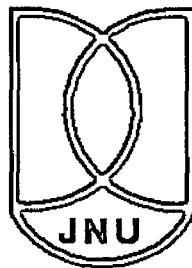


# **FOOD SECURITY: A CASE STUDY OF PAKISTAN**

*Dissertation submitted to Jawaharlal Nehru University  
in partial fulfillment of the requirements  
for the award of the Degree of*

**MASTER OF PHILOSOPHY**

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2009**



Date: 29 July 2009

**DECLARATION**

I do hereby declare that the dissertation entitled “**Food Security: A Case Study of Pakistan**” submitted by me in partial fulfillment of the requirements for the award of the degree of **Master of Philosophy** of Jawaharlal Nehru University is a record of bonafide work carried out by me under the supervision of Prof. Savita Pande. The dissertation work is original and has not been submitted for the award of any other degree of this University or any other university.

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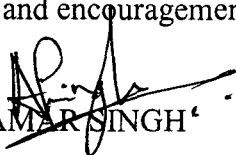
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*Dedicated to*  
*My Grandfather Late Shree Sadharam Singh*

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## ABBREVIATIONS

|                   |  |
|-------------------|--|
| <b>AMS</b>        | Aggregate Measure of Support                             |
| <b>AMSL</b>       | Agricultural Marketing and Storage Limited               |
| <b>AOA</b>        | Agreement on Agriculture                                 |
| <b>CAC</b>        | Codex Alimentarius Commission                            |
| <b>CBU</b>        | Completely Built Units                                   |
| <b>CEC</b>        | Cotton Export Corporation                                |
| <b>CGIAR</b>      | Consultative Group on International Agriculture Research |
| <b>DAP</b>        | Diammonium Phosphate                                     |
| <b>DMA</b>        | Disaster Management Authority                            |
| <b>DMSA</b>       | Dimercaptosuccinic Acid                                  |
| <b>DNA</b>        | Deoxyribonucleic Acid                                    |
| <b>EMR</b>        | Eastern Mediterranean Region                             |
| <b>EU</b>         | European Union   |
| <b>FAO</b>        | Food and Agriculture Organization of the United Nations  |
| <b>FSC&amp;RD</b> | Federal Seed Certification and Registration Department   |
| <b>FSDS</b>       | Food Supply and Distribution Systems                     |
| <b>FY</b>         | Financial Year   |
| <b>GAP</b>        | Good Agricultural Practices                              |
| <b>GATT</b>       | General Agreements on Trade and Tariff                   |
| <b>GBM</b>        | Ganges-Brahmaputra-Meghna                                |
| <b>GDP</b>        | Gross Domestic Product                                   |
| <b>GHG</b>        | Greenhouse Gas   |
| <b>GM</b>         | Genetically Modified                                     |

|               |   |
|---------------|---|
| <b>GMP</b>    | Good Manufacturing Practices                              |
| <b>HDI</b>    | Human Development Index                                   |
| <b>HYV</b>    | High Yield Variety  |
| <b>IFAD</b>   | International Fund for Agricultural Development           |
| <b>IFOAM</b>  | International Federation of Organic Agriculture Movements |
| <b>IFPRI</b>  | International Food Policy Research Institute              |
| <b>IPM</b>    | Integrated Pest Management                                |
| <b>IPRs</b>   | Intellectual Property Rights                              |
| <b>IRRI</b>   | International Rice Research Institute                     |
| <b>LDCs</b>   | Least Developed Countries                                 |
| <b>LSRO</b>   | Life Sciences Research Office                             |
| <b>MDG</b>    | Millennium Development Goals                              |
| <b>MHA</b>    | Million Hectares  |
| <b>MINFIL</b> | Ministry Of Food, Agriculture & Livestock                 |
| <b>MM</b>     | Millimeter  |
| <b>MNCs</b>   | Multinational Corporation                                 |
| <b>N: P</b>   | Nitrogen: Phosphorus                                      |
| <b>NARS</b>   | National Agricultural Research System                     |
| <b>NWFP</b>   | North West Frontier Province                              |
| <b>PAP</b>    | Poverty Alleviation Programmes                            |
| <b>PBR</b>    | Plant Breeders' Rights                                    |
| <b>PDS</b>    | Public Distribution System                                |
| <b>PKSF</b>   | Palli Krama Sahayak Foundation                            |
| <b>PPAF</b>   | Pakistan Poverty Alleviation Fund                         |

|               |  |
|---------------|--|
| <b>PPCBL</b>  | Punjab Provincial Cooperative Bank Ltd                   |
| <b>PS</b>     | Public Sector  |
| <b>RDA</b>    | Recommended Dietary Allowance                            |
| <b>REC</b>    | Rice Export Corporation                                  |
| <b>SCARPS</b> | Salinity Control and Reclamation Projects                |
| <b>SEWA</b>   | Self Employed Women's Association                        |
| <b>SPS</b>    | Sanitary and Phytosanitary Standards                     |
| <b>SRES</b>   | Special Report on Emissions Scenarios                    |
| <b>TBT</b>    | Technical Barriers to Trade                              |
| <b>TCARD</b>  | Technical Committee on Agriculture and Rural Development |
| <b>TRIPS</b>  | Trade-Related Aspects of Intellectual Property Rights    |
| <b>UN</b>     | United Nations   |
| <b>UNDP</b>   | United Nations Development Programme                     |
| <b>UNFPA</b>  | United Nations Population Fund                           |
| <b>UNICEF</b> | United Nations Children's Fund                           |
| <b>UPOV</b>   | Union for the Protection of New Varieties of Plants      |
| <b>UR</b>     | Uruguay Round  |
| <b>WEF</b>    | World Economic Forum                                     |
| <b>WEFS</b>   | World Economic Forum Survey                              |
| <b>WFC</b>    | World Food Conference                                    |
| <b>WFP</b>    | World Food Programme                                     |
| <b>WFS</b>    | World Food Summit  |
| <b>WTO</b>    | World Trade Organization                                 |
| <b>ZTBL</b>   | Zarai Taraqati Bank Limited                              |

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## PREFACE

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The concept of food security has undergone many changes during the last 50 years or so not only in Pakistan, but also in regional and International discourse. The Universal declaration of Human Rights of 1948 provides that “Everyone has the right to a standard of living adequate for the health and well being of himself and his family, including food”. The most important single provision in the covenant relating to the right to food is Article-11, which reads as follows:

- The States/parties to the present Covenant recognize the right of everyone to an adequate standard of living for himself and his family, including adequate food, clothing and housing, and to the continuous improvement of living conditions.
- The States/parties to the present Covenant, recognizing the fundamental right of everyone to be free from hunger, shall take, individually and through international co-operation.

World Food Summit of 1996 had redefined the concept of food security as a situation when all people at all times have “physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life”. The three main aspects of this definition are adequacy of food, access (supply), and equitable distribution of food in accordance with the needs of the individual for active healthy life. It is useful to define the food security at national, household and individual levels also. Food security at national level may be described as a satisfactory balance between food supply and demand. The household level of food security is most important. It may be assumed that incomes come to household and all resources allocation decisions are made at household level and household consumption is divided among its members according to their needs. It may be mentioned that food security at one level may not imply food security at other level. A country which is food insecure will certainly contain groups of population which are food secure as compared to other country, which is food secure at national level but will contain groups of population who suffer from severe food insecurity, as in the case Pakistan.

### **Food Security for Whom?**

One can observe groups with more pronounced deficiencies of (a) total food, (b) essential food items and food complements, (c) coping capacity (for lack of savings) and, thus, (d) a higher risk (or higher vulnerability). In general, the “weaker sections” or poorer ones can look forward to less food security, they may be urban or rural population, often, although not necessarily, lower caste or tribal. There is a substantial gender bias when it comes to in food; children in South Asia are less well fed than those in Africa. Accordingly, girls from low caste families in backward areas are among the worst fed.

### **Why food security?**

The fact that children in South Asia are less well fed than those in Africa, even at comparable family income levels shows that “development”, if measured in per capita income, does not automatically bring out the levels of nutrition that could be expected. If the well-being of the people (however defined) established only if a certain level of “basic needs” guaranteed for all the people and none of them suffering from hunger over any longer period of time, then food (supply) for all has to be secured.

Food insecurity is a global menace, the intensity of which may differ from nation to nation. It is a complex phenomenon, attributable to range of factors that vary across the regions, countries and social groups. These factors can be grouped in five areas i.e. availability, accessibility, affordability, adequate storage facilities and nutritional value of the food should meet the requirements of healthy person. In aggregate, over one-third of the population suffers from chronic hunger. The number of under-nourished population in Pakistan has increased from 24 per cent to 28 per cent; the number of people deemed “food insecure” has gone up to 77 million from 60 million in the last year. It highlights the fact that food insecurity in Pakistan is not necessarily the function of under-production and bad weather.

As of late 2008, increased farming for use in bio-fuels, world oil prices at nearly \$120 a barrel, global population growth, climate change, loss of agricultural land to residential and industrial development, and growing consumer demand in China, Pakistan and India have pushed up the price of grains. For instance in the case of Pakistan, during the early 1980s, the country was almost self-sufficient in wheat and was a leading rice exporter. Over time, domestic demand for food increased steadily because of rapid



population growth. The growth in food grain production fell behind demand because of the consistent decline in world prices of food grains and a shortfall of investment in agricultural infrastructure and technology to improve production. As a result, domestic demand for food grains exceeded the domestic supply, and annual imports rose to 2.5 million tons in the late 1990s. Even with these imports, food security is a growing concern in Pakistan, given inequitable access to food and the declining purchasing power of the poor. People have shifted from agricultural sector to other business because of low returns and high risk and uncertainty. Inflation has affected the common man and increasing food prices mean that half of the country's population is facing "food insecurity".

The primary purpose of this study is to find out as to what the factors are influencing food security in Pakistan. In this context population growth, global warming and oil security factors have analysed so as to put the subject also in the perspective of national and regional politics. It is also imperative to understand efficiency of regional cooperation machinery to affect the food security. Food Security conceptually relates to the availability of food and its access by people. However, there are major challenges in achieving food security, the most pressing one of which is ensuring the quantity of food necessary for food security at the house hold, regional and national as also at the global level. Achieving food security for its inhabitants remains a major challenge for Pakistan.

The dissertation has been divided into five chapters. The first chapter is an "**Introduction**" to the subject which examines food security scenario in world in general and Pakistan in particularly. It looks into the different concepts of food security and its relation with security. An attempt has been made to examine the causes of food insecurity and its implication for the security of state.

The second chapter "**Agriculture Food Production in Pakistan**" throws ample light on food production scenario of Pakistan. It also looks into green revolution and present situation of agriculture.

The third chapter, "**Determinants of Food Security in Pakistan**" examines challenges to food security from water scarcity, degradation of land resources (water logging and

salinity), population growth, and urbanisation, and poverty, effect of globalisation on agriculture and climate change.

The fourth chapter, “**Mechanism for Ensuring Food Security**” describes the regional cooperation as a mechanism to overcome food insecurity of South Asia in general and Pakistan in particular. It also examines collective policies regarding collaborative activities and mutual learning in agricultural research, sharing experiences in rural development, establishing a common buffer stock, taking a common stand on world forum.

The final chapter, “**Conclusion**”, finds out limitations and problems of food security and bring out suggestion to improve the situation.

# Chapter One

## Introduction

## Introduction

*Hunger<sup>1</sup> is exclusion – exclusion from the land, from income, jobs, wages, life and citizenship. When a person gets to the point of not having anything to eat, it is because all the rest has been denied. This is a modern form of exile. It is death in life...*

*Josue de Castro*

While the term “energy security” has been in vogue for many years, the term “food security” seems to be competing with it for an equal or higher ranking on the world agenda.<sup>2</sup> Food security is an essential feature of a country’s independence and sustenance. It depends on self-production of food grains in sufficient quantities and ability to transport and store grains on a large scale, commensurate with population size, economic strength that allows import/export of grains in required quantities, and availability to meet the demand of grains in the international market. Recent food shortages in several South Asian countries have raised questions about the long-term prospects for food security. Many governments are concerned that as population growth increases combined with the effects of rapid urbanisation food availability may emerge as one of the key security issues of the 21<sup>st</sup> Century.

A free and democratic world can only exist if its comprising states exercise self-government. Likewise, a free and democratic state cannot exist unless its citizens are able to determine their own actions. Thus, the major hurdle to the ideal world society is not rogue nations or terrorism: these are merely consequences of deep-seated social conditions. Humanitarians have realised that the best way to do such is to ensure food

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<sup>1</sup>“Hunger is a very subjective term, and there is no single, clear, universally-accepted definition of hunger, or how to measure it. In a recent document International Food Policy Research Institute (IFPRI) defines hunger according to the number of calories consumed per day: subacute hungry: those who consume between 1,800 and 2,200 calories per day; medial hungry: those who consume between 1,600 and 1,800 calories per day; ultra hungry: those who consume less than 1,600 calories per day. 2,200 calories is the average energy requirement that, as recommended by international experts, is needed for adults undertaking light activity. However, country level definitions of hunger vary greatly. Hunger can also be defined as nutritional deficiency and/or under-nourishment and malnourishment and in the extreme case starvation.” Mukherjee, Amitava (January 2008), “Food Insecurity: a Growing Threat in Asia”, [Online: Web] Accessed 5 September 2008, URL: <http://www.unapcaem.org/publication/FoodInsecurityInAsia.pdf>.

<sup>2</sup>“Pakistan's Ministry of Food and Agriculture are working to finalise a policy for introducing corporate agriculture in the country where large farm holdings will be allowed to companies which would seek listing in the stock exchange”. Haq,Riyz (2008), “Can Pakistan Enhance World's Food Security?”,[Online: Web] Accessed 3 September 2008, URL:<http://www.riazhaq.com/2008/05/can-pakistan-enhance-worlds-food.html>.

security through poverty eradication. Yet lasting food security is not a terminal objective but a condition that must be sought and maintained to create a free and more prosperous tomorrow.<sup>3</sup>

## **Present World Food Security Situation**

The FAO World Food Summit in November 1996 concluded that about 840 million people (15per cent of population) are undernourished and that under current prospects this would only reduce to 680 million by 2010 (10per cent of world population). This would be 18per cent of the population in the most vulnerable countries where 3 billion people would live (out of a world population of about 6.8 billion in 2010). It is easy to gather such statistics from the literature but they miss the essence of the food security problem such as: a third of children (nearly 180 million) are malnourished and this may only drop to a quarter worldwide by 2020 and remain at 40per cent in South Asia; a third of the people in Sub-Saharan Africa will be food insecure by 2010, while the population may have doubled from today.<sup>4</sup> Data at the country or local level will most likely show even greater disparities. Then at the household or individual level there will be significant differences which discriminate, for instance, against the poor, women and children and the aged, who suffer disproportionately and often seriously.

The World Food Summit (WFS) held in Rome in 1996 had resolved to reduce the number of hungry people in the world from its 1990 level to half of it by 2015. Four years later, the UN General Assembly adopted the Millennium Development Goals (MDG).<sup>5</sup> The first MDG is that the proportion of people living in poverty as well as the proportion of hungry people in 2015 should be half of what they were in 1990. Taking

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<sup>3</sup>“Projections indicate that bioenergy produced through agricultural could meet up to 25 percent of global energy demand by 2050. Energy that can be grown has many advantages. It can replace the diminishing fossil fuel supply, open new economic opportunities”. Chawla, Sagar(2004) “India: Food Security and the Implementation of Biofuels”, p.1, [Online: web] Accessed 9 September 2007, URL: [http://www.worldfoodprise.org/assets/YouthInstitute/07proceedings/Des\\_Moines\\_Central\\_Academy\\_Chawla.pdf](http://www.worldfoodprise.org/assets/YouthInstitute/07proceedings/Des_Moines_Central_Academy_Chawla.pdf).

<sup>4</sup>Hall, D.O.(1998),“Food Security: What have sciences to offer?”, p.5 [Online: web] Accessed 9 September 2007 ,URL: [http://www.icsu.org/gestion/img/icsu\\_doc\\_download/221\\_dd\\_file\\_foof\\_security.pdf](http://www.icsu.org/gestion/img/icsu_doc_download/221_dd_file_foof_security.pdf).

<sup>5</sup>“The eight Millennium Development Goals (MDGs) – which range from halving extreme poverty to halting the spread of HIV/AIDS , maternal health, gender equality and aim at combating child mortality, and providing universal primary education by the target date of 2015.” UNMDG (2008),United Nations Millennium Development Goals, “End poverty by 2015” [Online: web] Accessed 9 September 2008, URL: <http://www.un.org/millenniumgoals/bkgd.shtml>.

stock in early 2007, it is discovered that while even the weaker MDG goal is unlikely to be met if current trends continue; fulfilling the WFS pledge seems a far more difficult proposition. Compared with 1990–92, the number of undernourished people in the developing countries in 2001–03 has declined very marginally from 823 million to 820 million, a meager 3 million decline which is not statistically significant. The current hot spots of hunger and under-nutrition are in South Asia and Sub-Saharan Africa. Despite some reduction in the number of hungry people between the late 1970s and the early 1990s, South Asia still faces high levels of hunger.<sup>6</sup>

South Asia, where one or two famines occurred almost every decade in the nineteenth century, today feeds its population much better than in the past although their number has more than triplicated since Independence (India and Pakistan: 1947).<sup>7</sup> South Asian Nations have transformed from food-deficit countries in the 1960s and '70s to food-surplus countries in the 1980s and '90s. And yet, food insecurity and under-nutrition remain huge problems. One of the most significant forms of material insecurity in South Asia is still food insecurity. It remains a major policy challenge, despite the fact that food production has increased (but at a declining rate) in all the countries of South Asia.

**Table1: Food balance sheet of south Asian countries, (in thousand metric tonnes for 2002)**

| Country    | Food Production | Food Exports | Food Imports | Food Balance |
|------------|-----------------|--------------|--------------|--------------|
| Bangladesh | 26,924          | 1.6          | 2,827        | -4,601       |
| India      | 1,74,655        | 9,490        | 56           | 23,826       |
| Nepal      | 5,839           | 11           | 39           | 57           |
| Pakistan   | 24,936          | 2,966        | 288          | 3,818        |
| Sri Lanka  | 1,938           | 9.8          | 1,307        | 252          |

Source: Ghosh ,Jayati (October 2006)“Increasing food insecurity in South Asia” InfoChange News & Features, pp.1-2, [Online :web] Accessed 15 November 2007 ,URL:  
[http://www.infochangeindia.org/index2.php?option=com\\_content&do\\_pdf=1&id=5659](http://www.infochangeindia.org/index2.php?option=com_content&do_pdf=1&id=5659).

<sup>6</sup> *Ibid.*

<sup>7</sup>Zingel, Wolfgang Peter (2006), “Food Security in South Asia” in Eckart ehlers and Thomas krafft (eds.), *Earth System Science in the Anthropocene: Emerging Issues and Problems*, Heidelberg, springer. Pp. 229-246.

The table above shows that South Asian countries have been exporting some amount of food. The balance for 2002 is positive in all countries except Bangladesh. However, increased food production has not generated greater household and individual food security for significant sections of the population.<sup>8</sup>

Today, about 42 million people in Pakistan lack adequate income to purchase the food they need for a healthy life. The fact that about one third of the population does not have access to food needed for adequate nutrition is manifested by the widespread incidence of malnutrition. In 1998, the estimated number of malnourished children was about 8 million. Nearly half of the children under five years of age are underweight.<sup>9</sup> The country also lags behind in other socio-economic indicators. According to United Nation Development Programme (UNDP), Pakistan ranked 136 among the 177 nations covered by the latest survey applying the Human Development Index (HDI).<sup>10</sup>

In the past, the country achieved near self-sufficiency in food production and maintained high GDP growth for long periods. It is generally accepted that the declining trend in poverty in Pakistan during the 1970s and 1980s was reversed in the 1990s. The incidence of poverty increased from 26.6 percent in FY1993 to 32.2 percent in FY1999 and the number of poor increased by over 12 million people during this period.<sup>11</sup> But in 2004-05 it drop down to 23.9 per cent, still large part of population lives under the poverty line.<sup>12</sup> Considering these accomplishments and the fact that the Government

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<sup>8</sup>“Nutritional deficiencies remain huge - at least half the children in India (and possibly more in Pakistan) are born with protein deficiency”. Ghosh ,Jayati (October 2006)“Increasing food insecurity in South Asia” InfoChange News & Features, pp.1-2, [Online :web] Accessed 15 November 2007 ,URL: [http://www.infochangeindia.org/index2.php?option=com\\_content&do\\_pdf=1&id=5659](http://www.infochangeindia.org/index2.php?option=com_content&do_pdf=1&id=5659).

<sup>9</sup>“Food Security issues in Pakistan especially Policy and Strategic Options”, p .1, [Online: web] Accessed on 9 September 2008, URL:<http://www.un.org/pk/unic/pdf/finaldoc.pdf>.

<sup>10</sup>UNDP(2008), United Nation Development Programme, *Country Fact Sheet: Pakistan*, [Online: web] Accessed on 13 September 2008, URL:[http://hdrstats.undp.org/countries/country\\_fact\\_sheets/cty\\_fs\\_PAK.html](http://hdrstats.undp.org/countries/country_fact_sheets/cty_fs_PAK.html).

<sup>11</sup>“Poverty in Pakistan: Issues, Causes, and Institutional Responses”,(July 2002)This report describes the trends and key features of poverty in Pakistan, discusses its main causes, outlines existing programs and initiatives to reduce poverty, and gives a set of strategic options for Asian Development Bank. ADB(2008), Asian Development Bank, “Fighting Poverty in Asia and pacific” [Online: web] Accessed 9 September 2008,URL:[http:// www.adb.org/Documents/Reports/Poverty\\_PAK/default.asp](http://www.adb.org/Documents/Reports/Poverty_PAK/default.asp).

<sup>12</sup>Government of Pakistan (2009), Poverty Reduction Strategy Paper (PRSP) – II, Finance Division, [Online: web] Accessed on 13 June 2008, URL:<http://www.finance.gov.pk/admin/images/poverty/PRSP-II.pdf>.

accorded high priority to poverty reduction and achievement of food security, the deteriorating socio-economic situation is a serious cause for alarm. The policy makers and planners must address the issues of stagnating food production, re-emergence of food poverty and food security.

### **History of Food Security**

There appears to be agreement that concerns on food security have progressed over the last 50 years or so from purely physical availability at the global level to the provisions of food to individuals and the role of poverty in ensuring year round access to food. The interaction between agriculture/food policies and socioeconomic factors at the micro and macro-level is now considered crucial to ensure food availability.

