as this dialogue comprised of not only officials from both governments on both sides representing agriculture and crop bureaucracies, the Indian and American LGUs but also the private sector (Dobriansky: 2007). The private sector was expected to help identify research areas that have the potential for rapid commercialisation, and to make crops and seeds affordable to the Indian farmers (*The Business Line*: 2005; Balaji: 2005).

This chapter examines the process through which the negotiations on agricultural cooperation were carried on. It studies the various aspects of the institutional mechanisms such as the US-India Economic Dialogue, the US-India Commercial Dialogue, the US-India Working Group on Trade, the United States-India Trade Policy Forum (TPF) and its Focus Group on Agriculture, the Private Sector Advisory Group (PSAG), the Framework for Cooperation on Trade and Investment, and the US-India CEO Forum in order to understand how the relevant policies would be put into action. Further, the important role played by the US Congressional Caucus on India, Indian Americans, lobbies such as the US- India Political Action Committee, Indian American Friendship Council as well as the private sector conglomerates like the US-India Business Council (USIBC); Federation of Indian Chambers of Commerce and Industry (FICCI) and the Confederation of Indian Industry (CII), that advocate and push for favourable policy decisions in both the US and India is also examined in order to establish linkages between policy and eventual outcome.

4.1 US-India Economic Dialogue

For both US and India, the significance of their economic partnership has increased the stakes in improving their bilateral relationship. By 2000 the rapidly growing two-way trade (growing at over twenty percent annually), found the US-India relationship increasingly become broad, complex and complementary. The intensifying and increasingly complex economic links being forged between the two countries began having a profound impact on the joint economic outlook for the twenty-first century for both countries. (US Department of State: 2005). This rationale was further explored in the creation of the US-India Economic Dialogue in 2000 when the High-Level Coordinating Group for Indo-US Economic Dialogue was constituted by India (Embassy of India, Washington, D.C.: 2000b). The Economic Dialogue had four tracks, namely; the Financial and Economic Forum, the Environment Dialogue and the Commercial Dialogue and finally the Trade Policy Forum, a cabinet-level dialogue launched in July of 2005. Each of these tracks is led by the respective US agency and Indian ministry. A decision on the pace of these dialogues was taken at the level of Indian Prime Minister and the US President in order to keep the momentum going. This was unusual given that the Indian decision-making on agriculture has always been shared by many actors and stakeholders. A case study published by WTO on the subject highlighted that the key actors in the agricultural negotiations at the governmental level in India are normally the Ministry of Commerce and Industry (MoCI), the Ministry of Agriculture (MoA) and the MEA. In this dialogue process, all three were seemingly well organised towards Indian positions. Further, it is noteworthy that agriculture being a state subject in India, the coalition government at the center weigh several political factors before undertaking any major transformation of the agricultural sector. As was evident during the negotiations during the Uruguay Round, state governments have significant sensitivities regarding agriculture. Yet, this factor did not seem to be in the forefront in this dialogue. In all this, the criticality and sensitivity of the Indian agriculture sector cannot be underestimated. It can be gauged by the fact that the rural population in India (which is largely agro-based), has a political mind of its own, and has the power (and often the inclination) to prove the political ‘pundits’ wrong. This was amply demonstrated in the General Elections of 2004 in which the previously ruling National Democratic Alliance (NDA) was voted out of power, primarily because the rural population felt neglected by the process of economic liberalization (Priyadarshi: 2005; Sivakumar: 2009).

The decision-making process in agriculture gains further sensitivity with the involvement of the private sector. The then Director of Confederation of Indian Industry (CII) N. Srinivasan stated that the previously hyphenated relationship between the government and industry changed as progress was made in the bilateral negotiations of the Uruguay Round. As a result, major industry organisations like the CII and Federation of Indian Chambers of Commerce and Industry (FICCI), were frequently consulted in order to provide critical inputs to the government on agricultural trade issues (Priyadarshi: 2005).

For the US, the decision-making has been more structural. Though a federal country, the level of federal government's involvement in the negotiations was substantial, with the Congress and USDA having a premier role to play. Within the Congress, the state representation, the committee system and the lobbies by both farmers and industry perform important roles to orchestrate their positions. However, as a recent study pointed out that it was the executive or the Presidency that pushed the US-India agricultural dialogue process forward. It noted the active involvement of George W. Bush and Barack Obama during their respective Presidencies to revitalize and expand the agricultural cooperation of the 1960s to move towards a 'Second Green Revolution'. An important highlight of the Second Green Revolution has been the emphasis on "*the private sector and on privately-funded research*", as against the public-funded research and development of the Green Revolution era (Purushothaman: 2011).

Thus it is clear that there was an acknowledgment of an enhanced role for the private sector in this dialogue in comparison to the earlier bilateral and multilateral negotiations with India. While the negotiations on agriculture were the overall economic dialogue between the two, the private sector initiated new directions in many fields that changed the way the two countries negotiated. Indeed, the role of the business sector in taking this forward was factored in by both governments. The US was always keen on enhancing the ties between the private sectors to achieve quick results, but as evidence reveals, India too emerged as a willing partner in encouraging the private sector to play a stronger role than before. This change in the Indian position had significant implications on the course of the dialogue on agriculture over the coming years. The US-India CEO Forum thus logically carried forward the private sector negotiations that would dovetail with both the government's plans to achieve their goals especially in agriculture, where several issues of concern were related to the firm levels.

In April 2004, the then Economic Adviser to the then Prime Minister Atal Bihari Vajpayee, S. Narayan, and the then Under Secretary for Business and Agricultural Affairs, of US Department of State, Alan Larson, led an extensive bilateral discussion to revitalise the US-India Economic Dialogue, where interests of the agricultural community was agreed to be focused upon (Mulford: 2004).

One of the most important themes of the Economic Dialogue was that of biotechnology and information technology (US Department of State: 2005). In 2005 three new initiatives were launched under the Economic Dialogue. These were: The Information and Communications Technology Working Group (ICTWG), the CEO Forum, and the USIKIA. The Economic Dialogue, through its working groups was meant to be a platform for the resolution of outstanding economic issues, addressing the legality of commercial disputes, developing appropriate capacity building and technical assistance programs, and boosting the bilateral trade and investment. The efforts to revitalise the US-India Economic Dialogue were buttressed by the commitment of the then US President Bush and the then Indian PM Manmohan Singh, as a result of which the working groups maintained regular communications, thereby giving a major boost to bilateral economic engagement in a wide range of areas.

It is striking that the year 2005 was one of the watershed years in the Indo-US relations, as decisions on energising the strategic economic partnership were made and implemented. The co-conveners of the Economic Dialogue in 2005, Allan Hubbard, the then Assistant to the President for Economic Policy and Director of the National Economic Council (NEC) and the then Deputy Chairman of the Planning Commission Dr. Montek Singh Ahluwalia (US Department of State: 2005) agreed to focus on making progress on key issues to promote bilateral trade and investment, and providing close coordination on the work done by the four tracks of the Economic Dialogue (Trade, Commerce, Finance, and Environment) (Embassy of India Archives: 2005). In March 2006, they were joined with the then US Trade Representative Rob Portman, Indian Minister of Commerce Kamal Nath (the co-chairs of the Trade Policy Forum), and Undersecretary of State Josette Sheeran Shiner and Foreign Secretary Shyam Saran along with the executive secretaries of the Economic Dialogue, who appraised the Dialogue's progress and discussed next steps to further enhance the bilateral economic relationship. It was agreed that Undersecretary Shiner and Secretary Saran would host a High-Level Public-Private Investment Summit in 2006 to advance the Dialogue's

economic and commercial goals (US Department of State Archives: 2006). Currently, the US and India are continuing efforts to deepen the economic relationship, improve investor confidence, and support economic growth in both countries.

The recognition of the role of the private sector came across clearly from both the American and the Indian side (Parsai: 2005), and the clubbing of the “economic” with the “commercial” reveals how far India had come in the process of overall negotiations and deliberations with the US (Balaji: 2005). An *ICAR-Industry Meet Titled Agricultural Transformation through Public-Private Partnership: An Interface*, recognised the efficiency, flexibility, and competence of the private sector in achieving the strategic goals of agricultural development such as market penetration, improved competitiveness and exploration of new markets (Ayappan, et al.: 2007). In particular, the goals of the dialogue included aspects of agriculture that displayed some continuity with the past collaborations with some significant departures. Prime Minister Singh had been an early proponent of the need to kick-start a new green revolution based on the application of new technologies and modern business practices with the aim to enable and empower the farmers (Singh: 2005; Singh: 2006). This was actively supported by President George W. Bush (George W. Bush Archives, The White House: 2006). Hence, the other tracks like the US-India Commercial Dialogue devoted considerable time to the steps that need to be taken to ensure that agriculture would in fact be the strong vital pillar of the bilateral dialogue, as the then Secretary of State Hillary Clinton had stated that agriculture would be the one of the strongest and most important pillars of cooperation between the United States and India (US Department of State: 2009; Government of India, Ministry of Agriculture: 2009; Kumar: 2009).

4.1.1 US-India Commercial Dialogue

The US-India Commercial Dialogue was constituted by Minister of Commerce and Industry and US Commerce Secretary during the visit of President Clinton in March 2000 to India (Embassy of India, Washington, D.C.: 2000b). The importance of trade and business as significant thrust areas continued during and beyond the then Indian Prime Minister Vajpayee's visit to the US in October 2000. As envisaged in the statement “*India-US Relations: A Vision for the 21st Century*”, the objective of the US-India Commercial Dialogue was to foster the development and strengthening of commercial, trade and

investment ties between Indian and US private sectors (Government of India, Ministry of Commerce and Industry: 2000; Chatterjee: 2010). In Vajpayee's words, economic cooperation would provide an '*attractive architecture*' for the emerging Indo-US relationship (Vajpayee: 2000). Both countries desired to become partners in fighting hunger, poverty, hunger, illiteracy, disease and pollution of the world and called for greater investments in agricultural biotechnology as the solution for widespread hunger and malnutrition in India. The joint statement expressed confidence about the working of different trade and technology groups established earlier (Embassy of India, Washington DC: 2000b). Therefore, pursuing this further, the second forum that was formed under the Economic Dialogue was Indo-US Working Group on Trade. The mandate of this group was to increase cooperation on trade policy, which would sort the matters related to WTO. Towards this, a high-level coordination group led by the United States Trade Representative and the Ministry of Commerce and other concerned Ministries/Departments of the Government of India would engage in regular discussion to enhance cooperation on trade policy, to deepen ties between the Indian and American business communities. As appropriate, individual trade issues could be examined in greater depth with the participation of other agencies with corresponding responsibilities and through the creation of subgroups. The Group would receive inputs from the private sector (including trade policy issues identified in the US-India Commercial Dialogue) (Clinton: 2000b; Government of India, Ministry of Commerce and Industry: 2000; Nayan: 2000) and serve as a locus of consultation on a broad range of trade-related issues, including those pertaining to the WTO. This incorporated provisions for regular government-to-government meetings to be held in conjunction with private sector meetings, especially such consultations on a host of contentious issues at the WTO (Ramachandran: 2000; Government of India, Ministry of Commerce and Industry: 2000).

From the start, US-India Commercial Dialogue facilitated the exchange of best practices and standards across priority sectors such as manufacturing, infrastructure, clean energy, and agriculture. Co-chaired by the Indian Secretary of Commerce and the US Under Secretary of Commerce for international trade, the Commercial Dialogue has worked to facilitate trade and maximise investment opportunities in a number of areas, prominently IT, infrastructure, bio-technology and services. Participation was expanded to include representatives of other Cabinet agencies and ministries on both sides. Since the beginning, maintenance of close contact with business associations was required for the government agencies and receive private sector inputs, including the establishment of subcommittees to pursue specific

projects or sectoral issues of mutual interest (Clinton: 2000b; Inderfurth and Khambatta: 2013).

In line with the stated objective of being a platform for the development and strengthening of commercial, trade and investment ties between the private sectors of India and the US (Government of India, Ministry of Commerce and Industry: 2000), the US-India Commercial Dialogue contributed to an ‘upsurge’ in US-India relations (Ackerman: 2002). During President Bush’s visit to India in 2006, this Dialogue was renewed and elevated to involve the private sector to reduce bilateral trade issues in various sectors including agriculture (Englehart: 2006). The 2007 *National Export Strategy* of the US mentioned the significant role played by the US-India Commercial Dialogue in strengthening the bilateral partnership by “combining export promotion and commercial policy activities” (Lavin (ed.): 2007).

In 2012, the then Minister of Commerce, Industry and Textile of India, Anand Sharma and the then US Commerce Secretary John Bryson commended the contribution of US-India Commercial Dialogue in the growth in bilateral economic ties in since its establishment. They attached particular importance to the opportunity that the Commercial Dialogue and other bilateral mechanisms provide for the exchange of views with the private sector. They reaffirmed their governments’ commitment to further strengthen the India-US economic partnership as an important element of the vision of the strategic partnership between the two countries as outlined by PM Manmohan Singh and President Barack Obama. During this time, the Commercial Dialogue was renewed for two more years, i.e. until March 2014, to further stimulate trade and investment ties across all areas, and, in particular, infrastructure, clean energy, agriculture cold supply chain (Government of India, Ministry of Commerce and Industry: 2012). It established a new working group on Agriculture Biotechnology to promote agricultural science and technology research collaboration led by India’s Department of Biotechnology and US Department of Agriculture. Further, in 2015, this platform was incorporated in the strategic dialogue agenda and was revamped as US-India Strategic and Commercial Dialogue (Government of India, Ministry of External Affairs: 2015).

Since its establishment, the US-India Commercial Dialogue has been effective in facilitating information exchanges between government and private-sector experts on standards and regulatory procedures. It has stimulated trade and investment ties in areas of agriculture and cold supply chain (Embassy of India, Washington, D.C.: 2012). The Dialogue held technical dialogues on animal health, plant health, and food issues highlighting positive implications

for US-India agricultural cooperation process (US Embassy, India: 2015). The US-India Commercial Dialogue has also supported technical discussions on a bilateral investment treaty (BIT) with the Indian Government that is led by USTR and the US Department of State that would facilitate bilateral trade in food and agricultural products.

The International Trade Administration (ITA) of the US Department of Commerce has engaged with India's Ministry of Commerce and Industry and formed working groups on biotechnology, agricultural infrastructure and have worked to negotiate on agricultural tariffs and non-tariff barriers under the Trade Policy Forum led by the Office of the US Trade Representative (USTR) (US Department of Commerce, International Trade Administration: 2014). The following section provides a detailed analysis of the Focus Group on Agriculture of the United States-India Trade Policy Forum (TPF), where both countries have mutual interest in boosting farmer income and ensuring consumer welfare, and have agreed to deepen collaboration on best practices that can benefit both farmers and consumers (Office of the USTR: 2016).

4.1.2 Focus Group on Agriculture of the United States-India Trade Policy Forum (TPF)

The United States-India Trade Policy Forum (TPF) was created in 2005, as a premier bilateral forum and standing bilateral committee for the discussion and resolution of trade and investment issues between the US and India (Trade Promotion Coordinating Committee: 2006; Office of the USTR: 2010a). Trade Policy Forum is the principal trade dialogue body between India and the US. It is a cabinet-level dialogue co-chaired by the US Trade Representative and the Indian Minister of Commerce and Industry. In July 2005, the then US Ambassador Robert Portman and Indian Minister of Commerce and Industry Kamal Nath announced the establishment of this new consultative mechanism called the US-India Trade Policy Forum to be chaired by themselves or their Deputies, to better coordinate trade and investment policy between the two countries. TPF has provided an opportunity to work together to expand trade between the two countries and discussions in the Forum are organised around five Focus Groups covering the following areas: Agriculture; Innovation and Creativity; Investment; Services; Tariffs and Non-Tariff Barriers (Office of the USTR: 2010a).

In effect, this track garnered a keen focus on trade in the agricultural sector was a key part of the negotiations. This forum also focused on how to overcome the several challenges that constrained the relationship. For instance, as the Press Trust of India reported that India had issues with market access for agricultural products such as rice, mangoes, pomegranates and table grapes, Indian agricultural exporters faced difficulties in shipping these commodities due to some non-trade barriers in the US. As a result, during TPF meetings, both countries agreed to establish a new technical dialogue to promote cooperation on plant and animal health and food safety issues in order to facilitate the trade of agricultural goods (The Economic Times: 2015). The US on the other hand, according to a *Congressional Research Service Report* to the US Congress, sought greater market access to India's agricultural market and key service sectors for its exports (Martin and Kronstadt: 2007).

Thus, both sides decided to consider a wide range of issues of interest to both governments with the expectation of expanding bilateral trade and investment in agriculture. Issues of concern in an agricultural trade to the two sides including sanitary and phytosanitary issues began being addressed by the sub-group on agriculture under the India-US TPF. The two sides reviewed the status and agreed to move forward expeditiously, on these items which were under examination, of either country. On plant quarantine issues, the two sides expressed satisfaction regarding the resolution of problems relating to import of almonds from the US. India also urged the US side to complete all formalities to permit import of mangoes from India before the start of 2007 mango season (USDA: 2006b).

The Focus Group on Agriculture (a part of TPF), covered the following subjects: tariff and non-tariff trade barriers; foreign direct investment; subsidies; customs procedures; standards, testing, labeling and certification intellectual property rights protection; sanitary and phytosanitary measures; government procurement; and services. It offered the opportunity for the two governments to work together bilaterally toward a successful outcome of the Doha Round of multilateral trade negotiations (US Department of State Archives: 2005), and have created momentum for expanding bilateral agricultural trade (Government of India, Ministry of Commerce and Industry: 2009) and promoting inclusive growth (Office of the USTR: 2010).

The 2006 National Export Strategy Report of the Trade Promotion Coordinating Committee (TPCC: 2006), which is Chaired by the US Secretary of Commerce, highlighted that the two

sides successfully resolved a number of outstanding trade irritants and established detailed work plans to address outstanding issues and opportunities to encourage bilateral trade and investment. Some of these are:

- i) Trade in agricultural products:** Agricultural departments in the two countries have sought to address a number of sanitary and phytosanitary (SPS) issues. India granted the US temporary waivers from methyl bromide fumigation requirements affecting US exports of almonds, peas, and pulses, while longer-term solutions are being developed. In addition, the Indian authorities have initiated the regulatory process for the approval of two edible waxes, positively affecting the environment for trade in US apples. The two countries continued their negotiations under this Focus Group with respect to fumigation treatments, poultry, dairy, almonds, wheat, and additional edible wax approval, and also to explore possible joint initiatives in the area of biotechnology and agricultural products (Bajaj: 2006; US International Trade Commission: 2009; Johnson: 2013).
- ii) Tariffs and non-tariff barriers:** India opened its market to US industries manufacturing insecticides to be sold throughout India. It also eliminated special duties on carbonated beverages and committed to reducing duties on life-saving drugs as well as lowering duties on most non-agricultural imports. Both sides have agreed to consult with respect to potential initiatives to enhance the transparency of tariff regimes; Indian regulatory requirements, subsidies, and/or tariffs affecting US exports of boric acid, fertilizer, amongst others.
- iii) Investment:** Since the creation of the TPF, India has liberalised its restrictions governing foreign direct investment (FDI) in the retail sector, allowing 51 percent FDI in retail trade for single brand stores, and removed an approval requirement for 100 percent of FDI in wholesale stores (Government of India, Ministry of Commerce and Industry, Department of Industrial Policy and Promotion: 2008). The two governments have also agreed to continue to identify potential sector-specific investment joint initiatives, such as agro-processing and biotechnology (Office of the USTR: 2006; The Trade Promotion Coordinating Committee (TPCC): 2006; Paddock: 2009).

The *India-US Memorandum of Understanding for Cooperation in Agriculture and Food Security* was initialed in November 2009. The then Minister of External affairs S.M. Krishna and the then US Secretary of State Hillary Clinton noted the importance of this MoU in increasing cooperation in agricultural research, human resources capacity building, natural resource management, agri-business and food processing, and collaborative research for increasing food productivity. It was also emphasised that India's experience with agricultural development in the framework of low capital intensity and diverse conditions offered useful lessons for other developing countries, which was the underlying vindication for India being a partner country with the US in President Obama's *Feed the Future* program (Press Information Bureau: 2009).

In pursuance of implementing the MoU, the India-US Agriculture Dialogue was established in November 2010. It is co-chaired by Foreign Secretary of India and the Under Secretary (Energy, Economic and Agricultural Affairs) of the US State Department, on behalf of the Governments of India and USA respectively. Three Working Groups for having been set up under this dialogue, namely, Strategic Cooperation in Agriculture and Food Security; Food-Processing, Agriculture Extension, Farm-to-Market linkages; and Weather and Crop-forecasting respectively (Embassy of India Archives: 2017).

This Dialogue has aimed at continuing to look for innovative ways to work jointly in promoting agricultural development and reducing rural poverty, promoting global food security, and improving weather prediction and crop forecasting capabilities for agricultural purposes in order to improve livelihoods in the rural sectors (IDSA: 2010).

Indeed, the role of the business sector in taking this forward was factored in by both governments. The US was always keen on enhancing the ties between the private sectors to achieve quick results, but as was noted in the Indian communications, India too emerged as a willing partner in encouraging the private sector to play a stronger role than before. This change in the Indian position had significant implications on the course of the dialogue on agriculture over the coming years. The US-India CEO forum thus logically carried forward the private sector negotiations that would dovetail with both the government's plans to achieve their goals especially in agriculture, where several issues of concern were related to the firm levels.

4.2 US-India CEO Forum

Recognising the need to create a high-level private sector forum to exchange business community views on key economic priorities, India and the US established a CEO Forum, in 2005 and subsequently reconvened in 2006, 2009, 2010, 2011, 2013 and most recently in January 2015 during President Barack Obama's second trip to India (The White House: 2009; US Department of State: 2013; Tata Sons: 2015). This Forum affirmed that inputs from the business community were an integral component of a successful bilateral economic dialogue. This Forum discussed actionable ways to promote greater trade and investment opportunities. As for agriculture, participants have focused on expanding collaborative initiatives into areas such as agri-business, food processing, clean energy, education and skills development, and infrastructure financing, explore ways to improve the food value chain and reduce losses by focusing on marketing, cold chain infrastructure, water recycling (US Department of State: 2014).

In 2005, the CEOs met in US Department of State, Washington, D. C. The participants from the US were: Paul Hanrahan, AES Corporation, Warren R. Staley, Cargill Inc, Charles Prince, Citigroup, William Harrison Jr., JP MorganChase, David M. Cote, Honeywell, Harold McGraw III, The McGraw-Hill Companies, Thomas J. O'Neill, Parsons Brinckerhoff, Ltd., Steven Reinemund, PepsiCo, Inc., Christopher Rodrigues, Visa International, Anne M. Mulcahy, Xerox Corporation. The CEOs from India were: Ratan N. Tata, Tata Group, Indian Chair, Dr. Pratap C. Reddy, Apollo Hospitals Group, Baba N. Kalyani, Bharat Forge Ltd., Kiran Mazumdar-Shaw, Biocon India Group, Deepak S. Parekh, HDFC, Ashok Ganguly, ICICI One Source, Nandan M. Nilekani, Infosys Group, Yogesh C. Deveshwar, ITC Ltd., Anajjit Singh, Max India Group, Mukesh Ambani, Reliance Industries, Ltd. (US Department of State: 2005).

The CEO Forum presented its recommendations to President Bush and Prime Minister Singh in March 2006. Allan Hubbard (the then Assistant to the President for Economic Policy and Director of the National Economic Council (NEC)), Dr. Montek Singh Ahluwalia (the then Deputy Chairman of the Planning Commission), and other senior officials from both governments also met with members of the CEO Forum to discuss the Forum's policy recommendations. The recommendations covered the entire spectrum of the US-India economic relationship, with the aim to enhance economic growth and job creation for both countries, to improve market access for goods and services, and to promote bilateral trade and

investment. The US and Indian governments have been receptive to the recommendations and expressed determination to continue working with the CEO Forum members (US Department of State Archives: 2006). Given that agriculture formed a substantial part of these discussions in one way or another, these institutional mechanisms have clearly impacted the US-India agricultural relations. The CEO Forum in their report and recommendations for enhancing trade and investment entitled *US-India Strategic Economic Partnership* defined six priority initiatives which are promotion of trade and industry, creation of an infrastructure development fund, promote technology exchange in Agriculture, Bio-technology and Nano Technology, partner in skills development, set up an Indo-US Centre for Industrial Research and Development and establish a dispute resolution mechanism (Embassy of India, Washington, D.C: 2010).