*Swaminathan (1998) divides the post-war era into 4 phases (mainly from an Indian perspective).*<sup>13</sup>

- a) 1940/60s - food security was only considered in physical availability terms
- b) 1970s - economic access to food was considered equally important
- c) 1980s - food security must be considered at the level of the individual and not merely of the household (since within a household women and girl children tend to be undernourished)
- d) 1990s - recognition that micronutrients in addition to environmental hygiene and safe drinking water are important.

He concluded that today food security should be seen from the viewpoints of physical, social, economic and environmental access.

*Maxwell (1998) has distinguished 5 phases since 1974, they are:*<sup>14</sup>

- a) 1974-1980: global food security - the world food crisis was evident from famines in Africa, doubling of international grain prices and large grain imports by the Soviet Union. FAO set up a committee on World Food Security and a World Food Council was established to monitor world food availability.
- b) 1981-1985: food entitlement and structural adjustment - questions of poverty and access featured since it was clear that production on its own did not assure consumption,

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<sup>13</sup> Hall, D.O. (1998), "Food Security: What have sciences to offer?", p.4, [Online: Web] Accessed 9 Sep. 2008, URL: [http://www.icsu.org/gestion/img/icsu\\_doc\\_download/221\\_dd\\_file\\_foof\\_security.pdf](http://www.icsu.org/gestion/img/icsu_doc_download/221_dd_file_foof_security.pdf).

<sup>14</sup> *Ibid.*



and people needed access to food. This era coincided with structural adjustment activities where poverty reduction and basic needs were subordinate to debt management, macro-economic stability, etc.

c) 1986-1990: the golden age - the 1984/5 African famine and the drawbacks of the social costs of structural adjustment changed the perceptions of food security which rose up in the international agenda.

d) 1990-1996: poverty, not food security - poverty reduction was brought back to the front of the development stage and displaced food security; many donors abandoned or downgraded food security. Famines were seen to be far more associated with war and with drought (eg. Southern Africa in 1992) which appeared to be managed reasonably well. Thus the problem was not seen as a food security issue per se but rather one of managing food supplies in complex political emergencies characterised by social and policy breakdown.

e) 1996-....., another rise in food prices and renewed concern about the ability of the world to feed itself. Will the agenda shift back to Malthusian concerns of the 1970s with a focus on food production, often in high potential areas or will the concern with consumption and access be sustained?

### **Concepts of Food Security**

Food security is a flexible concept as reflected in the many attempts at definition in research and policy usage. Even a decade ago, there were about 200 definitions in published writings.<sup>15</sup> Whenever the concept is introduced in the title of a study or its objectives, it is necessary to look closely to establish the explicit or implied definition.<sup>16</sup>

The continuing evolution of food security as an operational concept in public policy has reflected the wider recognition of the complexities of the technical and policy issues involved. The most recent careful redefinition of food security is that negotiated in the process of international consultation leading to the World Food Summit (WFS) in November 1996. The contrasting definitions of food security adopted in 1974 and 1996,

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<sup>15</sup> Maxwell, S. and M. Smith (1992), "Household Food Security; a conceptual review". In S. Maxwell & T.R. Frankenberger (eds.), *Household Food Security: Concepts, Indicators, Measurements: A Technical Review*, New York and Rome: UNICEF and IFAD, p.13.

<sup>16</sup> Maxwell, S. (1996), "Food security: a post-modern perspective", *Food Policy*, 21 (2): 155-170.

along with those in official FAO and World Bank documents of the mid-1980s are set out below with each substantive change in definition underlined. A comparison of these definitions highlights the considerable reconstruction of official thinking on food security that has occurred over 25 years. These statements also provide signposts to the policy analyses, which have re-shaped our understanding of food security as a problem of international and national responsibility.

Food security as a concept originated only in the mid-1970s, in the discussions of international food problems at a time of global food crisis. The initial focus of attention was primarily on food supply problems of assuring the availability and to some degree the price stability of basic foodstuffs at the international and national level. That supply-side, international and institutional set of concerns reflected the changing organisation of the global food economy that had precipitated the crisis. A process of international negotiation followed, leading to the World Food Conference (WFC) of 1974, and a new set of institutional arrangements covering information, resources for promoting food security and forums for dialogue on policy issues.<sup>17</sup>

The issues of famine, hunger and food crisis were also being extensively examined, following the events of the mid 1970s. The outcome was a redefinition of food security, which recognised that the behaviour of potentially vulnerable and affected people was a critical aspect.

The initial focus, reflecting the global concerns of 1974, was on the volume and stability of food supplies. Food security was defined in the 1974 World Food Summit as: “Availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices”.<sup>18</sup>

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<sup>17</sup>“Global hunger and food security after the World Food Summit” (Feb. 1997), Overseas Development Institute Briefing Paper, London,p.9.

<sup>18</sup>United Nations (1975), *Report of the World Food Conference*, Rome 5-16 November 1974, New York, p.6.

In 1983, FAO expanded its concept to include securing access by vulnerable people to available supplies, implying that attention should be balanced between the demand and supply side of the food security equation, “Ensuring that all people at all times have both physical and economic access to the basic food that they need”.<sup>19</sup>

In 1986, the highly influential World Bank report “Poverty and Hunger”, focused on the temporal dynamics of food insecurity.<sup>20</sup> It introduced the widely accepted distinction between chronic food insecurity, associated with problems of continuing or structural poverty and low incomes, and transitory food insecurity, which involved periods of intensified pressure caused by natural disasters, economic collapse or conflict. This concept of food security is further elaborated in terms of, “access of all people at all times to enough food for an active, healthy life”, from individual to the global level.<sup>21</sup> However, access now involved sufficient food, indicating continuing concern with protein-energy malnutrition. But the definition was broadened to incorporate food safety and also nutritional balance, reflecting concerns about food composition and minor nutrient requirements for an active and healthy life.

The 1990 Life Sciences Research Office (LSRO) Report on Nutritional Assessment defined terms associated with food access, including food security, food insecurity, and hunger.<sup>22</sup> Food security implies the ability to secure adequate food. According to the LSRO report, it is “access by all people at all times to enough food for an active, healthy life”.<sup>23</sup>

Food security includes at a minimum: (1) the ready availability of nutritionally adequate and safe foods, and (2) an assured ability to acquire acceptable foods in socially acceptable ways (e.g., without resorting to emergency food supplies, scavenging, stealing

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<sup>19</sup>Food and Agriculture Organisation (1983), *World Food Security: a Reappraisal of the Concepts and Approaches*, Director General’s Report, Rome, p.6.

<sup>20</sup>World Bank (1986), *Poverty and Hunger: Issues and Options for Food Security in developing Countries*, Washington D.C.p.15.

<sup>21</sup>*Ibid.*

<sup>22</sup>NRC (2005), National Research Council, “Measuring Food Insecurity and Hunger”, Phase 1 Report, U.S Department of Agriculture, [Online: web] Accessed 22 October 2008, URL: [http://books.nap.edu/openbook.php?record\\_id=11227&page=18](http://books.nap.edu/openbook.php?record_id=11227&page=18).

<sup>23</sup>World Bank (1986), *Poverty and Hunger: Issues and Options for Food Security in Developing Countries*, Washington D.C.p.7.

or other coping strategies), In contrast, food insecurity implies a limited ability to secure adequate food. Specifically, food insecurity is having “limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways”.<sup>24</sup>

A broader perspective was adopted in the UNDP 1994 *Human Development Report*, which promoted the construct of human security, including a number of component aspects, of which food security was only one.<sup>25</sup> The concept of human security is closely related to the human rights perspective to development that has, in turn, influenced discussions about food security.<sup>26</sup>

Ideally, estimates of under nutrition would be based on combined health and nutritional assessments, including anthropometry.<sup>27</sup> The assessment would be for a representative cross sectional sample population, stratified to ensure adequate representation of at-risk populations by category and region. Practically, such surveys are uncommon, especially in those countries where under nutrition is likely to be most pervasive.

Consequently, measurement is typically indirect and based on food balance sheet and national income distribution and consumer expenditure data. The line of reasoning linking hunger and under nutrition with inadequate food intake allows the *measurement*

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<sup>24</sup> Anderson, S.A. (1990), The 1990 Life Sciences Research Office (LSRO) Report on Nutritional Assessment defined terms associated with food access, *Journal of Nutrition*, 102:1559-1660.

<sup>25</sup> “The list of threats to human security is long, but most can be considered under seven main headings: economic security, food security, health security, environmental security, personal security, community security, and political security.” UNDP (1994), United Nation Development Programme, pp.24-25, [Online: web] Accessed 22 may 2009, URL: <http://www.undp.org/>.

<sup>26</sup> “At the end of the wider investigation into the role of public action into combating hunger and deprivation, Dreze and Sen (1989) found no separate place for food security as an organising framework for action. Instead they focused on a wider construct of social security which has many distinct components including, of course, health and nutrition”. Hubbard, Michael (May 1992), *Public Administration and Development*, 12(2):123 - 222.

<sup>27</sup> “Undernutrition is a less intimidating concept than protein-energy malnutrition (PEM), its technical synonym. PEM is manifested through wasting, low weight for height, as an acute condition and a stunting, low height for age, as a chronic condition.” Clay, Edward (11-12 July 2002), “Food Security: Concepts and Measurement”, FAO, Rome, [Online: web] Accessed on 22 may 2009, URL: [http://www.rlc.fao.org/iniciativa/cursos/Curso%202005/3prog/1\\_1\\_3.pdf](http://www.rlc.fao.org/iniciativa/cursos/Curso%202005/3prog/1_1_3.pdf)

of food insecurity in terms of the availability and apparent consumption of staple foods or energy intake.<sup>28</sup>

This definition is again broadly equivalent to the earlier narrower definitions of chronic food insecurity.<sup>29</sup> The 1996 World Food Summit adopted a still more complex definition: “Food security, at the individual, household, national, regional and global levels is achieved, when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life”.<sup>30</sup>

This term is again refined in *The State of Food Insecurity 2001*, “Food security is a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life”.<sup>31</sup>

“This new emphasis on consumption, the demand side and the issues of access by vulnerable people to food, is most closely identified with the seminal study by Amartya Sen”.<sup>32</sup> Eschewing the use of the concept of food security, he focuses on the entitlements of individuals and households.

The international community has accepted these increasingly broad statements of common goals and implied responsibilities. But its practical response has been to focus on narrower, simpler objectives around which to organise international and national public action. The declared primary objective in international development policy discourse is increasingly the reduction and elimination of poverty. The 1996 WFS exemplified this direction of policy by making the primary objective of international

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<sup>28</sup> Lieberum, Maren and et al.(2002), *The state of food insecurity in the world 2001*, Food and Agriculture Organisation, Rome, [Online: web] Accessed on 22 may 2009, URL: <http://www.fao.org/DOCREP/003/Y1500E/Y1500E00.HTM>

<sup>29</sup> World Bank (1986), *Poverty and Hunger: Issues and Options for Food Security in Developing Countries*, Washington D.C., p.19.

<sup>30</sup> World Food Summit (13-17 November 1996), *Rome Declaration on World Food Security and World Food Summit Plan of Action*, Rome, p.5.

<sup>31</sup> Food and Agriculture Organisation (2002), *The State of Food Insecurity in the World 2001*, Rome, p.6.

<sup>32</sup> Sen, A. (1981), “Poverty and Famines”, Oxford: Clarendon Press, p.21.

action on food security halving of the number of hungry or undernourished people by 2015.<sup>33</sup>

### **Household food security**

The ability to ensure adequate food security hinges on the ability to identify vulnerable households. Here we focus on the broad picture. Vulnerability refers to the full range of factors that place people at risk of becoming food insecure. The degree of vulnerability of an individual, household or group of persons is determined by their exposure to the risk factors and their ability to cope with or withstand stressful situations. Generally, vulnerable households will constitute three groups:<sup>34</sup>

- those which would be vulnerable under any circumstances: for example, where the adults are unable to provide an adequate livelihood for the household for reasons of disability, illness, age or some other characteristic;
- those whose resource endowment is inadequate to provide sufficient income from any available source;
- those whose characteristics and resources render them potentially vulnerable in the context of social and economic shocks: e.g. those who find it hard to adapt to sudden changes in economic activity brought about by economic policy.

Although no definition of ‘vulnerable’ is complete, a useful starting point is, estimates of income. It can be assumed that the first two categories will be relatively poor both in terms of income and assets, and it is also likely that the third category will have a

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<sup>33</sup> Gill, Gerard J. (December 2003), “Food Security and the Millennium Development Goal on Hunger in Asia”, Working Paper 231, p.25, [Online: web] Accessed 15 November 2008, URL: <http://www.odi.org.uk/resources/download/1266.pdf>.

<sup>34</sup> “The State of Food Insecurity in the World 2004 monitoring progress towards the World Food Summit and Millennium Development Goals”, [Online: web] Accessed on 15 November 2008. URL: <http://issuu.com/escap-publications/docs/st-escap-2535/119>.

fragile resource base and other characteristics which make its income sources uncertain.<sup>35</sup> An appropriate proxy, therefore, in identifying vulnerable households, is how poor is a particular household measured against some established criterion or “poverty-line”.<sup>36</sup> Having defined who the ‘vulnerable’ are, the second step is to identify their household characteristics:<sup>37</sup>

- *Location*: rural/urban; small village/large village; remote province/near to capital city etc.
- *Composition*: size, age and dependency ratios; male/female head.
- *Sources of income*: production, employment, trade, remittances and other transfers.

A frequent problem in delineating those sections of the population most vulnerable, or at risk from changes in policy direction, is the lack of baseline data regarding household income and consumption patterns.

The notion of household entitlement to food, derived from the work of Amartya Sen, is now widely used to investigate issues related to both food security and nutrition. The word “entitlement” refers to the various means through which households avail themselves of food, whether through household production, or through other income-generating activities such as the sale of labour or participation in trading. A number of these activities may be pursued by the same member of each household, or by different

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<sup>35</sup> *Ibid.*

<sup>36</sup>“The Planning Commission has decided that the official poverty line for Pakistan will be estimated on 2350 calories per adult equivalent per day. This is based on an adult equivalent intake of 2150 calories in the urban areas and 2450 calories in the rural areas. The poverty line for Pakistan for FY2004-05 on this basis has been defined at Rs. 878.60 per capita per month”. ADB (2002), Asian Development Bank, “Poverty in Pakistan: Issues, Causes, and Institutional. Responses”, [Online: web] Accessed 11 June 2009, URL:[http://www.adb.org/Documents/Reports/Poverty\\_PAK/chapter\\_2.pdf](http://www.adb.org/Documents/Reports/Poverty_PAK/chapter_2.pdf).

<sup>37</sup>World Bank (1986), *Poverty and Hunger: Issues and Options for Food Security in Developing Countries*, Oxford and New York: Oxford University Press, p.9.

members. In addition, transfers from sources external to the household, i.e. from the state or friends and relatives, will also add to household entitlement.<sup>38</sup>

Entitlement can also be perceived as the household's ability to express effective demand for food. It presupposes the availability of food, since for demand to be effective it must be capable of being transformed into consumption. It is important to recognise, however, that access to food through any of these entitlement endowments contributes only to the availability of food to the household. It does not ensure efficient utilisation and says nothing regarding intra-family distribution, both of which can have a profound effect on nutritional status regardless of food availability.<sup>39</sup>

Many development agencies regard the concept of household food security—often defined as adequate access to food at all times, throughout the year and from year to year as a guiding principle for designing interventions in rural areas. A commitment to household food security carries with it an important implication for development practitioners, namely the need to measure food security outcomes at the household and individual level. Measurement is necessary at the outset of any development project to identify the food insecure, to assess the severity of their food shortfall and to characterise the nature of their insecurity (seasonal versus chronic). Further, it provides the basis for monitoring progress and assessing the impact of these projects on the beneficiaries food security.<sup>40</sup>

Essentially, food security can be described as a phenomenon relating to individuals. It is the nutritional status of the individual household member that is the ultimate focus, and the risk of that adequate status not being achieved or becoming undermined. The latter risk describes the vulnerability of individuals in this context. As

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<sup>38</sup>FAOCDR (1997), Food and Agriculture Organisation Corporate Document Repository, "Safety nets to protect consumers from possible adverse effects: An organising framework", [Online: web] Accessed 22 October 2008, URL:<http://www.fao.org/docrep/W6808e/w6808e03.htm>.

<sup>39</sup>FAO (2002), Food and Agriculture Organisation, *The State of Food Insecurity in the World 2001*, Rome, pp.4-5.

<sup>40</sup>Hoddinott, John "Choosing outcome indicators of household food security", International Fund for Agricultural Development, No. 301-IFPRI, [Online: web] Accessed 15 November 2008, URL:[http://www.reliefweb.int/rw/rwt.nsf/db900SID/NVEA-5ULK83/\\$File/IFPR\\_](http://www.reliefweb.int/rw/rwt.nsf/db900SID/NVEA-5ULK83/$File/IFPR_).



the definitions reviewed above imply, vulnerability may occur both as a chronic and transitory phenomenon.<sup>41</sup>

Finally it can be said that *food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life.*<sup>42</sup> Household food security is the application of this concept to the family level, with individuals within households as the focus of concern. And Food insecurity exists when people do not have adequate physical, social or economic access to food as defined above.

### **The Impact of Food Insecurity**

Hunger, poverty and disease are interlinked, with each contributing to the occurrence of the other two. Hunger reduces natural defences against most diseases, and is the main risk factor for illness worldwide. People living in poverty often cannot produce or buy enough food to eat and so are more susceptible to disease. Sick people are less able to work or produce food. The UN Standing Committee on Nutrition concluded that nutrition is an essential foundation for poverty alleviation, and also for meeting MDGs related to improved education, gender equality, child mortality, maternal health and disease.<sup>43</sup>

Hunger is a major constraint to a country's immediate and long term economic, social and political development. Food security is also seen as a prerequisite for economic development. Losses in labour productivity due to hunger can cause 6-10 per cent reductions in per capita gross domestic product (GDP). Undernourishment pre birth and of young children is associated with poor cognitive development, resulting in lower productivity and lifetime earnings potential. The UN Children's Fund (UNICEF) estimate

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<sup>41</sup> WB (2000), World Bank, *World Development Report 2000/2001: Attacking Poverty*, Oxford and New York: Oxford University Press.p.7.

<sup>42</sup>FAO(2002), Food and Agriculture Organisation, *The State of Food Insecurity in the World*, 2001, Rome, p.6.

<sup>43</sup>“Food security in developing countries” (Dec. 2006), Parliamentary Office of Science and Technology Note, No. 274, p.2, [Online: web] Accessed on 15 November 2008, URL:[http://www.parliament.uk/documents/upload/post\\_pn274](http://www.parliament.uk/documents/upload/post_pn274).

that one third of the world's people do not reach their physical and intellectual potential due to micronutrient deficiencies caused by food insecurity.<sup>44</sup>

## Causes of Food Insecurity

Food insecurity is determined by the immediate causes of hunger, underlying determinants of conditions in a community affecting poverty, food production, and ability to respond to shocks, and the impact of shocks.

### *Low rates of agricultural production:*

In the last few decades, agricultural output in South Asia, has barely kept up with population increases, and Africa now imports 25 per cent of its grain requirements. Inherent differences in agricultural systems prevented the large increases in food production ('green revolution') seen in Asia. These were due to wide introduction in the 1960-70s of high-yielding varieties of rice and wheat, expanded fertiliser use, and more irrigation.<sup>45</sup>

### *Low access to food:*

Sufficient food available at the country or local level does not mean that all people are food secure. Low incomes, lack of roads and infrastructure, safe drinking water, primary health care and education all impact on people's food consumption. In some cereal-surplus countries, there are more underweight children than in food deficit ones. For example, India has sufficient food production, and yet very high numbers of underweight children, probably due to low incomes, imbalances in household food distribution and weak social networks.<sup>46</sup>

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<sup>44</sup> *Ibid.*

<sup>45</sup> "Future of Agriculture in the Semi-Arid" (14 November 2000), Proceedings of an International Symposium on Future of Agriculture in Semi-Arid Tropics, in Bantilan, M C S and et al. (ed.) (2001), International Crops Research Institute for the Semi-Arid Tropics, Patancheru, India, p.31.

<sup>46</sup> UN Task Force on Hunger (2005), *Halving hunger: it can be done*, [Online: Web] Accessed 22 October 2008, URL: [http://www.unmillenniumproject.org/documents/HTF-SumVers\\_FINAL.pdf](http://www.unmillenniumproject.org/documents/HTF-SumVers_FINAL.pdf).

*Degradation of natural resources and increasing water scarcity:*

Degradation of natural resources is rampant in many resource-poor areas of developing countries, particularly those areas with fragile soils, irregular rainfall, relatively high population density, and stagnant productivity in agriculture. While natural resource degradation often is a consequence of poverty, it also contributes to poverty. Water scarcity is emerging as a most limiting factor for food security in many regions.<sup>47</sup>

*Rapid Population Growth:*

While poverty and natural disasters are the most common causes of food insecurity, rapid population growth overburdens already strained financial and natural resources. This, in turn, greatly impedes efforts to raise incomes and reduce food shortages, particularly in rural areas where food insecurity is mostly concentrated.<sup>48</sup> In many developing countries rapid population growth makes it difficult for agricultural production to keep pace with the rising demand for food. Most developing countries already are cultivating virtually all arable land and are bringing ever more marginal land under cultivation.<sup>49</sup>

*Rapid Urbanisation:*

Most of the population increases in coming years will occur in cities and towns of developing countries. By the year 2020, a majority of the developing world's population will live in urban areas. This will present new challenges to provide employment, education, health care, and food. While current actions must continue to focus on the rural areas where the majority of the poor and food insecure people reside, future policy

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<sup>47</sup>FAO (2004), Food and Agriculture Organisation, *The state of food insecurity in the world 2004*, Rome, p.7.

<sup>48</sup>“How Population Growth Affects Hunger in the Developing World”(1 August 2005), [Online: web] Accessed 22 June 2009,URL:

[http://www.populationaction.org/Publications/Fact\\_Sheets/FS30/Summary.shtml](http://www.populationaction.org/Publications/Fact_Sheets/FS30/Summary.shtml).

<sup>49</sup>Population Reports (Dec. 1997), “Winning the Food Race” ,The Johns Hopkins School of Public Health, 25(4),Maryland, USA, [Online: web] Accessed 22 June 2009,URL: <http://www.infoforhealth.org/pr/m13edsum.shtml#top>.

actions must pay increasing attention to the growing poverty and food insecurity in urban areas.<sup>50</sup>

*Health, Water and Sanitation:*

Poor sanitation, health facilities and water sources contribute significantly to malnutrition by increasing the burden of illness. More than 1 billion people globally lack access to safe drinking water, increasing their exposure to bacteria and parasites.<sup>51</sup>

*Climate Change and Natural Disasters:*

Natural disasters and climate variability are major sources of vulnerability for the food insecurity. They particularly affect those in countries that largely depend on rain fed farming and those highly dependent on agriculture. Poor people are also less able to cope with the impacts of climate shocks and variability. These events can result in massive crop losses, loss of stored food, and damage to infrastructure and consequent increases in food prices.<sup>52</sup> Climate change is increasing the frequency and size of such events.

*Continued Conflict:*

Violent conflicts continue to cause severe human misery in a large number of developing countries. The impact of these conflicts on food security, nutrition, and natural resource management are severe. While humanitarian assistance may be effective in providing food and shelter for millions of refugees, policy action is needed to deal with the underlying causes and the resulting impact on the people in war-torn and neighbouring areas.<sup>53</sup> Achieving sustainable food security for all is unlikely to be possible in the midst of conflict.

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<sup>50</sup>“By 2030 this number will swell to almost 5 billion, with urban growth concentrated in Africa and Asia”. UNPF(2008),United Nations Population Fund “Urbanisation: A Majority in Cities: Population & Development : UNFPA”, [Online: web]Accessed 23 March 2009,URL: <http://www.unfpa.org/pds/urbanisation.htm>.

<sup>51</sup>UN Millennium Project (2005), *Investing in Development: A practical plan to achieve the MDGs*, [Online: Web] Accessed 22 October2008 URL: <http://www.unmillenniumproject.org>.

<sup>52</sup>“Adapting to climate change in developing countries” (October 2006), PTSO note, No.269:4, [Online: Web] Accessed 22 October2008, URL: <http://www.parliament.uk/documents/upload/postpn269.pdf>.

<sup>53</sup>IFPRI (2002), International Food Policy Research Institute, *Reaching Sustainable Food Security for All by 2020: Getting the Priorities and Responsibilities Right*, Washington, D.C., p.23.

Many other issues also affect food security. Access and rights to land, education, gender and social exclusion all have big impacts. Poor governance and corruption can affect hunger levels by disempowering vulnerable groups (such as women and minority, ethnic groups), and seriously undermine any policies in place.

### **Food Security and “Availability” vs. “Accessibility”**

Food security can be defined as “access by all to sufficient food for an active, healthy life”.<sup>54</sup> A very useful way of analysing food security is to differentiate the concepts of food availability and food accessibility. Availability refers to the physical presence of adequate food supplies; for instance, the physical ability of a particular area of land to produce food. Availability can also refer to the presence of food throughout the world, which can be distributed through the international trading system or as food aid. In general, adequate availability of food depends on effective agricultural production. There are four basic sets of factors that influence agricultural productivity and availability (either by hindering or enhancing its development); (1) soil factors (including such things as the physical properties of soil, its texture, slope, chemical properties, nutrient content, etc.); (2) plant factors (referring to species and the genetic variation that may exist within species); (3) climatic factors (includes such factors as moisture supply, temperature, solar radiation and carbon dioxide concentration); and (4) socioeconomic factors (refers to the price of agricultural inputs and products, farm income, availability of credit, and infrastructure for disseminating information about new knowledge and practices.<sup>55</sup>

*Accessibility*, on the other hand, refers to the ability of people within a particular country or region to actually receive or gain access to the food (for example, by having the financial means to purchase adequate food). In fact, the basic cause of chronic malnourishment is not the lack of food in the world, but the fact that the food is not getting to the people who need it most. This seems to contradict a common and widespread perception that human population growth has outstripped agricultural

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<sup>54</sup>WB (1986), World Bank, *Poverty and Hunger: Issues and Options for Food Security in Developing Countries*, Washington D.C., p.9.

<sup>55</sup>Bender, William and Margaret Smith (1997), “Population, Food, and Nutrition”, *Population Bulletin*, 51(4):134-142.

production worldwide. As one writer has noted that, “Food distribution systems are largely shaped by political and economic forces that prevent the food from getting where it is most needed.”<sup>56</sup> Thus, the availability of food does not necessarily address the problem of accessibility to food; famines occur and have occurred in countries in which food is readily available and plentiful.

Nevertheless, as the world’s population grows by around 80 million per year, political and scientific leaders around the world are increasingly raising questions about the viability of the global food system in accommodating this unprecedented demographic change. Although population growth is not the only determinant of food security, it is an issue that focuses popular concern and even alarm about the sustainability of global food production. This is because intuitively it would seem that food shortages occur when “human populations outstrip the production capacity of the agricultural system on which they rely.”<sup>57</sup> But food shortages can also occur because of inequitable food distribution or a breakdown—perhaps resulting from war or civil strife of the distribution systems that provide food. One study suggests that three major factors disrupt the ability of people to have access to food: inequitable food distribution, poverty, and political unrest.<sup>58</sup>

Clearly, therefore, population growth is just one factor that can influence food security. Food security can also be influenced by such basic factors as literacy rates, levels of farmer education, agricultural research and extension capacity, transport infrastructure, international capital movements, and international labor movements. Responsive political systems and the presence of viable opposition political forces and a free press can also influence food security in a positive way. As Dr. Amartya Sen, the Nobel Prize winner has stated: “One remarkable fact in the terrible history of famine is

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<sup>56</sup>Kline, Gary (Spring, 1998), “The Affluent West and the Third World”, *Forum for Applied Research and Public Policy*, 13(1):31.

<sup>57</sup>IFPRI (2002), International Food Policy Research Institute, *Reaching Sustainable Food Security for All by 2020: Getting the Priorities and Responsibilities Right*, Washington, D.C., p.25.

<sup>58</sup>Pimental, David and Marcia Pimental (Spring, 1998), “Rising Populations, Diminishing Resources”, *Forum for Applied Research and Public Policy*, 13(1):12.

that no substantial famine has ever occurred in a country with a democratic form of government and a relatively free press.”<sup>59</sup>

In summary, food security is a multi-faceted issue that is influenced by multiple social, political, economic, and technical variables—purchasing power of consumers, dietary patterns, soil quality, climate factors, among others. Nevertheless, food security is almost always a matter of “access” instead of “availability” (in other words, *food is often available and the global agricultural system is capable of assuring this availability but people cannot always get access for various reasons: economic, social or political*).

### Food as a Political and Security Concern

Traditional definitions of security have tended to concentrate on the state and military threats to its sovereignty.<sup>60</sup> However, in the post-Cold War world, it is clear that a much more nuanced perspective is required, also considering a variety of so-called ‘soft security’ issues such as social, human and environmental threats.<sup>61</sup> Furthermore, this must appreciate the extent to which these varied threats are integrated. Food security is one of them. There has long been a discussion about security concepts and what constitutes a security challenge to different states. During the Cold War there was a dominant realist school of ‘hard security’ with a focus on military security of states, the conflict between the superpowers and the balance of power.<sup>62</sup> This has changed dramatically since 1991 and today there is a move towards a more diverse concept of security that incorporates both traditional “hard threats” and new challenges to the state and people, so-called “soft threats”. These soft threats come in many shapes and forms

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<sup>59</sup>Sen, Amartya (1998), *Insurance against Famine*, Los Angeles Times, 16 October 1998, p. B9.

<sup>60</sup>“Security, in an objective sense, measures the absence of threats to acquired values, in a subjective sense, the absence of fear that such values will be attacked”. Wolfers Arnold (Dec. 1952) “National Security: as an Ambiguous Symbol”, *Political Science Quarterly*, 67(4):481-502.

<sup>61</sup>“Nontraditional (or non-conventional or soft) threats can originate from a variety of non-state human and natural causes, and they can affect both government institutions and civilian populations”. Wang, Yizhou “Defining Non-Traditional Security and Its Implications for China”, [Online: web] Accessed 2 May 2009, URL: <http://www.irchina.org/en/pdf/wyz07a.pdf>.

<sup>62</sup>“Traditional (or conventional or hard) threats refer to hostile actions by governments of nation-states against governments and populations of other nation-states; the instruments used are typically armed forces, intelligence services or surrogate actors (e.g., political parties, guerrilla forces) to carry out subversion; and the targets are typically another nation’s armed forces, intelligence services, key government agencies, and societal institutions”. *ibid*.

but a characteristic is that they are less tangible than the traditional threats and more difficult to define and deal with. One of the new security threats that have received relatively modest attention is that from hunger and poverty.<sup>63</sup>

Food security and traditional national security have usually been viewed as separate and unrelated subjects. However, increasingly security experts are re-examining traditional notions of security and are, in some instances, expanding the definition to encompass non-military threats to the welfare of the nation-state.<sup>64</sup> “These concepts of security must change—from an exclusive stress on national security to a much greater stress on people’s security, from security through armaments to security through human development, from territorial security to food, employment and environmental security”.<sup>65</sup>

For too long, the concept of security has been shaped by the potential for conflict between states and threats to a country’s borders. For too long, nations have sought arms to protect their security. For most people today, a feeling of insecurity arises more from worries about daily life than from the dread of a cataclysmic world event. Job security, income security, health security, environmental security and security from crime—these are the emerging concerns of human security all over the world. Human security is relevant to people everywhere, in rich nations and in poor. The threats to their security may differ—hunger and disease in poor nations and drugs and crime in rich nations but these threats are real and growing.<sup>66</sup>

For many Asian countries, food security is a national security issue as evidenced by protectionist agricultural and other policies that reflects a sense of “national vulnerability” about the availability or lack of food supplies. In some Asian countries, China for instance, statistics about food are considered so sensitive that they are deemed

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<sup>63</sup>Swanstrom, Niklas (Nov.2007), “The Narcotics Trade: A Threat to Security? National and Transnational Implications” *global Crime*, 8:1

<sup>64</sup> Goldstone, Jack (1996), *Environmental Change and Security Project*, The Woodrow Wilson Center, Issue 2, Washington, DC, p. 66.

<sup>65</sup>“Human Development Report 1993”, [Online: web] Accessed 22 December 2008 URL: <http://www.undp.org/hdro/e93over.htm>.

<sup>66</sup>Mesjasz, Czesław (9-11 Sep. 2004), “Security as an Analytical Concept” Paper Presented At the 5th Pan-European Conference on International Relations, The Hague, p.11.



state secrets.<sup>67</sup> Perhaps out of concern about their own food security vulnerability, many Asian countries have attempted to pursue what they view as the ideal of “self-sufficiency” even in the face of evidence that such policies are extremely inefficient. Pakistan considers food security to be one of its six major policies designed to achieve comprehensive national security. India, similarly, issues public and official statements insisting that it should and can remain “self-sufficient” in food production in the coming century.<sup>68</sup>

## **Food Security and Political Stability**

Food security and political stability are often inextricably linked in many countries. Historically, significant malnutrition and famine have been caused by the disruption of food supplies through wars and civil strife. Yet, the concepts of food security and political stability are often mutually dependent and reinforcing. Food security, for example, can influence the political stability of countries. Simultaneously, political instability (such as wars or other forms of civil strife) can influence food security, as can be seen recently in the case of Pakistan. Generally, starvation in the countryside does not result in political instability. This is because those who experience the brunt of food shortages tend to be rural and have little political voice. In Pakistan, International Fund for Agricultural Development (IFAD) is currently supporting about 500,000 people, especially herders, landless people and smallholders. These poor rural people live in marginal, mountainous and rainfed areas that are generally food-deficit. Unable to produce enough food for themselves, the majority of these people purchase food most of the time. However, the wheat crisis and rising prices of food items might result in increased under- and malnutrition as their purchasing power is further weakened and they cut back on food consumption.<sup>69</sup> Thus, the sensitivity that many Asian governments have about food security may be linked to fears of social instability and

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<sup>67</sup>Crook, Frederick W. and W. Hunter Colby (Oct.1996), “The Future of China’s Grain Market”, *USDA Agriculture Information Bulletin*, No. 730.

<sup>68</sup> *Ibid.*

<sup>69</sup>Shah, Qaim (May-June 2008), “Wheat crisis and rising food prices threaten food security in Pakistan”, *Pakistan*, issue 21, [Online: Web]Accessed 10 December 2008,URL:<http://www.ifad.org/newsletter/pi/21>

perhaps even political revolution. Food security thus becomes an issue of regime survival.

Another security concern prominent in many Asian capitals is the prospect for increased economic migration as a result of food shortages. Internal migration is the first concern for many governments, especially as internal migration is often a natural “coping response” in times of famine.<sup>70</sup> The Pakistan government has sought United Nations intervention to help avert nutrition crisis among 84,000 displaced persons in Balochistan.<sup>71</sup>

### **Food as a Weapon**

Another way in which food can be linked to security is when it is used as a “weapon” or even a tool for gaining political leverage of some sort. Nation-states may also be tempted by the prospect of using food as a weapon. One military scholar has noted that recent notions of food as a weapon can be traced to the 1970s during the height of the oil crisis. During this period, “food was sometimes called the green weapon, apparently on the assumption that the embargo of one commodity could be countered by the embargo of another.”<sup>72</sup> Under these circumstances, the question of food, who has it and who can produce it, can become a legitimate strategic consideration.

Food can also be an effective weapon in the relations between nation-states. For example, food may become a subject for international economic sanctions; a nation that is a major food producer may refuse to sell grain to another country in order to assert its own power and perhaps even influence the policies of other countries. Similarly, a food exporting country might use its abundant food resources as a means of tempering relations with a foreign power that might otherwise be acrimonious. For example, some have argued that the former Soviet Union’s reliance on American food imports during the

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<sup>70</sup>“Food Security and Political Stability”, [Online: Web] Accessed 10 December 2008 URL [www.apcss.org/Publications/Report\\_Food\\_Security\\_98.html](http://www.apcss.org/Publications/Report_Food_Security_98.html).

<sup>71</sup> Arif, Mazhar (2007), “Agriculture and food security in Pakistan”, p.7, [Online: Web] Accessed 10 December 2008 URL: <http://www.sappk.org/reports/agriculture%20and%20food%20%security.pdf>.

<sup>72</sup> Rosenberger, Leif R. (Spring 1997), “The Strategic Importance of the world Food Supply” *Parameters*, pp.84-105.

Cold War.<sup>73</sup> It helped in improving relations between the two adversaries despite their obvious and extensive political differences.

## **Agriculture in Pakistan**

The Islamic republic of Pakistan is an ancient civilisation, although its political boundaries were drawn only a little over half a century ago when it gained independence on August 14, 1947. Initially comprising east and West Pakistan, separated by 1770 km. of India, its present territory since December 1971 is confined to the former west wing which has a total area of 796050 square kilometers. It mainly comprises of four provinces i.e. Baluchistan, North West Frontier, the Punjab and Sindh. This territory is a region of diversified relief, with mountains to the north and west and arid and semi arid expanses to the south and east. Down in the center is a flat fertile plain, fed by Indus and its tributaries. The Indus plain has the largest canal irrigation system in the world, making cultivation possible despite scanty and erratic rain fall and ranges of extreme temperature.<sup>74</sup>

Agriculture sector is the lifeline of Pakistan's economy. It contributes 24 per cent to the GDP, employs 48.4 per cent of the labor force and contributes to 70 per cent of the foreign exchange earnings through export of raw materials; semi processed and processed agricultural products. The agricultural growth in Pakistan since 1960s has taken place at a magnificent rate of 4.3 per cent per annum. It is seen that the productivity levels of crops in Pakistan are generally low.<sup>75</sup>

Pakistan's 68 per cent of the population lives in rural and depends upon agriculture for sustenance. The major crops as wheat, cotton, rice, sugarcane and maize account for 41 per cent of value added and minor crops 10 per cent in overall agriculture.

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<sup>73</sup>Smith Paul J. (11 Sep. 1998), "Food Security And Political Stability In The Asia-Pacific Region Asia-Pacific", Center For Security Studies, Honolulu, Hawaii, [Online: Web] Accessed 10 December 2008 URL: [http://www.apcss.org/Publications/Report\\_Food\\_Security\\_98.html](http://www.apcss.org/Publications/Report_Food_Security_98.html).

<sup>74</sup>FAO (2008), Food and Agriculture Organisation, Country profile, [Online: web] Accessed 15 November 2008, URL: <http://www.fao.org/countryprofiles/index.asp?iso3=PAK>.

<sup>75</sup>Rind, Sardar Yar Mohammad (2003), "Agricultural, Perspective and Policy", Minister for Food, Agriculture and Livestock, Pakistan, p.7, [Online: web] Accessed 15 November 2008, URL: <http://www.pakboi.gov.pk/pdf/Agriculture%20Perspective%20&%20Policy.pdf>.

Livestock has emerged as an important subsector of agriculture. Similarly, fisheries play an important role in national income through export earnings. Government has identified agriculture as a priority area for addressing problems of unemployment, poverty alleviation and for fostering economic development.<sup>76</sup>

### **Growth in Agriculture**

The growth in agricultural sector and growth in national economy moves hand in hand. The wide fluctuations in agricultural growth have greatly influenced national economy. The sixties was a period of green revolution wherein dwarf cultivars of wheat and rice with high turnover of photosynthesis were introduced. This brought a quantum jump in productivity of these cereals. This resulted in an average growth rate of 5.1 per cent during the decade. The growth however retarded in seventies to 2.4 per cent. The massive nationalisation policy of the private enterprises had an overall negative impact on the economy. However, the seventies was a period of high public sector investments in agriculture sector.<sup>77</sup>

The results of high investment in seventies were visible in eighties. The average growth rate during the decade was 5.4 per cent. Eighties was period of Government interventions. The Agricultural Prices Commission was setup during this period to institutionalise support prices for major crops. Massive procurement operations were carried out by public sector during this decade. This intervention curtailed the role of private sector. The farmers' problems of crashing prices during the period of glut were in general addressed to some extent. Prior to eighties, the agricultural policy was lob sided. The emphasis had been mainly on new technologies, inputs and investments. The policy did not address the issue of distortions on output side. The country took corrective measures during eighties to address issues of stabilising output prices.<sup>78</sup>

The Government at the debut of the nineties started closing down public sector institutions that had played a major role in procurement of agricultural commodities.

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<sup>76</sup> Arif, Mazhar (2007), "Agriculture and Food Security In Pakistan", p.10. [Online: web] Accessed 10 December 2008 URL: <http://www.sappk.org/reports/agriculture%20and%20food%20security.pdf>

<sup>77</sup> Afzal, Muhammad (1992), "Review of Prices of Agricultural Inputs and Outputs", *Pakistan Journal of Agricultural Economics*, 1(2): 1-11.

<sup>78</sup> Chaudhry, M. Ghaffar and Ghulam Mustafa Chaudhry (Winter 1997), "Pakistan's Agricultural Development since Independence: Intertemporal Trends and explanations", *The Pakistan Development Review*, Part II, 36(4):593-12.

Cotton Export Corporation (CEC), Rice Export Corporation (REC) and Agricultural Marketing and Storage Limited (AMSL) were closed. The procurement operations were accordingly curtailed and confined to a number of restricted commodities. During middle of the decade, insect pressure was encountered in cotton especially the American Boll Worm and Army Worm inflicted heavy losses to the economy. In late years of the decade, severe drought started which inflicted a colossal loss to both crops and livestock sectors. There were wide fluctuations in growth of agriculture sector during the decade.<sup>79</sup>

### **The Crisis in Agriculture**

The pattern of growth in the crop sector during the 1990s is characterised by a slowdown in the annual growth rate of major crops, a declining growth rate of factor productivity and an increased instability of output growth. For example the average annual growth rate of major crops declined from 3.34 per cent during the 1980s to 2.38 per cent during the 1990s.<sup>80</sup> At the same time, the frequency of negative growth in some of the major crops during the last seventeen years has been significantly higher than in the preceding two decades. If we consider wheat, which is by far the largest crop (it accounts for over 30 per cent of value added in major crops), it is found that the average annual growth rate has been steadily declining since the onset of the 'Green Revolution'. The slowdown in the growth of yields per acre gives cause for concern in view of the fact that it has come at a time when the extensive margin in the crop sector has been reached and further growth will have to depend on increasing the efficiency of input use.<sup>81</sup>

Under conditions in which higher input use per acre is required to maintain yields, subsistence farmers with few resources are likely to suffer a greater than average decline in yields compared to large farmers. At the same time due to lack of savings to fall back

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<sup>79</sup>Arif, Mazhar (2007), "Agriculture and food security in Pakistan", p.12, [Online: web] Accessed 10 December 2008, <http://www.sappk.org/reports/Agriculture%20and%20Food%20Security.pdf>.

<sup>80</sup>Khan, Mahmood Hasan (1997), "Agricultural 'Crisis' in Pakistan: Some Explanations and Policy Options", *The Pakistan Development Review*, 36(4):419-466.

<sup>81</sup>Chaudhry, M. Ghaffar (1982), "Green Revolution and Redistribution of Rural Incomes: Pakistan's experience", *The Pakistan Development Review*, 21 (3): 173-205.

upon, poor farmers are relatively more vulnerable to bad harvests under conditions of unstable growth.<sup>82</sup>

The basic philosophy has been to maintain a growth rate in agriculture sector higher than population growth rate. As the scope to increase the area under crops is limited, the major emphasis will be on increasing productivity. In livestock also the focus will be on increasing efficiency and productivity. Slower and more unstable growth would be accompanied by a tendency for growing inequality in rural income distribution, together with increased poverty. The available evidence suggests that Pakistan has its task cut out on food security front.

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<sup>82</sup>Kemal, R. and et al.(2003), "Poverty, growth and governance" ,*Pakistan National Human Development Report 2003*,[online: web] Accessed 25 December 2008,URL:  
<http://www.Planipolis.iiep.unesco.org/upload/pakistan/pakistan%20hdr.pdf>.