Furthermore, this Forum has allowed business executives to relay their core concerns to policymakers directly, and serve as a channel to provide senior-level private sector input into discussions and formulation of economic policy. Their contribution has been solicited to help the US and India make progress on key issues that would enhance economic growth and job creation and promote bilateral trade and investment by harnessing the energy and expertise of private sector leaders. On agriculture, the two countries have sought to collaborate to improve the food value chain and reduce losses by focusing on marketing, cold chain infrastructure, and water recycling (Inderfurth and Khambatta: 2013; The White House: 2009).

During the meeting of US-India CEO Forum in 2010 held in Washington, D.C., the participants from India included Ratan Tata, Mukesh, D. Ambani, Reliance Industries Limited, S. Gopalakrishnan, Infosys Technologies, Sunil Bharati Mittal, Bharti Enterprises, Chanda Kochhar, ICICI Bank Limited and Deepak Parekh, HDFC. From the US side the participants were David M. Cote from Honeywell, Louis Chenevert, United Technologies Corporation, Jamie Dimon, JP Morgan Chase & Co., Terry McGraw from the McGraw-Hill Companies, Indra Nooyi, Pepsi Co. and Vikram Pandit, Citigroup among others (Embassy of India, Washington, D.C: 2010).

During the CEO Meeting in 2011, David Cote of Honeywell remarked that the CEO Forum's recommendations have provided a roadmap to strengthen the economic bilateral relationship between India and the United States and creating jobs and promoted the strong commercial ties that bring peace and prosperity to both countries (Embassy of the USA, New Delhi: 2011).

The rapidly growing involvement of public-private partnership in the overall context of US-India relations underscores the fact that economics and globalization do not fall under the strict category of a zero-sum game of realist theories of international relations. While it is true that a good foreign policy minimises risks and maximises benefits (Morgenthau: 1978), and both US and India adhere to this tenet, yet, the interest for bilateral cooperation in agriculture proves that it is not confined to the aspect of power maximisation. In a highly inter-dependent world, India's growing economy cannot be seen as an encumbrance upon the US, nor does it symbolise its failure and India's success. Job creation in India does not equate to job loss in the US. Thus, from the above description it is illustrative that the high-level importance accorded to strengthening economic ties in general and agricultural relations in particular, demonstrates the willingness of the US and Indian government to take the partnership to the next level, not just being potential markets for each other, but also becoming collaborators and leaders in the agricultural development around the world and ensuring food security for all.

The last meeting of the Forum in 2015, held in New Delhi the CEOs from the US were: Dave Cote, Chairman and CEO of Honeywell International; Indra Nooyi, chairperson and CEO, PepsiCo; Ajay Banga, CEO, Mastercard; Robert Iger, Disney; Deven Parekh, Insight Partners; Ahman Chatila, Sun Edison; Daniel Roderick, Westinghouse; Mary Andringa, Vermeer Corp; Sanjay Bhatnagar, WaterHealth and; Arne Sorenson, Marriott. The CEOs from India were: Mukesh Ambani, Reliance Industries Ltd; Gautam Adani, Adani Group; Sunil Bharti Mittal, Bharti Entreprises; Sashi Ruia, Essar Group; Hari S Bhartia, Jubilant Life Sciences; Kiran Mazumdar Shaw, Biocon; Anand Mahindra, Mahindra and Mahindra; Deepak Parekh, HDFC; Chanda Kochar, ICICI Bank; Arundhati Bhattacharya, State Bank of India; Vishal Sikka, Infosys; B Prasada Rao, Bharat Heavy Electricals Limited; Sudhir Mehta, Torrent Pharmaceuticals; Preetha Reddy, Apollo Hospitals Entreprises; Anurag Kumar, Indian Institute of Science, Bangalore and; D.K. Saraff, ONGC (Zee Media Bureau: 2015).

Thus, the role of the private sector that is increasingly considered by both governments as an indispensable pillar in the agricultural cooperation between India and the US must be understood in order to evaluate the continuing stakes of the private sector in facilitating the implementation of the decisions taken by the two governments.

4.3 Role of Lobbies and Private Sector in Augmenting US-India Partnership in Agriculture

Analysis supported by international lending institutions like the World Bank reflect the understanding that when market reforms are introduced, even though partial, the private sector tends to respond swiftly and dynamically, and turns the terms of trade in favour of farmers and lowers the prices for consumers, having favourable distributional consequences (Adelman: 2001). The above discussion on the US-India CEO Forum in part reflects the rationale given by this analysis. The instances of the emergence of contract farming, electronic exchanges, ICT-based market information systems and kiosks, and myriad value chain improvements, concur with this argument (Gautam: 2015). Yet the consensus is that the marketing, trade, value addition, agro-processing, and food safety capacity required by a diversified, vibrant, and modern agricultural sector continues to offer a large scope for the countries to collaborate (World Bank Group: 2014), and therefore there remains a huge opportunity for the private sector to fill the gap with its optimism. To quote the chairman of Bharti Enterprises, Sunil Mittal, *“the biggest area of development is going to be in the area of agriculture, which, like telecom, is a “business which can transform India, and more importantly, transform rural India”* (Mittal: 2006). The private sector in India has been enthusiastic of public-private partnerships to foster innovations in the agricultural research and development as well as been adaptive to technologies developed through international collaborations (Organisation for Economic Co-operation and Development: 2012).

Indian and multi-national corporations involved with agriculture, such as the Indian Tobacco Company (ITC), Pepsi India, Monsanto, Tata Rallis, Mahindra Shubh Labh, Hindustan Lever, and many others, are eager partners in the government’s plans to use public-private partnerships as the engine of future agricultural growth. Two major Indian business groups with no prior experience in agribusiness, Reliance, and Bharti, have both started major operations. According to the then Indian Minister of Agriculture Sharad Pawar, the US-India Agriculture Knowledge Initiative agreed upon in the shadow of the civilian nuclear deal, *“will contribute tremendously to launching a second green revolution in our country”* (Witsoe: 2006; US Department of Agriculture (USDA): 2006c).

A further example of continuity of two countries' private sector agricultural partnership is that of Monsanto and Indian Society of Agribusiness Professionals (ISAP) to create a sustainable model for sustainable agriculture. In February 2009, they launched Project SHARE (Sustainable Harvest Agriculture Resources Environment) to empower over ten thousand cotton and corn small and marginal land holders across three states and 1,100 villages, and improve their socio-economic conditions. Farmers would have access to HYV seeds and modern agriculture inputs, and training and education about relevant agronomic practices. Farmer groups would be formed to enable collective bargaining power, which would also have increased engagements with *Krishi Vigyan Kendras* (KVKs) and SAUs, and modern technology demonstration units. The creation of self-help groups (SHGs) for beneficiary household women and better farm to market linkages would further facilitate the farming communities. Project SHARE thus envisions farmers as the agents of a sustainable change for farming so that it would become a lucrative enterprise for generations to come (Monsanto India: 2009; Duncan: 2011). There is a continuity of holistic public-private partnerships (PPP) with states of Rajasthan, Gujarat, Uttar Pradesh, Madhya Pradesh, Andhra Pradesh and Karnataka to intensify crop productivity and improve lives. This Monsanto-PPP approach has been recognised as being comprehensive that provides support and data about the entire crop cycle, right from the seed selection stage to preparation of land prior to sowing, and building effective market linkages at harvest time (Monsanto: 2015b).

Pro-active support from the US Congressional Caucus on India and Indian-Americans in the US as well as private sector conglomerates in India that have effectively lobbied for augmenting good relations between the US and India has garnered the support of the citizens and policymakers of both countries. Their significance may be measured by the number and frequency of statements and releases on the subject that were given at that time.

4.3.1 US Congressional Caucus on India and Indian-Americans

Formed in 1992, Congressional Caucus on India and Indian-Americans, popularly called the India Caucus is a bipartisan group of Members of the US House of Representatives (Press Trust of India: 2013). It was formally launched in 1993 by Frank Pallone (D- New Jersey) and Bill McCollum (R- Florida) constituted the largest single country Caucus in the House of Representatives (Embassy of India, Washington, D.C.: 2015). Since its establishment, its

goals have been to positively influence US' policies towards India in the Congress; advocate the interests of American Indians and; promote and strengthen economic and strategic relationship relations between the US.

The India Caucus has performed a pivotal role in forging a strong bilateral partnership between India and the US (Chatterjee: 2010). It has focused on strengthening the relationship between the two largest democracies of the world, emphasising the two nations' shared interests from global security to trade and international prosperity.

During his term as the co-chair of the Caucus, Joseph Crowley (D- New York) led the Democratic whip effort as part of the Congressional push to secure the enactment of the US-India Civil Nuclear Agreement, and pushed for the adoption of the US-India Knowledge Initiative for Agriculture, the landmark agreements that brought US-India relations into the century after decades of distance during the Cold War (Crowley: 2015). The peaceful purposes clause under the US-India Civil Nuclear Agreement includes the use of information, nuclear material, equipment or components in areas of research, power generation, medicine, agriculture and industry (US Senate: 2006). Congressman Sherrod Brown (D- Ohio), a senior member of the International Relations Committee and currently a member of the Senate Committee on Agriculture has continued to push for stronger US-India agricultural relations (Brown: 2015). The then co-chair of the India Caucus, Representative Ami Bera (D-California), has been a staunch supporter of US-India relations, and has pointed that India has a critical role in holding and maintaining the gains US had made in anchoring stability in South Asia and called upon the US Congress to nurture the economic and diplomatic ties with New Delhi (India Times: 2013). Republican Senators Richard G. Lugar (R- Indiana), who headed the powerful Foreign Relations Committee, and Sam Brownback, who headed Senate Foreign Relations Committee on Eastern and South Asian Affairs, were designated as the friends of India (India Abroad: 2002). House International Relations Committee Members Ben Gilman (R- New York) and Gary Ackerman (D- New York), along with House Armed Services Committee Member Jim Saxton (R- New Jersey) supported growing and prospering US-India relationships in the promotion of adoption of technology for Indian agriculture, greater economic and scientific cooperation between the two countries (India Post: 2003), and has been committed to enhancing trade and investment, global security and democracy (Office of Joseph Crowley: 2013; Crowley: 2013).

Subject experts have noted that the end of the Cold War provided an enabling platform for both US and India to work on a constructive bilateral relationship. It was pushed by the economic affluence of the Indian-American community, formation of Indian-American political organisations, Indian-American political activism and leadership, and the formation of the India Caucus in 1993, all of which facilitated the creation of a strong cohesive Indian lobby group. Since then, Indian lobbying has grown in size and funding strength. Further, for the first time, a Caucus was formed in the US Senate in 2004 dedicated to a single country-India (Sharma: 2017). The members of the Caucus have been sensitive to the needs and demands of the agricultural sector in general, as they represent constituencies that have a large agrarian base. Therefore, they have been forthcoming to attach special significance to India as a vital market for their own farmers. It was informed to the author during the field work for the present research in the US, by Congressman Ami Bera and Senator Lugar that the Caucus assigns special importance to India's agriculture and has played an important role over the years to foster greater US-India cooperation in the area. Also, advocacy organisations in the Capitol Hill have an important role to play in developing perspectives and providing specialised information to the policy makers. Among such organisations is the US-India Political Action Committee (USINPAC), which ever since its formation, has vouched for strong US-India relations. The next section details the ways in which it has contributed to the strengthening of US-India agricultural cooperation.

4.3.2 US-India Political Action Committee (USINPAC)

US-India Political Action Committee (USINPAC) is an advocacy organisation that has a strong working relationship with the Senate and House Caucus on India and Indian Americans, as well as with Senate Foreign Relations and House Foreign Affairs Committee and conduct informational briefings and meetings on issues pertaining to US-India relations. During its delegation's visits to India, USINPAC delegates have deliberated upon a roadmap for US-India collaborative areas including agricultural development, drinking water and sanitation, and strategies for linking Small and Medium Enterprises (SMEs) between the US and India, agribusinesses and role of biotechnology (USINPAC: 2006; USINPAC: 2008). With expanding prospects for US-India trade relations, USINPAC has advocated promoting bilateral cooperation in research and development of new technologies in key sectors including agriculture, energy, life sciences, waste management, and information technology

(USINPAC: 2010). They have engaged the policymakers and businesses in both countries to foster the exchange of ideas, communication of business culture, and forge closer business ties. Augmenting greater agricultural linkages have remained on the agenda of the USINPAC and Indian American Friendship Council (IAFC) (USINPAC: 2013). The founder of USINPAC, Sanjay Puri, in his testimony to the House Foreign Affairs subcommittee, endorsed the need for exchange programs for farmers of India and the US which would help foster education and new partnerships between the two nations (Dingbaum: 2013; US House of Representatives: 2013b). With the long-term objective of improving vocational education and skills development in India, USINPAC has hosted leaders of education in the agricultural sector for exploring and cooperating relationships between industry and vocational education institutions, to contribute to the local workforce development (USINPAC: 2016). The recommencement of TPF's focus group on agriculture's meeting in 2014 after a gap of two years was hailed by the USINPAC, where discussions on disputes in agriculture in the WTO produced a bilateral benefit for the two countries (Basu: 2014). The efforts of USINPAC have thus contributed to a comprehensive appreciation of the challenges as well as opportunities in US-India agricultural cooperation.

4.3.3 US-India Business Council (USIBC)

USIBC was formed in 1975 because of personal efforts of the then Secretary of State Henry Kissinger, who with his foresight set aside the political differences in the India-US relations after India's nuclear tests of 1974. He was committed to encourage the private sector collaborations between the two countries and encourage bilateral investment and trade opportunities (Mehra: 2016). USIBC further gained encouragement during President Clinton's visit to India in 2000 and was solicited as a business group for private sector cooperation (Nayan: 2000). The USIBC is a member-based preeminent business advocacy organisation dedicated to strengthening the economic and commercial relationship between the US and India. Its principal objective is to serve the direct link between business and government leaders, with the aim to create an inclusive bilateral trade environment between the two countries by serving as the voice of industry, linking governments to businesses, and supporting long-term economic partnership that seeks to cultivate entrepreneurial innovations, creation of jobs, and contribute positively to the global economy. It is comprised

of over 350 leading American and Indian businesses, with offices in Washington, D.C., New Delhi, New York, and Silicon Valley¹⁸.

The Food and Agriculture Executive Committee of the USIBC is made up of companies representing the entire farm-to-market supply chain. The Committee focuses on advocating policies under three comprehensive goals of enhancing productivity; improving the supply chain efficiency and; leveraging global markets, products, and expertise to improve the investment environment in agriculture. It is focused on introducing mechanisation, irrigation, and scientific methods to improve production and best ways to utilise India's arable land. It has been engaged in multilateral consultations at the governmental level and initiated collaborative programs with public and private sector stakeholders (Hayden: 2015). For instance, at India's request, USIBC provided a detailed explanation of the practice of food product approval procedures followed by the US (Farrell: 2014; Farrell: 2015a). USIBC encouraged India to establish a system that focuses on an ingredient by ingredient, rather than product-by-product approval, which was the approach in use by Food Safety and Standards Authority of India (FSSAI). An ingredient risk assessment based system, according to USIBC, would better identify and neutralise potential health and safety hazards while allowing products that meet previously established standards a quicker path to market (Farrell: 2015b).

The USIBC has been engaged in working with Indian and US companies to develop efficiency in cold chain management systems, in order to avoid food wastage through spoiling, and development of capacity-building programs to promote a transparent, science-based regulatory regime in order to ensure the access to safe food by the consumers. Mukesh Aghi, the President of USIBC noted that US-India bilateral ties were critical for sustaining the momentum of increasing its agricultural productivity as well as in being one of the world's largest agricultural exporters (US Foreign Agricultural Service: 2014), serving farmers, and helping India achieve its food security goals. He was confident that the long-standing ties between the two countries can help India position itself as the "breadbasket of Asia" (Aghi: 2015). According to Aghi, the seeds of a Second Green Revolution have already been sown to ensure long-term food security for India. A renewed partnership between Indian and American enterprise in order to build a strong US-India bilateral cooperation on the agriculture front has continued to lead to advancements in agricultural technology and food

¹⁸ USIBC, About Us, Available at: <http://www.usibc.com/about-us>

production. For over a decade the USDA has promoted knowledge transfer and exchange and sponsored 112 Indian agricultural researchers under the Borlaug Fellowship Program and 79 fellows under the Cochran Fellowship Program, offering training and collaborative research opportunities to the next generation of scientists, researchers, and policymakers (Aghi: 2015).

American companies have partnered with the Indian private sector and state governments to lead and support investment and development. Food-processing companies supply potato farmers in Punjab with quality seed varieties, technologies and sustainable farming practices to help produce process-grade potatoes that can be packaged and readily consumed. This partnership has been scaled up to a collaboration with farmers in several states, who have access to high yielding potato seeds which enable them to produce good quality potatoes and procure higher returns (Aghi: 2015; Tully: 2011).

USIBC led by Ron Somers advocated the need for easing trade and investment barriers in insurance, education and agricultural products especially multi-brand retail in India (USINPAC: 2011). A joint-summit meeting on ‘Strategies to promote Value Addition in Agriculture’ was organised on August 25, 2015, in New Delhi that brought together US and Indian Industry, entrepreneurs, farmer-producer organisations, government, academics and other stakeholders to facilitate a high-level engagement on strategies to accelerate value addition opportunities in Indian Agriculture. It was co-hosted by USIBC and the Small Farmers’ Agribusiness Consortium (SFAC) and emphasised on the significance of the collaboration between the public sector and private sector (USIBC and SFAC: 2015).

Thus, USIBC has been an active voice and a key private sector conglomerate that has successfully created an inclusive bilateral agricultural trade environment and espoused investment opportunities in the sector in both India and the US.

4.3.4 Federation of Indian Chambers of Commerce and Industry (FICCI)

The agriculture division at FICCI has been engaged with devising agriculture policies and putting forth suggestions to the Ministry of Agriculture and Farmers’ Welfare, Government of India on ways to enhance farm income, productivity and global competitiveness of Indian farmers. Over the years, it has promoted public-private partnership in various parts of

agriculture value chain including agricultural warehousing, farm mechanisation, extension, secondary agriculture, risk management and agricultural-marketing reforms. In partnership with the Ministry of Agriculture and Farmers' Welfare, and ICAR and John Deere, USA, FICCI organizes Eima Agrimach, a flagship forum that highlights the importance of modern farm mechanisation technologies from several countries of the world, coordinates an exchange of ideas and aid promotion of farm mechanisation (EIMA AgriMach: 2015).

FICCI has vocally highlighted the alarmingly poor infrastructure in agriculture. About 30 per cent of the villages do not have a metal road within five kilometer radius, 55 per cent do not have a seed store, over 80 per cent do not have repair facilities for agricultural implements, 75 per cent do not possess warehousing facilities and 60 per cent do not have a market centre. These constraints, as highlighted by experts, have largely been the reason for inducing low productivity and are plaguing the sector (Swaminathan: 2005). Interviews conducted at FICCI revealed that the organisation is committed to sensitise all stakeholders including the governments to catalyse the necessary policy changes that are needed to make agricultural sector more vibrant and competitive in the global market by addressing the conflicting domestic policies relating to production, procurement, pricing and distribution, lack of infrastructure facilities, low productivity, low value addition, ad-hoc export policies as well as in forging international co-operation for showcasing possible collaborative opportunities for the benefit of all the stakeholders in agricultural value chain (FICCI: 2013; Batra: 2015).

A USAID-FICCI collaboration with called the 'Millennium Alliance' as a public-private platform to enable small and medium Indian entrepreneurs to secure the funding necessary to develop and pilot solutions to the country's most challenging social and economic problems, including agriculture, for instance, grants for seed funding and mechanised tools for farming. It brings together the ICICI bank, and other public and private donors, Indian businesses, and venture capitalists, the alliance provides local innovators with funding, mentorship, and business accelerator services. The Millennium Alliance has been actively involved in exploring innovations in the agriculture and food security domain that promises to bring access to food to the needy at the right time, right quantity, and at the right price (Millennium Alliance: 2012). Working in consort with Associated Chambers of Commerce and Industry of India (ASSOCHAM), both ASSOCHAM and FICCI have argued that quantitative restrictions on exports and imports of agricultural commodities have discouraged private investment in agriculture. Experts have noted the need for concerted efforts should be laid for

the modernization of agricultural sector to raise farm income and increase employment opportunities (Rao: 2005; ASSOCHAM: 2010).

FICCI has invested ample energy towards addressing the need to increase agricultural productivity under the impact of climate change. Important workshops like Sustainable Agriculture: Harnessing Technologies- Harvesting Prosperity have been organised in the past under its auspices that called for the strategic integration of innovative technology into Indian agricultural systems that have crucial implications for markets, producers and consumers. FICCI has been committed to work with its American counterparts, both in the private sector and the public sector to usher in the “Evergreen Revolution” as well as the Gene Revolution which has promising prospects to benefit big and small farmers alike (Singh: 2016).

4.3.5 Confederation of Indian Industry (CII)

CII is the oldest business association which is a non-government, non-profit, industry-led and industry-managed organisation that has played a proactive role in India's development process since 1895 (CII: 2016). A study conducted by CII found that agriculture in 2004 was similar to the situation in 1991, in that, the private sector was in need for policy reforms that would allow it to make much larger investments in the sector. Agricultural reforms and increased private investment were imperative to benefit farmers, especially small farmers so that they have access to competitive sources of finance, competitive markets to sell to as well as competitive suppliers of knowledge. To improve the sector further, economists have emphasised that enhancement of farm production through substantial investment in agricultural infrastructure was the only effective instrument for the eradication of rural poverty (Fan and Gulati: 2008).

According to CII, one of the most distinguishing characteristics of reform strategy should be to involve farmers at different layers of developmental activity, freeing up agricultural markets and setting up of commodity exchanges for future trading boards similar to the Chicago board of trade to cover major commodities. Then along the lines of agriculture reforms and free-market approach, the opinion was that large scale corporate cultivation would lead to better allocative efficiency and corporatization of agriculture. This would

require investment by industry often working with the government. The industry would invest in agriculture through contract and lease farming and also in the upstream elements of food chain agriculture, procurement, and storage. For the Indian economy to grow at a consistent pace, the urban-rural divide has to be bridged and Indian agriculture has to grow at 4 per cent. Farmers must be involved in the decision-making process and investments needed to be stepped up in agriculture (Rao NJ: 2005; CII Agriculture Summit: 2004).

CII has set up a Food and Agriculture Centre of Excellence (FACE) to contribute to the ongoing policy dialogue related to agriculture and food-security concerns. With the aim of improving the competitiveness of India's agriculture sector, by catalysing innovation, capacity-building and enhancing productivity across the agriculture and food value chain, while simultaneously ensuring food security and inclusive growth, it is actively involved in contributing to policy-making through evidence based research and value chain assessments. A Collaborative Training Centre (CTC) has been established jointly by FACE and Spices Board of India (under Ministry of Commerce, Government of India) in partnership with Joint Institute for Food Safety and Applied Nutrition (JIFSAN), University of Maryland, USA, for upgrading food safety and supply chain management in spices and botanical ingredients. It has also signed an MoU with University of California, Davis (as a knowledge partner) to conduct a multi-phased project for increasing supply chain efficiencies by the management of post-harvest losses along the supply chain of perishable fresh fruits and vegetables. Taking a step forward towards Evergreen Revolution, USAID has entered into a partnership with FACE to set up rural business hubs in eastern India, which would serve as 'one-stop-shops' offering various agricultural inputs and services to farmers, including weather information, crop management advice, and access to markets and finance. These would also demonstrate best practices and strengthen producer-processor-retailer linkages to better address the challenges related to production, price, and marketing that farmers face in the region (Parti: 2013b).

To increase farmer incomes in the region, these hubs have collaborated with public and private sector partners to demonstrate best practices and strengthen producer-processor-retailer linkages to better address the challenges related to production, price, and marketing that farmers face in the region.

As per a study conducted by CII-McKinsey, India can be the largest food factory given the fact that its food production is equal to that of the US and is only second to China (Swaminathan: 2005). Going by the potential of food processing, further development of food processing has a multiplying effect. Experts point that if India has to compete globally, then agricultural production and processing need to take place at international standards. In other words, efficiencies need to be built into the agricultural production and processing systems. Newer production technologies need to be examined (Swaminathan: 2005).

According to the CII, there is an urgent need to implement reforms in Indian agriculture and has proposed a five-point reform agenda:

1. Give states an incentive to amend the Agricultural Produce Market Committee (APMC)¹⁹ act and abolish *mandi* taxes. This would allow competitive markets to develop; farmers and processors will both gain.
2. Support the organised private sector in increasing its spending on extension and technology transfer. This would give farmers the knowledge of what to grow, and how to grow so that stringent quality norms are met.
3. Implement the Unified Food Law and back it up with lowering the total tax burden on processed foods so that the sector picks up, and consequently demand farm produce rises.
4. Target foreign buyers of high-value ethnic Indian foods, as opposed to commodity exports, starting with the large Non-Resident Indian (NRI) population of 20 million, which can be a huge market.
5. Create a viable model of public-private partnership that allows private investors to invest in agriculture infrastructure in partnership with banks and financial institutions (Rao: 2005; CII Agriculture Summit: 2004).