## Chapter Two

# Agriculture Food Production in Pakistan

## **Agriculture Food Production in Pakistan**

The concept of providing people with food security extends from the individual and local community level to the global level. At the individual level, the concept of food security implies that under all circumstances each man, woman and child has access to sufficient, good quality food to meet the individual dietary requirements consistent with normal active life. At the national and regional levels, food security implies an assured availability of food through production, stock drawdown, trade or food aid to meet minimum requirements per capita, and also to meet any unexpected shortfall over a limited period.<sup>1</sup>

The achievement of food security requires the utilisation of both renewable and non-renewable agricultural resources and carries the risk of environmental degradation if managed inappropriately. Alarming food supply and demand deficits are projected to the year 2020 and beyond for Pakistan, based on its current low investment/low growth agricultural sector. Evidence suggests that agricultural productivity growth and increases in production may not keep pace with past growth rates. Part of the problem is an underfunded and poorly managed agricultural research system that cannot hope to contribute significantly to increasing agricultural productivity now or in the future.<sup>2</sup>

This chapter discusses the food security situation in Pakistan in terms of food production availability and policy actions undertaken to promote food security. Pakistan is a low-income developing country with a per capita income of US\$ 443 in 1999-2000. The country has made significant progress in half a century since independence in 1947, when it was a predominantly agricultural economy.<sup>3</sup>

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<sup>1</sup>FAO(13-17 Nov.1996), Food and Agriculture Organisation, *World Food Summit Report*, Rome, p. 8,[Online: web] Accessed 15 December 2008, URL:[http://www.fao.org/wfs/index\\_en.htm](http://www.fao.org/wfs/index_en.htm)

<sup>2</sup>Nagy, Joseph G. and M. A. Quddus (1998), "The Pakistan Agricultural Research System : Present Status and Future Agenda" *The Pakistan Development Review*, summer ,37 (2):167—187

<sup>3</sup>United Nations System in Pakistan(2000), "United Nations Statement on Food Security in Pakistan ", Islamabad, p.5,[Online: web] Accessed 15 December 2008, URL:<http://www.rdfs.net/OLDsite/EN/News/Pakistan1.pdf>



## **Agriculture in Pakistan**

Pakistan is basically an agricultural country and its economy is mainly agrarian. It is the biggest sector of the economy and the country earns about 35-40 per cent of the national income from it. Pakistan like many developing countries of the world is faced with the problem of low agricultural productivity. Pakistan is facing the challenge of producing more food and fibre, while there is little room for expansion in the cultivated area and yield per unit area of various crops are very low. In spite of the fact that Pakistan is blessed with a galaxy of climate, soil condition and irrigation water. The country is totally dependent on agriculture for the supply of food and fibre. Therefore, it is imperative to increase food and fibre production to cope up, not only with ever growing requirements of the country, but also for the sake of foreign exchange earnings and to attain self-sufficiency. Rapid agricultural growth can stimulate and thus sustain the pace of industrial growth, thus setting into motion a mutually reinforcing process of sustained economic growth.<sup>4</sup>

Agriculture is considered the mainstay of Pakistan's economy. More than 67 per cent of the country's rural population is directly or indirectly linked with agriculture for their livelihood. Whatever happens to agriculture is bound to affect the livelihood and consequently food security of the poor rural people.<sup>5</sup> Notwithstanding its declining share in GDP (Gross Domestic Product), agriculture is still the single largest sector, contributing 21 per cent to the GDP and employing 44 per cent of the workforce. Decline of agriculture and shrinking livelihood opportunities have resulted in rising poverty in rural areas.<sup>6</sup>

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<sup>4</sup>“In Pakistan agriculture is the largest income generating sector. It employs more than 45 per cent of the country's total labour force and supports directly or indirectly about 68 per cent of the population for their sustenance. It contributes about 65 per cent to total export earnings derived from raw and processed agricultural commodities.” Alam, S.M. and M.H. Naqvi (2003), “Pakistan Agriculture- 2003”, [Online: Web] Accessed 22 February 2009, URL: <http://www.pakistaneconomist.com/pagesearch/search-engine2003/s.e155.asp>.

<sup>5</sup> Arif, Mazhar (2004), *Land, peasants and Poverty: Equitable Land Reforms in Pakistan*, Islamabad: The Network Publications, p.23.

<sup>6</sup> Government of Pakistan (2008), *Pakistan Economic Survey 2007-08*, Ministry of Finance, Islamabad, p.16, [Online: Web] Accessed 22 December 2009, URL: <http://www.accountancy.com.pk/docs/economic-survey-pakistan-2007-08-02.pdf>.

Agriculture is an important sector, providing food to the fast growing population of the country. With a population growth rate of 2.23 per cent, there will be a net addition of 3.0 million people each year. According to United Nations Statement on Food Security, in more than 50 years (1948-2000), the population has increased fourfold but during this period the production of wheat, the major food crop, has increased only 2.9 fold. Pakistan Agricultural Research Council, however, claims that wheat production in the country has increased by 647 per cent (more than 6.4 fold) during 1948 to 2006 whereas increase in the area was 210 per cent during this period. The country's consumption requirement, however, is approximately 21.3 million tons per year.<sup>7</sup>

In Pakistan, agricultural production is dominated by crop production, which accounts for almost 61 per cent of agriculture's GDP (at constant prices). It is important to note that livestock accounts for 52.2 per cent of agricultural value added, contributes 11 per cent to GDP and affects the lives of 30 – 35 million people in rural areas.<sup>8</sup> In 2007, fisheries and forestry made up about four per cent of the GDP. There are three major crops in production; wheat, rice, and sugarcane. Among the minor crops the most important are; fruits and vegetables, followed by pulses and oilseeds. The main successes since the 1960s have been in the production of wheat, rice, cotton and poultry products. Although self-sufficiency has not been achieved in grain production, rice and cotton have contributed substantially to increased export earnings.<sup>9</sup>

During the period of July 2008 to March 2009, the major crops sub-sector witnessed a growth rate of only 7.7 per cent. The other sub-sectors such as minor crops and livestock did well in the 1990s but fisheries slowed down. Income from forestry is declining due to ban on harvesting enforced since 1997-98 for forestry protection. Wheat production fluctuated between 14.56 million tons in 1990-91 to 23.4 million in the period

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<sup>7</sup>“Food insecurity in Pakistan is a product of poverty and inadequate food availability. The term food poverty is commonly used to determine the level of poverty viz-a-viz food security in a country.” Arif, Mazhar (2007), “Agriculture and Food Security in Pakistan” [Online: Web] Accessed 10 December 2009, URL:<http://www.sappk.org/reports/agriculture%20and%20food%20security.pdf>, p.7.

<sup>8</sup> Government of Pakistan (2008), *Pakistan Economic Survey 2007-08*, Ministry of Finance, Islamabad, p.18, [Online: Web] Accessed 22 December 2009, URL:<http://www.accountancy.com.pk/docs/economic-survey-pakistan-2007-08-02.pdf>.

<sup>9</sup> *Ibid.*

of July 2008 to March 2009. The relative success story of wheat, rice and cotton has not been repeated in sugarcane though its production has increased mainly through increased area which went up from 190,000 hectares in 1948 to a record 9062 thousand hectares in 2008-09, showing an increase of 5.9 per cent over last year's area of 8550 thousand hectares.<sup>10</sup> Sugarcane yields have remained more or less static. For oil seeds, the country turned from self-sufficiency into a major importer of edible oils. In 2000, the imports represented 65 per cent of domestic consumption. Area under maize has doubled since 1948 but its yield has not shown any significant improvement.<sup>11</sup>

The major reasons for low productivity and instability includes: delayed harvesting of kharif crops like cottons, sugarcane and rice, and consequent late planting of wheat, non availability of improved inputs like seeds, inefficient fertilizer use, weed infestation, shortage of irrigation water, drought in rain-fed area and terminal heat stress, soil degradation, and inefficient extension services. Moreover, farmers are not aware of modern technologies because of weak extension services system.<sup>12</sup>

## **Natural Resources**

Pakistan has a rich and vast natural resource base, covering various ecological and climatic zones; hence the country has great potential for producing all types of food commodities.

### **Land resources:**

The total geographical area of Pakistan is 79.61 million hectares (ha), of which 59 million ha have been covered by soil survey. In 1998-99, the cropped area was 22.96 million ha, of which 18.00 million ha is irrigated, while the remaining 5.0 million ha is rainfed. The area under forest is 3.60 million ha. The cultivable wasteland is 9.29 million ha. From 1959 through 1998-99, the cultivated land has increased at a minimal rate of 0.82 per cent. In this regard, Pakistan has one of the highest proportions of irrigated-

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<sup>10</sup>Government of Pakistan (2009), *Pakistan Economic Survey 2008-09*, Ministry of Finance, Islamabad, p.18, [Online: web] Accessed on 12 June 2009 URL:

[www.pro-pakistan.com/.../download-economic-survey-of-pakistan-2008-09/](http://www.pro-pakistan.com/.../download-economic-survey-of-pakistan-2008-09/)

<sup>11</sup>United Nations System in Pakistan (2000), "United Nations Statement on Food Security in Pakistan ", Islamabad, p.10, [Online: web] Accessed 15 December 2008 URL:<http://www.rdfs.net/OLDSite/EN/News/Pakistan1.pdf>.

<sup>12</sup>NARC (1994), National Agricultural Research Council "National Coordinated Wheat Programme" Briefing Paper, Islamabad, Pakistan, p.15.

cropped area. The cultivable wastelands offering good possibilities of crop production amount to 9.3 million hectares.<sup>13</sup> A good part of Pakistan is classified as arid to semi-arid where rainfall is not sufficient to grow agricultural crops. About 68 per cent of the geographical areas have annual rainfall of 250 mm, whereas about 24 per cent have annual rainfall of 251 to 500 mm. supplemental water is required for profitable agricultural production in these areas, which is mainly possible through water harvesting.<sup>14</sup>

Table 2 shows the agricultural land distribution by farm size. The much skewed distribution of the size of farm holdings is very striking. The small farms (up to 2 ha. in size) comprising nearly half (47.5 per cent) of all the farms account for only 11.2 per cent of the total land area. On the other hand, the large farms (over 10 ha.) which comprise only 6.8 per cent of all farms account for 39.8 per cent of the total farm area. However, there has been a decreasing trend in the number of and total area of large farms.<sup>15</sup>

**Table2: Land Distribution by Farm Size, 1999 Census of Agriculture**

| <b>Size of Farm in hectare</b> | <b>Per cent of the Total Number of Farms</b> | <b>Per cent of the Total Farm Area</b> | <b>Per cent of Farm Area Cultivated</b> |
|--------------------------------|--|--|---|
| < 2                            | 47.5   | 11.2                                   | <b>92</b>                               |
| 2 - < 5                        | 33.4   | 27.5                                   | <b>91</b>                               |
| Sub-total                      | 80.9   | 38.7                                   |   |
| 5 - < 10                       | 12.2   | 21.5                                   | <b>80</b>                               |
| 10 - < 10                      | 4.7  | 15.8                                   | <b>79</b>                               |
| 20 - < 60                      | 1.8  | 13.9                                   |   |

<sup>13</sup>United Nations System in Pakistan (2000), "United Nations Statement on Food Security in Pakistan", Islamabad, p.11, [Online: web] Accessed 15 December 2008,

URL:<http://www.rdfs.net/OLDsite/EN/News/Pakistan1.pdf>.

<sup>14</sup> Blood, Peter (1994), "Pakistan: A Country Study", Washington, p.9.

<sup>15</sup>United Nations System in Pakistan(2000), "United Nations Statement on Food Security in Pakistan ", Islamabad, p.5,[Online: web] Accessed 15 December 2008 URL:

<http://www.rdfs.net/OLDsite/EN/News/Pakistan1.pdf>

|           |     |      |    |
|-----------|-----|------|----|
| > 60      | 0.3 | 10.1 | 70 |
| Sub-total | 6.8 | 39.8 | 54 |
| Total     | 100 | 100  |    |

Source: United Nations System in Pakistan (2000), "United Nations Statement on Food Security in Pakistan", Islamabad, p.5, [Online: web] Accessed 15 December 2008 URL: <http://www.rdfs.net/OLDSite/EN/News/Pakistan1.pdf>

Land holdings are fragmented making on-farm water management and other farm operations difficult. There have been efforts aimed at land consolidation but the results are not very visible. The skewed distribution of landholdings has not only adversely affected the access of the rural poor to basic production resources but also cropping intensity and consequently farm productivity. The main reasons for this negative relationship are the large proportion of absentee landlords in large farms and limited access to farm inputs and technology by small farmers.

### **Water resources**

The total geographical area of Pakistan according to agricultural statistics of Pakistan was 79.61 million hectares (mha) (about 197 million acres) in 1998-99, of which only 25 per cent or 19.82 mha (about 48.96 million acres) are currently under cultivation.<sup>16</sup> Agriculture in Pakistan is basically irrigated with 82 per cent of cultivable area equipped with irrigation infrastructures. During the last 46 years, the area with irrigation facilities increased from 8.21 to 18.0 million ha, at an average annual rate of 1.7 per cent.<sup>17</sup>

At present Pakistan have three major reservoirs (Tarbela, Mangla and Chashma), 23 barrages/head works/syphons, 12 inter river links and 45 canal commands extending for about 38,000 miles to serve over 90,000 water courses. Rainfall in this area is seasonal and generally varies from 50 to 900 mm with an annual average of 250

<sup>16</sup>Alam, Syed Manzoor (10 -16 Sep 2001), "Agriculture in Pakistan", *Pakistan & Gulf Economist*, issue 31:45.

<sup>17</sup>United Nations System in Pakistan(2000), "United Nations Statement on Food Security in Pakistan ", Islamabad, p.8,[Online: web] Accessed 15 December 2008 URL: <http://www.rdfs.net/OLDSite/EN/News/Pakistan1.pdf>.

mm. About 75 per cent of lands were cultivated through irrigation water. While, nearly 25 per cent of land is cultivated through tube-wells, ponds and rain water.<sup>18</sup>

**Table3: Source of Irrigation of Irrigated Areas for Selected Years (in mha)**

| Source of Irrigation | 1951-1952 | 1961-1962 | 1971-1972 | 1981-1982 | 1991-1992 | 1998-1999 |
|----------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Cultivable area      | 15.11     | 16.88     | 19.09     | 20.42     | 21.06     | 21.87     |
| Irrigated area       | 8.21      | 10.46     | 12.99     | 15.41     | 16.85     | 18.00     |
| Canal irrigation     | 8         | 8.89      | 9.57      | 11.46     | 13.68     | 14.57     |
| Tube-well            | Na        | 0.14      | 2.10      | 2.99      | 2.72      | 3.00      |
| Wells                | Na        | 0.74      | 0.67      | 0.30      | 0.16      | 0.16      |
| Tanks                | Na        | 0.03      | 0.01      | 0.06      | 0.08      | 0.09      |
| other                | Na        | 0.66      | 0.64      | 0.60      | 0.21      | 0.17      |

Source: United Nations System in Pakistan (2000), "United Nations Statement on Food Security in Pakistan", Islamabad, p.8, [Online: web] Accessed 15 December 2008 URL: <http://www.rdfs.net/OLDsite/EN/News/Pakistan1.pdf>

## **Sustainable Food Security**

Pakistan is located at the mouth of Persian Gulf in the Arabian Sea that extends into the Indian Ocean. This position is of strategic geo-political importance and the region has already undergone turmoil over last 20 years.<sup>19</sup> The sustainable domestic food security through own indigenous production is therefore an issue of prime importance in

<sup>18</sup>Alam, Syed Manzoor (10 -16 Sep 2001), "Agriculture in Pakistan", *Pakistan & Gulf Economist*, issue 31:34.

<sup>19</sup>Hanif, Muhammad and et al. (January 2004), "Agricultural perspective and policy", p.5, Ministry of Food, Agriculture and Livestock, Islamabad.

Pakistan's Agricultural Policy. The commodities that make an integral component of food security are food grains, edible oils and sugar. Pakistan can ill afford a fragile or marginalised situation in production of these commodities. The details are as follows:

### **Food Grains**

Pakistan's production of cereal crops is around 25 million tons. The important food grains are wheat, rice and the coarse grains. Wheat is Pakistan's major and staple food crop. Pakistan generally remained a food deficit country and the requirements were met through imports. The country has built up a huge network of agricultural research institutions to strengthen research on crops to improve productivity. The major focus among cereals was on wheat and rice crops although to lesser degree some attention was also given to maize crop.<sup>20</sup>

More than two-thirds of Pakistan's population lives in rural areas and their livelihood continues to revolve around agriculture and allied activities. Like in other developing countries, poverty in Pakistan is largely a rural phenomenon; therefore, development of agriculture will be a principal vehicle for alleviating rural poverty. Empirical evidence suggests that higher growth in agriculture on a sustained basis had a lasting impact on poverty reduction in Asia in the 1970s and the 1980's.<sup>21</sup>

In later decades the impact of agriculture on poverty reduction became weaker as the South Asian countries in general, and Pakistan in particular, began to witness productivity gains stagnating on account of structural issues, including limited investment in research and extension services. Due to the recent global food crises prices of staple foods have seen increases ranging from 30 per cent to 150 per cent in 2007 and 2008 in world market. The impact of this phenomena, according to the World Bank, has increased the number of malnourished people worldwide by 119 million in 2007 and 2008 bringing the total to nearly one billion people (967 million) worldwide. Oxfam's 2008 report,

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<sup>20</sup>*Ibid.*

<sup>21</sup>Government of Pakistan (2008), *Pakistan Economic Survey 2007-08*, Ministry of Finance, Islamabad, p.14, [Online: Web] Accessed 22 December 2009, URL:<http://www.accountancy.com.pk/docs/economic-survey-pakistan-2007-08-02.pdf>.

“Food Crisis in Pakistan: Real or Artificial”, says that the number of poor in the country has risen from 60 to 77 million since 2007 because of food inflation.<sup>22</sup>

The emerging economies like Pakistan have become more affluent as they have sustained higher economic growth in recent years. Such affluence is impacting the consumption patterns of households including a dietary change towards higher quality food such as meat and dairy products. As a result, the production of these items is rising globally. In Pakistan however, the livestock and dairy sectors have received little or no attention by the successive governments in the past despite the fact that it accounts for 52 per cent of agriculture, 11 per cent of GDP and affects the lives of 30-35 million people in rural areas.<sup>23</sup> The volatility in agricultural growth is mainly caused by crop sector which is associated with the vagaries of mother nature, pest attacks, adulterated pesticides etc. Such volatility is detrimental to income growth of farmers and hampers government efforts to reduce poverty.

**Table4: Agriculture Growth in Pakistan (Per cent)**

| Year       | Agriculture | MajorCrops | MinorCrops |
|------------|-------------|------------|------------|
| 2002-03    | 4.1         | 6.8        | 1.9        |
| 2003-04    | 2.4         | 1.7        | 3.9        |
| 2004-05    | 6.5         | 17.7       | 1.5        |
| 2005-06    | 6.3         | -3.9       | 0.4        |
| 2006-07    | 3.7         | 8.3        | -1.3       |
| 2007-08    | 1.5         | -3.0       | 4.9        |
| 2008-09(p) | <b>4.7</b>  | <b>7.7</b> | <b>3.6</b> |

\* P=Provisional (July-March)

Source: Government of Pakistan (2009), *Pakistan Economic Survey 2008-09*, Ministry of Finance, Islamabad, [Online: web] Accessed on 12 June 2009, URL: <http://www.pro-pakistan.com/.../download-economic-survey-of-pakistan-2008-09/> -

<sup>22</sup>Shikoh, Rafiuddin and Shuriah Niazi (10 Nov.2008), “The global food crisis and the Muslim world”, *Globalimagazine*, Berlin, Germany.

<sup>23</sup>Hanif, Muhammad and et al. (January 2004), “Agricultural perspective and policy”, p.42, Ministry of Food, Agriculture and Livestock, Islamabad.



Agriculture performed poorly in 2007-08, growing at 1.5 per cent against the target of 4.8 per cent. The poor performance of agriculture can be attributed to an equally poor performance of major crops and forestry, registering negative growth of 3.0 per cent and 8.5 per cent, respectively. Livestock, minor crops and fishing have been the saving grace as these sectors have performed reasonably well to compensate the performance of major crops and forestry to arrive at 1.5 per cent growth in agriculture this year. Major crops, accounting for 34 per cent of agriculture and 7.1 per cent of GDP, suffered on account of poor showing of wheat and cotton and less than satisfactory performance of rice crop.<sup>24</sup>

Despite the poor show of wheat this year, composite efforts have enabled Pakistan to achieve self-sufficiency in wheat production over last three years in a row. As a policy it is planned to continue assuring national food security in staple food of wheat. For this purpose, the agricultural research, manpower training and institutional support for provision of quality seeds for wheat production system would remain an area of high priority in agricultural policy. Rice is another important food crop of the country. However, Pakistan is already surplus by 2.5 million tons of rice and the export of rice especially aromatic basmati rice is an important source of foreign exchange earnings. There is massive planned shift from coarse irri rice to fine basmati rice. Simultaneously, Pakistan as a policy, plans to improve productivity for both basmati and irri rice to improve profitability of the farming community.<sup>25</sup>

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<sup>24</sup>Government of Pakistan (2008), *Pakistan Economic Survey 2007-08*, Ministry of Finance, p.18, Islamabad, [Online: Web] Accessed 23 may 2009, URL: [http:// www.accountancy.com.pk/.../economic-survey-pakistan-2007-08-02.pdf](http://www.accountancy.com.pk/.../economic-survey-pakistan-2007-08-02.pdf),

<sup>25</sup>Hanif, Muhammad and et al. (January 2004), "Agricultural perspective and policy", p.15, Ministry of Food, Agriculture and Livestock, Islamabad.

**Table5: Production of Major Crops in Pakistan (in 1000 tonnes )**

| Year            | Sugarcane        | Rice           | Maize          | Wheat           |
|-----------------|------------------|----------------|----------------|-----------------|
| 2003-04         | 53419<br>(2.6)   | 4848<br>(8.3)  | 1897<br>(9.2)  | 19500<br>(1.6)  |
| 2004-05         | 47244<br>(-11.6) | 5025<br>(3.6)  | 2797<br>(47.4) | 21612<br>(10.8) |
| 2005-06         | 44666<br>(-5.5)  | 5547<br>(10.4) | 3110<br>(11.2) | 21277<br>(-1.6) |
| 2006-07         | 54742<br>(22.6)  | 5438<br>(-2.0) | 3088<br>(-0.7) | 23295<br>(9.5)  |
| 2007-08         | 63920<br>(16.8)  | 5563<br>(2.3)  | 3313<br>(7.3)  | 21749<br>(-6.6) |
| 2008-09<br>*(p) | 50045<br>(21.7)  | 6952<br>(24.9) | 4036<br>(11.9) | 23421<br>(11.7) |

\* P=Provisional (July-March)

Source: Government of Pakistan (2009), *Pakistan Economic Survey 2008-09*, Ministry of Finance, Islamabad, [Online: web] Accessed on 12 June 2009, [www.pro-pakistan.com/.../download-economic-survey-of-pakistan-2008-09/-](http://www.pro-pakistan.com/.../download-economic-survey-of-pakistan-2008-09/)

The wheat crop was adversely affected by the shortage of irrigation water by 23.3 per cent over normal supplies during Rabi and inordinate spike in prices of DAP fertilizer. Accordingly, production of wheat declined to 21.7 million tons - from 23.3 million tons in 2007, thus registering a decline of 6.6 per cent.<sup>26</sup>

In sheer contrast, the two other major crops performed better with sugarcane recording highest ever production level of 63.9 million tons — 16.8 per cent higher than last year. The production of rice witnessed a modest growth of 2.3 per cent and stood at 5.6 million tons. Minor crops accounting for 12 per cent in agriculture value added posted a growth of 4.9 per cent against the negative growth of 1.3 per cent in 2007. The

<sup>26</sup>Government of Pakistan (2008), *Pakistan Economic Survey 2007-08*, Ministry of Finance, p.17, Islamabad, [Online: Web] Accessed 23 May 2009, URL: <http://www.accountancy.com.pk/.../economic-survey-pakistan-2007-08-02.pdf>,

performance of livestock accounting for 52.2 per cent of agricultural value added was satisfactory at 3.8 per cent. The performance of fisheries has been impressive as it grew by 11 per cent in 2007-08 because inland fish catch has increased by 11.1 per cent while the output of marine fishing grew by 11.5 per cent during 2007- 08. Forestry followed the traditional negative growth pattern for the fifth year in a row.<sup>27</sup>

**Table 6: Area and Production of Other Major Kharif and Rabi Crops**

| Crops                 | 2006-07                    |                                | 2007-08                    |                             | per cent<br>Change |
|-----------------------|----------------------------|--------------------------------|----------------------------|-----------------------------|--------------------|
|                       | Area<br>(1000<br>hectares) | Production<br>(1000<br>tonnes) | Area<br>(1000<br>hectares) | Production<br>(1000 tonnes) |                    |
| <b>KHARIF</b>         |                            |                                |                            |                             |                    |
| Maize                 | 1017                       | 3088                           | 1015                       | 3313                        | 7.3                |
| Bajra                 | 504                        | 238                            | 531                        | 305                         | 28.1               |
| Jawar                 | 292                        | 180                            | 281                        | 170                         | -5.6               |
| <b>RABI</b>           |                            |                                |                            |                             |                    |
| Gram                  | 1052                       | 838                            | 1046                       | 823                         | -1.8               |
| Barley                | 94                         | 93                             | 92                         | 98                          | 5.4                |
| Rapeseed<br>& Mustard | 256                        | 212                            | 228                        | 271                         | 27.8               |

Source: Government of Pakistan (2008), *Pakistan Economic Survey 2007-08*, Ministry of Finance, Islamabad, [Online: Web] Accessed 23 may 2009, URL: [http:// www.accountancy.com.pk/.../economic-survey-pakistan-2007-08-02.pdf](http://www.accountancy.com.pk/.../economic-survey-pakistan-2007-08-02.pdf)

## **Green Revolution**

The Green Revolution means introduction of new technology in agriculture sector, in order to increase its production through different measures.<sup>28</sup> The revolution gained

<sup>27</sup> *Ibid.*

<sup>28</sup> "A significant increase in agricultural productivity, resulting from the introduction of high-yield varieties of grains, the use of pesticides, and improved management techniques". [Online: Web] Accessed 17 May 2009 URL:<http://www.thefreedictionary.com/green+revolutions>.

momentum from scientific and technological breakthrough in improved quality and utilisation of inputs like high yielding varieties (HYV) of seed, fertilisers, pesticides and water. There was a greater spread of agricultural mechanisation mainly in terms of tube wells, tractors and other machinery.

**Stages of Green Revolution:**

For the purpose of analysis, the green revolution can be divided into four different stages.<sup>29</sup>

- *Scientific Breakthrough*

The scientific Breakthrough is the discovery of HYV of seeds. This is usually associated with Mexican wheat varieties (Mexi-Pak) developed in the international corn and wheat improvement center and the high yielding rice varieties in the International Rice Research Institute (IRRI) in Philippines.

- *Technological Breakthrough*

To achieve optimal level of output from above HYVs, pertinent technological developments were made in the field of mechanisation and water resource utilisation.

- *Production Breakthrough*

To have optimal agriculture produce, there was a dire need of excess supply of inputs such as fertilisers, chemicals, machinery and HYVs of seeds. With production breakthrough a large scale supply of all the inputs was made available. In an addition the government made facilitating policies pertaining to easy and cheap availability of inputs and prices stability of outputs etc.

- *Agricultural Breakthrough*

The efforts made in earlier phases helped a lot to give enormous output. It covered all the main crops and also the various enterprises of animal production.

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<sup>29</sup>Ahmad, Imtiaz and et al. (Dec.2004), "Why the green revolution was short run phenomena in the development process of Pakistan: a lesson for future", *Journal of Rural Development & Administration*, 35(1-4):267-278.

This agriculture produce directly and indirectly benefited the small as well as large-scale farmers.

**Impact on Agricultural Production:**

Pakistan's wheat yield rose from 801 kilograms per hectare in 1959/60 to 2,026 kilograms per hectare in 1996/97; over the same period, the per hectare rice yield has risen from 826 to 1,912 Kg. per hectare. Similarly, annual wheat production increased from 4 million tonnes in 1959/60 to 16.4 million tonnes in 1996/97, while rice production rose from a million tonnes to 4.3 million tonnes during the same period. These enhanced levels of production were accompanied by correspondingly impressive changes in the area under food crops. The area under wheat rose from 4.9 million hectares in 1959/60 to 8 million hectares in 1996/97, and the rice area increased from 1.2 million hectares to 2.25 million hectares over the same period. Accordingly, as a result of increases both in yield and in cropped area, wheat production has quadrupled in the past 36 years. Over the latter period, rice yield has more than doubled, while the land area devoted to this crop has almost doubled.<sup>30</sup>

**Table6: Post-Green Revolution Increases in Wheat and Rice Yield/Production/Area**

| <b>Year</b> | <b>Crop</b> | <b>Yield/Hectare<br/>(kilograms)</b> | <b>Production/Year<br/>(million tonnes)</b> | <b>Land Area<br/>(million hectares)</b> |
|-------------|-------------|--------------------------------------|---|---|
| 1959-60     | Wheat       | 801                                  | 4.0   | 4.9                                     |
| 1996-97     | Wheat       | 2,026                                | 16.4  | 8.0                                     |
| 1959-60     | Rice        | 826                                  | 1.0   | 1.2                                     |
| 1996-97     | Rice        | 1,912                                | 4.3   | 2.25                                    |

Source: Niazi, Tarique (January 2004), "Rural Poverty and the Green Revolution: The Lessons from Pakistan" *The Journal of Peasant Studies*, 31(2):242-260

<sup>30</sup> Niazi, Tarique (January 2004), "Rural Poverty and the Green Revolution: The Lessons from Pakistan" *The Journal of Peasant Studies*, 31(2):242-260.

### **Factors Responsible for this Phenomenal Growth:**

There are many factors responsible for this phenomenal growth; some are of general nature, whereas the others are Pakistan specific. Each one is explained below:

#### **General Factors**

There were certain common factors existing in those countries, which adopted Green revolution. High yield varieties, progress in fertiliser manufacturing, better quality pesticides and insecticides increased acreage of land to be disinfected and better management of human resource and an effective utilization of non-human resources was made in these countries. The quantity and quality of land inputs as determined by the total cultivated area and the cropping intensity was improved. Water availability was ensured, keeping in view its quantity required at a pertinent time during growth of crops.<sup>31</sup>

#### **Pakistan Specific Factors**

Although the above general factors substantially contributed to the rapid increase in agricultural production of Pakistan, yet, there were some specific factors that played important role in agricultural growth in Pakistan, which are given below:<sup>32</sup>

- Government policies to provide subsidies and credit to the producers encouraged them to develop and adopt new technology for accelerated agricultural growth.
- Incentive prices were offered to the farmers through the price support programme, which guaranteed them to sell produce in the market. This reduced the element of risk and uncertainty and created a conducive atmosphere to enhance agricultural production.
- The government's policies made way for the enhancement of private investment in agriculture sector especially in manufacturing and installation of tube wells,

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<sup>31</sup>"India and Pakistan during the Green Revolution", The story of the Green Revolution in India and Pakistan is the story of rice and wheat, hunger and governmental response to the suffering. [Online: web] Accessed 23 February 2009, URL: [http://www.livinghistoryfarm.org/farminginthe50s/crops\\_16.html](http://www.livinghistoryfarm.org/farminginthe50s/crops_16.html).

<sup>32</sup>Ahmad, Imtiaz and et al. (Dec.2004), "Why the green revolution was short run phenomena in the development process of Pakistan: a lesson for future", *Journal of Rural Development & Administration*, 35(1-4):267-278.

machinery and allied equipments. The annual increase in 1963- 64 and 1964-65 was around 35 per cent.

- Transmission of the improved technology to the farmers through Extension Service Programmes.

### **From Green to Gene Revolution<sup>33</sup>**

The Green Revolution has essentially run its course and its achievable potential has been largely realised. The emergence of post-green revolution problems, especially pests and diseases, declining water resources, land degradation coupled with high population growth are now posing threats to food security and environmental sustainability of the current production systems. When we couple this with the looming water shortages, it is believed that it will be difficult for Pakistan to support a population of 230 - 260 million in 2030, with current technology and current best possible practice alone. Biotechnology will play the critical role in meeting agricultural targets during this century, leading to higher production, better resistance, and lower costs of production.<sup>34</sup>

Nobel Peace Laureate Norman Borlaug says the 21st Century challenge to agriculture will be producing sufficient supplies of food to sustain the world's continued population growth. "Extending the Green Revolution to the Gene Revolution will provide a better diet at lower prices to many more food-insecure people."<sup>35</sup>

The global planting of transgenic crops is rising annually at a rapid rate from 1.7 million ha in 1996 to 81 million ha in 2004. By the end of 2004, transgenic crops were grown in several developed and developing countries; two-thirds of the world's transgenic area and more than 90 per cent production are located in developed countries.<sup>36</sup>

The issues with 'Gene' Revolution is access of the beneficiaries (farmers, scientists etc) to new technology. Biotechnology is generally knowledge intensive (use of

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<sup>33</sup> A **gene** is the basic unit of heredity in a living organism. All living things depend on genes. Genes hold the information to build and maintain their cells and pass genetic traits to offspring. In general terms, a gene is a segment of nucleic acid that, taken as a whole, specifies a trait. The notion of a gene has evolved with the science of genetics. [Online: web] Accessed 22 January 2009 URL: <http://www.accessexcellence.org/AE/AEPC/NIH/gene03.php>

<sup>34</sup> Evenson, Robert E. (winter 2005), "The green revolution and the gene revolution In Pakistan: policy implications", *The Pakistan Development Review*, part I, 44 (4):359-386.

<sup>35</sup> "Borlaug Urges Shift To Gene Revolution" (25 June 2003), Farm Press, [Online: Web] Accessed 22 January 2009 URL: <http://www.agbioworld.org/biotech-info/topics/borlaug/shift.html>

<sup>36</sup> "Agriculture: Food, Water and Land", p.4 [Online: Web] Accessed 23 February 2009 URL: [http://www.parc.gov.pk/IFPRI/Resources/vision\\_2030.pdf](http://www.parc.gov.pk/IFPRI/Resources/vision_2030.pdf).

DNA technology) and because of intellectual property rights research stations in Pakistan would not have easy access to the technology. Pakistan has not had a Gene Revolution because it has not yet established the food safety and environmental safety regulations required for the Gene Revolution.<sup>37</sup>

Pakistan is paying a “double penalty” for its inability to develop the regulatory systems required to take advantage of genetically modified (GM) crops, Not only does it lose the cost reductions enabled by GM crops, but because other countries have adopted GM crops, world prices are lower as a result.<sup>38</sup>

**Table 8: Green vs ‘Gene’ Revolution**

| <b>Tasks</b>        | <b>Green Revolution</b>                | <b>‘Gene’ Revolution</b>   |
|---------------------|--|----------------------------|
| Technology          | Hybridization(Dwarf Gene/Biodiversity) | Recombinant DNA Technology |
| Technology Transfer | Free                                   | Barriers                   |
| Inventor            | Public (NARS)                          | Private (MNCs), Few PS     |
| Regulations         | None                                   | WTO, TRIPS, SPS            |
| Thrust              | Public Good                            | Profit/Efficiency          |

Source: Evenson, Robert E. (winter 2005), “The green revolution and the gene revolution In Pakistan: policy implications”, *The Pakistan Development Review*, part I, 44(4):359–386

<sup>37</sup>Evenson, Robert E. (winter 2005), “The green revolution and the gene revolution In Pakistan: policy implications”, *The Pakistan Development Review*, part I, 44(4):359–386.

<sup>38</sup>GM is a special set of technologies that alter the genetic makeup of organisms such as animals, plants, or bacteria. Biotechnology, a more general term, refers to using organisms or their components, such as enzymes, to make products that include wine, cheese, beer, and yogurt. Combining genes from different organisms is known as recombinant DNA technology, and the resulting organism is said to be “genetically modified,” “genetically engineered,” or “transgenic.” GM products (current or those in development) include medicines and vaccines, foods and food ingredients, feeds, and fibers. [Online: Web] Accessed 23 February 2009, URL:<http://www.foodprocessing-technology.com/.../genetically-modified-organisms.html> .



The past four decades have seen two waves of agricultural technology development and diffusion to developing countries. The first wave was initiated by the Green Revolution in which improved “germplasm” was made available to developing countries as a public good through an explicit strategy for technology development and diffusion.<sup>39</sup> The second wave was generated by the Gene Revolution in which a global and largely private agricultural research system is creating improved agricultural technologies that are flowing to developing countries primarily through market transactions. Asymmetries between developed and developing countries in research capacity, market institutions and the commercial viability of technologies raise doubts regarding the potential of the Gene Revolution to generate benefits for poor farmers in poor countries.<sup>40</sup>

## **Farm Inputs**

### **Fertilizer:**

Fertilizer is one of the key inputs to agricultural production. Balanced usage of fertiliser helps in increasing crop yield from 30 to 60 per cent in different regions of the country. Almost the entire available soil in the country is nutrient deficient.<sup>41</sup> To overcome the problem of nutrient deficiency, use of nutrient fertiliser has become vital for achieving the higher agricultural production. However, the main impediment in exploring the full potential of the soil has remained below par due to imbalances in fertiliser usage especially, in terms of over application of nitrogenous fertiliser compared to phosphatic fertiliser. Realising the importance of balanced nutrition, the prices of 50 Kg bag of these fertilizers’ were reduced by Rs 250 for encouraging a more balanced use

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<sup>39</sup>“The hereditary material that is transmitted from one generation to another”. [Online: Web] Accessed 12 June 2009, URL: [http:// dictionary.reference.com/medical/search?db...germplasm](http://dictionary.reference.com/medical/search?db...germplasm) -.

<sup>40</sup>Pingali, Prabhu and Terri Raney (Nov. 2005), “From the Green Revolution to the Gene Revolution: How will the Poor Fare?” ESA Working Paper No. 05-09, p.1, Agricultural and Development Economics Division, FAO, [Online: Web] Accessed 12 may 2009, URL: <http://www.ftp://ftp.fao.org/docrep/fao/008/af276e/af276e00.pdf>.

<sup>41</sup>Government of Pakistan(2009), *Pakistan Economic Survey 2008-09*, Ministry of Finance, p.27, Islamabad , [Online: Web] Accessed 12 June 2009, URL: [http:// www.pro-pakistan.com/.../download-economic-survey-of-pakistan-2008-09/](http://www.pro-pakistan.com/.../download-economic-survey-of-pakistan-2008-09/) -.

of key fertilizers in 2006.<sup>42</sup> But following the steep increases in international prices of phosphatic and potassic fertilizers, the Government in July 2007, increased the relief in price from Rs 400 to Rs 470 per bag.<sup>43</sup>

The domestic production of fertilizers during 2007 to 2008 was less by 2.2 per cent (See Appendix no.1). On the other hand, the import of fertilizer in nutrient tonnes increased by 27.4 per cent, hence, the total availability of fertiliser increased by 3.9 per cent during 2007 to 2008. Total off-take of fertiliser remained flat 0.5 per cent mainly because off take pattern of nutrients also changed, as nitrogen off take increased by 11.4 per cent while that of phosphate and potash decreased by 25.3 and 33.3 per cent, respectively during 2007 to 2008. Increased international prices of phosphatic and potash fertilizers overshadowed the subsidy effect and eventually off take could not increase and remained at almost 2007's level.<sup>44</sup>

#### **Fertiliser Consumption:**

Fertiliser consumption has experienced an exponential growth during the last three decades. Urea consumption is about 4.0 million tons and DAP one million tons. In nutrient terms nitrogen consumption is 2.33 million tonnes and phosphate only 0.63 million tonnes, with N: P: K ratio of 3.7:1. It shows consumption skewed in favor of nitrogen, resulting in imbalance use of nutrients at national level.<sup>45</sup>

#### **Fertiliser Demand:**

Fertiliser demand by the year 2010 is estimated using three different approaches i.e. on food production requirements, agronomic needs and taking into account economic and non-economic variables such as exchange rate, crop and fertiliser prices and the development of irrigation and other infrastructure. It is projected that the country would

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<sup>42</sup>Government of Pakistan(2007),*Pakistan Economic Survey 2006-07*, Ministry of Finance,p.34, Islamabad, [Online: Web] Accessed 23 May 2009,URL:[http:// www.accountancy.com.pk/.../economic-survey-pakistan-2006-07-02.pdf](http://www.accountancy.com.pk/.../economic-survey-pakistan-2006-07-02.pdf).

<sup>43</sup>Government of Pakistan(2009), *Pakistan Economic Survey 2008-09*,Ministry of Finance, p.22, Islamabad, [Online: Web] Accessed 12 June 2009URL:[http:// www.pro-pakistan.com/.../download-economic-survey-of-pakistan-2008-09/](http://www.pro-pakistan.com/.../download-economic-survey-of-pakistan-2008-09/) -.

<sup>44</sup> *Ibid.*

<sup>45</sup>Hanif, Muhammad and et al. (January 2004), "Agricultural perspective and policy", p.17, Ministry of Food, Agriculture and Livestock, Islamabad.

need additional capacity of one million tons of urea and 1.5 million tons of DAP by the year 2010.<sup>46</sup>

### **Improved Seed**

It is generally accepted that high quality seed is the most effective input for improving productivity. Seed is an important component in agriculture productivity system. Seed has the unique position among various agricultural inputs because the effectiveness of all other inputs mainly depends on the potential of seeds. Improved Seed is a high technology product and is an innovation most readily adapted. The Seed Industry Project was launched in the country through promulgation of Seed Act, 1976. This enactment provides requisite infrastructure like National Seed Council, Provincial Seed Councils and Federal Seed Certification and Registration Department. The National Seed Council addresses all pursuits of seed both of public or private seed sector organisations.<sup>47</sup>

The Federal Government entrusts the Provincial Seed Councils function within the provincial territories for the purpose of this act. The department regulates and controls the quality seed through crop inspection and seed testing. Seed production/multiplication and distribution is carried out by public and private seed sector organisations like Punjab Seed Corporation, Sindh Seed Corporation (now as Foundation Seed Cell), Agricultural Development Authority, NWFP (North-West Frontier Province) (now as Department of Agriculture Extension and Research), Department of Agriculture Extension, Balochistan and private seed companies. Certified seed availability in the country is about 14per cent in wheat, 60per cent in cotton, 15.5per cent in paddy and 15per cent in maize. The MINFAL(Ministry of Food, Agriculture & Livestock) has fixed the seed renewable target at 20per cent for wheat and paddy, 100per cent for cotton and 30per cent for maize.<sup>48</sup> The Federal Seed Certification and Registration Department (FSC&RD) is an attached department of MINFAL and is engaged in providing seed certification coverage to public

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<sup>46</sup>*Ibid.*

<sup>47</sup>Government of Pakistan (2008), Pakistan Economic Survey 2007-08, Ministry of Finance, p.26, Islamabad, [Online: Web] Accessed 23 May 2009 URL:[http:// www.accountancy.com.pk/.../economic-survey-pakistan-2007-08-02.pdf](http://www.accountancy.com.pk/.../economic-survey-pakistan-2007-08-02.pdf).

<sup>48</sup>Hanif, Muhammad and et al. (January 2004), "Agricultural perspective and policy", pp.17-18, Ministry of Food, Agriculture and Livestock, Islamabad.

and private sector seed companies of Pakistan along with seed quality control services through its 30 seed testing laboratories and monitoring of seed quality in the market as well.<sup>49</sup>

Seed Industry of Pakistan is comprised of both formal and informal sectors. There are four public sector organisations and more than 600 national seed companies and about four multinational companies. The public and national seed companies deal with the seeds of varieties from public sector research institutes where as multinationals deals with hybrids of maize, sunflower, canola, fodders, forages and vegetables. During July-March 2007-08, about 231.67 thousand tonnes of improved seed of various kharif/rabi/spring/winter season crops was distributed. The procurement and distribution of seeds of various Kharif crops (cotton, paddy, maize, mungbean etc) is under progress.<sup>50</sup>

### **Mechanisation**

Mechanisation as a tool for modernisation of agriculture has been well recognised. Mechanisation generates greater cropping intensity and as such improves productivity. It also results in considerable saving of fodder and feed through a reduction in bullock population. Thus a transition from subsistence farming to commercial farming can only be achieved through the transfer of the latest, most efficient and cost effective technology to the farming system. The efficient use of scarce agriculture resources and accelerated agriculture mechanisation is, therefore, vital and demand comprehensive strategic planning for the future.<sup>51</sup> Perhaps, nothing else symbolises modernisation of agriculture more than the use of tractors in the developing countries. Pakistan is no exception in this regard.<sup>52</sup> The demand for tractors has increased significantly. In order to meet tractor's demand, Federal Government allowed import of new and used tractors in

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<sup>49</sup>Government of Pakistan (2008), *Pakistan Economic Survey 2007-08*, Ministry of Finance, p.24, Islamabad, [Online: Web] Accessed 23 May 2009 URL: [http:// www.accountancy.com.pk/.../economic-survey-pakistan-2007-08-02.pdf](http://www.accountancy.com.pk/.../economic-survey-pakistan-2007-08-02.pdf).

<sup>50</sup>*Ibid.*

<sup>51</sup>Government of Pakistan(2007),*Pakistan Economic Survey 2006-07*, Ministry of Finance,p.39, Islamabad, [Online: Web] Accessed 23 May 2009 URL:[http:// www.accountancy.com.pk/.../economic-survey-pakistan-2006-07-02.pdf](http://www.accountancy.com.pk/.../economic-survey-pakistan-2006-07-02.pdf).