In collaboration with the Feed, the Future program of the USAID, the Rural Hubs of the CII program has been designed to complement and upgrade the knowledge-sharing cooperation and technical capacity-building integral to the MANAGE training. It has sought to overcome specific bottlenecks in agricultural value chains in the most difficult and underdeveloped areas of India. Together, the USAID and CII have committed to sharing the lessons learned on modern technologies and methods of production with African farmers, where market

¹⁹ APMC Act works to ensure that farmers are not exploited by intermediaries (or money lenders) who force the farmers to sell their produce at the farm gate for an extremely low price.

access is in a deplorable state. The two sides also launched another innovative program, called the 'India-Africa Agriculture Innovations Bridge Program', which aimed to share agricultural innovations, to increase agricultural productivity in priority value chains, increase access to diverse and quality foods, and enhance climate resilience in agricultural production (Parti: 2013a). The overarching goal of these joint collaborative programs is to share proven agriculture innovations from India's private and public sector to address food insecurity, undernutrition, and poverty in the target African countries. The triangular engagement, MANAGE training program, CII partnership, and the India-Africa Agriculture Innovations Bridge have contributed to consolidating and paving the way for future partnerships between India and the US. It serves a model for strategic engagement on global food and nutrition security, by progressing together towards ending hunger and poverty from the world (Shrier: 2013).

To summarise, it is evident from the above discussion it is that both US and India have heavily invested in expanding their economic partnership and elevated it beyond the governmental level to the private sector. An expanded economic partnership between the United States and India has been recognised as allow both countries to create greater prosperity for workers, businesses, and communities in both nations, and that is what brought government and private sector leaders together (US Department of Commerce: 2015). In September 2015, the new US-India Strategic and Commercial Dialogue was co-convened by US Secretary of State John Kerry and US Secretary of Commerce Penny Pritzker co-convened, with their Indian counterparts External Affairs Minister Sushma Swaraj and Commerce and Industry Minister of State Nirmala Sitharaman, in Washington, D.C. India and the US had continued the trend of convening a strategic dialogue since 2010, so the change this year elevated discussion of economic and commercial issues to the cabinet level alongside the central matters of security and global diplomatic concerns. Since 2010, the US-India Strategic Dialogue has been the primary forum to advance shared objectives in regional security, economic cooperation, defence trade and climate challenges. With a new commercial track, the US and India will focus additional attention on shared priorities of generating economic growth, creating jobs, improving the investment climate, and strengthening the middle class in both countries (US Department of Commerce: 2015). In launching the US-India Strategic and Commercial Dialogue, both countries have injected new

energy into efforts focused on improving the ease of doing business; infrastructure development; promoting innovation and entrepreneurship; and harmonizing standards and global supply chains (US Department of Commerce: 2015).

Republican Matt Salmon, from the fifth district of Arizona, a member of the House Committee on Foreign Affairs as Chairman of the Sub-Committee on Asia and the Pacific, reflected the support of the elevation of commercial issues in the recently concluded first US-India Strategic and Economic Dialogue, which highlighted the important role of entrepreneurs and business leaders in the ways to advance our economic relationship (Salmon: 2015). Through a reinvigorated US-India CEO Forum, both governments have also heard from their respective private sectors on their priorities in areas such as business climate, smart cities and infrastructure financing, supply chain integration (including cold chain), aerospace, and renewable energy. Subscribing to the understanding that a flourishing private sector in any country is demonstrative of a flourishing and liberal market economy (Garg: 2016), inputs from US and Indian business leaders will continue to inform policymaking discussions as both countries work toward the leaders' shared goal of increasing US-India trade fivefold, to \$500 billion annually (US Department of Commerce: 2015). It needs to be mentioned here that after India's economic liberalisation, by the mid-1990's, that Indian businesses began seeking and making a discerning commercial presence in the US. The CII-Grant Thornton survey of 2014²⁰ demonstrated that they have an operational presence (by way of physical investments as well as leased spaces) in all the fifty states in the United States, as well as in Washington, D.C., creating employment opportunities and generating revenue for the US economy (Banerjee: 2012). These companies are spread over a wide array of businesses, and most prominently in the following sectors: IT and IT-enabled services (IT-es); food and agriculture, life sciences, pharmaceuticals and health care; mining, materials and manufacturing; design, engineering and construction; financial services; automotive; energy; and others. The Survey concluded that through the significant and growing contributions of Indian investments in the US economy that remain a critical component of the bilateral partnership between India and the US (CII-Grant Thornton: 2015).

²⁰ The top five states in which Indian companies have generated maximum employment are: New Jersey (9,278 jobs), California (8,397 jobs), Texas (6,230 jobs), Illinois (4,779 jobs) and New York (4,134 jobs). According to the survey, the top five states that have the highest concentrations of Indian companies were New Jersey, California, New York, Pennsylvania and Illinois. The top five states that have received the highest volume of investments from Indian corporations of over \$1 billion and above were Texas (\$3.85 billion), Pennsylvania (\$3.56 billion), Minnesota (\$1.8 billion), New York (\$1.01 billion) and New Jersey (\$1 billion).

Ultimately, it may be noted that the US remains interested with this growing segment of cooperation with India for the long term. A recent report by the USDA on Indian agriculture studied the supply, demand, and policy factors that influence India's behaviour in world markets for commodities important to US agriculture. While it provided suggestions for reforms, it highlighted the importance of Indian agriculture to the US markets and vice-versa. Thus, there seems little doubt that both these countries are committed to the long-term cooperation (Landes: 2016).

In essence, agricultural issues have experienced continuity in all the official level dialogues between the two countries. By encompassing these into the wider realm of strategic dialogues and including them into the cabinet level, signals a greater energy and higher level of importance for economic and commercial matters. Building on longstanding consultations and success in joint training for third countries in subjects like agriculture and technology, India and the United States an agriculture biotechnology group has been set up to facilitate research in this area (Ayers: 2015).

While the discussions so far in detail the growing US-India relations in agriculture as passing through the era of enduring 'breakneck bilateral positivity' (Panda: 2015), the basic premise of having shared values does not rule out differences and disputes between the two countries in this sector. The next chapter, (Chapter V) studies the various outstanding issues of contentions between the US and India that call for the need to pursue continued dialogues and discussion at all levels of interaction- government, bureaucratic, diplomatic, business and academia.

CHAPTER 5

US-India Agricultural Cooperation: Bilateral and Multilateral Challenges

Sections:

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CHAPTER 5

US-India Agricultural Cooperation: Bilateral and Multilateral Challenges

In a highly inter-dependent world, the domestic policy adopted by one country impacts upon the affairs of many and is particularly apparent in the field of agriculture (Block: 1985; Bertucci and Alberti: 2003). Agricultural policies of both India and the US have continued to be framed in accordance with the necessities of the domestic agriculture as well as the demands of the international agricultural political economy, and both have impacted each other. The continuity in the agricultural ties between India and the US also contains aspects of contentions between the two countries. Thus, the process of agricultural cooperation has not always been smooth and has often strained the decision-making processes, producing difficult encounters in their interactions in the multilateral settings often spilling over to the bilateral agenda (Schaffer: 2008). It becomes even more conspicuous when the two parties are the two largest democracies of the world. Many of the issues of contention between the two countries need to be understood as they have been the most persistent despite better bilateral relations. Others require the scrutiny as they link the developments in the political economy of both the countries to the continuation of cooperation in agriculture. The discussion underlying the challenges between India and the United States has important implications for both countries' ability to set policy to promote food security and control their food systems. The role that the WTO and the multilateral system should play in that effort has also been an issue.

The US has sought a stronger role for their government and a more aggressive use of the bilateral approach with the Indian government, instead of leaving issues related to the Agreement on Agriculture to be resolved multilaterally in the stagnant Doha Round of negotiations of the WTO. This position was reiterated by the then US Trade Representative, Ron Kirk in his interview to the Indian newspaper *Live Mint* in October 2009 (Mishra: 2009). Further, US-based corporations have also been pressurising India to adopt more restrictive intellectual property rights regulations, and allow greater room for them in India's retail trade (Sridhar: 2014).

These developments have to be seen in conjunction with a closer integration of Indian markets for agricultural produce with global market since the 1990s (Sridhar: 2014). Supporting this argument it has also been argued that internally, the the reversal of land reform, changes in the policies of administered agricultural input costs and output prices, cutbacks in public investment in rural physical and social infrastructure, the dismantling of the institutional structure of social and development banking, the withdrawal of quantitative restrictions on the import of agricultural products, cutbacks in the public distribution system, and the undermining of national systems of research and extension and protection of national plant and other biological wealth has weakened agricultural sector (Ramachandran and Rawal: 2010).

The US–India Knowledge Initiative on Agriculture Education, Research, Services, and Commercial Linkages (USIKIA) of 2005 was positioned as a program that would benefit Indian farmers and lead to agricultural growth. It also aimed at furthering the interests of US corporate entities, especially agribusiness corporations, in Indian agriculture. However, as a critic pointed out, “... *the lack of transparency in its functioning has generated suspicion that it is meant primarily to further the interests of US corporate entities, especially agribusiness corporations, in Indian agriculture*” (Sridhar: 2014).

The fact that India is one of the world’s largest agricultural producers of staple crops, fruits, horticulture, and dairy, it has been argued that there was a vast scope for US-India cooperation under the agreement to expand access to knowledge to improve productivity, safety, and nutritional quality of food crops; to strengthen market institutions and foster growth of agribusiness investment and improve food security and access to adequate quantities and quality of food, particularly for women and young children (USAID: 2017; Council on Foreign Relations: 2009). The collaboration also emphasised on sharing and transferring these innovations globally, in partnership with the Government of India, civil society organisations, and the private sector to improve food security locally, regionally, and globally (USAID: 2017). The criticality of the role of agricultural research as a means of development was further illustrated by the then Deputy Coordinator for Development William J Garvelink. During his speech in November 2010 in Dallas, Texas, he said that “*Research is a critical means for driving productivity gains in the crops and livestock sector on which the food insecure depend. In fact, agricultural research stands as one of the best of all development investments. For research to be successful in solving problems and driving*

gains at the farm level, partnership with our host countries is crucial to success” (Garvelink: 2010).

Bilateral challenges cluster largely around the pace of economic reforms in India and controversy over genetically modified (GM) crops. The then US Assistant Secretary of Commerce for Global Markets in the US Department of Commerce, Arun M. Kumar summed up the bilateral challenges in India-US agricultural cooperation as India's bureaucratic capacity; the overall pace of economic reforms in India and the ease of doing business and systemic infrastructure bottlenecks (Kumar: 2015). Multilaterally, India's position that small farmers in the developing world face unfair competition from highly subsidised products exported by farmers from developed countries, which leads to the artificial depression in world food prices and agricultural dumping in developing countries has blocked the progress of negotiations. As some UN experts pointed out, it directly causes unemployment and poverty in some sectors, in particular in the farming sector, dismantles local industries, impacts ways of productions and attendant ways of life, and triggers population migration.

By virtue of being member-states of the WTO, the stance of both countries over these issues is often drawn to the WTO forum and sometimes to its dispute settlement body for the resolution of the cases before it. From the Doha negotiations, India along with other developing countries stressed that priority should be given to the strengthening of special and differential treatment provisions under WTO agreements, which allows developing countries some exemptions from domestic support reduction commitments as it is essential to support developing countries' efforts to progressively fulfil their obligations in economic, social and cultural rights. If a trade is to work for human rights and development it should contribute to (among others) the realisation of the rights to adequate food. Thus, India-US agricultural trade negotiations, in fact, had reached an impasse by 2014.

This chapter will detail some of the issues of contention and examine the discussions that went on in these negotiations. Some issues of contention between the two countries need to be understood as they have been the most persistent despite better bilateral relations. Others require the scrutiny as they link the developments in the political economy of both the countries to the continuation of cooperation in agriculture. Importantly, these differences are found in both bilateral and multilateral spheres. The following sections discuss the challenges

in US-India agricultural cooperation that both countries are faced with because of non-converging policies adopted by them in the agricultural sector. The first of these that merits serious consideration are the economic reforms undertaken by India.

5.1 Bilateral Challenges

5.1.1 Pace of Economic Reforms in India

The US and India have adopted different models of economic development for the overall growth of their respected economies. A free-market and a laissez-faire economy have been at the core of US democratic capitalism ever since it gained independence in 1776—a country which has been endowed with abundant natural resources. It has been guided by John Locke’s philosophy that emphasise upon the politico-economic premises of liberty, equality, consent, and contract, property and least interference from the government (Macpherson: 1951) as well as George Washington’s idea of that “liberal and free commerce” (The Economist: 2015). India, on the other hand, followed a model of coexistence of a socialistic and capitalistic economy, in pursuit of building a strong foundation for its overall growth and development.

The economic model of development and the pace of economic reforms had been a matter of concern among the American businesses for a long time, especially since the 1990s. It also found mention in the Lok Sabha proceedings when the then Minister of State in the Indian Ministry of Commerce A. Sreedharan referred to the Joint Council Meeting of India and USA in Washington in 1990; where it was highlighted that the American businesses emphasised the need to de-regulate and liberalise the Indian economy and the procedural delays in their investments into India were delayed inherent in the government procedures (Sreedharan: 1990b). After the New Economic Policy (NEP) of 1991, India began to tread the path of liberalisation, privatisation and globalisation, and witnessed great gains from an inter-dependent world (Hope et al.: 2013). India formally joined the alliance of nations seeking greater gains from the globalisation of the global economy with the membership to the WTO in 1995. This period coincided with the then Prime Minister of India Atal Bihari Vajpayee’s visit to the US followed by the then President Clinton’s visit to India. Most astute observers, and experts have pointed out that this was a time that witnessed an upswing in the US-India

relations, setting the stage for enhanced bilateral economic ties (Clinton: 2000c; Saxton: 2000; Gilman: 2000; Cohen and Jaishankar: 2009; Malone and Mukherjee: 2009; Celeste: 2016). Continuing with this positive trajectory in relations, Vajpayee's visit to the US in November 2001 not only confirmed the continuation of bilateral cooperation in biotechnology among other areas but also agreed to expand the Bilateral Economic Dialogue for enhanced agricultural ties (Vajpayee: 2001b).

There was persistent opposition to continuing import liberalisation of the agricultural sector in India. Such opposition was in part political and some ideological. Experts too differed on the impact of trade liberalisation on agriculture. The Indian government, however, argued that instead of negatively affecting agriculture, the process of trade liberalisation as envisaged in the NEP actually proved beneficial, with a significant inter-sectoral transfer of resources towards agriculture. The then Finance Minister of India, Manmohan Singh outlined the potential beneficial implications on trade liberalisation on Indian agriculture (Singh: 1995), which was further reiterated by M.S. Ahluwalia (the then Finance Secretary of Government of India). They presented their analysis based on 'two-sector model' of trade theory. A policy of heavy protection of the industrial sector, as that existed earlier, operated to the disadvantage of the agricultural sector because industrial prices were raised relative to world prices, and thus the profitability of investment in industry was raised vis-a-vis agriculture. This led to a shift of resources from the unprotected sector (agriculture) to the protected sector (industry) to the extent that it artificially increased incomes from industry and depressed incomes from agriculture (Ahluwalia: 1996). This is evident from the statistics from the Ministry of Agriculture and Farmers' Welfare-after the economic reforms of 1991(that lifted some restrictions on the agricultural exports of the country), the net agricultural exports almost doubled from \$2.6 billion in 1990-91 to \$4.9 billion in 1996-97. This also raised the proportion of trade in agricultural GDP from 4.9 percent in 1990-91 to close 9.4 percent by 1995-96²¹. Thus, the-economic reform period of the 1990s significantly affected agriculture and the related sectors (Chand: 2004; Rao: 2005).It has been argued that agricultural liberalisation would improve the productive efficiency by ensuring the convergence of potential and realised output, increase in agricultural exports and value added activities using agricultural produce, and provide improved access to domestic and

²¹ Agricultural Statistics at a Glance, Ministry of Agriculture and Farmers' Welfare.

international markets that are either tightly regulated or are overly protected (Mahadevan: 2003).

However, the ensuing decline in the international prices of agricultural products after India's entry to the WTO and its commitments (of removal of Quantitative Restrictions (QRs) and liberalising trade) at this multilateral forum, the country became an attractive destination as an export market for other countries (Mahadevan: 2003). As a result, while the exports continued to rise at their pace, a number of imports increased manifold from 1996 onwards and consequently the net earnings from the agricultural sector experienced a decline. Agricultural economists have noted that international prices and trade liberalisation increased the domestic prices. As a result, rising prices cereals and food for the Indian consumers, and worsening of household and food security situation of farm households led to a political uproar and the government over the years have applied import duties and non-tariff barriers to regulate the agricultural trade (Chand: 2004). For instance, government intervention has raised the Minimum Support Price (MSP) for cereals and food grains, increased food and input subsidies to protect the interests of the farming community of the country (Mahadevan: 2003; Chand: 2004).

The inconsistencies in the pace of agricultural liberalisation due to domestic pressures have been a source of concern in the US policymaking circles. India's falling growth rates and rising inflation along with the challenges posed by India's political dynamics on economic reforms warranted a concern, especially of the US Congress (Bajpai and Sachs: 2000; Tomar: 2002; Martin and Kronstadt: 2007; Kronstadt, et al: 2011; Subramanian: 2013; Hope, et al.: 2013). Further, India's reluctance in opening its agricultural markets in importing more American farm products has been a point of contention, especially with the American farm exporters, because of a growth in India's profile as a farm exporter (Council on Foreign Relations: 2007).

Whereas the US agricultural exporters have sought to get access presented by the expanding market opportunities in India, the latter's emphasis on protection of the farm sector has been a restricting factor on such exports (Gupta and Raju: 2016; Foreign Agricultural Service of the USDA: 2016). It has been observed that India has wilfully raised and applied tariffs for agricultural trade to protect its farmers and vested interests (Gupta: 2015). It has also been seen that because agriculture is a state subject, the Union government has been unable to

adopt a uniform agricultural marketing framework for the whole country (Aggarwal, et al.: 2017). As a result, the slow pace of reforms has prevented the growth of India's farm sector (Gupta: 2015).

The US has been a firm supporter of the diversification of India's agricultural sector, of which one of the avenues is the agro-processing and food processing sector. Opportunities for food processing constitute an important part of the agricultural cooperation between India and the US especially as it promises development and increased revenues for the government. It is true that processed Indian food and other groceries have been in high demand in the US and have continued to rise, with the growing diaspora in the country (Dhas: 2016; Richardson: 2016). However, at present, the proportion of India's agricultural output that is processed is very small. Trade associations of the industry like Federation of Indian Chambers of Commerce (FICCI) have cited some of the major hindrances towards the rapid development of food processing sector, which include, discriminatory taxation structures against food processing because processed food is the first stage at which indirect taxes are applied, and absence tax rebates on inputs in effect increases the final value added tax to a significant extent. Another impediment has been the protection of certain categories of products for small-scale production, which cannot be produced on a large scale; inconsistencies in Union and state laws; lack of applied research; lack of cost effective machinery and packaging technologies (FICCI: 2010).

It had been noted that the absence of a modern food-processing law with the sector being governed by a number of laws, has added to the difficulties of effective operations. This necessitated an integrated food processing law, which was introduced in the Parliament in the year 2002 (The Hindu: 2002), aimed at making a qualitative difference to the operating environment (Ahluwalia: 2005) by helping to build an overall climate in favour of fortification of processed food items. It was enacted as the *Food Safety and Standard Act* by the Government of India in the year 2006 (Government of India, Ministry of Law and Justice: 2006). In a step towards agricultural reforms, the then Prime Minister of India Manmohan Singh called for the need to modernise agriculture and increase manufacturing by expanding agribusiness and food processing as well as attempted to decrease government subsidies on fertilizers (Singh: 2005).

Other reasons for market reforms to be extended to agriculture have been articulated by some agricultural economists in India. One argument is that the overall liberalisation of the economy would result in higher investment and growth in agriculture induced by favourable terms of trade (Parikh, et al.: 1995). However, many others point out that the entire extent of domestic policies needed to be reviewed and measures aimed to enhance competitiveness in agriculture must be adopted. They underlined that with India having a comparative advantage in agriculture, there remains a considerable scope for raising farm income and employment by stepping up agro-based exports without jeopardising, and by consolidating the food security already achieved (Hoda and Gulati: 2007). Agriculture could thus promisingly serve as the biggest safety net in the process of structural adjustment in India (Rao: 2005), and the benefits accruing from the overall high growth of the economy would be equitable if agricultural reforms were implemented. QRs on imports of manufactured consumer goods and agricultural products were finally removed on April 1, 2001, almost exactly ten years after the reforms began, and that in part because of a ruling by a WTO dispute panel on a complaint brought by the United States (Government of India, Ministry of External Affairs (2017). Key policy officials in India have also called for further deregulation of the India's agricultural sector to increase the country's competitiveness in world markets (Ahluwalia: 2002).

The launch of USIKIA by US President George W. Bush and PM Singh endorsing the agreement to promote bilateral trade in agriculture through agreements that laid a path to open the US market to Indian mangoes, recognise India as having the authority to certify that shipments of Indian products to the US according to USDA organic standards, and provide for discussions on current regulations affecting trade in fresh fruits and vegetables, poultry and dairy, and almonds (Institute for Defence Studies and Analyses (IDSA: 2006; USDA: 2006a).

In essence, Bush and Singh affirmed the fact that India would increase its competitiveness by reforming its agriculture. This was particularly so as over half of the country's output came from its manufacturing and agricultural sectors, with over 60 per cent of its work force employed in agricultural and allied activities (Ahuja, et al.: 2006). Commenting favourably on the government of India's role in lowering non-agricultural tariffs, removal of many non-tariff barriers, and relaxed rules on foreign investment in several important sectors, including agriculture', Catherine A. Novelli, Under Secretary for Economic Growth, Energy, and the

Environment, stated that it would help in the deepening of the US-India commercial partnership. She, however, insisted on a greater role of the Indian government to bring about further reforms as discussed in the Trade Policy Forum meetings (Novelli: 2015).

Genetically Modified (GM) Crops forms yet another issue of contention between India and the US. The next section details the perspectives, reservations, and stance of the two countries over GM crops. It presents the viewpoints of the scientific community, the government standpoint and the position taken by activists and NGOs, all of which have a bearing on the decisions of the farming community.

5.1.2 Controversy over Genetically Modified (GM) Crops

There are several stakeholders in the US-India agricultural cooperation that includes not just the governments but also the industries, agri-businesses, NGOs farmers and consumers. The debate over GM crops has been ongoing, ever since it was first commercially put into use in 1996 in the US. Therefore, it becomes important and relevant to understand the various issues relating to it, and how does it impact upon the overall negotiating positions between the US and India. The amount of land and water that is available for agriculture in India as well as around the world is limited. The projected estimates of the FAO of the UN reveal that the production of food, feed, and fibre in the developing countries would need to be doubled by 2050 to meet the demands of a rapidly growing population (FAO: 2009). This urgency implies the need for higher crop yields. Agricultural biotechnology is one tool that holds the promise to alleviate hunger and poverty (Popp, et al. (eds.): 2012). Genetic engineering opens the possibilities of developing new varieties of crops that can grow with less dependence on water and chemical inputs. This could provide a reasonable basis for substantial increases in production in areas where progress has been limited.

Biotechnology, as one of the newest of the applied sciences that started as an interdisciplinary endeavour from the field of agriculture, analytical chemistry, chemical engineering, genetics and molecular biology, covers all techniques that “*use living organisms or substances from organisms to produce or alter a product, cause changes in plants or animals, or develop microorganisms for specific purposes*” (Lemaux: 2008). Over the past six decades, advances in molecular biology which are the basis of all discoveries in genetic modification have opened the prospects of researching the smallest, most basic units within the workings of the

living cell (Pinstrup-Andersen and Schiøler: 2000). Thus, genetic engineering to produce GM crops is the most prominent aspect of biotechnology. Initial successes in genetic engineering as early as 1970, have continued to progress as the methodologies and techniques became increasingly accurate, dependable and precise (Shmaefsky: 2005).