<sup>52</sup>"Tractorization of agriculture in Pakistan" (Dec.1987), *GeoJournal*, 15(4):1, Springer Netherlands.

CBU (Completely Built Units) at zero tariffs. Other interventions including use of laser land levelers, ridge and broad bed farming are being encouraged in the country through provision of incentives to the farmers.<sup>53</sup>

Out of 531,296 tube wells 413,228 numbers (77per cent) are reported to be diesel tube wells needing 10-25 Hp (Hours power) prime movers for operations. Whereas majority of tube wells are being operated with local 50 Hp tractors considered as inefficient use of the prime movers leading to high cost of production. The wider choice for machinery selection could allow improving socio-economic conditions of small farmers through increase in ownership of tractors, which stand 10per cent as per agriculture machinery census. In-efficient use of scarce irrigation sources is another area where intervention is required.<sup>54</sup>

### **Plant Protection:**

Plant protection is an important factor amongst the agricultural inputs. The Plant Protection measures help in increasing per hectare yield by protecting crops from damages of insects, diseases and weeds, because, without effective protection against the attack of pests and diseases, the beneficial outcome of other inputs may not be realised either.<sup>55</sup> In this regard; the Department of Plant Protection (DPP) provides facilities, such as, Locust Survey and Control, Aerial Pest Control and Pesticide Registration and Testing. The private sector also carries out plant protection activities such as ground sprays.<sup>56</sup> Pakistan remained free from gregarious desert locust activity during July-march 2006-07. However, scattered mature solitary locust population ranging from 1-100 hectare was observed in 123 localities of Cholistan, Nara, Turbat, Pasani, and Uthal deserts. The DPP did not receive any urgent demand from the provincial government for

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<sup>53</sup>Government of Pakistan (2008), Pakistan Economic Survey 2007-08, Ministry of Finance, p.27, Islamabad, [Online: Web] Accessed 23 May 2009 URL: [http:// www.accountancy.com.pk/.../economic-survey-pakistan-2007-08-02.pdf](http://www.accountancy.com.pk/.../economic-survey-pakistan-2007-08-02.pdf).

<sup>54</sup>Hanif, Muhammad and et al. (January 2004), "Agricultural perspective and policy", pp.17-18. Ministry of Food, Agriculture and Livestock, Islamabad.

<sup>55</sup>MINFAL(2009), Ministry of Food Agriculture and Livestock Government of Pakistan, "Department of Plant Protection Pakistan", [Online: Web] Accessed 22 March 2009, URL: <http://www.plantprotection.gov.pk/> -.

<sup>56</sup>Government of Pakistan (2008), Pakistan Economic Survey 2007-08, Ministry of Finance, p.28, Islamabad, [Online: Web] Accessed 23 May 2009 URL: [http:// www.accountancy.com.pk/.../economic-survey-pakistan-2007-08-02.pdf](http://www.accountancy.com.pk/.../economic-survey-pakistan-2007-08-02.pdf).

aerial spraying nor did any locust emergent situation occur. Regular field crops survey were carried out during 2006-07.<sup>57</sup>

### **Agricultural Credit**

Agricultural credit provides financial resources to the farming community particularly for purchase of primary inputs like fertiliser, seed, pesticides, machinery, equipments etc. Credit plays an important role in development. It capitalises farmers and entrepreneurs to undertake new investments or adopt new technologies. It helps smooth consumption by providing working capital and reduces poverty in the process. Both formal and informal lenders are active in rural credit market.<sup>58</sup> Collateral-free lending, proximity, timely delivery, and flexibility in loan transactions are some of the attractive features of informal credit.<sup>59</sup> Unlike formal finance, informal finance may not be as conducive to development because: (i) it is expensive, (ii) it is short-term and largely used for consumption, and (iii) it is not large enough to spur investment and growth.

Pakistan's rural credit markets, as in other developing countries, are characterised by the co-existence of formal, semi-formal, and informal lenders. Government considers it as an important instrument for achieving higher production and attaches high priority to ensure its timely availability to the farmers. Credit requirements of the farming

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<sup>57</sup>Pakistan plant quarantine act was enforced in 1976. It advises government on all aspects of plant protection. [Online: web] Accessed 5 May 2009 URL: [http://www.pakistan.gov.pk/divisions/food-division/.../faqs\\_dpp.pdf](http://www.pakistan.gov.pk/divisions/food-division/.../faqs_dpp.pdf)

<sup>58</sup>Aleem, Irfan. (1990), "Imperfect Information, Screening, and the Costs of Informal Lending: A Study of a Rural Credit Market in Pakistan" *World Bank Economic Review*, 4 (3):329-49.

<sup>59</sup>"Although the nominal rate of interest is lower for a formal loan than for an informal loan, the transaction costs of borrowing are higher for formal loans than for informal loans. However, unlike formal loans, informal loans have small transaction costs, which reflect the opportunity cost of funding and are independent of collateral, duration, and size of loans. Informal lenders also perform an important role by facilitating the marketing of products or purchasing inputs, such as fertilizer. The informal loans are often in kind and purpose-specific, and, hence, serve some clientele need better". Khandker, Shahidur R. and Rashidur R. Faruquee (30 Nov.1999), "The Impact of Farm Credit in Pakistan", World Bank Policy Research Working Paper No. 2653, [Online: web] Accessed 5 March 2009, [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=632721](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=632721).

community have shown an increasing trend over the year.<sup>60</sup> In order to cope with the increasing demand for agricultural credit, institutional credit to farmers is being provided through Zarai Taraqati Bank Limited (ZTBL), Commercial Banks, Punjab Provincial Cooperative Bank Ltd (PPCBL) and Domestic Private Banks. The Government has allocated Rs 200 billion for agriculture credit disbursements for the year 2007-08 which is 25 per cent higher than the allocation of the preceding year i.e. Rs 160 billion. Out of the total credit target of Rs 200 billion, Rs 96.5 billion were allocated to commercial banks, Rs 60 billion to ZTBL, Rs 8 billion to PPCBL and Rs 35.5 billion to Domestic Private Commercial Banks.<sup>61</sup>

**Table: 9 Supply of Agricultural Credit by Institutions (Rs. in million)**

| Year    | ZTBL       | Commercial<br>Banks | PPCBL   | Domestic<br>Private<br>Banks | Total       |         |
|---------|------------|---------------------|---------|------------------------------|-------------|---------|
|         |            |                     |         |                              | Rs. Million | %Change |
| 003-04  | 29933.07   | 33247.45            | 7563.54 | 2701.80                      | 73445.86    | 24.6    |
| 2004-05 | 37408.84   | 51309.78            | 7607.47 | 12406.82                     | 108732.91   | 48.0    |
| 2005-06 | 47594.14   | 67967.40            | 5889.49 | 16023.38                     | 137474.40   | 26.4    |
| 2006-07 | 56473.05   | 80393.19            | 7988.06 | 23976.16                     | 168830.46   | 22.8    |
| 2006-07 | 40881.42   | 48962.19            | 5269.57 | 16081.99                     | 111195.17   | —       |
| 2007-   | 0839561.17 | 65124.83            | 3935.16 | 29975.57                     | 138596.72   | 24.6    |

Source: Pakistan Economic Survey 2007-08, Islamabad, [Online: Web] Accessed 23 may 2009, URL: <http://www.accountancy.com.pk/.../economic-survey-pakistan-2007-08-02.pdf>.

<sup>60</sup>Government of Pakistan(2009), *Pakistan Economic Survey 2008-09*,Ministry of Finance, p.28,Islamabad, [Online: Web] Accessed 12 June 2009 URL:<http://www.pro-pakistan.com/.../download-economic-survey-of-pakistan-2008-09/> -.

<sup>61</sup>Government of Pakistan (2008), *Pakistan Economic Survey 2007-08*,Ministry of Finance, p.29,Islamabad, [Online: Web] Accessed 23 May 2009 URL:<http://www.accountancy.com.pk/.../economic-survey-pakistan-2007-08-02.pdf>.

Results suggest that institutional credit is productive, and that its outreach is limited to a small proportion of the population that does not perhaps need subsidised credit. Its outreach should be expanded and collateral requirements relaxed so that credit has its desired impact, while steps to cut down default rates should be taken at the same time. There is little doubt that credit channeled in the right direction can have significant anti-poverty effects, and that broadening the outreach of formal lending institutions can be a step forward in the right direction.



## Chapter Three

# Determinants of Food Security in Pakistan

## **Determinants of Food Security in Pakistan**

The concept of food security has evolved over a period of time. Until the early 70s, adequate availability of food grains at the national level was considered a good measure of food security. Emphasis was placed on food self-sufficiency at the national level, principally through domestic production. The 1974 World Food Conference added another dimension to food security when it emphasized, apart from the overall availability, stability of food supplies within and over the years. Later, and mainly due to the writings of Amartya Sen, the question of 'access' and 'entitlement' gained prominence. An agreed definition of food security suggests that all households should be able to avail at all times of adequate food for a healthy living.<sup>1</sup>

Judged by the criteria of food insecurity and poverty, South Asia has the distinction of being the worst affected region. A large majority of the poor and the food-insecure people live in this part of the world.<sup>2</sup> The incidence of malnutrition in the region is very serious.<sup>3</sup> Among the South Asian countries Pakistan is backward in terms of social development indicators. In terms of human development, it is at 136, out of 177 countries, which is very low.<sup>4</sup>

Pakistan has fairly developed institutional, but is weak in physical and administrative infrastructure. It has witnessed frequent political upheavals and periodic negation of democratic institutions. Pakistan has been ranked the 10<sup>th</sup> most unstable country in the world, according to the 2009 Failed State Index, while Somalia has topped

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<sup>1</sup>FAOUNROAP(Dec.1998),Food and Agriculture Organization of the United Nations Regional Office for Asia and the Pacific, "Food Security in South Asia", [Online: Web] Accessed 11 November 2008, URL:<http://www.fao.org/docrep/004/AB981E/ab981e0a.htm>.

<sup>2</sup>WB (1996), World Bank, *World Development Report*, [Online: Web] Accessed 17 September 2008 URL:<http://www.worldbank.org/html/prddr/trans/Archives/1996.htm>.

<sup>3</sup>"In Pakistan, the nutritional status of children under five years of age is extremely poor. At a national level almost 40per cent of these children are underweight. Over half the children are affected by stunting and about 9 per cent by wasting". Food and Agriculture Organization, Nutrition country profile: Pakistan, [Online: Web] Accessed 19 January 2008 URL:<http://www.fao.org/ag/agn/nutrition/pak-e.stm>.

<sup>4</sup>UNDP (2008), United Nation Development Programme, *Human Development Report* , [Online: Web] Accessed 15 November 2008

URL:<http://hdr.undp.org/en/reports/global/hdr2007-2008/>.

the infamous list.<sup>5</sup> It shows that Pakistan's commitment towards poverty eradication and food security, in some respect has not gone beyond rhetoric.<sup>6</sup>

Agrarian structure in Pakistan is dominated by small farms (i.e., holdings of less than one hectare), where they account for 17 percent and 2 percent of agricultural land are marginal holdings. In addition to the marginal and small farmers there are a large number of landless households, accounting for 30 percent. These two categories (marginal farmers, and landless labourers) and a large number of traditional craftsmen constitute the bulk of food insecure households in the rural areas of the Pakistan.<sup>7</sup>

Pakistan has a high rate of population growth, high concentration of poor households, low per capita income, and a modest rate of GDP growth. Agriculture is the dominant sector of their economies and, agrarian structure is dominated by landless labourers, small and marginal farmers, and the scope for extensive agriculture is more or less exhausted.<sup>8</sup> With this several new challenges have now emerged. These include increasing water scarcity, degradation of land resources (water logging and salinity), population growth, urbanisation, poverty, effect of globalisation on agriculture and climate change. All these are not isolated problems. Each, to some extent, is both a cause and a consequence of the others. Given these and several other social and political handicaps it will be instructive to see what they could achieve in ensuring food security

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<sup>5</sup>"A state that is failing has several attributes. One of the most common is the loss of physical control of its territory or a monopoly on the legitimate use of force. Other attributes of state failure include the erosion of legitimate authority to make collective decisions, an inability to provide reasonable public services, and the inability to interact with other states as a full member of the international community. The 12 indicators cover a wide range of elements of the risk of state failure, such as extensive corruption and criminal behavior, inability to collect taxes or otherwise draw on citizen support, large-scale involuntary dislocation of the population, sharp economic decline, group-based inequality, institutionalized persecution or discrimination, severe demographic pressures, brain drain, and environmental decay. States can fail at varying rates through explosion, implosion, erosion, or invasion over different time periods."

[Online: Web] Accessed 11 November 2008 URL:

[http://www.foreignpolicy.com/articles/2009/06/22/2009\\_failed\\_states\\_index\\_faq\\_methodology](http://www.foreignpolicy.com/articles/2009/06/22/2009_failed_states_index_faq_methodology).

<sup>6</sup>*Ibid.*

<sup>7</sup>Jazairy, I. et al. (1992), "The State of the World Rural Poverty - An Enquiry into its Causes and Consequences", International Fund for Agricultural Development, New York: University Press.

<sup>8</sup>FAOUNROAP (Dec.1998), Food and Agriculture Organization of the United Nations Regional Office for Asia and the Pacific, "Food Security in South Asia", [Online: Web] Accessed 11 November 2008, URL:<http://www.fao.org/docrep/004/AB981E/ab981e0a.htm>.

for their people. Hence reviews on the dimensions of food security as listed above are as follows:

## **Water**

Water is a unique natural resource. In Pakistan, conservation and management of water supplies is crucial as the demand for water continues to rise because of burgeoning population. Pakistan agriculture is predominantly irrigated. Water is one of the most limiting constraints for agricultural production in Pakistan.<sup>9</sup> Irrigation provides crucial water for agricultural production on over 80 percent of the gross cropped area in Pakistan. Most of this irrigation comes through public canal systems, which, according to official reports, deliver surface water to approximately 70 percent of the irrigated area. However, throughout the 1970s and 1980s groundwater irrigation has been the most rapidly-growing source of irrigation: it now serves approximately 25 percent of the irrigated area, and provides over 36 percent of the irrigation water available at the farm gate.<sup>10</sup>

Access to water in public irrigation systems (surface canals and public tubewells) is tied to ownership of land in the command area. This land ownership entitles the farmer to a fixed turn of irrigation flow during a rotation cycle, to be used only on that land. The rigidity of this system limits the productivity of surface irrigation and public tubewells, a limitation which is especially apparent in comparison with privately-managed groundwater irrigation, where farmers have more control of water timings.<sup>11</sup>

Access to privately-managed groundwater irrigation is dependent on investment in wells and pumping devices. To the extent that large and wealthy farmers are most likely to own tubewells and small or poor farmers are unable to make the necessary investment, the latter may be excluded from the benefits of highly productive groundwater resources. On the other hand, widespread private ownership leads to over-

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<sup>9</sup>Alam, S.M. and M.H. Naqvi (2003), "Pakistan agriculture: 2003", p.21, [Online: Web] Accessed 11 November 2008 URL: <http://www.pakistaneconomist.com/pagesearch/search-engine2003/s.e155.asp>.

<sup>10</sup>Dick, Ruth Meinzen and Martha Sullins (Sep.2003), "Water markets in Pakistan: participation and productivity", International Food Policy Research Institute, Washington, D.C. USA, p.3.

<sup>11</sup>Renfro, R. Z. H., and E. W. Sparling (1986), "Private Tubewell and canal water trade on Pakistan Punjab watercourses" In K. W. Easter (ed.) *Irrigation Investment, Technology, And Management Strategies For Development*, Colorado:West view Press,p.76.

investment in wells and pumpsets, particularly where holdings are small or fragmented.<sup>12</sup> Institutional measures are needed to increase access to groundwater to other farmers, and to increase agricultural productivity and equity of irrigation water resources.

### **Elements of the Water Crisis**

Some of the major problems of irrigation in Pakistan may be identified as follows:

#### *Water Scarcity due to Inadequate Reservoir Capacity:*

Pakistan's river flows are highly seasonal (85 per cent of annual flows are in the summer season). Yet Pakistan does not have adequate reservoir capacity in its irrigation system to store waters at peak flows. Consequently cropping intensity is exceptionally low. (For example in 2006 out of the 16 million hectares of irrigated land only 5.7 million hectares, 35 per cent were double cropped).<sup>13</sup>

#### *Low Delivery Efficiency of Irrigation:*

Due to poor maintenance, the average delivery efficiency is only 35 to 40 per cent from the canal head to the root zone, with most of the losses occurring in the watercourses. This huge loss of surface water is a major factor in creating water logging and salinity.<sup>14</sup> A significant proportion of the water lost through seepage from the irrigation system flows into saline groundwater reservoirs thereby making it impossible for re-use by tubewell irrigation.

#### *Problem of Drainage, Water Logging and Salinity:*

The surface drainage problem of the Indus Plain is inherent in its flat topography, and the associated lack of natural drainage channels and porous soils. This problem is compounded by construction of roads, railways and flood embankments without adequate provision in the design to facilitate natural drainage flows. Under these circumstances irrigation without adequate drainage leads to rising water tables and hence salinity and

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<sup>12</sup>Dick, Ruth Meinzen and Martha Sullins (Sep 2003), "Water markets in Pakistan: participation and productivity", International food policy research institute, Washington, D.C. USA, p.5.

<sup>13</sup> United Nations Educational, Scientific and Cultural Organization (March 2006), "Water, a shared responsibility", The 2nd UN World Water Development Report: New York, p. 134.

<sup>14</sup> Kijne, J.W. and M. Kuper (1995), "Salinity and Sodidity in Pakistan's Punjab: A threat to sustainability of irrigated agriculture", Water Resources Development, 11:26.

water logging. Therefore, it is vital for sustainable agriculture to construct adequate drainage systems for the removal of excess water and salt from the soil. During the 1960s, a number of Salinity Control and Reclamation Projects (SCARPs) were undertaken.<sup>15</sup> Despite these efforts about 16 million hectares of land in Pakistan are irrigated by a network of canals and tube wells and 26 per cent of it is affected, to different degrees, by salinity and about 36 per cent of the groundwater is classified as highly saline.<sup>16</sup>

*Inequitable Distribution of Irrigation Water:*

Contrary to the assumption in the original design of the irrigation delivery system, in reality, water does not reach users at the tail end of the system. This is to a large extent due to reduced carrying capacity of canals resulting from inadequate maintenance. Illegal pumping from canals by big landlords who are able to bribe or pressurize the local irrigation department into silence, adds to the inequality of distribution.

**The water challenge**

The basic constraint in the development of agriculture in Pakistan is inadequate and unreliable irrigation supplies, widespread occurrence of water logging and salinity and low level of modern farm inputs. Inadequate and unreliable water supplies have resulted in low cropping intensities and are moreover responsible for low yield.

Water shortage is a most important factor impeding growth of the agricultural sector. Fluctuations in weather conditions, deficient in storage capacity and poor use of available water, culminate in water acting as a major constraint to agricultural growth. According to data of the Pakistani federal government's Planning and Development Division, the overall water availability has decreased from 1,299 m<sup>3</sup> per capita in 1996-97

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<sup>15</sup>“According to FAO estimates, the advance of salinity renders three hectares of land barren every minute, adding to the amount already devastated by human action and to the several hundred million hectares of salt land that occur naturally in Earth’s arid regions. Around the world, seven per cent of land - one million square kilometers - is salty”. Washing Out the Soil: Utilizing Saline Groundwater Productively in Agriculture,[Online: web]Accessed 23November, URL:<http://www.iaea.org/NewsCenter/Features/.../pakistanwater.htm>.

<sup>16</sup>Pakistan Water Gateway (2008), “The Pakistan Water Situational Analysis” p.4, [Online: Web] Accessed 22 June 2009,URL:<http://www.waterinfo.net.pk/pdf/pwsa.pdf>.

to 1,101 m<sup>3</sup> per capita in 2004-05.<sup>17</sup> In view of growing population, urbanization and increased industrialization, the situation is likely to get worse.<sup>18</sup>

The vital problem of the crop sector is to raise crops under the arid or semi-arid conditions. It is, therefore, very important to give maximum attention and top priority to agricultural development of these regions. As a very large portion of arable lands is in the arid and semi-arid regions, agricultural productivity of these areas can be increased only by supplying water. Productivity per unit area can be increased through technological change.<sup>19</sup>

The massive expansion of private-sector tube-well irrigation in Pakistan has had its serious environmental consequences; 11 per cent of the 22 million hectares of arable land has been declared as 'disaster area' because of severe water logging and salinity (water table only 0 – 5 feet), while another 20 per cent is under stress (water tables 5 – 10 feet below the surface).<sup>20</sup> The existing water use methodologies, based on gravitational irrigation are extravagant. All possible incentives are being provided for the adoption of water saving technologies such as laser land leveling, furrow irrigation and high efficiency irrigation systems (drip & sprinkle).<sup>21</sup> In addition efforts are being made for rain harvesting. Drought tolerant and water use- efficient crop varieties through biotechnology will also augment conservation of water resources.<sup>22</sup>

There are nearly 14 million acres of salt affected waste land with brackish underground water as well as large areas of sandy desert. Pakistani scientists have pioneered bio-saline agriculture technology whereby such lands can be economically

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<sup>17</sup>Pakistan Statistical Year Book (2007), "Overall Water Availability", Government of Pakistan, Ministry of Economic Affairs and Statistics, Statistics Division.

<sup>18</sup>Ministry of Finance (June 2007), "Pakistan Economic Survey 2006-07", Chapter 16: Environment, p. 248.

<sup>19</sup>Alam, S.m. and M.h. Naqvi (2003), "Pakistan agriculture:2003", [Online: web] Accessed 11 November 2008, URL:<http://www.pakistaneconomist.com/pagesearch/search-engine2003/s.e155.asp>.

<sup>20</sup>Asian Development Bank (November 2004), "Report and recommendation of the president to the board of directors on proposed loans and technical assistance grants to the Islamic Republic of Pakistan for the Balochistan Resource Management Program", p. 11.

<sup>21</sup>"Drip irrigation is a watering method which delivers water to plants slowly and right where they need it... at the roots. Where typical pop-up sprinklers spray water into the air and onto plants." [Online: web] Accessed 22 January 2009 URL: <http://www.irrigationdirect.com/>.