Studies have found that potential yield loss because of production without protecting the crops from pests, weeds, pathogens and other viruses is about 50 to 80 per cent worldwide (International Institute for Sustainable Development and United Nations Environment Programme: 2014). GM plants with resistance to insects and tolerance against herbicides offer promising prospects to contribute to sustainable solutions to reduce crop loss, increase incomes and economic stability (Bigler and Romeis: 2010). Given the continued relevance of the GM technology and with an ever-growing population, scarce resources, prevailing hunger and food insecurity, India needs to produce more with less available resources. Biotechnology agriculture presents one of the possible reliable solutions for this, as it could help in improving the effectiveness of agriculture inputs, in bringing down input costs and increasing the yields. This is primarily because it can help expand and increase the yields of staple crops by making them resistant to climatic stresses, diseases, and pests and improve their nutritional profiles (Bossard: 2012), like beta carotene in rice, flavonoids in tomato and alfalfa, calcium in potato, etc. The crops most intensively grown with genetic modifications are canola, corn, cotton, potatoes, rice, wheat, flax, soybean and sugar beet (Lemaux: 2008). Scientists have also exhibited their social responsibility and utilised GMOs to address health problems in the developing countries. For instance, Golden Rice was developed to prevent Vitamin-A deficiency in the children of developing countries, including India (Santiago: 2013; Sears and Wolt: 2012).

The virtues of the soil bacterium *Bacillus thuringensis* or *Bt*, found worldwide have been well-known for many years. Even the organic farmers spray *Bt* on their fields because when insect attacks become widespread and has led to substantial reductions in the use of chemical insecticides which is often accompanied by serious health impacts on farm workers especially in developing countries (Bigler and Romeis: 2010; Fitt: 2008). This has been possible because, *Bt* is produced naturally, is rapidly biodegradable and has no harmful side effects, it is recognised as a permissible pesticide for use in otherwise non-toxic farming, but is lethal to various insects and harmless to humans, animals, and non-target insects. GM enables farmers to apply *Bt* genes to crops directly by integrating the ability to produce the toxin into the

plants themselves. International seed-producing companies have successfully developed several *Bt*-producing crops, including maize, cotton and tomatoes, potatoes, papaya, squash (Krueger: 2001; Pinstруп-Anderen and Schiøler: 2000). In the US, most corn, soybeans, and cotton planted have been engineered with *Bt* to ward off insects or with another bacterial gene to withstand herbicides (Nelson: 2001), and have been commercially successful. This effectively controls several insect pests, and have been successfully introduced commercially. The use of such varieties has the potential to greatly reduce the need for insecticide sprays through more specific interventions and dosages (Havener, et al.: 2005). In India, *Bt* Cotton was planted by 2.3 million farmers on an overall area of 3.8-million-hectare area in 2006 (Manjunath: 2007; Prakash: 2007), which has not only benefitted the farmers but also the economy and the environment (Prakash: 2007; Bigler and Romeis: 2010; Qaim, et al.: 2008). In the year 2008, it increased to 7.6 million hectares, or 82 per cent of total cotton production (James: 2008) and by 2010, *Bt* cotton was grown on 9.4 million hectares, or 86 per cent of the land in total cotton production (James: 2010; Ashok, et al.: 2012). A systematic study of data from 2002 to 2008 found that the yield advantage per hectare of *Bt* cotton had a 33 per cent over non-*Bt* cotton varieties (Witjaksono et al.: 2014). It was also found that there was a 54.7 per cent reduction in the number of insecticide sprays applied by cotton growers in the Warangal District of Andhra Pradesh, India, from 2003 to 2007 (National Academies of Sciences, Engineering, and Medicine: 2016).

Recent studies have argued that the cultivation of *Bt* cotton does not ensure higher yields for farmers from drought-prone areas (Venkat: 2015). On the other hand, a study by International Service for the Acquisition of Agri-biotech Applications found that between 2002 and 2010, the adoption of *Bt* cotton hybrid went up significantly to 86 per cent of the total cultivated area of cotton in India. Therefore, in the words of the agricultural expert M.S. Swaminathan, the merits of *Bt* cotton *remain debatable* as some have approved it for giving a better yield, while some question the claim. In an interview to *The Hindu*, he stated that “*However, I support the adoption of higher yielding crop varieties as most of our cotton farmers are small farmers who need better yields to earn profits. Back in 2004, I had advised seed companies selling hybrid cotton to farmers to also sell insurance schemes alongside, so that if crops fail for reasons beyond the farmer’s control, they can recover losses. But these recommendations remain to be adopted widely*” (Venkat: 2015).

Some of the major attributes of GM crops that are widely acknowledged are:

- a) Disease resistant: GM crops have genes that permit plants to ward off attacks by bacteria, fungi, and worms that damage fruits, leaves, roots, and seeds. India's climate and ecology exacerbate plant diseases, and hence this becomes a valuable characteristic for crops. It has been recognised that through agricultural biotechnology, crop yields can be increased to provide increased food production for and assist in feeding the burgeoning population in the developing world. Plants damaged by insects are more receptive to diseases and can carry diseases. For instance, mycotoxins can build up in damaged corn stalks and kernels, and sometimes can be fatal to animals and have been identified as carcinogenic for humans. As an advancement, *Bt* corn resists insect damage and this protects against disease (Krueger: 2001; Manjunath: 2007).
- b) Drought tolerant: GM crops can be grown with limited irrigation and are enhanced to express traits that prevent dehydration during drought. Insufficient water resources and unreliable irrigation necessitate this trait in many crops.
- c) Herbicide resistant: GM crops have certain genes that counter-react the damaging effects of herbicides to protect the development of the crop. More than 80 per cent of transgenically transformed crops planted throughout the world possesses herbicide-tolerant traits (James: 2009). This work well with crops and are grown in India. GM crops have also enabled host plant resistance to viruses (Cavatorta, et al.: 2012). Their success can be attributed to the ease of weed management options, increased yield, and economic return, and soil conservation due to reduced cultivation permitted by the deployment of these crops (Sears and Wolt: 2012).
- d) Medicinally enhanced: a technique called metabolic engineering can improve a plant's production of medicinal compounds. The benefits of this technology are evident for India. Increased yields of these compounds reduce the price and enhance their export in the global market. India could also benefit from crops engineered to produce animal and human vaccines against major infectious diseases.

- e) Metal and Toxin Tolerant: genes that discourage the uptake of metals and toxins permit these crops to grow in artificially and naturally polluted soils. India has many soils that have levels of metals and toxins that prohibit crop growth. Also, these plants can be used to clean polluted soils using a strategy called phyto-remediation²².
- f) Nutritionally supplemented: crops can be engineered to produce large amounts of proteins, vitamins, and other essential nutrients to supplement diets. The high degree of malnutrition in India can be curbed with these types of specialty crops. There already are benefits being seen by initial attempts using rice enriched with vitamin A.
- g) Pest resistant: Agricultural crops face major threats from a variety of natural enemies such as predators, parasites, and pathogens. These pests can damage crops and impact the nutritional value of the produce. Genes that selectively poison or discourage feeding by pest insects can be added to crops. The traits cause no harm to human or livestock. Currently, India loses many tonnes of crops to pests during storage and transport. It would benefit India if more crops are enhanced with these characteristic genes. Also, biotechnology techniques fulfil plant micronutrient requirements by supplying organic nutrients through microorganisms and their by-products (Bigler and Romeis: 2010). These microorganisms doctor the natural nutrient cycle of the soil and build soil organic matter (Accenture-CII report: 2013). It has led to the reduction in the application of nitrogen fertilizers in the soil, without compromising on the plant's ability to get the nutrients from the soil and has been helpful for the environment (CIMMYT: 1996; Ahluwalia: 1996). In the year 2002, it was estimated that in US alone, the pesticide use was reduced by 21000 metric tonnes per year in cotton, maize, and soybeans (Gianessi: 2002).
- h) Prolonged storage tolerant: GM crops are enhanced with characteristics that enable them to push the ripening changes that encourage spoilage. This is especially relevant for fruits and vegetables. India can exploit this technology to improve the export of fruits and seed crops.

²² The use of green plants to clean up the environment.

- i) Saline tolerant: various genetic strategies are being used to prevent crops from dehydrating in salty soils. This technology would be very valuable for India by increasing the amount of arable land for growing sustainable and export crops (Shmaefsky: 2005; Neefjes and Fowler: 1999).

Despite the globally acknowledged, peer-reviewed research and tested results worldwide, there has been vibrant resistance to the advent of GM crops in India. Most arguments are related to environmental well-being and food safety; in that it would lead to a destruction of nature and intervene with the natural processes for food production (Kavitha: 2011). The Parliamentary Standing Committee on Agriculture during the fifteenth Lok Sabha brought out a report on “*Cultivation of Genetically Modified Food Crops-Prospects And Effects*” (Government of India, Ministry Of Agriculture, Department Of Agriculture And Cooperation: 2012). It noted that the challenges of food insecurity, malnutrition and the need to practice sustainable agriculture call on the need to incorporate genomic techniques, better resource management, breeding productive nutritious and less input demanding crops and making a judicious use of agricultural biotechnology. As the then Minister of Agriculture Sharad Pawar said, this was because conventional technologies of agriculture are inadequate to meet formidable challenges of feeding burgeoning population with limited land and water resources (Samanta: 2013). The report provided an oral evidence of then President of All India Kisan Sabha, S. Ramchandra Pillai, who acknowledged *the possibilities for increasing productivity and production in agriculture by making use of genetically modified crops*. He, however, raised concerns over the profit motives of the private seed companies and therefore exhorted greater intervention by the government for the development of GM crops. When the pricing concerns were taken up by the Parliamentary Standing Committee on Agriculture with the Chairman of Monsanto India Ltd., Sekhar Natarajan, stated that there were over eighty companies selling *Bt* Cotton seeds of which Monsanto’s share was a meager six per cent. Also, Monsanto along with all other seed companies had priced the seeds as mandated by the government in 2006 at Rs. 750. Before this, the farmers purchased the seeds at Rs. 3700, and therefore they gained an average of Rs. 20,000 crores of additional income by 2012. However, the report concluded that the concerns raised by the International Assessment of Agricultural Knowledge, Science and Technology for Development (to which India is a signatory) over the ability of biotechnology to make significant contributions to the resilience of small and subsistence agricultural systems (Government of India, Ministry of Agriculture, Department of Agriculture and Cooperation, Committee on Agriculture: 2012).

The report of Technical Expert Committee²³, constituted by the Supreme Court, put a ten-year moratorium on the field testing of GM crops on grounds that there has been a lack of the procedures followed for the monitoring and evaluation of the impacts of these crops. Therefore, the Technical Expert Committee provides for a set of conditions to be fulfilled before restarting the field trials, namely, designation of specific sites for field trials, setting up of a panel of qualified personnel and scientists for the evaluation of bio-safety data, fulfillment of tests of biosafety and resolution of conflict of interest in the regulatory body (The Supreme Court of India: 2012).

Objections over the use of GM crops have also been raised by the RSS-affiliate *Swadeshi Jagran Manch* and voiced that indigenous varieties of seeds and crops must be promoted by the government (*Business Standard*: 2016). An Indian NGO opposed the US' sending of food aid that included GM foods to the Indian state of Orissa (Shiva and Shiva: 2000). Some sections opine that along with social maladies, the planting of GM seeds poses a significant threat to India's bio-diversity, which would hamper the agro-ecosystems. They argue that each farming region once grew a variety of seeds, many of them have turned towards the production of crop monocultures and have become dependent upon costly, natural inputs with which they are unfamiliar. This threatens the millions of plant species to extinction, and in turn, increasing risks of crop failure (Shiva: 2007). Critics also suggest that the GM technology is a maneuver by giant corporations, particularly Monsanto, to market its herbicides, dominate the agricultural supply chain, and keep the farmers dependent on high-priced transgenic seeds (Rotman: 2013). Other unfounded and unsupported fears regarding GMOs are that some organisms would be pushed to becoming invasive species and displace native bio-diversity (Shiva: 2000). Some researchers have claimed that the issues related to food safety, the rights of indigenous peoples, damaging impact on soil ecosystems are serious enough to warrant an immediate moratorium on GE foods and crops (Caplan: 2001).

These challenges based upon perceptions have been rejected by the scientific community (Bigler and Romeis: 2010). Dr. Robert Fraley, a 2013 World Food Prize Laureate, noted that the passions surrounding GMOs were so intense that because of accusations by whether against products or companies or individuals, tend to leave a mark, even though they are later

²³ In accordance with the Order of the Honorable Supreme Court of India dated May 10, 2012 on the Writ Petition (Civil) No. 260 of 2005 of Aruna Rodrigues Vs Union of India.

proved to be baseless (Fraley: 2016). The American policymaking circles hold that genetic engineering is the technology of the future and is needed to boost production, as the GM crops would require fewer fertilizers and pesticides, would be drought resistant, yield more, mature earlier and would consume less water (Purushothaman: 2011). The US since its independence in 1776, has remained open to the spirit of innovation and scientific fervour of which GM technology is of the several examples (The Economist: 2015). GE cotton varieties have been grown commercially in the US since 1996 and by 2009 represented 49 per cent of the world production (James: 2009). Food safety being compromised by GMO crops has never been substantiated by medical studies and scientific research. The incidental consumption of Mexican food products contaminated with StarLink corn produced no ill effects. An intensive study by the Center for Disease Control, USA, showed that the novel protein in the plant produced no harmful effects and evidenced that these crops were safe for humans (Shmaefsky: 2005). The new agricultural technologies on the horizon are largely biotechnologies. The Environmental Protection Agency (EPA) of the US in 2013 concluded that glyphosate, an active ingredient in many popular herbicides, does not pose a cancer risk to humans, and hence, *“a dietary exposure assessment for the purpose of assessing cancer risk was unnecessary”* (Environmental Protection Agency: 2013). On similar lines, a 2015 study on pesticide risk assessment of glyphosate, on the health of human beings conducted by the European Union (EU) concluded that *“glyphosate is unlikely to pose a carcinogenic hazard to humans and the evidence does not support classification with regard to its carcinogenic potential”* (European Food Safety Authority: 2015).

Biologists are of the opinion that, founded on non-scientific claims, the most persuasive criticism against the transgenic crops could be that existing transgenic crops have done little to guarantee the future of the world’s food supply in the face of climate change and a growing population (Rotman: 2013; Kranthi: 2014) is untrue. According to this view, throughout the history of agriculture, biotechnological processes have been used in the creation of agricultural products. Food and agriculture are biological by nature and are the result of biological applications. Earliest examples include bread making and the fermentation of fruits and grains to make wine and beer. Many conventionally bred crops could be considered transgenic as they contain genes or segments of chromosomes found in totally different crop species. For instance, many crop varieties of sugarcane, tomato, potato, rice, corn, oats, and other highly bred crops contain genes or chromosome segments derived from different wild relative species (Babinard: 2001). Farmers have taken advantage of the

natural processes of genetic exchange through sexual reproduction to produce varieties of organisms that display desired biological traits. In conventional breeding, the genes pre-existing within a species are brought together in new combinations by making sexual crosses, a process in which tens of thousands of genes are mixed together through the fusion of pollen and egg. Each parent contributes half of its gene to the offspring, but the composition of that half varies in each parental sex cell and hence in each cross. In practice, many crosses are necessary before the 'right' recombination of genes occurs to create the desired crop. The genetic variation of the present times in agriculture comes for the most part from mutations that occurred long ago in natural populations or during cultivation (Ramani and Rousseliere: 2007; Babinard: 2001). Thus, plant breeding has existed for thousands of years. It must be noted that long before humans intervened, nature overstepped in its own species boundaries. Wheat researchers point to the crossing of grasses in the wild thousands of years ago that led to the emergence of the first varieties of wheat: durum wheat can be traced back 5500 years to the agricultural civilizations of the Middle East, later this development was taken a step further when this wheat variety was crossed with another grass variety to produce the bread wheat- Nature's own genetically modifies food, 98 per cent of which according to Borlaug are GM by nature (Borlaug: 1999). It became a scientific endeavour after Gregor Mendel formulated his laws of inheritance in 1866. His basic discovery was that each heritable property in any living organism is determined by a physical factor contained within the cell of the organism (Babinard: 2001; Wortman and Cummings Jr.: 1978). This raises the question of the nature of Indian opposition to the GM issue.

The scientific community in India warned that rescinding from the advanced technologies such as GM crops would push India into a food crisis, where the country would have to import food grains as the population rises to 1.5 billion by 2050. The Director of Central Institute for Cotton Research (CICR), Nagpur Dr. K.R. Kranthi noted that a "*moratorium on field trials, essentially means a ban on field experiments and a full-stop to any further releases of GM crops... this move will invigorate the pesticide multinational companies, and kill any possible competition to the multinational products from the public-sector institutions. Any moratorium on field trials will bring all the biotech GM science in India to a grinding halt*" (Kranthi: 2014).

The series of droughts in India in the early 1960s that threatened to plunge the country into mass starvation, but the increases in production beginning in 1966 ameliorated the impact of

the drought, through the adoption of Green Revolution technology (Ramani and Rousseliere: 2007). Nobel laureate and father of Green Revolution Norman Borlaug had used genetically improved crops (predominantly dwarf wheat and rice) combined with irrigation, fertilizers, and mechanisation to improve yields in India. It needs to be mentioned here that the foundations for sustainable agriculture were laid in the late 1950s when the US Atomic Energy Cooperation and the IARI began the Atoms in Agriculture program. Other institutions that were involved in this in due course were the Bhabha Atomic Research Centre (BARC), the ICRISAT and Tamil Nadu Agricultural University. Using atomic mutation, the improved crop varieties that were produced were rice, chickpeas, groundnut, mung pulses and others. BARC explained that agriculture was one of the important areas for peaceful utilisation of atomic energy along with the help of biotechnology (BARC: 2015). The Nuclear Agriculture and Biotechnology Division (NABID), in the Bio-Medical Group of BARC, has been involved in developing high yielding and early maturing crop varieties, integrated pest management, nutrient formulation and technology related to bio-regulators, bioremediation, biosensors, bio-control and agro-processing, which have had immense societal impacts²⁴. The then PM of India Atal Bihari Vajpayee commended the achievements of BARC in the commercialisation of the applications of radiation technology in developing high-yielding, disease-resistant varieties of rice, jute, pulses, groundnuts, black gram and mustard, as well as in inventing technologies for the increasing the shelf-life of agricultural commodities like cereals, pulses, vegetables and dry fruits and upgrading of food hygiene. Cereals, pulses, vegetables and dry fruits can be preserved by this method (Vajpayee: 2002).

Through integrated pest control, cultivation and crop genetics research, the agricultural science community tripled wheat production from 2 to 6 tonne per hectare during 1968-72 (IFPRI: 2002). Rural areas of the country flourished with increased production (IFPRI: 2002). The number of poor in rural India dropped from 65 per cent in 1965 to 34 per cent in 1993 (Matlock: 2012; Datt and Ravallion: 2009).

Today a new technological paradigm, the ag-bio-technology revolution is a promising path towards the rejuvenation of the agricultural sector, which refers to the application of modern biotechnology to agriculture, and guarantees greater advantages than the Green Revolution (Ramani and Rousseliere: 2007). Indian policymakers, scientists, and regulators have

²⁴Nuclear Agriculture, Bhabha Atomic Research Centre (BARC), Available at: <http://www.barc.gov.in/pubaware/agri.html>

supported the development of biotechnology (including GM) that provides new crops favorable to India's climatic areas and suitable for the use by farmers in rural communities. One of the most important technologies in the Indian context is the one that produces drought resistance. Developing biotechnology appropriately would require effective research and reforms of the regulatory structure and process, recognising the local and international debate on biotechnology, particularly regarding GM crops (van Braun, et al.: 2005), and they provide nutritional security to the ever-growing population. However, lack of a common stance on GM technology across the ministries of Government of India, and between union and state governments has brought the agricultural regulatory system to a standstill. Delay in regulatory approvals the existence of multiple regulatory bodies causes inordinate postponements. As of 2014 91 applications for field trials were pending for approval, 44 of which were for GM food crops (Ji: 2014). To overcome such deferrals, the government proposed to set up Biotechnology Regulatory Authority of India (BRAI), an independent regulator under the Ministry of Science and Technology (Kakkar: 2013), but the proposal is waiting Cabinet approval. Thus, according to the scientific community, the challenge for the government has been would be to establish an effective regulatory system and a communication mechanism on GM foods, which would assuage the fears about the safety of such crops, while ensuring higher productivity and remuneration to farmers. India's current expenditure on agriculture is only 0.6 per cent of the total agriculture GDP, which is less than the average of 1 per cent spent by other developing countries (Fan, et al.: 2000; Chand, et al.: 2011).

It needs to be emphasised that biotech crops are well-established around the world. The US has approved about 100 genetically modified plants for use in agriculture (Johnson and O'Connor: 2015). Farmers in the US welcomed the new technologies and the three main GM crops-maize, soybeans and rapeseeds- captured between 25 and 50 per cent of the seed market in the last three years of the 1990s (Pinstrup-Andersen and Schiøler: 2000). GM soybeans accounted for 50 per cent in 1999 in the US of all the soybeans sown in the country (Clive: 2000). The first wave of agricultural biotechnology products in India was initiated from 1995 onwards from which the producers and farmers have benefitted as it has provided agronomic traits that have made it easier to grow crops while reducing the production costs. The products are primarily modified to genes that are pest or herbicide resistant. It uses genetic engineering techniques to create new plant varieties by first inserting specific genetic material into a selected plant and then following it up with cross-breeding. It increases the

precision of new plant variety creation exponentially by enabling the transfer of the desired gene set rather than permitting a random transfer of genes. It also lowers the costs of producing new plant varieties, as plants can be ‘designed’ to exhibit desired traits in a much shorter time. At present, the most popular traits that have been genetically transferred are insect resistance, pest resistance, herbicide tolerance and blockage of the functioning of certain genes (example, the gene that causes ripening) (Ramani and Rousseliere: 2007). Biotechnology is also being applied with some success in the livestock sector (Sejian, et al.: 2015). As has been assessed by experts, food production in the developing countries like India over the next twenty-five years would need to be doubled, and genetically engineered crops can help attain this objective (Herdt: 2001; Keller: 2012). In India 96 per cent of the cotton production, a significant economic staple for the country is genetically modified (Parrett: 2015; Rotman: 2013), and has not only benefitted the farmers but also the economy and the environment (Prakash: 2007). *Bt* cotton that was approved by Government of India in March 2002 to control bollworms, has been successful in transforming cotton into one the most productive and profitable crops in the country (Manjunath: 2007; Prakash: 2007). The output of cotton increased to 35.2 million bales in 2011 from 13.7 million bales in 2002 (Accenture-CII report: 2013; Manjunath: 2007).

The scientific consensus on the safety of GMOs is overwhelming. Nobel Laureates from around the world in a running signature campaign have urged all organisations around the world opposed to modern plant breeding, biotechnological innovations in agriculture, to “*re-examine the experience of farmers and consumers worldwide with crops and foods improved through biotechnology, recognize the findings of authoritative scientific bodies and regulatory agencies, and abandon their campaign against "GMOs" in general and Golden Rice in particular*”. They stress upon the safety of food and crops that have been improved through biotechnology in that there no confirmed case of negative health impacts for humans or animals from their consumption. Additionally, they have been evidenced to be less damaging to the environment and a boon to global biodiversity²⁵ (Achenbach: 2016; Kloor: 2014).

The Laureates exhorted the governments of the world to accelerate farmers’ access to

²⁵ The letter can be found in the website: http://supportprecisionagriculture.org/nobel-laureate-gmo-letter_rjr.html

biotechnology. They feared that resistance would keep the poorest populations especially women and children away from getting access to the essential nutrition compromising their immunity and leading to deformities and deaths. Outright opposition based on emotions and dogma would be the reason for the loss of innocent lives and has the potential to be termed as a "crime against humanity"²⁶.

Similar debates have raged in the US, both criticising and extolling the GMOs. For instance, a poll conducted by the Pew Research Centre, Washington, D.C. found that 88 per cent of American scientists believed GMO technology to be harmless (Hiatt: 2015). By contrast, only 37 per cent of civilians agreed to the usefulness of GMO (Pew Research Centre: 2015). US Supreme Court decision concurred that genetically modified alfalfa was safe. The USDA, after onerous review, allowed genetically modified sugar beets (Entine: 2013). Several independent studies so far have tested the impacts of varieties of genetically modified crops on animals. In 2012, extensive studies published in the *Food and Chemical Toxicology* concluded that GM plants were nutritionally equivalent to their non-GM counterparts and could be safely used in food and feed (Snell, et al.: 2012). Similarly, as per the independent organisation *Biofortified*, more than a hundred such studies have been performed, with no harmful results (Parrett: 2015).