<sup>22</sup>IFPRI(2006), The International Food Policy Research Institute, "Food, Water and Land", p.7, [Online: web] Accessed 22 January 2009 URL: [http://www.parc.gov.pk/ifpri/Resources/vision\\_2030.pdf](http://www.parc.gov.pk/ifpri/Resources/vision_2030.pdf).

utilized through an integrated approach. A National Bio-saline Agriculture Programs is being launched to bring into use all such lands. Salt tolerant, fast growing grasses, shrubs & trees could be grown with brackish water, and used as a feedstock for economic conversion to methane or ethanol. This allows excellent use of wastelands, which will not only alleviate the poverty of local communities, but also improve the environment.<sup>23</sup>

It is estimated that population of the Pakistan will be 171 million by the end of 2010. A 30 percent population increase will require at least the same increase in food and fibre production to meet national requirements. Coupled with Pakistan's objective of increasing exports and reducing imports, it is more realistic to achieve 63 percent increase in agricultural production. Targeted 63 percent increase in agricultural production would demand 13.3 percent crease in water availability. This additional water will come solely through savings of existing losses.<sup>24</sup>

Integrated water resource management, which aims at ensuring the most optimal use of water, is a major strategy for overcoming the looming water scarcity. While agriculture sector will remain the predominant user of water, the requirements for industries, municipal and human use will continue to increase. The strategy is to enhance efficiency for all uses of water, including re-cycling and re-use. By use of all these technologies and construction of water reservoirs, Pakistan will be able to meet the needs of agriculture during the coming quarter century and beyond.

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<sup>23</sup>Pakistan Water Gateway, "The Pakistan Water Situational Analysis", p.4., [Online: web] Accessed 28 December 2008, <http://waterinfo.net.pk/pdf/pwsa.pdf>.

<sup>24</sup>Randhawa, Hafeez Akhtar "Water development for irrigated agriculture in Pakistan: Water development for irrigated agriculture in Pakistan: past trends, returns and future requirements", South Asia regional meeting on water for Food and Agriculture Development. New Delhi, [Online: web] Accessed 22 December 2008, URL:<http://www.fao.org/docrep/005/ac623e/ac623e0i.htm> - Cached - Similar -



## **Population**

*“In the midst of this age of plenty, the standard of living for much of the world is declining, their poverty and economic backwardness are increasing, and their share of the world’s population is growing. In the world community of nations, the rich are getting richer while the poor are getting poorer. First among causes is the rapid, overwhelming and utterly unprecedented world population explosion”.*

The above statement was made by John F. Kennedy in 1958 when he was a junior senator.<sup>25</sup>

The world agricultural growth has slowed down in the last three decades. It has 3 per cent per year in 1960s, 2.3 per cent per year in 1970s and 2 per cent per year in the period of 1980-92. This trend has given rise to concern about the capability of world agriculture production to keep up with the growth of world population. This has raised the issue for the world food security particularly the vulnerable regions in the developing countries. The growth rate of gross world agricultural output may slow down further to 1.8 per cent per year between 1990/98 to 2010. On the other hand, this has been unprecedented growth in world’s population during last decades. The world population at the start of millennium of 20<sup>th</sup> century was approximately 1.6 billion and reached a level of 2.52 billion in the year 1950. It is about 6 billion at this stage and there are projections that it will reach 8 billion before the year 2020 and to 9.322 billion in 2050. Similarly, China 1.462 billion, India 1.572 billion, USA 397.1 million, Pakistan 344.2 million and Bangladesh 265.4 million will reach.<sup>26</sup>

The International Food Policy Research Institute (IFPRI) has estimated that to meet the food requirements of the projected population in 2020, annual cereal production

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<sup>25</sup>“Facing the Future, Economic and Social Impacts of Population Growth” (1998), p.1, [Online: web] Accessed 12 December 2008, URL: [http:// www.facingthefuture.org/econ.html](http://www.facingthefuture.org/econ.html).

<sup>26</sup>Government of Pakistan (2003), “Population Policy of Pakistan”, [Online: web] Accessed 6 October 2008, URL:<http://www.mopw.gov.pk/event3.html>.

will need to increase by 57 per cent, from the current 1950 million tons to an estimated 3,066 million tons. In addition, production of other food items would need to increase similarly.<sup>27</sup>

The rising population growth has adversely affected the quality of life of the people, in geometrical progression. Pakistan's case is not different being essentially agrarian economy, majority of the populations' economic dependence had to be on agriculture. In the face of rapidly increasing population, coping with the resources presents a Catch 22 situation. For example, to improve the literacy graph of the nation, mere addition of educational institutions of various levels has not proved adequate. Promotion of real education demands many allied reforms, which is not possible due to overall economic stringency of the country. The implications of fast growing population in Pakistan encompass all imaginable aspects of citizenship. The fall out of this goes deeper down than it is generally expected.<sup>28</sup>

In the case of Pakistan, its population has increased from 34 million in 1951 to 144 million in mid 2001. The addition of over 108 million Pakistanis in just five decades is due to the high population growth rates in the last thirty years. Continuing high population growth will amount to Pakistan's population reaching 220 million by the year 2020. Coupled with poor human development indicators such as low literacy, high infant mortality and low economic growth rates, such a large population will undermine efforts being undertaken to reduce poverty and to improve the standards of living of the populace.<sup>29</sup>

The World Food Programme (WFP) has cautioned that nearly half of Pakistan's 160 million populations were at the risk of "food insecurity" due to a surge in prices in past few months. On the basis of findings of a survey conducted by it, the WFP said that

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<sup>27</sup>Alam, S.M. and Tandojam (16 - 22July, 2001), "Demographic growth, food, fertilizer and Pakistan", *Pakistan & Gulf Economist*, issue3:34-37.

<sup>28</sup> Rashid, A. (June 2002), "Implications of Population Growth", *Defenc Journal*, 5 (11):34, Karachi, Pakistan.

<sup>29</sup>Government of Pakistan (2003), "Population Policy of Pakistan", [Online: web] Accessed 6 October 2008 URL: <http://www.mopw.gov.pk/event3.html>.

during the year 2008, the number of people deemed “food insecure” had risen 28 per cent to 77 million from 60 million in the previous year.<sup>30</sup>

**Table10: Population growth of Pakistan**

| Census | Population  | Population growth rate (per cent) |
|--------|-------------|-----------------------------------|
| 1951   | 33,816,000  | 2.37                              |
| 1961   | 42,978,000  | 2.64                              |
| 1972   | 65,321,000  | 2.72                              |
| 1981   | 84,254,000  | 3.75                              |
| 2000   | 146,404,914 | 2.17                              |
| 2008   | 172,800,000 | 1.805                             |

Source: “Social indicators of Pakistan 2007”, [Online: web] Accessed 22 June 2009, URL: [http://www.statpak.gov.pk/depts/fbs/publications/social\\_indicators\\_of\\_pakistan2007/sip2007.pdf](http://www.statpak.gov.pk/depts/fbs/publications/social_indicators_of_pakistan2007/sip2007.pdf)

Presently, Pakistan is in the grip of population explosion of severe intensity, and has experienced a greater population growth compared to other developing countries. The population of Pakistan is increasing at the rate of 2.61 per cent and the gap between the supply and demand of agricultural products is widening day by day. The population was about 33.82 million in 1951 and just after 20 years it increased to 65 million. The current population of Pakistan is above 145 million but, it may touch 180 million by year 2010 and 344.2 million in 2050.<sup>31</sup> Pakistan's projected growth from 146 million today to 345 million by 2050 will shrink its grain land per person from 0.08 hectares at present to 0.03 hectares, an area scarcely the size of a tennis court.<sup>32</sup>

<sup>30</sup>Nagpal, Sahil (May 2008), “Half of Pakistan population at the risk of food insecurity, warns WFP”, [Online: web], Accessed 22 November 2008 URL: <http://www.topnews.in/half-pakistan-population-risk-food-insecurity-warns-wfp-230301>.

<sup>31</sup>UN(2008), United Nation, “World population prospect: The revision data base 2008” , [Online: web] Accessed 22 April 2009, URL: <http://esa.un.org/unpp/>.

<sup>32</sup> “AGST 3000: Agriculture, Society and the Natural World”, p.13, Agricultural Studies Department, California, [Online: web] Accessed 2 November 2009, URL: <http://www.csustan.edu/AgStudies/AGST3000.html>.

Increasing population pressure on quantity and quality in food supply and dwindling land and water resources forces the agriculture to steadily increase the productivity of the land through higher yields and crop intensity. To meet the challenge of food supply to the accelerated increasing population of Pakistan, there is an urgent need to boost up crop yield. The issues in developing countries are growing population, fragile food security, low agriculture inputs like fertilizer, poor yields, degrading soils and dependence on imports from the developed world. On the other hand, the land availability per capita will decline. Thus, the country faces great challenge to improve crop productivity per unit of land to ensure national food security in the wake of growing population.<sup>33</sup>

### **Population Growth is a Security Issue for Pakistan:**

At present, there are confirmed estimates that 70 percent of the Pakistani population is living either under, on or just above the poverty line and make two or less dollars a day. 49 per cent of the population is living absolutely below the poverty line. According to a Population Welfare study, “the impact of population growth on poverty is obvious, since poorer families, especially women and marginalized groups bear the burden of a large number of children with much fewer resources further adding to the spiral of poverty and deterioration in the status of women.”<sup>34</sup> The same study established that the contraceptive prevalence is 30 percent which is nearly 120 percent lesser than the required standard to help reduce Pakistan’s population growth to an “acceptable level” of 1.2 percent. Because of repeated population explosions, Pakistan is faced with serious a socio-economic and a political crises.<sup>35</sup>

Even with a population of nearly 160 million in 2007, the State is finding it very hard to provide its citizens with a healthy living environment and other basic amenities of life.<sup>36</sup> Shortage of electricity, water and wheat flour has become serious challenges and things are bound to deteriorate further particularly if and when population reaches 333

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<sup>33</sup>Alam , S.M. and M.H. Naqvi, (May 2003), “Pakistan Agriculture — 2003”, [Online: web] Accessed 22 November 2008 URL: <http://www.pakistaneconomist.com/pagesearch/Search-Engine2003/S.E155.asp>.

<sup>34</sup>“Population Growth is a Security Issue for Pakistan” (2008), [Online: web] Accessed on 08 November 2008, URL:<http://taraqee.wordpress.com/2008/11/04/population-growth-is-a-security-issue-for-pakistan/>.

<sup>35</sup> *Ibid.*

<sup>36</sup>“Social indicators of Pakistan 2007”, [Online: web] Accessed 12 June 2009, URL: [http://www.statpak.gov.pk/depts/fbs/publications/social\\_indicators\\_of\\_pakistan2007/sip2007.pdf](http://www.statpak.gov.pk/depts/fbs/publications/social_indicators_of_pakistan2007/sip2007.pdf).

million in 2025. In Pakistan, unemployment continues to be rampant; 25 percent as of September 30, 2008.<sup>37</sup> Then there's the power crisis, gas, water shortages, increased diseases, lack of medical facilities, security, terrorism and law and order crisis.

Pakistan's future is their children, but 31 percent of children under the age of 5 are suffering from severe malnutrition. Mortality rate per 1,000 is 78 (worse than some of the poorest African countries). A mere 4.38 percent Pakistanis are university graduates with a paltry 1.58 percent holding a master's degree. The technical corps among the educated is 0.41 percent. Only 17.29 percent of the school-going population qualifies the "matriculation" (10 years of education) examination and this figure further shrinks to just 6.56 percent qualifying as "intermediates" (12 years of education).<sup>38</sup>

The government's Population Sector Perspective Plan 2012 framework sets out improvements in the quality of life of all persons, including children, adolescents, adults, and aged, both male and female. The current Population Policy is designed to achieve social and economic revival by curbing rapid population growth and thereby reducing its adverse consequences for development. It is intended to achieve a reduction in dependency ratios, to alleviate pressures on dwindling resources and to help in the reduction of poverty. The Population Policy has several wide-ranging consequences for the economy, polity, human rights and the long-term prosperity of Pakistan.<sup>39</sup>

## Poverty

Poverty is also an ethical concept, not a statistical one. Inherent in the term "poverty", when applied to human beings, is the notion of a life situation that should not exist. It is not only lack of *roti, kapra aur makan*—food, cloth and shelter. Amartya Sen aptly sums up many dimensions of poverty as lack of "capability"—capability to overcome violence, hunger, ignorance, illness, physical hardship, injustice and

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<sup>37</sup>CRSS (27 Oct. 2008), Center for Research and Security studies, "Focusing Pakistan on the issues of Democratic Governance", Islamabad, [Online: web] Accessed on 24 June 2009, URL: <http://crss.pk/res-reports/we27oct08.pdf>.

<sup>38</sup>"Population Growth is a Security Issue for Pakistan" (2008), [Online: web] Accessed on 08 November 2008, URL: <http://taraqee.wordpress.com/2008/11/04/population-growth-is-a-security-issue-for-pakistan/>.

<sup>39</sup>Government of Pakistan (2003), "Population Policy of Pakistan", [Online: web] Accessed 6 October 2008, URL: <http://www.mopw.gov.pk/event3.html>.

voicelessness.<sup>40</sup> The World Bank has argued that poverty often lies in the absence of opportunity, empowerment and security, and not just the absence of food on the table.

Poverty in Pakistan has many dimensions and requires a multi-strategy solution. Although Pakistan's growth rate (6 per cent) has been impressive for much of the last four decades but it has failed to trickle down to the masses. The pattern of income distribution has worsened. This disparity in income shows that lowest 20 per cent of households received only 7 per cent of income share, while upper 20 per cent received highest ever income share of 49.4 per cent in 1996- 97. In 1969- 70 overall 46.53 per cent population were poor as compared to 40.24 percent poor in 1963-64 due to significant changes in the agrarian structure.<sup>41</sup> The magnitude of poverty is higher in the rural areas as compared to urban areas. Then between 1969-70 and 1979, the absolute poverty declined at all levels due to the start of large-scale overseas migration to Middle East. Moreover, in the 1980's, it saw a continuous decline until around 1987-88, after which for the most part there has been another rise in the incidence of poverty in the country. By 2000-2001 the number of absolute poor rose to 34.5 per cent of total population. The absolute poverty again declined at all levels to 23.9 per cent of total population in 2005.<sup>42</sup>

**Table11: Trends of Poverty in Pakistan**

| Years     | Total | Urban | Rural |
|-----------|-------|-------|-------|
| 1963-64   | 40.24 | 38.94 | 44.53 |
| 1979      | 30.68 | 32.51 | 25.94 |
| 1984-85   | 24.47 | 25.87 | 21.17 |
| 1990-91   | 22.11 | 23.59 | 18.64 |
| 1993-94   | 27.40 | 29.90 | 23.10 |
| 1998-99   | 35.20 | 39.80 | 31.70 |
| 2000-2001 | 34.5  | 22.7  | 39.3  |
| 2004-2005 | 23.9  | 14.9  | 28.1  |

<sup>40</sup>Sen, Amartya (1985), "Well-Being Agency and Freedom: The Dewey Lectures 1984", Amsterdam: North-Holland, *Journal of Philosophy*, 82 (4):169-221.

<sup>41</sup> Amjad, Rashid and A. R. Kemal (1997), "Macroeconomic Policies and their Impact on Poverty Alleviation in Pakistan", *The Pakistan Development Review*, 36(1):39-68.

<sup>42</sup> Ministry of Finance, "Poverty Reduction Strategy Paper-II", p.43, [Online: web] Accessed 24 June 2009, URL: <http://www.finance.gov.pk/admin/images/poverty/PRSP-II.pdf>

Source: Poverty Reduction Strategy Paper (PRSP) - II Finance Division, Government of Pakistan. [Online: web] Accessed 22 June 2009, URL:<http://www.finance.gov.pk/admin/images/poverty/PRSP-II.pdf>

Report of Asian Development Bank (ADB) titled “Summary Poverty Reduction and Social Strategy” is quite significant in the context of a recent acknowledgement by the World Bank (WB) that poverty had declined by 5.1 per cent to 17.2 per cent in Pakistan in 2007-08. However, the WB is also of the view that poverty may have increased in 2008-09 owing to higher inflation as well as low growth. The ADB states “overall a 20 per cent increase in food prices will lead to an 8 per cent increase in the poverty head count, from 36 per cent to 44 per cent, with the negative impact of food price shocks falling disproportionately on rural poor, as opposed to the urban poor.”<sup>43</sup>

It is an unfortunate fact, that there has been a significant increase in poverty in the 1990s in Pakistan on account of sluggish growth, destabilizing macro-economic imbalances, absence of social safety nets, decline in the flow of remittances from overseas Pakistani workers, shedding of surplus labour by state owned enterprises and deterioration in the quality of governance.<sup>44</sup>

Pakistan has registered an average annual growth rate of GDP over 6 per cent in recent years, yet it ranks 136 out of 177 countries with an HDI of 0.551 in 2008.<sup>45</sup> The economy has been affected by a serious financial crisis with a deteriorating exchange rate, dwindling foreign exchange reserves and a highly negative balance of payment compounded by law and order situation, high food prices and an energy crisis.

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<sup>43</sup>“Poverty may have risen in Pakistan, says ADB”, *The News*, [Online: web] Accessed 24 June 2009, URL: [http://www.thenews.com.pk/daily\\_detail.asp?id=184102](http://www.thenews.com.pk/daily_detail.asp?id=184102).

<sup>44</sup>Haq Rashida and Mohammad Ali Bhatti (2001) , “Estimating Poverty in Pakistan: The Non-food Consumption Share Approach” Research Report no. 183, Pakistan Institute of Development Economics, [Online: web] Accessed 24 December 2008, URL: <http://www.pide.org.pk/Research/Report183.pdf>, p.1-3

<sup>45</sup>UNDP(2008), United Nation Development Programme, “Country Fact: Pakistan” [Online: web] Accessed 24 December 2008, URL: [http://www.hdrstats.undp.org/countries/country\\_fact.../cty\\_fs\\_PAK.html](http://www.hdrstats.undp.org/countries/country_fact.../cty_fs_PAK.html).

The country is classified as low-income with 84.6 per cent of its population earning less than US\$2 per day. This has contributed to poor human development, especially among women and children.<sup>46</sup>

The agriculture in developing countries as well as in Pakistan is subsistence, land holdings are small, and production is labour intensive with relatively low intensity of farm inputs, irrigation dependent on the vagaries of nature.<sup>47</sup> Consequently, the farm productivity is low. During the last three decades, in spite of the significance of agriculture in the economy and involvement of major segment of population, most of the government policies are discriminatory toward agriculture. There have been declining shares of public investment in agricultural sector. No doubt these policies retarded growth depressed the value of agriculture and possibly also lowered rural wages, implicitly transferring income from rural to the urban areas. These resulted in migration from rural to urban centre's, increase in unemployment whereas decrease in real wages, high dependency ratio etc. The urban industrial sector was not robust to absorb the flux of rural migrants. The situation becomes the worst in the rain fed and marginal areas where substantial small peasant are located. These all are considered as the major determinants of poverty in Pakistan. The investment in increasing agricultural productivity is the prerequisite to economic development.<sup>48</sup>

### **Spatial Dimensions of Poverty**

Since there are significant differences between rural and urban areas, both are heterogeneous and, in most countries, the incidence of poverty differs between rural regions. Rural areas close to the major cities (peri-urban areas), and other long settled agricultural regions, may be well connected to national and international markets and have adequate supporting infrastructure and a range of vigorous enterprises producing inputs and processing outputs of the agriculture sector. In such regions the incidence of poverty may be relatively low. However, other, more remote areas perhaps inhabited by

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<sup>46</sup>“The HDI provides a composite measure of three dimensions of human development: living a long and healthy life (measured by life expectancy), being educated (measured by adult literacy and enrolment at the primary, secondary and tertiary level) and having a decent standard of living (measured by purchasing power parity, PPP, income)”.World Food Programme,[Online: web] Accessed 24 May 2009,<http://www.wfp.org/countries/pakistan>.

<sup>47</sup> Mustafa, Usman and et al.( Winter 2001) “Globalisation and Its Implications for Agriculture, Food Security, and Poverty in Pakistan”, *The Pakistan Development Review*, Part II, 40 (4):767–786.

<sup>48</sup> *Ibid.*



minority ethnic groups and majority powerlessness and voiceless-ness groups may lack these attributes and characterized by a high incidence of poverty. Thus, a strategy for tackling rural poverty should recognize these differences and, if necessary, place differing emphases on the types of issues flagged in different regions.<sup>49</sup>

### **Rural Poverty Links with Agricultural Growth**

The disparity in incidence of poverty in urban and rural areas, and the higher rate of increase of poverty in the rural areas has prompted debate on growth and productivity trends in the agriculture sector. Although growth in agriculture averaged over 4 per cent per year from FY1993 to FY2005, the incidence of poverty in rural areas is estimated to have increased by over 14 per cent points in this period. Thus growth in the primary sector on which rural livelihoods are based did not actually translate into a sustained increase in average rural incomes.<sup>50</sup>

One possible reason for this anomalous finding is that although annual average growth in agriculture was relatively high in this period, the standard deviation of agricultural growth rates was also high at 5.3, relative to a mean of 4.7. The volatility in the agriculture sector is likely to have caused considerable fluctuation in consumption in rural areas, as well as depletion of assets of the rural poor. The persistence of poverty in rural areas in spite of periods of robust growth is also closely linked to the pattern of distribution of assets, particularly land.<sup>51</sup>

### **Poverty Trends and Regional Differentials**

The increasing trend of poverty during the 1990s was sharper in rural areas, especially after mid-1990s. For example, the incidence of rural poverty was 25 percent in 1990-91 and increased to 39 per cent in 2001-02. On the other hand, urban poverty has declined from 27 per cent in 1990-91 to 23 per cent in 2001-02. Although it can be noted that during the periods of low agriculture growth, poverty went up sharply the obverse is not as clear. Another important feature of poverty in Pakistan is a high concentration of the population within a small range around the poverty line. According to the Planning

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<sup>49</sup>Chaudhry, Imran Sharif and et al. (winter 2006), "Rural Poverty in Pakistan: Some related concepts, issues and empirical analysis", *Pakistan Economic and Social Review*, 44(2): 259-276.

<sup>50</sup>Federal Bureau of Statistics (2001), "Pakistan Integrated Household Survey-Poverty in the 1990s", Second draft, p.20.Islamabad.

<sup>51</sup>Arif, G.M. and et al. (Winter 2000), "Rural Non-agriculture Employment and Poverty in Pakistan", *The Pakistan Development Review*, Part II, 39(4):1089-1110.