The above description evidences no valid reason to dismiss the technology as plant scientists have striven to increase crop productivity. Scholars note that given the rapidly growing population, scientists are faced with a daunting breeding challenge, calling for the urgent need for the second generation of transgenic crops (Rotman: 2013). The reason for GM crops to have become widespread over a short span of time was because of the fact that these crops fulfilled their promise of robust yields with reduced drudgery for the farmers and reduced requirements for insecticides and pesticides that are environment-friendly than those used in traditional farming. All parties except the insecticide producers have witnessed profits (Pinstrup-Anderen and Schiøler: 2000). The concerns about food safety are legitimate but radically exaggerated. The regulatory system has worked in an exemplary fashion where not a single evil gene was unleashed upon the people or nature in 50 years of forced plant mutations (Avery: 2001). The rules and regulations for testing and using GM crops should be reasonable in terms of risk aversion, and cost-effective to implement, and avoiding excessive

²⁶ *ibid*

restrictions for scientists in carrying out the tests (Havener, et al.: 2008). Labeling of GE food is not legally mandatory in the US, as is the same for conventional foods. It is only intended to inform the consumers about the changes in nutritional content, health safety or food quality. However, if the GE food has a significantly different nutritional profile from its conventional counterpart, the food must be labeled to indicate the difference (Lemaux: 2012; Hansen: 2001).

According to a Principal Scientist at Indian Agricultural Research Institute, S.K. Chakrabarty, "*Concerns about the affordability of hybrids and GM seeds, environmental and ethical issues in the cultivation of GM crops, risks to the food chain, disease spread, and cross-pollination have resulted in their non-introduction... There is nothing wrong with GM and it should not be restricted to cash crops in India*" (Seetharaman: 2016).

The anti-GMO sentiment in India is driven both by political and social activists and environmentalists. Some have also viewed it through the narrow lens of American neo-imperialism and scientific imperialism that through its corporations has successfully instilled doubts and fear in the minds of ordinary Indian consumers and farmers (Ramanna: 2006). They worry that the entry of trans-national corporations into India would lead to the monopolisation of the seed industry, that would be detrimental to the small Indian farmers (Jha: 2001). Opponents of *Bt* Brinjal in India argued that its cultivation would damage thousands of existing types of the crop grown in India, which was also feared to have potential human health hazards (*Associated Press*: 2010).

Protests and demonstrations against GM crops have been generalised and applied against the US which has soured the US-India relations (Das and Bhardwaj: 2015). During the author's interview with Senator Richard Lugar, (a strong proponent of science and biotechnology in agriculture), he stated that the policymaking and the scientific community have a tremendous task to vocally present the picture in the entirety and not let some sections hold progress of the country to ransom (Lugar: 2015). When fields planted with varieties of crops are planted with the expectation of profitable yields, and becomes infested with crop destroyers like earworm, black cutworm, fall armyworm, insect-borne bacterial diseases, and other harmful pests, it leads to the destruction of the farming communities along with the economy, with spiralling effects of food inflation and food insecurity. There has been much human misery caused by hazardous substances in many food-crops- such as the presence of neurotoxin in

kesar dal, cyanide in tapioca, aflatoxins in groundnuts, etc. biotechnology has the capability to rectify these undesirable traits and thereby improve the quality of these staple food crops critical to the nutrition of disadvantaged and resource-poor consumers and must be extended to crops such as rice, oilseeds, pulses, millets, vegetables and fruits (Prakash: 2007). In the year 2001, India was embroiled in controversy about banned StarLink cotton grown by the farmers in Gujarat (Shah and Banerji: 2001). StarLink products were feared to kill beneficial insects contrary to intensive research studies in the US showing that the product is environmentally safe. India must avoid biotechnology policies based on unfounded suspicions (Sharma: 2003; Shmaefsky: 2005). GM of agricultural crops deserves to be viewed in an optimistic light (Pinstrup-Andersen and Schiøler: 2000).

It was urged by Senator Lugar and the Director of the FAO, North America office, Ajay Markandey, that the agenda should be set by those who have to live with the consequences of the resulting action, not by misguided beliefs and fearmongering that people in rich countries know what is best for the poor countries and poor people of the developing world and ill-founded conclusions (Pinstrup-Andersen and Schiøler: 2000), which are not supported by peer-reviewed scientific reports or data from thousands of individual field trials (Prakash: 2007).

Biotech proponents argue that GE is the solution to the problem of hunger in the world because it increases crop yields to feed a growing population (Borlaug: 2000b). Nevertheless, the real causes of hunger are poverty, inequality and lack of access. Too many people are too poor to buy the food that is available (but poorly distributed) or lacks the land and resources to grow it themselves (Kucinich: 2000). These are the issues that need introspection and implementation.

Researchers have emphasised that communication efforts that engage all public and private stakeholders at the local level (scientists, policy makers, producers, retailers, processors, consumers, etc.) early in the process of choosing which foods to develop with biotechnology were likely to increase their acceptance, adoption, and consumption. This priority setting has been used in India by the Agricultural Biotechnology Support Project II and led to the identification of *Bt* Brinjal as a high priority product (Gregory et al.: 2008). They noted that this was because of its proven technology and potential economic, health and environmental benefits (Bossard: 2012). Further, it becomes a task of the policy makers to not succumb to

pressures, and that the viewpoints of vested interests from NGOs and farmer organisations. Instead, a comprehensive assessment must be made that would relate the strategies for economic development and impact of biotechnology and farmers' livelihoods (Ramanna: 2006). Thus, the issue of GM crops has agitated bilateral relations since 2000. It has remained a persistent issue as even in 2016 the issue of GM mustard, the ban on Monsanto *Bt* brinjal moratorium testify. It illustrates the argument that while progress was being made in several other aspects of the relationship, specific issues in agriculture pose a formidable challenge.

India and the US have differed in their policy stance in the WTO and have been seen to represent the developing and the developed group of countries respectively. Some of the most pressing challenges have been over agricultural issues, which have had their implications on US-India agricultural cooperation. The next section studies these in detail.

5.2 Multilateral Challenges

5.2.1 Negotiations in the Doha Development Round of the World Trade Organization (WTO)

It has been argued that multilateral negotiations assume the significant position for the developing countries that might otherwise be left out of a regional or bilateral trade agreement (Caballero, et al.: 2000). Developing country coalitions could improve trade and economic growth among its members, but the larger share of benefits accrues from the trade agreements that open the markets of the world (The White House: 2015). Multilateral trade negotiations are thus an exercise in international cooperation and encourage economic interdependence, which offers political benefits as well.

The WTO is the principal international organisation governing world trade where considerations of comparative advantage can have a free and fair play in the context where some countries are at advanced levels of development while others have a long way to go before they can compete with the developed countries on an equal footing (Rao: 2005). WTO was established in 1995 as a successor institution to the General Agreement on Tariffs and Trade (GATT). GATT was a post-World War II institution intended to promote non-

discrimination in trade among countries, with the view that open trade was crucial for economic stability and peace (Bhalla: 2013; Ray and Saha: 2009).

Article 20 of the WTO Agreement on Agriculture (which is annexed to the WTO Agreement) contains a mandate for the negotiations on ‘continuation of the reform process’ to dismantle the trade barriers (Hoda and Gulati: 2007). Periodically, member countries negotiate to revise existing rules or establish new ones. These periodic negotiations are commonly called “rounds.” The Uruguay Round of GATT (1986-1994) that focused on trade in agriculture and trade in services gave way to the Doha Development Round. This sought to expand the scope of negotiations to allow further trade liberalisation. This was supported by the US.

The WTO Doha Round²⁷ of multilateral trade negotiations began in November 2001. The trade ministers of member countries met in Doha, for the fourth WTO Ministerial Conference. At that meeting, they agreed to undertake a new round of multilateral trade negotiations and adopted three documents that provided guidance for future actions. The Ministerial Declaration included a preamble and a workable program for the new round and for other further action. This Declaration folded the on-going negotiations in agriculture and services into a broader agenda (Fergusson: 2011), and because of the greater influence of developing countries in setting the agenda at Doha, the new round became known as the Doha Development Agenda (DDA). The goal of the Doha Round has been to make progress on agricultural negotiations simultaneously across the three pillars of the WTO’s Agreement on Agriculture, namely, *domestic support, market access, and export competition*, by building on the specific terms and conditions established during the previous Uruguay Round of negotiations (Schnepf: 2015). America’s goals in the Doha Round were the elimination of “*agricultural export subsidies, easing of tariffs and quotas, reductions in trade-distorting domestic support and improved market access in both developed and developing countries*”. The US has also sought improved market access for its industrial goods, especially in developing countries (Fergusson: 2006).

Countries have tried to maintain a balance across the three pillars by simultaneously achieving concessions from exporters and importers in the form of tighter spending limits on

²⁷ The multilateral trade negotiations have come to be known as the Doha Round after the city in which the ministers of WTO member-states met in November 2001, which contains a work program on trade negotiations.

trade-distorting domestic support; elimination of export subsidies and new disciplines on other forms of export competition; and expansion of market access by lowering tariffs, increasing quota commitments, and limiting the use of import safeguards and other trade barriers. The agricultural exporting countries accepted that the Doha mandate would stimulate the negotiations for the liberalisation of agriculture (Hoda and Gulati: 2007). However, as a concession to poorer WTO member countries, the degree of new conditions was agreed to be less rigorous for developing than for developed nations (Schneepf: 2015). India was seeking concessions as a developing country and the US as a developed one.

The WTO negotiations have been characterised by persistent differences among the US, the European Union (EU), and developing countries such as India, on major issues, such as agriculture, industrial tariffs and non-tariff barriers, services, and trade remedies. Partly as a result of being labeled a development round, developing countries like India have sought the reduction of agriculture tariffs and subsidies among developed countries, non-reciprocal access for manufacturing sectors, and protection for their services industries. The US, EU, and other developed countries, on the other hand, have sought increased access to developing countries' industrial and services sectors while attempting to retain some measure of protection for their agricultural sectors. Given the differences, the ability of WTO member states to reach a comprehensive agreement has been difficult. At the core of US-India differences were the issue of subsidies: for instance, India argued against the rich nations subsidizing their farmers and dumping while the US remained concerned over the lack of market access and low pricing of agricultural produce due to subsidies that led to trade distortion (Markheim and Reidel: 2007).

While the US embarked upon the Uruguay Round with ambitious objectives for the worldwide liberalisation of agriculture, as throughout the round its position was the elimination of all forms of trade-distorting measures on agriculture over a period of ten years (Hoda and Gulati: 2007). It continues to urge further discussions on opening markets to trade. Although decisions in the WTO are made by consensus, the US has maintained an influential role in the decision-making processes (*Inside US Trade*: 2001). India entered the Uruguay Round for the liberalisation of agriculture with deep misgivings because of over 61 per cent of its population engaged in agriculture for livelihood (World Bank: 1994) and demanded more freedom to be able to assist and protect agriculture (Hoda and Gulati: 2007). While access to foreign markets for farm exports was improved by the imposition of tariffs on

nontariff barriers and by the commitment of the member states to reduce tariffs to lower levels, yet despite these commitments, substantial agricultural tariff barriers remained, even after the agreed cuts had been made (Matthew and Ingersent: 2001).

The economic reforms of 1991 did not hasten the phasing out of the QRs on agricultural products. Except for the liberalisation of import licensing on sugar and cotton and for most edible oils, most agricultural products continued to be subject to import controls. By 1997, with considerable improvements in its balance of payments situation, India agreed to phase out its QRs over a nine-year period. By 2000-01, wheat was offered for exports that led to the growth of India's exports of food grains (rice and wheat) to an unprecedented level, increasing from 2.08 MMT in 2000-01 to 10.2 MMT by 2003-04 (Hoda and Gulati: 2007; Government of India: 2005). This was also a time when there was a rapidly strengthening of India-US ties, with increased frequency of high-level visits from both sides. Quite naturally, the issue of trade barriers came to the center stage of discussions. In particular, agricultural trade became a major focus in the talks as Indian liberalisation opened the economy.

Even though India began with the process of liberalisation in the 1990s, and from 1997 onwards made progress in gradually removing the QRs and tariff cuts, with PM Vajpayee opening India's economy to FDI, yet, despite these efforts trade barriers remained high (World Bank: 2004). It must be noted that the high agricultural tariffs do not reflect generally of high production cost, but in most cases, are precautionary to protect the domestic market (Brümmer: 2005). Since the beginning of the Doha Round, India has drawn a sharp distinction between the food security and livelihood concerns of developing countries and the non-trade concerns emphasised by the developed countries. Where agriculture contributed to around 15 per cent of the GDP, overall economic development could not be achieved without rural development. Because alternative avenues for the redeployment of large numbers from the workforce were not available in countries like India, significant reduction of the labour force in agriculture was inconceivable (Hoda and Gulati: 2007). India has a comparative advantage in several commodities for agricultural exports because of self-sufficiency of inputs and bumper crops. However, the dismantling of QRs on imports as per the WTO agreement on agriculture has created various challenges for many exporters in the global market (Krishnaveni and Gosh: 2005).

It is evident that agriculture occupies the center of the Doha Development Agenda (Fergusson: 2011).as negotiations have proceeded at a slow pace and have been characterised by a lack of progress on significant issues and persistent disagreement on nearly every aspect of the agenda. Some of the challenges that have divided India and the US and hindered the progress of negotiations at the WTO are elaborated below.

- India is the view that reform in agricultural trade is the need of the hour. The argument is that its producers cannot compete against the surplus agricultural goods that the developed countries, principally the EU and the US that sell at low and subsidised prices. The US, on the other hand, opines that the scope envisioned by countries like India would be unacceptable as it would lessen the overall market access gains from the agreement, and adversely affect millions of people in the developing countries, who are dependent upon growing corn, rice, sugar, cotton, and other products (Watkins and Fowler: 2002).
- At the Cancun Ministerial Conference of 2003, the US was under pressure from the EU and the G-20 countries represented by Brazil and India to improve its subsidy reduction offer. Oxfam International campaigned particularly around cotton subsidies in the US and the ways these negatively impacted low-income cotton producers in the Horn of Africa (Oxfam International: 2004). The US stand reflected that unless the EU improved its own market access offer and that the G-20 countries evidenced a willingness to open up their markets not only to agricultural products but to industrial products and services as well, any changes in its domestic subsidy program would be difficult (Baldwin: 2006). The Cancun Round that followed thus faced a debacle as it attempted to forge a consensus where none existed, and views on agriculture amongst the members were polarised (Thompson: 2005; Hoda and Gulati: 2007).
- In early 2004, the then US Trade Representative (USTR) Robert Zoellick proposed mechanisms to move the round forward. He called for a focus on market access, including an elimination of agricultural export subsidies (Office of the USTR: 2005; Fergusson: 2011; Hoda and Gulati: 2007). Member states did not heed the advice and the talks drifted back to stalemate. Even the Hong Kong

Ministerial Conference of December 2005 also turned to be a non-event, as it was more of a stocktaking exercise in which ministers received the reports of the chairpersons of various negotiating groups and laid down the time frame for future work (Cho: 2005; Falk: 2006; Hoda and Gulati: 2007).

- In July 2006, the then Director General Pascal Lamy put forth a ‘20-20-20 proposal’ that called upon the US to accept a ceiling on domestic farm subsidies under \$20 billion, proposed the negotiations use the G20 proposal of 54 per cent as the minimum average cut to developed country agricultural tariffs, and set a tariff ceiling of 20 per cent for developing country industrial tariffs (Saggi: 2012; Fergusson: 2008). This suggestion was criticised by all sides and was not adopted at the Geneva meeting as the G-6 (India, US, Japan, Australia, Brazil, European Community) could not find any convergence of position on settling the modalities of negotiations on issues of trade-distorting domestic support, market access in agriculture and non-agricultural market access, acceptable to all. Lamy formally announced the failure to reach an agreement in the on-going round of multilateral trade negotiations, with unbridgeable differences (von Braun and Ahluwalia: 2007). Apart from other issues, India was faced with the US demand to moderate its request for special and differential treatment in agricultural market access and the US faced the pressure of India and Brazil with respect to its trade-distorting domestic support (Hoda and Gulati: 2007).
- In the trade negotiations, the gap in the positions of G-6 was unbridgeable and the negotiations were suspended. It was said that consensus could not be reached primarily because of the inability of the US to show any movement on domestic support, because of the US mid-term elections due in November 2006. Hence the talks were suspended and the Doha Round of multilateral trade negotiations was said to be in the gravest crisis (WTO: 2006; Hoda and Gulati: 2007).
- While the deadlock continued, members of the US Congress appreciated the uncompromising position taken by US negotiators that additional domestic subsidy concessions must be met with increased offers of market access. Following the July 2006 suspension, several WTO country groups such as the

Group of 20 and the Cairns Group²⁸ of agricultural exporters met to lay the groundwork to restart the negotiations. Key players in the talks, such as the G-4 (US, EU, Brazil, and India), conducted group meetings to break the stalemate in the first months of the year. Yet, it collapsed in bitterness in 2007, over competing demands for higher cuts in developed country agricultural subsidies made by developing countries.

- The then Finance Committee Chairman Max Baucus (Democrat from the state of Montana) and Ranking Member Chuck Grassley (Republican from the state of Iowa), along with House Ways and Means Chairman Charles Rangel (Democrat from the state New York) and Ranking Member Jim McCrery (Republican from the state of Louisiana), sent a letter to President Bush, urging the administration to stand firm in the Doha Round negotiations at the WTO. They feared that the WTO proposals would not provide new market access for American agriculture and would not be supportive of either the US farmers needs nor would stabilise the global economy. They called for the guaranteed commitment from India, Argentina, Brazil, China as willing partners to reach a strong outcome and strengthen a rules-based trading system (Rangel, et al.: 2008). This shows that the political economy that gives rise to divisions when positions have to be taken on politically sensitive subjects like agriculture leads to economic distortions worldwide (Hoda and Gulati: 2007).
- Several studies point out at the differences between the US and Indian stance and their allegations against each other at the WTO leading to the collapse of the Doha Development Round that centers around methods to reduce trade-distorting domestic subsidies, elimination of export subsidies, and increase market access for agricultural products. (Chanda: 2006; Thies and Porche: 2007; Swinnen: 2009) It also focuses on protectionism, trade in agricultural goods, and Non- Agricultural Market Access (or NAMA) (Foreign Agricultural Service, US Department of Agriculture: 2006; Mohan and Ayers: 2009; Perkovich: 2010). Besides tariffs, the

²⁸ The Cairns Group is a coalition of agricultural exporting countries with a commitment to reforming agricultural trade. A diverse coalition bringing together developed and developing countries from Latin America, Africa and the Asia-Pacific region, the Cairns Group has been an influential voice in the agricultural reform debate since its formation in 1986 and has continued to play a key role in pressing the WTO membership to meet in full the far-reaching mandate set in Doha (<http://cairnsgroup.org/Pages/default.aspx>).

non-tariff barriers also hinder the import of certain agricultural goods to India. One way of doing this is through the use of State Trading Enterprises (STEs)²⁹ to control the imports. India has used STEs especially for rice, wheat, coarse grains (except for maize and barley), that make up 40 % of the Indian agricultural GDP (Brümmer: 2005).

- While stressing upon the need for a rule-based multi-lateral trading system and seeking to end the "structural flaws" in the global trading system especially in agriculture, the then Minister of Trade and Commerce, Kamal Nath, blamed the US for the prevailing bottlenecks at the WTO. He maintained that there could be no further movement on the round if developed countries wanted to view India through the lens of only gaining market access for their subsidised products. Like Cancun Ministerial of September 2003, India sought the unity of the developing countries to ensure that no unfair rules were hurled at them and to defend an outcome in the agricultural negotiations that would reflect the objectives of the Doha mandate and the interests of the developing countries. He also emphasised that the bilateral trade engagement with the US would continue but there remained huge scope for incremental gains with an agreement in the Doha Round (*The Hindu*: 2006). India has called for the substantial reductions in trade-distorting domestic support (including direct payments to farmers) as a formula for better market access for agricultural products (Brümmer: 2005).
- The developed nations, especially the US and the EU countries continue with their policies of state support to their farmers and urge the developing nations to reform their tariff regimes to facilitate imports or free entry of multinational companies in the seed and pesticide markets, while the developing nations have somehow tried to resist this onslaught. If continued unabated, the farmers of the developing world would be the losers in the process of development achieved under the policies of globalisation and free trade based on comparative advantage (Suri: 2007). Some activists in India claim that India's agriculture has turned into a negative economy

²⁹ STEs regulate the marketing and pricing of agricultural products by purchasing or selling domestic production, exporting, or importing (Ackerman and Dixit: 1999).

due to corporate globalisation and unfair free trade policies implemented by the WTO (Shiva: 2007).

Given the standoff at the WTO, India and the US do not disregard the necessity to arrive at an understanding to move forward towards a free-liberal-global market order.

It has been observed by experts that the WTO Agreement on Agriculture constituted a weak attempt at agricultural liberalisation. Research conducted by the International Food Policy Research Institute (IFPRI) and Indian Council for Research on International Economic Relations (ICRIER) suggests that in the multilateral trade negotiations, the strategy of the developing countries should be aimed at a fundamental reform of world agriculture, especially for countries like India, where agriculture provides the main means of livelihood to a majority of the population. Hence, it would continue to be difficult for the WTO members to agree to an outcome of negotiations on agriculture based on economic reasons alone (von Braun and Ahluwalia: 2007). In the joint address made by the then PM of India Manmohan Singh and the then President of the US, George W. Bush, in September 2004 in New York, it was affirmed that policies encouraging greater integration of the two economies with each other as well as with the global economy would offer opportunities to expand and strengthen their economic partnership.

To this end, they expressed their desire to strengthen cooperation on international economic issues including the DDA as well as on the bilateral efforts such as the US- India Economic Dialogue (Embassy of India, Washington, D.C.: 2004). Scholars agreed that DDA could become meaningful with the achievement of the target of global poverty reduction only if resolute efforts are made to rectify the agriculture of the world, and bridge the differences on trade (Hoda and Gulati: 2007). Acknowledging that the two countries had differed on critical issues during the long Doha Round of trade negotiations, the then Under Secretary of State for Political Affairs, Nicholas Burns emphasised upon the need for two countries to come together for the successful completion of the Doha Round talks, which in his opinion offered the best hope for expanding global economic growth and prosperity. He highlighted that a global trade policy of India that increased liberalisation and stimulated significant and sustained trade in agriculture and manufactured goods would benefit all, and so would the opening of India's retail, banking, and insurance sectors (Burns: 2007). During a personal interview with the former Under Secretary of Agriculture in the Bill Clinton administration as

well as the Chief Agricultural Negotiator of the Office of US Trade Representative (USTR) in the Obama administration, Ambassador Islam Siddiqui believed that the US and India are going past their prejudices and stereotyping of each other and was 'reasonably confident' of a 'working agricultural relationship' between India and the US (Siddiqui: 2015).

Scholars have pointed out how reforming India's agriculture would impinge upon US-India agricultural cooperation. Streamlining the domestic markets by creating necessary infrastructure and institutions would competitively connect India's farmers with the US markets (Mehta: 2016). Reining in the taxes on rice and sugar mills, decontrolling investments in large-scale agro-processing and on foreign investments in retail chains, and removing the bans on direct buying by processors from the farmers, would not only improve India's negotiating positions at the WTO but also enable it to benefit more from the liberalisation of world agriculture that the successful conclusion of the Doha Round would bring about. by continuing to demand reduction in support and protection and subsidisation in the developed countries (von Braun, et al.: 2005).

Indian experts point out that the India must play a pro-active role in facilitating the globalisation process to prepare the necessary information base and develop the capacity to articulate its concerns and policy trade-offs in the WTO for multi-lateral trade negotiations. It would provide significant welfare benefits through both trade and investment and strengthen India's bargaining positions, both bilaterally and multilaterally (Lawrence and Chadha: 2004).

Given the understanding about the prevailing deadlock in the WTO, by highlighting the significance of the Doha negotiations to reach a balanced agreement, American trade economists argued for the need to reach a balanced agreement, acceptable to both the developed and developing countries. They opine that the reduction of trade barriers would allow for a more efficient exchange of products among countries and would encourage economic growth (Froning: 2000; Love and Lattimore: 2009). Multilateral negotiations offered the greatest potential benefits by obliging countries throughout the world to reduce barriers to trade. In 2002, the gains to the US and to the world from multilateral trade agreements was estimated to be over half trillion dollars. A study by the University of Michigan found that if all trade barriers in agriculture, services, and manufactures were reduced by 33 per cent because of the Doha Development Agenda, there would be an

increase in the global welfare of \$574 billion. Authors, however, contend that while overall welfare increases, the largest absolute gains are directed towards the developed countries (Brown, et al.: 2002). A study by *Copenhagen Consensus* found that successful completion of the Doha Round would impact the entire world economy. By 2030 it would be about \$1.5 trillion richer every year, and in the very short term, the other benefits would include cheaper food for everyone, and greater profits for the Third World farmers (Lomborg: 2015).

If the trade negotiators at the WTO are unable to achieve a breakthrough, there may be several consequences for multilateral trade liberalisation. It could lead to an increased use of the WTO's dispute settlement function, where some practices like agricultural subsidies may be challenged in dispute settlement. An increased reliance on dispute settlement may, in turn, would lay stress on the WTO as an institution if the decisions rendered are not implemented or are not perceived as being fairly decided (Fergusson: 2008).

In response to the stalemate at the WTO, experts point that in an increasingly interdependent world, it was neither desirable nor feasible to remain insulated from global markets (von Braun, et al.: 2005). Noted economists like Jagdish Bhagwati, Pravin Krishna and Arvind Panagariya have exhorted that India being a major player in the world, should play its due role in WTO negotiations and push for multilateral global liberalisation of agricultural trade (Bhagwati, et al.: 2014). While insisting on substantial cuts in the export subsidies and domestic support being provided to agriculture in the US, India should continue to engage further to break the deadlock and argue for a rules-based trade. In the event of a slowdown in multilateral negotiations, given the complexities, the country should open a second track of negotiations on bilateral and free trade agreement with the US in order to enhance the bilateral economic relationship (Lawrence and Chadha: 2004). In the context of WTO negotiations on agriculture, ultimately, it was imperative to weigh viable strategies to ensure the competitiveness of Indian exports while simultaneously enhancing their efficiency. Nevertheless, many continue to urge that to attain this objective, India should continue to seek substantial deductions in the domestic support given to agriculture by developed countries as well as support its own agriculture and improve its competitiveness simultaneously (Krishnaveni and Gosh: 2005).

5.2.2 Controversy over Subsidies

Discussions in the trade negotiations of the WTO revealed that India and the US are at loggerheads over several trade issues. Prominent among them has been over the two countries' domestic governmental support to agriculture or subsidies. Subsidies are the payments made by governments to manufacturers or farmers to reduce the cost of their product to consumers (Chanda: 2006). In agriculture, subsidies are provided mainly towards enabling the farmers to purchase inputs for their farming activities, for instance, fertilizers, seeds, equipment, among others. (Timmer, et al.: 1983). These subsidies are generally rationalised in the overall economic context in that they play a crucial role in stimulating the development of any country through increased agricultural production, employment and investment (Gulati and Sharma: 1995). Costs of input subsidies are evaluated against the loss of potential benefit if the same amount was invested in creating the productive potential of agriculture.

There has been a serious discussion on the role and relevance of subsidies to agriculture in India. The apex body of policy planning, the Planning Commission of India, had in fact clearly stated that the continued reliance on input subsidies to increase production has been one of the causes of lower public investment and quality of public services in agriculture, especially in the poorer states. As a result, it called for the need to review such policies given that it would inevitably lead to the diversion of scarce resources away from the creation of productive assets to subsidies for fertilizers, rural electricity, irrigation, credit and other agricultural inputs (Planning Commission of India: 2002).

In general, there, are three categories in which the governments provide support to their domestic agriculture. First, *import policies*, which refer to border protection through trade barriers such as invoking QRs, quotas and import tariffs that create a difference between the domestic and prevailing global prices of agricultural commodities. Second, *export policies* refer to those mechanisms which either promotes exports through subsidies, etc. or constraints exports through export restrictions, taxes, etc. The third category is the domestic policies covering *input subsidies*, *direct payments to farmers*, *price support to outputs*, that aims to meet domestic goals like protection of farmers' incomes (Gulati and Narayanan: 2003).

Policy makers and analysts have concurred that the developed countries of the world support their agricultural sector, through subsidies to the tune of around a billion dollars a day, and thus international trade in agriculture at present has remained heavily distorted (von Braun: 2003; Lilliston (ed.): 2007). Estimates by *International Food Policy Research Institute* (IFPRI) in 2005 revealed that protectionism in developed countries cost the developing countries about US \$24 billion in agricultural and agro-industrial income (Pal: 2005; Halderman and Nelson: 2005). The developing countries have alleged that high subsidies in developed countries are contributing significantly to the weak performance of their own agricultural sectors (Von Braun: 2003). They explain that the subsidies by the developed world to their farmers, artificially depress commodity prices in global markets and thus prevent efficient producers in the developing countries from getting their rightful share in the global markets (Centre for WTO Studies: 2008).

Thus, one of the primary objectives of the Doha Development Round was to substantially reduce the distortions through subsidies and protection by the developed countries (WTO, Doha Ministerial Declaration: 2001). It has been evidenced that these subsidies have caused fluctuations in the global agricultural markets (Gulati and Narayanan: 2003; Bagwell and Staiger: 2012). The Uruguay Round of Agreement on Agriculture sought to discipline the farming sector by imposing restrictions and reduction commitments on domestic and export subsidies on the countries (WTO: 1994). It set the rights and obligations regarding trade in agricultural products, with provisions dealing with market access, domestic support and export subsidies (Government of India, Ministry of Commerce and Industry, Department of Commerce: 2006). The aim of the Doha Round was to establish a fair and market-oriented agricultural trading system³⁰. The importance of agriculture for least-developed and developing countries called for inclusion of provisions on Special and Differential Treatment (SDT) and more leeway, and time, for them to meet their commitments under the AoA (International Institute for Sustainable Development and United Nations Environment Programme: 2014).

Farm subsidies distort the production structure of a country by raising crop prices in a country's domestic market. Higher prices induce the farmers to over-produce the crops that

³⁰ WTO, Uruguay Round Agreement, Agreement on Agriculture, Article 20 Available at: https://www.wto.org/english/docs_e/legal_e/14-ag_01_e.htm

are subsidised. Most agricultural goods are price and income inelastic (which means there is little change in the demand for this product even if there are greater changes in the prices or the income levels) in nature and therefore, high-income countries tend to have a stagnant demand for such commodities. Over production and stagnant demand for agricultural goods in the domestic economies lead to 'surpluses' in these countries. This surplus not only dismisses the imports from the already restricted domestic markets of the developing world, it is also dumped in the international market at a cheaper rate. Agricultural dumping creates an unfair trading advantage for US and OECD agribusiness firms because they depress international prices and narrow or even eliminate market opportunities for producers in other countries (Ritchie, et al.: 2003). According to the experts at the Agriculture Policy Analysis Center at the University of Tennessee, as well as during personal interviews conducted during the field work with food policy experts at the John Glenn College of Public Affairs, Ohio State University, the elimination of US farm subsidies would not contribute much to slow down US crop production. Rather, it shifts production to different commodity crops, and the fundamental problems of oversupply and low prices continue to persist (Ray, et al.: 2003; Hooker: 2015). This leads to price suppression of that commodity in the international market. Export subsidies are used to cover the price difference between high domestic prices and lower international prices (Pal: 2005). This structural price depression impacts the farmers of the developing countries in two major ways. First, without sufficient governmental support, developing-country farmers are driven out of their local markets by the low-cost imports, and secondly for those farmers who export their products find their market share undermined by the lower-cost competition in the world markets (Lilliston (ed.): 2007; Messerlin: 2005).

The implementation experience of the AoA is demonstrative of the fact *that subsidy reduction commitments have been the least binding of all WTO commitments* (Pal: 2005). The Doha Round negotiations reveal that the developed countries such as the US have been reluctant to lower their farm subsidies, and have instead sought greater market access in the developing countries like India. However, it has been felt that granting greater market access could lead to a flooding of foreign goods in these countries and in turn lower the prices, hurting the poor farmers (WTO Committee on Agriculture: 2001; Khor: 2008; Giddings, et al.: 2016). An effort was taken to reduce these fears at the 2004 Ministerial (also known as the July Framework) modalities for special and differential treatment were incorporated into the AoA (Bernal: 2008). It incorporated two important measures to the Doha framework to assist the developing countries, namely Special Products (SP) and Special Safeguards Mechanism

(SSM). It was at this juncture that two important measures, namely, Special Products (SPs) and the Special Safeguard Mechanism (SSM), were incorporated into the Doha framework to assist the developing countries (WTO: 2008). While SPs are the agricultural products on which a developing country can ask for tariff relaxation on grounds of development, food security, and livelihood concerns, SSMs give them the right to have recourse to a Special Safeguard Mechanism (SSM) based on import quantity and price triggers. For the developing countries, it was a victory of sorts as these measures would guard the food security and livelihoods of billions of poor and vulnerable farmers who form the bulk of the farm population in their countries, from the uncertainties of the global market (Bernal: 2004).

Despite the provisions, India has expressed its dissatisfaction over the restrictions on the number of products to which SP can be applied, as well as on its right to apply the SSMs. India has firmly maintained that the SSMs are important for developing countries like itself in order to protect their poor and vulnerable farmers from the adverse effects of an import surge or price fall (which refers to tariffs that countries can impose in the case of an import surge of agricultural products). As a result, India has demanded unrestricted rights to increase import duties to protect its farmers from the international market impulses (WTO: 2008). After India's insistence, the revised draft modalities of December 2008 proposed entitlement to apply SPs 12 per cent of its overall agricultural tariff lines (Government of India, Ministry of Commerce and Industry, Department of Commerce: 2009). The US, on the other hand, has sought to limit the number of SPs that India can apply. It has sought to restrict the extent of tariffs that can be imposed India has been opposed to the US policy of monetisation of food aid, as it causes distortions in the market, both local and global.

As a result, due to opposing position taken by the US and India, there have been disagreements over the application of SSM as the former argues that this mechanism could be used by developing countries like India to temporarily protect producers of special products when imports surge. Disagreement over the size of a surge in import volume needed to trigger an SSM, as well as the size of the temporary SSM tariffs, are the major factors behind the prevailing stalemate of the Doha Round. India's Secretary of Commerce, Ms. Rita Teatota noted the necessity of SSMs for India primarily because of the continuing subsidisation of agriculture by developed countries like the US (Mishra: 2015). India along with China proposed that the intricacies of SSM would allow the developing countries to impose tariffs fifteen per cent above bound rates if imports surged ten per cent above average

trade levels. According to the US Trade Representative, the proposal by India would reduce existing market access, thus offsetting potential market access gains under proposed tariff cut modalities (USTR: 2012; Schnepf: 2015). According to the then US Trade Representative, Ron Kirk, since India continues to play a major role in the 21st-century global economy, the US was seeking to engage with India for further liberalisation of its agricultural sector among others (USTR: 2011).

While the negotiations on the subsidies and tariffs on SSMs and the number of SPs that India can apply for continue, it is essential to understand the scheme of permissible subsidies under the ambit of the WTO. These are divided into coloured categorisation, namely, Green Box³¹, Amber Box³² and the Blue³³ Box.

Scholars from India and abroad have highlighted that the US has adopted a double-standard in that it pays its farmers extremely high level of subsidies, and simultaneously encouraging other countries to reduce their domestic agricultural supports (Hoda and Gulati: 2007; Green and Griffith: 2002). This has resulted in a continued impasse in the WTO to arrive at a

³¹The green box is defined in Annex 2 of the WTO Agreement on Agriculture. The green box subsidies do not distort trade, or at most cause minimal distortion. They are government-funded (not by charging higher prices to the consumers) and must not involve price support. They tend to be programmes that are not targeted at particular products, and include direct income supports for farmers that are not related to (are “decoupled” from) current production levels or prices. They also include environmental protection and regional development programmes. “Green box” subsidies are therefore allowed without limits, provided they comply with the policy-specific criteria (Thompson: 2005; Hoda and Gulati: 2007; International Institute for Sustainable Development & United Nations Environment Programme: 2014).

³²All domestic support measures considered to distort production and trade (with some exceptions) fall into the “Amber Box”, which is defined in Article 6 of the Agriculture Agreement as all domestic supports except those in the blue and green boxes. These include measures to support prices, or subsidies directly related to production quantities. These supports are subject to limits: “de minimis” These are subject to reduction commitments as they are trade distorting domestic support which is exempt for subsidies that are product specific or minimal supports that are allowed (5% of agricultural production for developed countries, 10% for developing countries, non-product specific, but less than 5% of production for developed countries, 10% for developing countries (Hoda and Gulati: 2007; Gulati and Narayanan: 2003; International Institute for Sustainable Development & United Nations Environment Programme: 2014).

³³ Blue Box support is quintessentially aimed at reducing production. It is, therefore, considered less trade distorting than amber box support. Any support that would normally be in the amber box is placed in the blue box if the support also requires farmers to limit production. At present there are no limits on spending on blue box subsidies. It includes the production-limiting programs of payments based on no more than 85 % of the base level of production. In the current negotiations, some countries want to keep the blue box as it is because they see it as a crucial means of moving away from distorting amber box subsidies without causing too much hardship. Others wanted to set limits or reduction commitments, some advocating moving these supports into the amber box (International Institute for Sustainable Development & United Nations Environment Programme: 2014).

common AoA. Nonetheless, as a direct consequence of the FAIR Act of 1996, the US was had been willing to eliminate the ‘Blue Box’ category altogether and called for a reduction in the domestic support. This was challenged by the EU, as most of its support payments fell under the ‘Blue Box’ category (Matthew and Insergent: 2001). It has been researched that the US through its Farm Bill 2002 (Farm Security and Rural Investment Act of 2002) had increased its domestic spending on agricultural subsidies significantly (Aftandilian: 2002). Under this Act, federal spending on US agriculture increased by US\$ 82.6 billion until 2012 (US Department of Agriculture: 2016).

The Bush administration’s proposal in October 2005 to re-categorise the subsidy payments from the restricted ‘Amber Box’ to the less restricted ‘Blue Box’ was not accepted by the WTO as the actual spending would have remained unchanged (USTR: 2005; Murphy: 2005). According to research reports for the Congress, unless there would be changes in the Farm Bill, the US would be unable to accept any new restrictions on its domestic support programs, which is pertinent to meet US commitments in a final Doha Development Agenda AoA (Hanrahan and Schnepf: 2006; Schnepf: 2015), and unless there would be changes in the Farm Bill unable to accept any new restrictions on its domestic support programs. The prospects of controlling the US farm subsidies in the near future were effectively quashed by the US Farm Act 2008. Estimates reveal that due to the enactment of the US Farm Act of 2008 the US farm subsidies increased by \$20 billion during 2008-2012. This, in essence, meant that the farm sector in the United States would continue to provide subsidies using the subsidies in the “Green Box”, i.e. those that are not subjected to any reduction commitments (Centre for WTO Studies: 2008).

The ways in which the US has applied this classification for its agricultural products has received objections from India. It has been observed that since the establishment of the WTO, the US raised the subsidies to its agricultural producers by 300 per cent, or \$32 billion, annually (Drummond: 2001). It has been pointed out that once democratic governments begin to subsidise something, the withdrawal becomes difficult due to populist politics. This is mainly because these subsidies create electorates through which the former wield substantial political power (Natsios and Doley: 2009). However, it must be noted here that subsidies on inputs are generally advanced on the assumption that these are temporary measures and would be withdrawn once the objectives have been achieved (Wiggins and Brooks: 2010). Experience clearly shows that it becomes increasingly difficult to reduce or abandon

subsidies. In fact, there is nothing wrong with subsidies if they are well-targeted and reach the intended beneficiaries and have a definite time frame for their termination.

It is intriguing to note that the US has increased its domestic subsidies, while simultaneously fulfilling its WTO subsidy reduction commitments. This apparently baffling situation can be explained by the fact that after the Uruguay Round, most developed countries transferred a significant part of the prohibited subsidies (the Amber Box subsidies) to the permissible Blue and Green Box subsidies, which are supposed to be less trade-distorting. This leads to an understanding that the US has been using its economic and political clout in channeling its trade-distorting subsidies towards the category of less trade distorting subsidies.

It has been observed that India has been vocal in pointing to, the distortions in world markets created by the Farm Bill (Lilliston (ed.): 2007). It has been highlighted by India's Ministry of Commerce that the expenditure of billions of dollars of the US government on farm subsidies, along with its policy of pressuring other countries to lower their tariffs, has been the primary cause of export dumping (Government of India, Ministry of Commerce and Industry: 2015; Wise: 2015) that has driven many developing countries out of farm trade, besides undermining market access in areas like cotton and sugar. Calling upon the US to lower its annual farm assistance, Indian delegation to the WTO led by Minister Nirmala Sitharaman maintained that the US farm subsidy program, worth an estimated \$17.7 billion per year, have continued to provide US agricultural exporters with a biased trade advantage (Government of India, Ministry of Commerce and Industry: 2015;). To the Indian government, the US program posed a threat to millions of Indian farmers; hence it maintains restrictions on US agricultural imports.

In addition, India viewed the US reluctance to curtail or eliminate its farm subsidy program as a major roadblock in making progress in the Doha Round negotiations (Basu: 2015; Kronstadt, et al.: 2011). The US farm subsidy program has thus been a source of India's concern about agricultural imports from the US. The negative effect of the US policies on agriculture is transferred to poor farmers outside the US and shrinks the world commodity prices (Sumner: 2007). Low prices affect every other country, especially those driven by trade liberalisation to reduce domestic and border protections for their agricultural sectors. Although the US does not hold a monopoly, yet constitutes one of the few major players in the oligopolistic world markets. Hence, low US prices consistently drive down world prices

directly affecting the livelihoods and sustainability of small farmers around the world (Kapur and Ganguly: 2007). Critics also argue that even though developing countries have a distinct cost advantage in the production of agricultural products, given the large subsidies are given to competitors in advanced nations, they are unable to compete on an even playing field (Shariff: 2008).

India has followed two approaches simultaneously for the resolution of domestic subsidies in the WTO negotiations. On one hand, it has called for a substantial reduction in domestic subsidies by the developed countries, and, on the other, proposed sufficient flexibility in the rules to permit the developing countries to carry out their domestic support measures, in the interests of poverty alleviation, rural development, rural employment and diversification of agriculture (Pal: 2005; Anand: 2010).

At present, Blue and Green Box subsidies account for a significant share of domestic subsidies in many WTO member countries. There is a growing consensus among economists that all Blue Box measures and some of the Green Box measure indeed have trade distorting effects and by providing exemptions to these types of subsidies the agreement has allowed the distortion in an agricultural trade to continue (Pal: 2005; Hepburn and Bellman: 2014). India has categorically pointed out that all Blue and Green Box subsidies are not as minimally trade distorting as is made out because the reasons that such payments entail insurance and wealth effects, and provide incentives to increase the production; that these direct payments encourage use of farm inputs and access to technology, which leads to over-production, in turn distorting the agricultural markets (WTO Committee on Agriculture: 2001; Pal: 2005). Further, it has been argued that direct payments increase the land prices resulting in an increase in the farmlands, impacting the environment in general (Sentamilselvan and Pragadeeswaran: 2013).

Further, economists have debated the agricultural producer support by the US. At the domestic level the high costs of such support are borne by the consumers and taxpayers (Riedl: 2007; Green and Griffith: 2002), while at the international level, developing countries that might otherwise enhance their continued economic development by exporting agricultural products to developed countries are hindered by tariffs, subsidies and other mechanisms designed to keep them out of business (Griswold: 2007; Thies and Porche: 2007; Riedl: 2007). As a negotiating strategy, the US has stressed upon the importance of

bilateral negotiations to advance the Doha Round (Baldwin: 2009). However, it has been pointed out that this approach has been met with opposition from the more economically advanced, developing countries such as India (Schnepf: 2015).

The elimination of domestic subsidies thus remains a key contentious issue dominating international negotiations on US agricultural policy, where the developing countries including India seek an end to these subsidies from the point of view of survival. Along with the goal of ending direct payments to US farmers, the broader objective is to ensure a measure of sustainability for the world's poorest farmers for whom receiving fairer prices in the marketplace remains important (Ray et al.:2003). It has been observed that the concessions put forth as part of the on-going Doha Round negotiations are extensive and would have consequences for US farm policy in that they would significantly lower the permissible spending limits for certain types of domestic support and eliminate export subsidies, while simultaneously allowing US agricultural products wider access to foreign markets (Schnepf: 2015).

Clearly, a large part of the negotiations focused on how domestic price support to the farmers in the developed world including the US had a detrimental to the farmers in developing countries like India. While experts reiterated the way forward is to ensure appropriate institutional reforms that encourage autonomy, transparency, and accountability in agricultural agencies (Gulati and Narayanan: 2003), yet negotiations for over two decades have not yielded any concrete decision, agreeable to all, and remains a thorny issue in US-India agricultural partnership.

5.2.3 Controversy over Sanitary and Phyto-Sanitary Measures (SPS)

In order to ensure that the consumers of any country are being supplied with food that is safe to eat, and also simultaneously ensuring that strict health and safety regulations are not being used as an excuse for protecting domestic producers, WTO espouses an agreement on the basic rules about the ways governments can apply food safety and animal and plant health measures (sanitary and phytosanitary or SPS measures) (International Institute for Sustainable Development and United Nations Environment Programme: 2014; WTO: 2016). It entered into force with the establishment of the World Trade Organization on 1 January 1995. It permits countries “*to set their own standards, and maintained that the regulations must be based on science. They should be applied only to the extent necessary to protect human, animal or plant life or health*”. Towards this, member countries are encouraged to use international standards, guidelines, and recommendations where they exist. These SPS measures can take many forms, like the requirements of products being sourced from a disease-free area, investigation of products and their ingredients, specific treatment or processing of products, setting of allowable maximum levels of pesticide residues or permitted the use of only certain additives in food. Sanitary (human and animal health) and Phytosanitary (plant health) measures apply to domestically produced food or local animal and plant diseases, as well as to products coming from other countries (WTO: 1998).

*“Article 5.7 of the SPS Agreement stipulates that if relevant scientific evidence is insufficient, members may adopt SPS measures, on a provisional basis, while seeking additional information about the risks posed by a hazard”*³⁴. However, this provision is more restrictive than what many consumer groups would like, for instance, the qualification by the word 'provisional' (Matthew and Ingersent: 2001). A sanitary or phytosanitary restriction which is not actually required for health reasons can be used as an effective protectionist device, and because of its technical complexity, a particularly deceptive and difficult barrier to challenge (WTO: 1998).

In the Uruguay Round trade negotiations, a new SPS Agreement and a strengthened Technical Barriers to Trade (TBT) Agreement were brought in to provide a set of rules to

³⁴ WTO, Article 5 of the Agreement on Sanitary and Phytosanitary Measures, Available at: https://www.wto.org/english/res_e/booksp_e/analytic_index_e/sps_02_e.htm

govern behaviour in the area of (Josling: 2001; Matthew and Ingersent: 2001) food safety and the necessity to protect human, animal, or plant life or health (International Institute for Sustainable Development & United Nations Environment Programme: 2014). Technological innovation, the globalisation of food supply, rising living standards and greater awareness of the risks of foodborne illnesses have led the public in many developed countries to become increasingly concerned about this issue (WTO: 1998).

The key principle underlying the SPS Agreement is that countries have the right to decide on the measures they deem necessary to protect human, animal or plant life or health. However, in order to prevent abuse, certain restrictions are applied; for instance, the measures should be based on scientific principles, and not be maintained without scientific justification, or applied in an arbitrarily or unjustifiably way. While these principles work reasonably well in routine situations where the science is well-established, they are less clear cut with respect to novel risks where a scientific consensus has yet to emerge (Matthew and Ingersent: 2001).

The above description of the basic criteria for the application of SPS measures lends to an inherent understanding that *by their very nature, these may result in restrictions on trade* (WTO: 1998). US-India agricultural partnership has also witnessed restraints due to the application of SPS. The US has expressed concern where? about India's application of SPS regulations on certain of its exports, mainly dairy, poultry and meat products that these were not in not in accord with internationally recognised standards, and that negatively affects US agricultural exports (Chanda: 2006; Johnson: 2014; Froman: 2015). These measures which were imposed to ensure the quality of the improved products, in essence, became a major barrier in diversifying exports in horticulture and meat products (Sharma: 2005).

In January 2003, the agricultural attaché at the US embassy in New Delhi, Chad R. Russell, highlighted India's stringent food laws, increasing use of SPS measures, its fragmented market chain, lack of a cold chain (to keep food refrigerated) and a complex tax structure work as disincentives to the exporters (Government of India, Ministry of Commerce and Industry: 2003). It was assured by the Ministry of Commerce and Industry that all these problems would be taken up for a resolution to mutual satisfaction.

Another instance is that of US almonds exports to India, where because of the application of SPS standards, some of which are found to be not consistent with what are existing

international standards (Chanda: 2006). Washington was of the view that India should remove non-science based SPS measures that are negatively affecting US agricultural exports and regular dialogue between technical experts from India and the United States to systematically address SPS issues with a view to increasing bilateral agricultural trade. (Office of the USTR: 2014; Das: 2008).

India, on the other hand, had also expressed dissatisfaction with US' SPS regulations with regards to the treatment of Indian agricultural goods at the WTO. For instance, an old source of tension between the two nations was the seventeen-year-old ban on the import Indian mangoes into the US. The mango ban was lifted when the then US President George W. Bush and the then Indian PM Manmohan Singh signed a deal in New Delhi in March 2006 to enhance bilateral trade in agriculture with India, symbolised by paving the way for mango exports to the United States (Kavilanz: 2007; Sen: 2007). India's Agricultural and Processed Food Products Export Development Authority (APEDA), (established in 1985 with a mandate to develop and promote exports of agricultural and processed food products from India), was instrumental in negotiating the re-entry into the United States for fresh mangoes (World Bank Group: 2014). In March 2007 after USDA's Animal and Plant Health Inspection Service (APHIS) issuance of a final rule for the removal of the quarantine, under certain conditions, the US allowed the import of mangoes from India. However, according to India's Department of Commerce, the estimated cost of compliance with the new rule was about \$3 per mango, rendering the Indian mango uncompetitive in the US markets (USDA: 2007c; Ferrier, et al.: 2012).

In 2012, the US approached the WTO to decide that India's restrictions on imports of various US agricultural products, including poultry meat and chicken eggs, were discriminatory (The Hindu: 2012). The US requested consultations with India with respect to the prohibitions imposed by India based upon its Livestock Importation Act 1898 as well as the Statutory Order issued by India's Department of Animal Husbandry, Dairying, and Fisheries in July 2011, on the importation of various agricultural products from the United States purportedly because of concerns related to Avian Influenza. The US claimed that the measures appear to be inconsistent with the basic text of the SPS Agreement. The then US Trade Representative Ron Kirk exhorted that it was essential for US farmers to obtain the reliable market access that was agreed to by India, and that the measures applied by India were inconsistent with the relevant science and international guidelines, as the US held its agriculture industry to the

highest standards of safety and was confident of the WTO panel to agree that there was no justification for India's restrictions on US exports (The Hindu: 2012). Finally, when the case was transferred to the Dispute Settlement Board of the WTO, initial recommendations noted inconsistencies in the application of the sanitary measures by India. The matter is still under review.

It may, therefore, be noted that despite vivid improvement of the bilateral relations between India and the US since 2000, their interactions in multilateral settings have produced some of their most difficult encounters, notably those in the WTO (Schaffer: 2009). Such irritants between the two nations, especially in the field of agriculture, is also one of the causes as to why agriculture remains the most contested sectors in the dialogues on international trade and development. The coexistence of high levels of domestic and export subsidies has held up negotiations in the Doha Development Round of the WTO. The controversy over GM foods and imposition of SPS regulations have been yet another set of recent causal factors in the emergent discord in agricultural cooperation envisaged by the two that has continued to impact global debates on the subject.

CONCLUSION

In the hierarchy of human needs, the requirement of food ranks first. A reality-check of the present-day challenges caused by the hunger-poverty-population nexus reveals that unless progress is made through the concerted and sustained actions of governments, institutions, and individuals with an enhanced sense of urgency, the existence of the entire human race would be in peril. The *2016 State of The World's Forests and Agriculture: Land-Use Challenges and Opportunities* released by the Food and Agricultural Organization (FAO) categorically states that there is a need for increased investments, through international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to augment agricultural productive capacity in the developing and least developed countries. In this context, the origin, evolution and current developments that characterise the agricultural cooperation between US and India provide a suitable canvas to study the role and impact of international collaboration in this sensitive sector. Further, available literature has not been focused holistically on the subject but rather been segmented with varied approaches. Most importantly, no study has yet critically assessed the determining factors and variables that have helped to bring in and sustain cooperation in agriculture between the two despite stresses and strains that clouded the relationship from time to time. This study scrutinizes the main processes and actors that would enable our understanding of how and why this cooperation arose? What were the main interests of the two countries in pursuing this policy? What are its challenges and issues that will impact on the continuation of such a policy? It attempts to contextualise this cooperation into the broader theme of transformed strategic relations between US and India after the Cold War, beginning with 1996. In an ever-changing world, with increasing impact of scarce resources, this study draws attention to the fact that all nations must cooperate to end poverty and provide food security to all.

The research focused on agricultural cooperation between India and US as a case study to ascertain whether agriculture, described by both as one of the five strategic pillars of strategic partnership, supports strong US-India ties. It probed the nature and scope of this cooperation from its inception to the current level. Importantly, it has found that in an atmosphere of

regular exchange of high-level political visits that seems to have provided sustained momentum to bilateral cooperation, the dialogue architecture has established a long-term framework for US-India engagement in agriculture as well. Largely driven by political leadership, the economic motivations, as well as developmental imperatives, have been the leading factors in this on-going partnership. However, the tremendous upswings in the ties notwithstanding, several issues have arisen in the bilateral and multilateral arena that poses a challenge to this cooperation. These challenges, the study contends, are inevitable given the clash between the rules of the World Trade Organization and the US' and India's interests.

The beginning of this cooperation and its subsequent stages has been the focus of Chapter One. With the help of archival sources, this chapter puts forth the journey of US-India relations in agriculture from American agricultural assistance programs to a strategic cooperation in agriculture. The prevailing urgent plight of India amid starvation and consecutive droughts that coincided with geo-political realities of Cold War. At the behest of the Government of India for American food assistance of the early 1950s, was utilised by India as an opportunity to develop its own agriculture, in line with US Land-Grant University (LGU)-style of agricultural education in India. The US on the other hand saw this as a strategic advantage to assist India and establish and maintain its influence in the region during the Cold War politics. This was demonstrated at the proceedings before the Sub-Committee on National Security Policy and Scientific Developments of the Committee on Foreign Affairs, House of Representatives, 91st Congress, 1st Session (1969) which urged US foreign policy to recognise that the future threat to peace and stability was poverty and not communism. This was affirmed by Cold War historians such as Perkins and Bashford who linked overpopulation and hunger as the causes of political instability in developing countries- having the capacity to threaten US national security objectives. The situation thus created were felt to potentially become a flourishing ground for communist ideologies to flourish and thereby heighten the prospects of war.

The study found evidence that the US also assisted with extension and outreach services that were aimed at providing advice to Indian farmers on new agricultural technologies. A key result of these initiatives was the establishment of five State Agricultural Universities (SAUs) in India with considerable advisory support from colleagues at American LGUs. This rich tradition of collaboration in knowledge exchange helped to launch India's Green Revolution, which itself led to the country's subsequent emergence from food insecurity. At the same

time, through this cooperation, American university campuses were extensively enriched with international insights and networks. Cornell University and the impact of collaborative training between Indian and American researchers in agriculture remains a case in point.

It also found how returns to the investment in agricultural research, after the Green Revolution in India, was extremely high when carried out effectively and often much higher than alternate investment opportunities. As was pointed out by Evenson, this was because along with training and research, it was sustained by the physical and institutional infrastructure built during the 1950s and the 1960s. Additionally, retention of the political advisors like Chester Bowles and others through the Eisenhower, Kennedy and Johnson administrations was one of the factors that made an agricultural intervention successful in India. As a result, India reaped its first 100 million tonnes food grain harvest in 1970 and crossed 125 million ton in 1978. It successfully combined high rates of investment in crop research, infrastructure, and appropriate policy support, and this according to the noted economist Prabhu Pingali, belied the dire predictions of Malthusian famine and human sufferings. It is understood that if the test of the application of technology in agriculture is measured through the yields, the Green Revolution technology in India was successful. As experts pointed out, the approach adopted by India's farmers and scientists has not been duplicated on any equal scale anywhere in the world.

Despite the success of the Green Revolution, hunger and food insecurity continued to persist in the country. American perceptions of the causes were highlighted by the eminent sociologist Douglas Ensminger, who had worked in India for nearly two decades and represented the US government and the Ford Foundation to find appropriate ways to help the nation with its development. He remarked that India continued to rely on the 'miracle' of monsoons and not on the seeds and fertilizers to determine the harvest results. The persistent hunger was because of distribution and not based on crop size, and hence underscored that in order to overcome poverty and food insecurity in India, there was an urgent need for political legislations to implement land and institutional reforms to ensure the nations' resources were equitably available to all. Similar views were expressed by Robert McNamara in 1972, a former US Secretary of Defense and the then President of the World Bank. He pointed out that despite India's growth in agriculture in gross economic terms, the individual lives were stagnant in human terms as the poor farming community had not been able to participate in the Green Revolution outcomes, Therefore, if the tremendous potential for agricultural

development is to be realised, continuous and adequate, government commitment and support is an absolute must and new policies for ensuring the equitable distribution of increased production are required if the resulting problems are to be solved, leading to higher incomes for the farmers. Experts of the Green Revolution era too reiterated that the efforts needed to be continued in order to increase the support for agricultural research at all levels and to strengthen mechanisms to improve cooperation and reduce duplication of the various components of the international research network.

Nevertheless, the successes of US-India cooperation in agriculture for Green Revolution cannot be underrated. It was the result of progressive farm policies, determination, sustained efforts of scientists and the vigour of the Indian and American scientists and farmers who readily adopted the improved technology. There was an explicit recognition of the immense role that research and technology could play in the agricultural development of India. According to the House Committee on Foreign Affairs, the term Green Revolution expressed the dramatic changes that took place in India as a result of new High-Yielding Varieties (HYVs) of cereal crops or '*miracle grains*' boosted their production. Thus, the revolution in food production that was spurred by the technological advances in agriculture not only demonstrated 'magnificent' achievements but also had ramifications for US foreign policy.

What marked a departure from the old ways was the seriousness and sincerity with which the policy recommendations of joint teams of scientists from the US and India were translated into action. The newly established SAUs encouraged investment in agricultural supply industries, and there was a reorganisation of programs in research, extension, and rural credit that were accelerated and supported. A comprehensive strategy having a combination of new ideas specifically designed to introduce new technology, with flexible planning and adaptability of varieties to regional conditions provided a further boost in creating a balance between the adoption of traditional and modern programs. Evidence pointed to the ensuing increase in food grain production in the country as a living testimony to the accomplishment.

It has been understood that when nations undertake to advance agriculture with minimum errors, planning and policy must be based on actual knowledge of systems and of the requirements to make them functional. As was discussed in Chapter One, the US LGUs were invited by the then Government of India in the early 1950s to create similar institutions for the country that would carry out elaborate education, research, extension throughout the

country, directly assisting the farming community. The fact that they were the instrumental in making India self-sufficient within two decades of their existence in the country and ushering in the Green Revolution is not an exaggeration. Archival research of the Lok Sabha debates and the personal cables of Presidents John F. Kennedy and Lyndon B. Johnson provide evidence that the personal involvement, rationality, and foresight of the American and Indian leadership during a time of recurring droughts and famines in India, contributed to formulation of appropriate policy decisions, and their timely implementation averted the severity of impending food crisis in the country. India became an important country for US foreign policy, as was evidenced by the time and energy spent by the US Presidents and Secretaries of State and other high-level delegations from both sides undertaking official visits. US and India continued to partner for agricultural development in India, where their joint-expertise in economics, agricultural and biological sciences were but two of the several components. Over the years, innovations in agriculture became a pre-requisite for increasing productivity and preserving ecosystem sustainability.

With an elaborate discussion of the agricultural sectors of the US and India and their respective domestic and international trade policies in Chapter Two of the dissertation, it becomes clear that this primary sector is held in great importance, in that it holds the promise of food security for the rapidly growing population and also in fuelling the overall development of the economies. US agriculture has witnessed tremendous advances, and as the US Department of Agriculture (USDA) statistics demonstrated in Chapter Two, the agricultural output has been increasing, although the percentage of the population involved in the agricultural activities have been declining over the years. Increased food productivity led to a decline in the prices of food in the country. In this context, the role of agribusinesses in their lobbying activities in the Capitol Hill has increased tremendously. It was found that the major chunk of recipients of lobbyists' contributions has been the candidates of the Republican Party at both federal and state levels.

This Chapter analysed how the Farm Bill of 1996 constituted a watershed not just for American agriculture with direct implication for its farmers, but also in bringing about enabling measures for facilitating agricultural trade with liberal economies of the world. The enactment of this Bill came at a crucial juncture after the establishment of the WTO in 1995, and addressed trade issues such as market access, domestic support, export subsidies, special and differential treatment for developing countries and called for charting out the path for

greater engagement with its member states. Senator Richard Lugar, who was one of the authors of the Bill, in his discussions with the then President Bill Clinton called upon the newly liberalised economies like India to be the focus-countries for “*opening up a new phase of agricultural cooperation with the United States*”.

Chapter Two has also highlighted how agricultural development has continued to be the most important objective of the Indian planning processes and remains crucial for reducing poverty and hunger in the country. Detailed discussion of the several policy initiatives aimed at strengthening India’s agriculture in the Chapter, for instance, the National Agricultural Policy (NAP) of 2000, the Export-Import (EXIM) Policy, 2002-07, amendments to the Agricultural Produce Market Committee (APMC) Act, the National Food Security Mission, the Agricultural Policy: Vision 2020, the National Mission for Sustainable Agriculture, 2014 and others elaborates how the central objectives of these policies have focused on sustainable agriculture, food, and nutrition security, generation and transfer of technology, inputs management, and investment in agriculture and risk management, encouraging agricultural exports, facilitating farmer-market linkages, and explore the role of biotechnology to counter the various stresses associated with Indian agriculture, and further open up avenues of expansion and growth of this sector. Emphasis on the diversification of agriculture has produced notable results. For example, the horticultural production has demonstrated high growth rates, which underlines a structural change that was underway in the agricultural sector in India.

While it could be debated, weather increased mechanisation of farming practices in India could lead to a decline in the number of the labour force in the sector, yet it must be kept in mind that the productivity enhancement accrued due to the use of advanced technologies has positively impacted the environment. As Lal and Ausubel argued, agriculture has been a major source of Green House Gas (GHG) emissions on its own, as well indirectly by clearing forest cover for farming, and hence, increased mechanisation could augment crop yields using the same or even less amount of land supplements the need for mechanisation of agriculture in India. Further, studies that argued that global adoption of American farming techniques could increase agricultural productivity to the extent that agricultural land of the size of India could be returned to nature, without hindrances to the food supply to the world population, provided powerful motivation for supporting the continuation of cooperation.

Chapter Two presented the importance of the sector in the economy of the two countries and affirmed the fact that it affects all aspects of health- human, animal, plant, environmental and economic development either directly or indirectly. Agriculture as an enterprise and activity reinforces the foundations of the economies of both countries and promote socio-economic well-being for their populations. It revealed that Indian agricultural trade policy has remained excessively guarded, with export controls applied on wheat and rice during 1996-2000 and 2007-11, along with limiting export guidelines on oilseeds/edible oils and pulses. In the determination of government intervention, the role of interest groups and farm lobbies was highlighted in the Chapter. Thorough descriptions of the agricultural policy in India in this chapter are indicative that there is no denying the fact that Indian agricultural sector is in dire need for reforms. In pursuit of this, some reform measures put forth by the CII include, incentivising the states to amend the APMC act and abolish *Mandi* taxes that fall hard on the pockets of poor farmers; support for the development of the private sector for introduction and dissemination of appropriate technology; lowering the total tax burden on the agro-processing sector to pick up the demands of farm production; and focus on the foreign buyers and the Indian diaspora living outside the country through high-value ethnic Indian foods. It is worth mentioning here that the present government led by Narendra Modi has taken proactive measures for reforming the agricultural sector of the country. For instance, the Pradhan Mantri Krishi Sinchai Yojana (PMKSY) was launched in 2015. The vision of ‘*har khet ko pani*’ (water to every field), and ‘more crop per drop’ has been incorporated in order to sustain agricultural production. Further, the *Paramparagat Krishi Vikas Yojana* (PKVY) was proposed by the Ministry of Agriculture and Farmers Welfare, Government of India in 2015 to encourage organic farming. It would develop ten thousand organic clusters and provide monetary support to farmers for pursuing organic farming. The same year witnessed the launch of several programs by the Prime Minister himself to enhance the quality of agricultural education, research and entrepreneurship in India. Some of these were: *Farmer FIRST* (Farmer, Innovation, Resources, Science, and Technology), *Student READY* (Rural Entrepreneurship and Awareness Development Yojana), *ARYA* (Attracting and Retaining Youth in Agriculture) and *Mera Gaon, Mera Gaurav* to enable effective and deeper diffusion of information on scientific farming in villages. Also, the National Agriculture Market (NAM) was launched by the Prime Minister. This would be the e-trading platform that would usher in transparency to greatly benefit the farmers. It would operate through an online portal which would be linked to the *mandis* of the States.

Scholars have pointed out that the problem of food insecurity in the country has resulted in a disconnect between the policymakers and scientists who have engaged in a 'blame game', that is, on matters of credit availability, food production, agricultural technology and research organisations come to the fore. While important debates on the persistence of rural poverty, hunger and malnutrition, agents of globalisation, seed companies and the WTO are accused. A recent report by the USDA on Indian agriculture studied the supply, demand, and policy factors that influence India's behaviour in world markets for commodities important to US agriculture. Given that India accounts for the largest share of the global population classified as food insecure, Economic Research Service (ERS) research addressed questions related to the measurement and causes of household food insecurity in India. This report called for the improvement of the efficiency of India's agricultural markets which have the capacity to generate economy-wide gains in output and wages, raise agricultural producer prices, reduce consumer food prices, and increase consumption, particularly by low-income households. Lower trade barriers could encourage India processors to boost capacity utilisation with imported oilseeds, resulting in lower processing costs, and increased net revenues and employment.

In essence, through the description of the agricultural sector and the relevant policies governing it in both USA and India, Chapter Two demonstrates the importance of the sector in the economy. It reinforced the fact that the sector affects all aspects of health- human, animal, plant, environmental and economic-either directly or indirectly. Agriculture as an enterprise and activity underpin the foundations of the economies of both countries and promote socio-economic well-being for their populations. Given this background, India's drive for economic and social development, gradual modernisation, and development of agriculture and a history of exchanges of knowledge, skill and resources made it a fit case for a close interaction between the political and diplomatic establishments of India and the US to pursue a full-fledged agricultural cooperation in the 1990s.

Chapter Three incorporated a study and analysis of US-India agricultural cooperation that ensued with a realisation of mutual interests for both countries. As a result of committed leadership and diplomatic negotiations, there was significant recognition in the US that India should be playing a leadership role through their techno-scientific expertise in Africa in ensuring food and nutritional security for all. It was clear that a goal-oriented desire of US and India to cooperate unfurled the era of continuity of agricultural ties between the two. The

very movement of food aid and later technological assistance was directed towards helping the India realise its goals of alleviating hunger and poverty by developing its agriculture. With the underlying objective remaining the same the cooperation was elevated to a strategic level, modernisation of India's agriculture and food security for all was the overriding endeavour of the bilateral policy making. In fact, the then Prime Minister of India Atal Bihari Vajpayee played an important role in generating a consensus in the WTO over the Agreement on Agriculture as well as concerns over Genetically Modified (GM) crops among the various states in India and even directed the Department of Biotechnology, Government of India to organise awareness about the challenges and prospects of this area of technology for India's agriculture. Discussions in the chapter highlight how the two intensified their cooperation in areas of agri-businesses, food processing, farm-to-market linkages, agriculture extension, weather and crop-forecasting, supplies of inputs, distribution and marketing and partnered to assist countries in Africa to develop their agriculture and achieve their food and nutrition security objectives. African nations, which have hitherto been dependent upon food aid, have been receptive to the knowledge and information cooperation with India and the US, as they emphasise upon agriculture as a pivot of growth. Agricultural economists have underlined that as a result of the digital revolution, these countries have viewed the significance to modern techniques like remote sensing and spatial mapping for precision agriculture for small farmers.

As per the latest available data from the USDA and India's Ministry of Commerce, leading categories of US exports of agricultural products to India include peas, lentils, almonds (whole and shelled), apples, protein concentrates, sugar and confectionaries, food preparations, essential oils, ethyl alcohol, animal feed, cotton and inputs like fertilizers, etc. valued at around \$ 850 million in 2014-15. On the other hand, India's exports of agricultural products to the US were valued at over 3.5 billion during the same year. Overall, India was the fourth largest source of US food imports after Canada, Mexico, and China, and the leading categories included frozen prawns, shrimps and shellfish, natural honey, cashew nuts, spices, pepper, rice, dried vegetables, animal and other fats, bulk grains, and products, etc. Overall, while US' exports to India for agricultural products was \$ 0.8 billion, the exports of frozen shrimps, prawns, and shellfish from India itself constituted \$ 1.3 billion. The trade of agricultural products was found to be in surplus for India with varying composition of products.

This chapter highlighted the continuity of US LGUs' cooperation with India's SAUs. Instances included the USAID grant support in 2003 for joint work by the Punjab Agricultural University (PAU) and Ohio State University (OSU) on diversification of markets and value-added agricultural products, development of a food industries' centre, and cooperation with researchers on agribusinesses for exploring food processing methods; the Cornell-India joint efforts in the fields of extension services to Indian farmers on agricultural technologies; the Agricultural Biotechnology Support Project to address issues of pest control, drought and intellectual property, technology management in India among others.

The myriad frontiers of science and technology that were and are being explored over the last six decades through the US-India development partnership with a focus on harnessing innovations in science and technology have focused on support to India's leadership in bringing about Indian innovation and expertise to African countries to strengthen food security. It has reaffirmed the optimism on the possibility of the goal of global food security. By encompassing these into the wider realm of strategic dialogues and as well as by including them into the cabinet level have signaled that they perceive a greater energy and enhanced level of importance for economic and commercial matters. Building upon these enduring consultations and successes in joint training for third countries, especially those in Africa, India, and the US have begun their work on subjects of agriculture and technology jointly. This has thus to be viewed as a positive outcome of the collaboration.

Evidence also reveals that the USAID has partnered with private Indian companies to launch Indian agricultural innovations in Africa. For example, the Lilongwe University (Malawi)-Fowler Westrup (Bengaluru-based company) for seed processing units; SRISTI (Ahmedabad)-Kenya cooperation for the transfer and indigenisation of low-cost mechanisation and processing equipment to Kenya, namely, the Bullet Santi (rechristened as Shujaa in Kenya); the multipurpose food processing machine and the seed and fertilizer dibbler; SRISTI-Jomo Kenyatta University of Agriculture and Technology (Kenya) for conducting demonstrations, training and capacity building as well as building an ecosystem of stakeholders around these technologies; Mahindra farm implements and Mahyco in entire Africa, among several others. As part of Obama administration's *Feed the Future* program, which was formulated out of President Obama's personal recognition about the causes of unemployment, poverty and unrest due to food insecurity, USAID-USDA-Indian Ministry of Agriculture have begun to conduct international training course for agricultural scientists of

thirty-five countries of the world to tackle poverty hunger and major nutrition imbalances and sustainable development.

All these efforts have complemented the political decision to strengthen the bilateral agricultural cooperation and work together on a second green revolution geared specially to help India's rural poor. It was demonstrated in this Chapter that the concentrated achievements of the first Green Revolution have now spread to the Eastern parts of India as well. Field visits to some areas in Jharkhand corroborated this premise. It, however, does not overlook the challenge to integrate smallholder farmers into value chains and maintain their competitiveness and bridge the income gap between the rural and urban areas. In fact, the Lok Sabha debates of the sixteenth Lok Sabha demonstrate that there is a consensus among the Indian Members of Parliament to accelerate the momentum of the second Green Revolution and revive the agrarian sector of the country. During the Parliamentary proceedings, Members of Parliament like B.N. Chandrappa, G. Hari, D.K. Suresh, R. Gopalakrishnan and P.K. Patasani called upon the Union government to play a proactive role in assisting the states in integrating the agricultural extension and research and the various development schemes like the National Food Security Mission (NFSM), Rashtriya Krishi Vikas Yojana (RKVY), especially directed towards the eastern and north-eastern states of the country. Thus, the choice of the two countries to continue cooperation in agriculture was based not only on the benefits of the first but also expanding it through a second. As this chapter illustrates, the cooperation based on both countries needs and interests goes beyond the bilateral and embraces the global arena. It also presents how circumstances changed that yet allowed continued agricultural cooperation to emerge as an alternative.

Analysis of the diplomatic negotiations and progress in agricultural cooperation between the US and India in Chapter 3 evidenced that with changes in the geopolitical realities due to the end of the Cold War and the coinciding liberalisation of the Indian economy, rapid advancement in the agricultural ties gradually unfurled with the Clinton, George W. Bush, and Obama administrations. The Joint Vision for the 21st Century, US- India Knowledge Initiative on Agriculture (USIKIA), US-India Agricultural Dialogue and the Strategic Dialogue led to the consolidation of mutual interests for developing India's agriculture, and taking India's development experiences to countries in Africa to enable them to fight the threat of food insecurity, malnutrition poverty and climate change. The chapter, along with

scholars, argues that agro-ecological and climate change concerns would require more diverse scientific and institutional approach to food grain research in India.

While work on USIKIA was effectively carried out on both sides, it emerged during the study that due to differences over finances, the scale of government intervention in the future development of Indian agriculture, the pace of cooperation gradually declined. An extensive review of literature of both primary and secondary resources along with field research in the US established that the key steps towards Evergreen Revolution have been undertaken and that through the active participation of the government, private sector, academia, farming community and the civil society, results have begun to prove its successes. An interview with Adewale (Walley) Adeyemo, the then Deputy Assistant to the US President and Deputy National Security Advisor for International Economics at the American Center, New Delhi, highlighted the importance of agricultural and trade cooperation between the US and India. Being on an official visit to India, during his interactions with policy makers and business leaders acknowledged the need for reforms in the sector.

In main, it has been demonstrated through the literature and the statistics that greater energy and enhanced level of importance have been accorded to bilateral economic issues by both the US and India. The continuity has been experienced at all the official level dialogues between the two countries. Building upon the enduring consultations and successes in joint training for third countries, especially those in Africa, through the Feed the Future Initiative, as being leaders for advancing the cause of food security, on subjects of agriculture and technology, India and the US set up an agriculture biotechnology group been set up to facilitate research in this area. This chapter made an extensive study of how the USAID and Indian Council of Agricultural Research (ICAR) have played a pivotal role in facilitating innovations in agriculture suitable for drylands of India and Africa and enhanced a greater appreciation of the challenges facing particular soils of these countries, thereby offering research and scientific expertise as sustainable solutions. Authors have referred to this growing US-India relationship as a journey that passing through the era of enduring '*breakneck bilateral positivity*'.

This study analysed the evolution of partnership between USAID and DARE/ICAR, and noted that despite the political compulsions during various administrations in both countries, the collaboration for the transfer of technology, agricultural research, extension, education,

setting up of state agricultural universities in India, adoption of biotechnology, food-processing, weather and crop forecasting among other diversified areas of cooperation, continued. These have led to the integration of Indian rural areas and the population to adopt the best practices in farming.

Even though USAID financial assistance program in food support to India was been terminated yet cooperation in research activities through University partnerships as well as international centers like CIMMYT, IRRI, IFPRI, and professional interaction of scientists and administrators who gain mutual benefit from a series of contractual and informal exchanges of information, have become very significant and has contributed to the development of sound policies. The study highlighted that with the turn of the century, US-India agricultural relationship has matured and the two countries have become co-partners to meet mutually significant goals and jointly assist other countries in need as well. The private sector and foundations have played an increasingly active role. According to the data of the Department of Industrial Policies and Promotion (DIPP), Government of India, the food processing sector in India has received around US\$ 6.70 billion worth of Foreign Direct Investment (FDI) during the period April 2000-December 2015, and the total bilateral trade has surpassed \$100 billion marks. Experts have pointed out that the successful resolution of the Doha Round, as well as further reforms in the Indian economy, would enable the bilateral trade figures to cross the \$ 500 billion mark. Examples of major investments from the US private sector in India include that of a franchise partnership between *Henry Ford Health Systems* (HFHS), a US-based health and wellness group and Chandigarh-based hospitality and food services firm *KWalls Hospitality*, and set up '*Culinary Wellness*' branded stores across the country. Also, *Mondelez International*, the American confectionery, food, and beverage chain, set up its new manufacturing plant worth \$190 million in Andhra Pradesh with an annual production capacity of 250,000 tonnes. The famous American doughnut chain *Dunkin' Donuts* has tied up with local online grocery delivery platform *Grofers* for home-delivery of its packaged and freshly cooked food.

Since the late 1990s, the rapidity with which India flexed its capabilities in the area of defence was complemented with high growth rates of its economic indicators. Thus, it was not surprising for the US to seek to pursue closer bilateral ties with India. This would not only benefit both countries but would also ensure India as an efficient and willing partner in maintaining the geo-political stability of Asia and the Asia Pacific. The argument that the

first Green Revolution led to a social dilemma of unequal prosperity in certain pockets of the country, leaving the rest of the areas worse off provided a critical space which examined the need for a renewed agricultural partnership between India and the US. As a result, the emergence of the discussion to revamp its agricultural sector and usher in a second Green Revolution in India led the then Prime Minister of India Manmohan Singh and the then US President George W. Bush to connect the existing diverse areas of agricultural cooperation into a formal framework of a bilateral agricultural cooperation. Hence, with a renewed understanding of the compatibility of interests gradually expanded the scope of strategic cooperation to include agriculture as one of its vital pillars, which has massive implications for billions of people of both countries. President Bush and Obama committed themselves to the strengthening cooperation with India in developing scientific research for raising its agricultural productivity as well as in areas of water management, food security, and agro-processing machinery and in engaging in field-trials and demonstrative projects and training of human resources. Experts commented during interviews conducted during the field work in the US that the US and India have wide scope to intensify their efforts towards building partnerships and build networks for sustaining an Evergreen Revolution on the farms in India.

In main, the most fundamental observation in Chapter Three was the enormity of the role of agriculture in the development of Indian economy and the vast potential it has in enhancing mutual trade relations with the US. The capabilities of the two countries to contribute globally well explains the decision of the US and India to move to a higher level of strategic partnership for the next generation agricultural development, namely the partnership for Evergreen Revolution. It was assessed that the on-going extensive research collaboration between India and the US-led to increased levels of agricultural productivity. It has fostered quality education for farmers in general and in areas especially relevant to farming, which became essential for the implementation and consolidation of the new technologies and methods, thereby creating a demand for the need for a second-generation Green Revolution across the country.

The various policies and decisions of the government are resultant of the regular interactions that occur at the official and business levels. In Chapter Four, the involvement of the private sector along with the various institutional frameworks set up by the governments on both sides that have played a very important role in taking the agenda of US-India strategic cooperation in agriculture forward was studied. It made a comprehensive assessment of the

causal factors that led to changes in the perceptions of the US Congress on matters concerning aid, assistance and transfer of technology to India, most prominent being the gradual opening up of the Indian economy, India's rise as a responsible power in South Asia, shared values between India and the US, vibrant multicultural fabric, entrepreneurial spirit and mutual economic interests, and respect for diversity, rule of law and democracy. It highlighted that unlike the first green revolution, which was implemented through state planning and through public institutions such as cooperative banks, cooperative marketing associations, and public sector agricultural research and extension systems, the private sector is now set to drive changes within the agricultural economy, especially in the rural areas. Chapter 4 made a detailed study of the institutional framework that has contributed to the facilitation and strengthening of the trade and economic interactions between the two countries. The major pillars that were identified were the US-India Economic Dialogue, the US-India Commercial Dialogue, the US-India Working Group on Trade, the United States-India Trade Policy Forum (TPF) and its Focus Group on Agriculture, the Private Sector Advisory Group (PSAG), Framework for Cooperation on Trade and Investment, the US-India CEO Forum and the US-India Business Council. The role of the business sector in taking agricultural collaborations forward was evident in the analysis. The US was always keen on enhancing the ties between the private sectors to achieve quick results, however, it was noted that India too emerged as a willing partner in encouraging the private sector to play a stronger role than before. This change in the Indian position had significant implications on the course of the dialogue on agriculture over the coming years. The US- India CEO forum thus logically carried forward the private sector negotiations that would dovetail with both the government's plans to achieve their goals especially in agriculture, where several issues of concern were related to the firm levels.

Apart from these, the personal interest and the commitments of the leaders on both sides to bridge the gap of the Cold War period, the role of India-centric lobbies in the US were studied as being one among the most influential in bringing about the above change. India centric caucuses and lobbies like the India Caucus, United States India Political Action Committee (USINPAC) and Indian American Friendship Council (IAFC) have played a key role in promoting understanding between the people of both countries. The US Congress since the Presidency of Bill Clinton has demonstrated bipartisan support for engagement and cooperation with India in the field of agriculture. Indian governments, regardless of the ideology they subscribe to, have also exhibited unequivocal commitment for a strengthened

India-US relationship. This has become all the more embossed in light of the new challenges that both countries face in the Indian sub-continent and the Indian Ocean Region (IOR), in the form of terrorism and Chinese aggression, respectively. Interviews conducted by the author at the FAO of the UN, North America Liaison Office and Center for Strategic and International Studies (CSIS), Washington, D.C., suggested that a pro-business policy environment that ensures intellectual property protection, lower trade tariffs and transparent biotechnology regime would lead to additional private sector research investments in India.

The efforts of these official-level dialogues are complemented by the role of caucuses in the US. Organisations like the USINPAC and the India Caucus have supported the call for an unwavering cooperation between the US and India in areas of research, power generation, medicine, agriculture, and industry. Business lobbies in India like the CII and FICCI have that advocate and push for favourable policy decisions in both the US and India. They have played a pivotal role in bringing together all the stakeholders- the government, the businesses, agricultural research organisations, the farming communities at common platforms and ensured continuity of the official level dialogues between the two countries. The Chapter evidenced through literature and interviews that there has been an acknowledgment that one of *the biggest areas of development in India would be in the area of agriculture, and was poised to transform India, and more importantly, transform rural India*. They exhibited a consensus that marketing, trade, value addition, agro-processing, and food safety requirements for a diversified, vibrant, and modern agricultural sector would continue to offer a large scope for the two countries to collaborate. In main, discussions in Chapter Four further re-affirmed that agricultural issues have experienced continuity not only at the official levels but also has had the commitment of the private sector in both US and India to pursue dialogues and exchanges for a comprehensive agricultural cooperation.

An understanding of the growing US-India relations in agriculture as passing through the era of enduring bilateral positivity and the basic premise of having shared values does not rule out differences and disputes between the two countries in this sector. In other words, the synergies in agricultural cooperation between the US and India the process has not been without differences. This implies that despite the presence of elaborate institutional frameworks for close cooperation to expand agricultural ties, the US-India agricultural cooperation has not always been smooth and has often strained the decision-making

processes, producing difficult encounters in their interactions in the multilateral settings often spilling over to the bilateral agenda.

Chapter Five discussed in detail the contentions in the bilateral and multilateral spheres. The challenges for the US in the bilateral agricultural cooperation is centered mainly the slow pace of economic reform in India and for India on the controversy over Genetically Modified (GM) crops. The contentions at the multilateral settings are occupied by the conflicting interests of the two countries in the WTO, especially over the Doha Development Agenda (DDA), on the issues of subsidies, and non-scientific application of Sanitary and Phyto-Sanitary (SPS) measures by both India and the US. Both allege each other as providing preferential treatment to their own products and therefore imposition of tariffs to avoid price competition in their domestic economies because of cheaper imports.

The slow pace of economic reforms in India has been a source of concern in the US policymaking circles. In spite of the overall improved economic and trade relations, relations have been strained in the face of uneven progress towards the opening up of India's economy. Analysis of the studies carried out by IFPRI and interviews conducted by the author at its headquarters in Washington, D.C., clarified that India was perceived as being unable to keep up its commitments on phasing out of the Quantitative Restrictions (QRs) on agricultural products. This was viewed as a major impediment towards building confidence among the US businesses in investing in India's markets. Further, while the American goals in the Doha Round were highly ambitious, and called for the elimination of agricultural export subsidies, easing of tariffs and quotas, reductions in trade-distorting domestic support and improved market access in both developed and developing countries, India highlighted its apprehensions given its vast majority of citizens being engaged in agriculture, and the pressures of domestic poverty indices. As a result, while it has stated its objective to liberalise agriculture, yet has not shied away from demanding the right to protect and assist its primary sector according to its demands from time to time. It has expressed the inability of its producers to compete against the subsidised agricultural goods sold by the developed countries, mainly the European Union (EU) and the US.

Nevertheless, during the bilateral interactions, both countries have voiced the need for reforms international agriculture trade. As the description in the Chapter revealed, India and the US have not disregarded the necessity to arrive at an understanding to move forward

towards a free-liberal-global market order. Scholars have put forth suggestions of the extensive second track of negotiations on bilateral and free trade agreement with the US, enhancing the bilateral economic relationship in the event of a slowdown in multilateral negotiations. Experts continue to urge that to attain this objective, India should continue to seek substantial deductions in the domestic support given to agriculture by developed countries as well as support its own agriculture and improve its competitiveness simultaneously.

Detailed discussion in Chapter Five revealed that opposition to the advent of Genetically Modified (GM) crops in India is based upon perceptions that have been derived from several factors. Political, socio-economic, cultural and ideological factors have clashed with the advances made by the scientific community in biotechnology revolution for enhancing agricultural productivity. There is a lively debate on the issue of GM crops requiring fewer fertilizers and pesticides, being drought resistant, medicinally enhanced, metal and toxin-tolerant, nutritionally supplemented, pest resistant, prolonged storage tolerant, yield more, mature earlier and would consume less water. Most arguments are related to environmental well-being and food safety, in that it would lead to a destruction of nature and intervene with the natural processes for food production.

It cannot be forgotten that it was biotechnology that saved India from mass starvation that was caused by the series of droughts in the early 1960s. Interviews conducted by the author at ICAR, New Delhi highlighted that due to a lack of a common stance on GM technology across the ministries of Government of India, and between union and state governments had brought the agricultural regulatory system to a standstill. Delay in regulatory approvals the existence of multiple regulatory bodies causes inordinate postponements. It is hence not a surprise that as of 2014, 91 applications for field trials were pending for approval, 44 of which were for GM food crops.

As one of the world's largest trading countries, for both agricultural and non-agricultural products, the US would continue to have a major stake in negotiations on trade rules and disciplines. However, it would be imperative for the developing countries not to succumb to the pressure of the developed world. This has been highlighted by agricultural economists Anwarul Hoda and Ashok Gulati that a prolonged crisis in the decision making of world trade in agriculture would be better than a conclusion that would perpetuate the existing distortions

in world agriculture. Increased recourse to dispute in the WTO could deepen the crisis and induce pressures for genuine agricultural reforms. The chapter also traced how experts reiterated that the way forward was to ensure appropriate institutional reforms that encourage autonomy, transparency, and accountability in agricultural agencies. In their view, India's efforts at the WTO must be directed towards getting developed countries like the US to reduce their high levels of support to agriculture, and hence strategize to align with countries that share India's concerns, while simultaneously engaging in continued dialogues bilaterally. Yet the fact that negotiations for over two decades have not yielded any concrete decision, agreeable to all, it continues to remain to be a thorny issue in US-India agricultural partnership.

Policy makers and analysts have concurred that the developed countries of the world support their agricultural sector, through subsidies to the tune of around a billion dollars a day, and as a result, international trade in agriculture at present has remained heavily distorted. Estimates by IFPRI in 2005 revealed that protectionism in developed countries cost the developing countries about the US \$24 billion in agricultural and agro-industrial income. The developing countries have alleged that high subsidies in developed countries have led to the weakening of the performance of their own agricultural sectors. It has been explained that the subsidies by the developed world to their farmers, have artificially depressed commodity prices in global markets and have thus prevented efficient producers in the developing countries from getting their rightful share in the global markets. India has opined that the negative effect of the US policies on agriculture is transferred to poor farmers outside the US and shrinks the world commodity prices. Thus, one of the primary objectives of the Doha Development Round to establish a fair and market-oriented agricultural trading system and also to substantially reduce the distortions that have in the global agricultural markets, which are caused primarily by subsidies and protection by the developed countries. This aspect has posed a serious challenge to the cooperative approach that was otherwise present between the two.

This chapter elucidated India's dissatisfaction over the restrictions on the number of products to which Special Products (SPs) can be applied, while the US has sought to limit the number of SPs. In the case of Special Safeguards Mechanisms (SSMs) (which refers to tariffs that countries can impose in the case of an import surge of agricultural products), India has demanded unrestricted rights to increase import duties to protect its farmers from the

international market impulses. The US and other developed countries, on the other hand, have sought to restrict the extent of tariffs that can be imposed. In light of this, it has been highlighted that the US has adopted a double-standards in that it pays its farmers extremely high level of subsidies while simultaneously encouraging other countries to reduce their domestic agricultural supports. What it is revealing is that India has opposed these measures despite given the tag “spoiler” with all the negative connotations such a term implies.

Chapter Five also raised the contention between the US and India over the SPS regulations. The key principle underlying the Sanitary and Phyto-Sanitary (SPS) Agreement is that countries have the right to decide on the measures they deem necessary to protect human, animal or plant life or health. However, in order to prevent abuse, certain restrictions are applied; for instance, the measures should be based on scientific principles, and not be maintained without scientific justification, or applied in an arbitrarily or unjustifiably way. The US has expressed concern about India’s application of SPS regulations on certain of its exports, mainly almond, dairy, poultry and meat products that these were not in not in accord with internationally recognised standards and that they negatively affect US agricultural exports. India, on the other hand, expressed dissatisfaction with US’ SPS regulations with regards to the treatment of Indian agricultural goods like mangoes. Again, issues of a bilateral nature are negatively affected by the multilateral rule applications and interpretations by respective countries.

In light of these contentions, and the prevailing food insecurity situation in India and also around the world, it is worthwhile to quote the father of Green Revolution Norman Borlaug, who said that no permanent progress in the battle against hunger would be possible unless the agents of food production and those who make policies unite in a common effort, which has the capacity to benefit all mankind. Agriculture for a developing country like India needs to adapt quickly in the decades ahead to meet the food and energy needs of a growing population, while preserving and rehabilitating the environment. The agricultural sector must reduce the environmental impacts by getting more from each unit of land, water, and energy committed to crop production. Increased production and conservation will lower the Green House Gas (GHG) emissions and reduce the amount of irrigation water per unit of crop yield produced. If these arguments are kept in mind, the cooperative approach remains the choice of India.

Discussions in the dissertation highlighted the need for urgent agrarian reforms in India before it can truly benefit from the globalisation of agriculture. Analysis of literature revealed that the nature and pace of US-India cooperation is a function of the salience of agriculture and agricultural development in domestic politics. Indian agriculture is characterised by low productivity with average crop yields well below world levels. Large investments, public and private, are needed to improve seed varieties, irrigation, and plant protection practices. Government agencies are promoting diversification in production, research, and farm extension. Experts from both US and India highlight that successful diversification was likely to require the shifting of public resources away from subsidies and improving incentives for private investment, which could be realised only if the decision makers put the considerations of populist politics at bay. The need for a comprehensive reform package for reforms in Indian agriculture has also been recognised by the Prime Minister Narendra Modi. In a meeting at the NITI Aayog in July 2016, he called for increasing the country's agricultural productivity, as well as developing the vibrant rural economy and emphasised upon the importance of food processing sector, technology inputs, and international collaborations to exchange the best practices.

The dissertation studied the ways in which the productivity gains that were achieved through the economic reforms of the 1990s were largely due to the result of proper application of modern scientific inputs and revolutionary progress in the application of mechanised power, to the infrastructure built and the green revolution technology introduced in the pre-reform period. US and Indian experts like Lemaux and Swaminathan recommend that an approach of 'progressive conservatism' must be adopted while dealing with important decisions on GMOs. This would not only encourage innovations, including biotechnology that has the potential to help end hunger but would also fulfill the requisite tests. GM foods are not the solution to hunger but are part of a larger solution that relies most heavily on traditional methods in agriculture. An informed and aware citizenry along with the government action must fulfill their responsibilities.

It is also revealing that the persistence of these contentions has not hindered the governments in negotiating towards reasonable solutions. They have advocated and practiced bilateral engagement to resolve the multi-lateral problems. This validates the hypothesis that the US-India agricultural cooperation has been the result of the imperatives and constraints generated by mutual economic necessities amidst political divergences through explicitly negotiated

policy coordination. It has been pursued at the highest political and diplomatic levels from both sides despite the pressing bilateral and multilateral challenges both during and after the Cold War. Personal interviews with serving and former Senators in the US Congress and officials at the US Department of Agriculture (USDA), conducted by the author as part of the field work, along with an extensive study of primary and secondary resources in both India and the US have supported the understanding that the value of agricultural enterprise and development inherent in the American tradition, was as important to India as was India's culture of spirituality and respect for the soils to the US. These were precisely the reasons for the unequivocal support of President Truman in 1948 to come to the aid of India which was reeling under the massive domestic challenge of food shortage. The commitment to secure human dignity and human security brought the US and India together to find enduring solutions to alleviate hunger, starvation, and poverty. The extent of confidence in each other was so intense, that even when the political differences became acute after the creation of Bangladesh and signing of the India-Soviet Union Friendship Treaty in 1971, and the abrupt ending of the US LGU-Indian SAU cooperation, Indira Gandhi-the then Prime Minister of India, recalled American officials, researchers, and scientists on different capacities to continue their work for the agricultural development of India. The US government, through the USAID, reciprocated favourably throughout the period of its existence in India till date. It has pitched in industries, entrepreneurs, small-scale farmers, women and the local administration in rural and urban areas of India and successfully addressed agricultural research, alternative-energy technology development, biomedical research, water resources management and family planning, facilitated the provision of agricultural credits, irrigation schemes and community forestry and focused on science and technology transfers with a focus on policy and institutional reforms and capacity building.

As the study reveals, agricultural cooperation between India and the US has become global in its reach, more complex in its trades and exchanges, more technologically grounded, and ever more challenged with balancing sustainability, productivity and social responsiveness. To conclude, the findings of the study are relevant and indicate implications for policy making. The partnership between US and India in the field of agriculture was one of the sectors that would benefit expanded trade, and lead to an overall relative advantage and continuous progress. Economic Research Service (ERS) research of the USDA demonstrated that India would remain an important player in the global agriculture market, as one of the world's largest importers of vegetable oils, soybean oils, and pulses, and an exporter of rice, cotton,

and beef. Findings of the research undertaken clearly exhibit that from the stage of a far-fetched objective of promoting agricultural prosperity through US-India cooperation, committed leaders on both sides have led to a sequential development of agriculture not just limited to the north-western parts of India but has been extended to the rest of the country as well. Through a sustained and pragmatic approach of the two countries, the goal of a second-generation Green Revolution in India has been initiated.

While there has been a substantial increase in the overall bilateral trade, yet the potential is hindered due to the various issues of contentions between the two countries. The move towards ushering in an Evergreen Revolution not only in India but around the world has been steadily progressing. The enactment of the Global Food Security Bill by the Obama administration having a bipartisan support illustrates this view.

There is strong evidence from the chapters that economic returns to agricultural research, when organised and implemented effectively, can be high. Establishment of agricultural research system and institutionalisation in India gave way to the confident introduction of new varieties of seeds and production practices to be developed to narrow the yield gap for the major foods, to extend their production into other areas in the future. Through the cooperation with the US, India established a basis for accelerated agricultural growth. The increased use of modern inputs signaled the beginning of a structural change: a significant part of the country's productive resources now being purchased from outside the agricultural sector. It has made the farm and non-farm sectors more interdependent, a characteristic which is crucial to the agricultural development process. The use of modern inputs also signals a change in the technology of production resulting in lower per-unit costs of production and higher per unit profits for farmers who can purchase and efficiently use such inputs.

This dissertation attempted an extensive research of primary and secondary resources and examined the shift in perceptions reshaping US-India relations and related them to the overall strategy of agricultural cooperation. This study examined the constraints and imperatives that helped explain the sustenance of bilateral agricultural engagement amidst the political divergences between the two countries starting with the first Green Revolution with India, to the joint agricultural research collaborations planned in the 1970s and the 1980s. Analysing the challenges in the bilateral agricultural cooperation, it ascertained the causal factors that

contributed to a greater focus on the parameters of agricultural export- import regulations. It studied the policies towards international collaboration in agriculture in both countries in order to establish their impact on the agricultural cooperation between US and India. The extensive research collaboration between the two countries continuing since the LGU-SAU partnership of the 1960s till date affirmed the hypothesis that these have significantly contributed to the innovation and joint-research, where the main actors that have promoted this have been the cohesive scientific and research community, the private sector and the agribusinesses, and the lobbies having the backing of the governments on both sides.

Thus, whether it is business to business, government to government or business to government, with a consistent level of cooperation between the US and India, agriculture can be a source of income, livelihood and prosperity for India and its people. In the Nobel Lecture (1970), Borlaug rightly pointed out, *“Food is the moral right of all who are born into this world. Without food, all other components of social justice are meaningless”*. If the two largest democracies of the world- India and the US agree to set their differences apart and commit themselves to cooperate for attaining global food security, the farming community would be empowered; agricultural production, productivity and farm incomes would be multiplied; innovations would be confidently attempted; and poverty, malnutrition, under-nutrition and food insecurity would be alleviated as they commit themselves to sustainable agriculture.

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