Commission, as much as 63 per cent of the poor population falls between the poverty line and a level of consumption that is equivalent to 75 per cent of the poverty line. This means that a fairly large percentage of the population is extremely vulnerable.<sup>52</sup>

### **Poverty Rate and Income Gap**

According to the household income survey implemented by the statistical department of the government, the poverty rate in 2000-01 was 34.5 per cent. This rate was reduced significantly to 23.9 per cent in 2004-05. With regard to income gap, the survey result shows that income gaps in both rural and urban area have narrowed. The income gap of the country has remained modest, so relatively few numbers of households face severe poverty. In other words, many of the households are in the vicinity of the poverty line. If these households suffer major economical or social external shocks, they could immediately fall into the poor group in the society. Among the four provinces, the Sindh Province realized the biggest reduction of poverty rate from 35.3per cent in 2001-01 to 16.7per cent in 2004-05. NWFP also brought down the rate by 14.6 points from 41.5per cent in the four years. The Balochistan Province, on the other hand, did not make a significant reduction of poverty rate, where nearly 30per cent of the households were still under the poverty line in 2004-05.<sup>53</sup>

### **Poverty Reduction Strategy:**

In the past 20 years, the country has generated economic growth and strengthened its macro-economic indicators by implementing macro-economic reforms. Like many other developing countries, Pakistan has also made significant efforts to integrate its economy with the rest of the world by lowering tariffs and taking measures to open economy for investment. The performance of the economy remained dismal in the 1990s which caused poverty to rise. However, knowing the rising trends in poverty during the 1990s, the Government of Pakistan adopted a strategy for poverty reduction in 2001. The

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<sup>52</sup>Social Policy Development Center (2007), "Social Development in Pakistan towards Poverty Reduction", Annual Review, Oxford University Press, p.27.

<sup>53</sup>Japan Bank for International Cooperation(Oct.2007), "Poverty Profile Islamic Republic of Pakistan: Executive Summary", [Online: web]Accessed 9 November 2008,URL: [http://www.jica.go.jp/activities/issues/poverty/profile/pdf/pakistan\\_e.pdf](http://www.jica.go.jp/activities/issues/poverty/profile/pdf/pakistan_e.pdf).

poverty reduction strategy of the government focuses mainly on the five areas which include:<sup>54</sup>

- i) accelerating economic growth and maintaining macroeconomic stability
- ii) investing in human capital
- iii) augmenting targeted interventions
- iv) expanding social safety nets
- v) improving governance

## **Urbanisation**

The world is becoming more urbanized and by the year 2025, according to UN projections, 61 per cent of the world population will be living in urban areas.<sup>55</sup> How to adequately feed the growing numbers of the urban consumers, many of whom will still be living under poverty conditions, is the challenge. Urban growth has many consequences for the food situation. It increases marketed food demand but reduces the availability of productive land in both urban and peri-urban areas. It makes existing market areas and infrastructure inadequate to cope with the growing pressures in both rural and urban areas. As urban food demand rises, food supply and distribution systems (FSDSs) have to supply the inhabitants of cities with increasing amounts of food coming from new and, possibly, more distant production areas and/or from more intensive production systems.<sup>56</sup>

### **Pakistan:**

According to Trewartha the level of urbanization is the proportion of urban population to total population residing in urban places.<sup>57</sup> Pakistan with a population of

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<sup>54</sup>Bhutto, Abdul Waheed (January - March, 2006) ,“Sustainable Agriculture and Eradication of Rural Poverty”, *South Asian Journal*, [Online: web] Accessed 13 November 2008,URL: [http://www.southasianmedia.net/Magazine/Journal/11\\_sustainable\\_agriculture.htm](http://www.southasianmedia.net/Magazine/Journal/11_sustainable_agriculture.htm).

<sup>55</sup>Food and Agriculture Origination (2004), “World agriculture: towards 2015/2030”, [Online: web] Accessed 23 May 2008, URL: <http://www.fao.org/DOCREP/004/Y3557E/y3557e06.htm>.

<sup>56</sup>FAO Corporate Document Repository (1999), “Urban Food Security and Food Marketing: A challenge to City and Local Authorities” , *Urban Food Security and Food Marketing in Metropolitan Lahore, Pakistan*, [Online: web] Accessed 23 November 2008,URL: <http://www.fao.org/DOCREP/003/X6977E/x6977e02.htm#bm2>.

<sup>57</sup>Trewartha, G. T. (1969), *A Geography of Population: World Patterns*, New York: John Wiley & Sons, p.147.

170 million (in 2008), is one of the fastest urbanizing countries of the world.<sup>58</sup> Punjab is one of its largest and the most developed province. Lahore Metropolis, with a current population of 7 million is the capital of Punjab province. At the time of independence in 1947, only 15 per cent of the population of Pakistan lived in urban areas. Today, the urban proportion of its population is above 40 per cent. It is expected that by the year 2030 the majority of its population will be living in urban areas. In Punjab province, 5 cities will become metropolises having a population of more than 4 million each. Lahore's population will rise to above 15 million by 2030. Although these cities will rise in population ranking, but the question is whether their "livability ranking" will improve or slide down. The current trends indicate that their livability ranking will slide down tremendously if nothing is done to improve their environments.<sup>59</sup>

Urban population of three provinces viz, Punjab, Sindh and NWFP grew at almost the same rate i.e., 3.31, 3.44 and 3.46 per cent respectively between 1981 and 1998. Urban proportion of Balochistan grew at the fastest rate during 1981-98 (4.91 per cent) among the four provinces of the country. This may be attributed due to major increase in public sector employment due to increase in provincial government expenditure during the 1980s.<sup>60</sup>

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<sup>58</sup>“Projections of urbanization indicate massive growth at both the national and provincial level. The Ministry of Planning’s Vision 2030 estimates that Pakistan’s total population will reach 218 million by 2030 and that 60 percent this of the total will be located in urban areas. In absolute terms, between 2001 and 2030, Pakistan’s urban population will increase from 48 to 130 million persons—an average of 2.8 million person per year”. The World Bank Infrastructure and Energy Department South Asia Region(June 2006), “Urban Land and Housing Markets in the Punjab, Pakistan”, Draft Report,[Online: web] Accessed 23 January 2008,URL: <http://www.urbanunit.gov.pk/downloads/rt-PLHMP.pdf>.

<sup>59</sup>Zaidi and et al. , “New urbanization trends in Punjab, Pakistan and their effect on the Lahore metropolis”, p.3 [Online: web] Accessed 23 January 2009,URL: <http://www.globalplannersnetwork.org/pdf/congresspapers2.pdf>.

<sup>60</sup>Haider, Murtaza (30 January 2006), “Urbanization challenges in Pakistan: Developing vision 2030”, p.9, [Online: web] Accessed 22 Accessed 12 January 2009, URL: <http://www.regionomics.com/INDUS/Vision%202030%20urbanization%20Pakistan.pdf>.

**Table12:Patterns of Urbanization In Pakistan: A Demographic Appraisal( Census:1998)**

| Administrative Unit | Area (SQ. M.) | Population 1998 |          | Population density per sq. Km | Urban per cent | Rural per cent |
|---------------------|---------------|-----------------|----------|-------------------------------|----------------|----------------|
|                     |               | Number          | Per cent |                               |                |                |
| <b>PAKISTAN</b>     | 796096        | 132352279       | 100.00   | 166.3                         | 32.5           | 67.5           |
| <b>N W F P *</b>    | 74521         | 17743645        | 13.41    | 238.1                         | 16.9           | 83.1           |
| <b>FATA **</b>      | 27220         | 3176331         | 2.40     | 116.7                         | 2.7            | 97.3           |
| <b>PUNJAB</b>       | 205345        | 73621290        | 55.63    | 358.5                         | 31.3           | 68.7           |
| <b>SINDH</b>        | 140914        | 30439893        | 23.00    | 216                           | 48.8           | 51.2           |
| <b>BALOCHISTAN</b>  | 347190        | 6565885         | 4.96     | 18.9                          | 23.9           | 76.1           |
| <b>ISLAMABAD</b>    | 906           | 805235          | 0.61     | 888.8                         | 65.7           | 34.3           |

\* NWFP: North-West Frontier Province. \*\*FATA: Federally Administrated Tribal areas.

Source: Statistics Division, Ministry of Economic Affairs and Statistics Pakistan, [Online: web] Accessed 22 January 2009, URL:[http://www.statpak.gov.pk/depts/pco/statistics/area\\_pop/area\\_pop.html](http://www.statpak.gov.pk/depts/pco/statistics/area_pop/area_pop.html)

## **Challenges**

It is no longer possible to overlook the urban decay in Pakistan. Streets are littered with waste, drains are overflowing with sewage, low-lying communities are inundated after rainfall, traffic congestion is ubiquitous, and the violent crime in urban centres is on the rise. The State either as divested from, or is no longer able to offer, reliable mass transit, good quality and affordable primary education, and healthcare. This has given the opportunity to the private sector to take up some of these roles. However, the private sector has assumed these roles at the cost of social justice and equity. Affordable public

healthcare, public transit, security, and primary/secondary education are some of the sectors where the private sector has filled the void left by the public sector. In brief, the urban decay in Pakistan is screaming and pleading for intervention.<sup>61</sup>

*Impact of Infrastructure Inadequacy:*

The infrastructure deficit is the most obvious telltale of urban decay in Pakistan. World Bank report mentioned that according to the World Economic Forum Survey (2006-07) of 125 countries, Pakistan ranked 67th in basic infrastructure category. For instance, (a) the under performance of the transport infrastructure costs the economy Rs 300 billion (US \$5 billion) per year and (b) existing power shortages of approximately 2,000 megawatts will increase to 6,000 megawatts by the year 2010 and 30,700 megawatts by the year 2020. Less than 1 per cent of wastewater is treated in Pakistan.<sup>62</sup> The rest is dumped into ravines, streams, and rivers. The result has been drastic. Brooks, streams, ravines and rivers have turned into sewers.

*Urban Poverty and Unemployment:*

Pakistan, the most urbanised country in South Asia, presently suffers from tensions in its largest city of its worst kind. The urban areas account for one third of Pakistan's population; one fifth of the urban population is considered poor; they may be more, maybe up to one tenth of the total population of Pakistan. Urban poverty is of a far more threatening and explosive nature and it has a potential to hurt the economy much more than rural poverty.<sup>63</sup> The poor economic growth, specifically the low rate of employment growth for the youth, lack of entrepreneurship, and the collapse of civilian institutions are some of the more inherent causes of the urban decay in Pakistan. Consider that the largest and the fastest growing group in Pakistan are between the ages of 15 and 25 years of age.<sup>64</sup> With the coming of age of large number of unemployed, educated youth in urban Pakistan, the severity of challenges is only likely to increase.

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<sup>61</sup>*Ibid.*

<sup>62</sup> Saif, Khalid Abbas (23 January 2008), "Pakistan ranked 67th in basic infrastructure category: World Bank report", [Online: web] Accessed 12 January 2009, URL: <http://www.brecorder.com/index.php?id=683325&currPageNo=1&query=&search=&term=&supDate>

<sup>63</sup>Zingel, Wolfgang-Peter, (Oct-Dec 1998), "Alleviating urban poverty - the Pakistan way", *Manpower journal*, Institute of Applied Manpower Research, 343:127-147.

<sup>64</sup>United Nation Development Programme(2007), "UNDP Pakistan - UNDP and The Youth", [Online: web] Accessed 12 January 2009, URL: <http://www.undp.org.pk/undp-and-the-youth.html>.

*Housing and Land Policy:*

Access to land is a pre-condition to equitable and efficient urban development. Achieving this for low-income households under conditions of market-led development strategies presents particular challenges and opportunities.<sup>65</sup>

There is an estimated backlog of six million housing units in Pakistan. Inadequate housing, overcrowding, poor indoor air quality, lack of affordable land, and ad hoc treatment of informal settlements within urban areas are some of the challenges facing urban Pakistan today. The urban development authorities have systematically shifted public land to a privileged few by sanctioning public land to land development schemes initiated by the military and other privileged groups in the civilian setup. Low-income communities have been shunned to largely undesirable parts of the cities. A housing policy that gives equal treatment to the housing development plans put forth by the community-based organisations is the need of the hour in urban Pakistan.<sup>66</sup>

*Education Policy:*

Education plays a vital role in human capital formation. It raises the productivity and efficiency of individuals and thus produces skilled manpower that is capable of leading the economy towards the path of sustainable economic development. Like many other developing countries, the situation of the education sector in Pakistan is not very encouraging. Economic survey of 2006-2007 indicates that literacy was 45 per cent in 2001 which has increased to 54 per cent in 2005-06, indicating at 9.0 per cent point's increase over a period of only 5 years, which is still quite low. It shows that Pakistan need to invest heavily in education sector.<sup>67</sup> A two tiered education system has emerged in Pakistan. One for affluent communities attends the more expensive private schools, which offer better education than the state-operated schools. And second for low-income communities attends the state operated affordable schools. An urban education policy is needed in Pakistan, which should benchmark the quality of education in public schools

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<sup>65</sup>[Online: web] Accessed 22 June 2009, URL: <http://www.gpa.org.uk/Special/UrbanLandDevel/index.html>.

<sup>66</sup>Haider, Murtaza (30 January 2006), "Urbanization challenges in Pakistan: Developing vision 2030", National institute of Urban infrastructure planning, Peshawar, Pakistan, [Online: web] Accessed 22 January 2009, URL:

<http://www.regionomics.com/INDUS/Vision%202030%20urbanization%20Pakistan.pdf>.

<sup>67</sup>Memon, Ghulam Rasool (spring 2007), "Education in Pakistan: The Key Issues, Problems and the New Challenges", *Journal of Management and Social Sciences*, Pakistan, 3(1): 47-55.

against the standards maintained in the private schools. The right to *quality education at affordable costs* should replace the *right to education*.

*Basic Health Policy:*

The indicators relating to health continue to reflect poor health status for the majority of approximately 154 million population of Pakistan. Life expectancy stands at 64 years with a high infant mortality rate of 82/1000 live births while maternal mortality rate ranges between 350-400/100,000 live births. Women in reproductive age constitute 24 per cent of total population and the sex ratio in Pakistan is adverse to women 108:100. Population growth rate is 1.9 per cent annual with total fertility rate of 4.00. Pakistan thus lags behind its neighbors and other low-income countries in terms of health and population outcomes.<sup>68</sup>

Improving the health of residents of the nation's urban areas has been a formidable and continuing struggle to meet complex and varied needs with limited resources. Entrenched chronic conditions such as asthma, diabetes, and cancer; infant mortality and child morbidity, drug abuse, violent crime, and health-risk behavior have been accompanied by chronic health system problems of difficult access to and inconsistent quality of care. These circumstances intersect with inner-city environments, requiring providers to recognize not only the specific medical challenge but also the complex social context within which individuals work and live.<sup>69</sup> A basic health policy that guarantees quality health care in urban centres at affordable prices is urgently required.

The urbanization in Pakistan is likely to pose new challenges in governance and urban service delivery. The current appalling state of most urban centres may worsen with time if the development challenges were not recognised and dealt with in a planned and systematic manner.

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<sup>68</sup>“Pakistan Red Crescent Society”, [Online: web] Accessed 12 March 2009, URL: [http://www.prcs.org.pk/health\\_policy.asp](http://www.prcs.org.pk/health_policy.asp) -.

<sup>69</sup>Andrulis, Dennis P. (June 2000), “Community, Service, and Policy Strategies to Improve Health Care Access in the Changing Urban Environment”, *American Journal of Public Health*, New York, 90 (6):1.



## **Globalization**

At a simple, dictionary level, globalisation is defined as “The act, process, or policy of making something worldwide in scope or application”. This simple definition of globalisation highlights the concept of borders. One can envisage three important concepts of globalisation that revolve around the term borders. First, globalisation can be seen as cross border relations. Second, it exhibits open border relations and finally it is considered as trans-border relations. When globalisation is considered as the spread of cross-border exchanges, it is synonymous to internationalisation. Therefore, the word globalisation is used to show the increase in movements between countries of goods, investments, people, money, messages and ideas. Globalisation is nothing but the larger international trade.<sup>70</sup>

Under the new scenario of globalisation, role of Pakistan’s agriculture in the international trade is quite marginal except in some crops where Pakistan has comparative advantages. Pakistan is a net food importing country. Therefore, even a small change in agricultural employment opportunities, or prices, can have major socio-economic effects in the country.<sup>71</sup>

The globalisation advocates deregulation and downsizing of public sector enterprises and increasing the role of private sector in economic activities. About 81 per cent of total farms in Pakistan were below 12.5 acres and they are 39 per cent of the total cultivated area, 49 per cent of wheat, 54 per cent of cotton and 48 per cent of sugarcane acreage. The prices which are low during the harvest, tend to rise in the off-season when farmers sell their produce. Under such situation, farmers in general and small farmers in particular need to have capital for the purchase of next crop inputs suffered a lot. In the situation of imperfect commodity markets, dominated by powerful vested interests, the

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<sup>70</sup>Abdullah, A. Ahmed (1998), “Comments on Globalisation: Threat or Opportunity?”, *The Pakistan Development Review*, 37(4): 81–83.

<sup>71</sup>Ahmad, Naved (Winter 2005), “Governance, Globalisation, and Human Development in Pakistan”, *The Pakistan Development Review*, part ii, 44 (4): 585–594.

country can ill afford the unbridled policies of free market economy, without adequate checks and balances.<sup>72</sup>

The agriculture was included in the multilateral trading system after the eighth (Uruguay) round of talks under GATT on demand of developing countries who had a comparative advantage in this sector and its benefits were being denied to them. This trade round stretched from 1986-1994 and concluded in establishment of WTO and inclusion among others of agriculture in the discipline of WTO.<sup>73</sup>

### **WTO Policies and its impact on Agriculture:**

WTO policies impact agriculture principally through the following agreements<sup>74</sup>:

1. Agreement on Agriculture (AOA)
2. Agreement on Application of Sanitary and Phytosanitary Standards (SPS):  
(Dealing with Health and disease related issues)
3. Agreement on Technical Barriers to Trade (TBT):  
(Dealing with Regulations, standards, testing and certification procedures, packaging, marking and labeling requirements, etc)
4. Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPs):  
(Dealing with Patents and copyrights, plant breeders' rights etc).

#### **Agreement on Agriculture:**

The preamble of the Agreement on Agriculture (AOA) recalls that the long term objective of the agreement is to establish “a fair and market oriented agricultural trading

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<sup>72</sup> Mustafa, Usman and et al.( winter 2001) , “Globalisation and its implications for Agriculture, food security, and poverty in Pakistan”, *The Pakistan development review*, part ii, 40(4):767–786.

<sup>73</sup>The General Agreement on Tariffs and Trade (GATT), which was signed in 1947, is a multilateral agreement regulating trade among about 150 countries. According to its preamble, the purpose of the GATT is the “substantial reduction of tariffs and other trade barriers and the elimination of preferences, on a reciprocal and mutually advantageous basis.”[Online: web]Accessed 23 May 2009 URL: <http://www.law.duke.edu/lib/researchguides/gatt>.

<sup>74</sup>Food and Agriculture Origination (2000), *Multilateral Trade Negotiations on Agricultural: A Resource Manual*, Rome, p.6.

system”.<sup>75</sup> The way AOA has been implemented so far evoked understandably harsh criticisms from developing countries and civil society organizations in the developed world. At best, AOA has turned to be a modest attempt to lay down some institutional framework and general principles that can be further developed to move towards a fair and market oriented trading system in agriculture. At worst, it has been perceived as legalization of trade distorting practices, being carried out by developed countries by virtue of which market access to foreign agricultural products is denied and domestic support to local agricultural products is continued to be provided.<sup>76</sup>

The three pillars of Agreement on Agriculture are domestic support, market access and export competition. Domestic support falls mainly under three domestic subsidy boxes named after traffic lights as Green, Blue and Amber.<sup>77</sup>

- *Green Box* subsidies are deemed to cause no or minimal trade distortion and hence not subject to reduction under WTO commitments. These include government spending for research, pest and disease control, training services, extension and advisory services, marketing and promotion services, infrastructure provisions, environment programme, relief from natural disasters, decoupled income support etc.
- *Blue box* subsidies are linked to acreage or animal numbers but under schemes that also limit production by imposing production quotas or requiring farmers to set aside part of their land.
- *Amber box* subsidies are considered to be trade distorting such as market price support and are expressed in terms of Total Aggregate Measure of Support (AMS) which is given as one figure. Only Amber Box subsidies are subject to WTO reduction commitments according to an agreed formula.

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<sup>75</sup>WTO (1999), World Trade Organisation, “Agreement on Agriculture: The Legal Texts-The Results of the Uruguay Round of Multilateral Trade Negotiations”, National Institute of WTO and International Trade Laws, Cambridge University Press, Islamabad, P 33.

<sup>76</sup>Khan, Mohsin S.(1998), “Comments on Globalisation: Threat or Opportunity? By Paul Streeten”, *The Pakistan Development Review*, 37(4):77–80.

<sup>77</sup>WTO (2007), World Trade Organisation, “Agriculture Negotiations: Background Fact Sheet”, [Online: web] Accessed 22 May 2009, URL:[http://www.wto.org/english/tratop\\_e/agric\\_e/agboxes\\_e.htm](http://www.wto.org/english/tratop_e/agric_e/agboxes_e.htm).

*Domestic support* can be provided under de minimis provision. Developed countries can give subsidies up to the value of 5 per cent and developing countries up to 10 per cent of the value of its agricultural production for non product specific purposes.

*Market access* provisions under WTO are based on the principles of “tariffs only”. Non-tariff barriers like quotas have been replaced by tariffs but the bound levels of tariffs for agricultural products originating in developing countries are excessively high in developed countries.<sup>78</sup> In Japan, for instance, tariff on rice is up to 1000per cent making it very difficult for agricultural products from developing countries to enter and compete in developed country markets.<sup>79</sup>

### **Reduction Commitments under AOA<sup>80</sup>**

- 36 per cent average reduction by developed countries, with a minimum per tariff line reduction of 15 per cent over six years.
- 24 per cent average reduction by developing countries with a minimum per tariff line reduction of 10per cent over ten years.

*Least Developed Countries* (LDCs) were exempted from tariff reductions, but either had to convert non–tariff barriers to tariffs, a process called tariffication or “bind” their tariffs, creating a “ceiling” which could not be increased in future.

“Export subsidies” is the third pillar of the AoA. The 1995 AoA required developed countries to reduce export subsidies by at least 35per cent (by value) or by at least 21per cent (by volume) over the five years to 2000.<sup>81</sup>

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<sup>78</sup>“Non-tariff barriers to trade (NTB's) are trade barriers that restrict imports but are not in the usual form of a tariff. Some common examples of NTB's are anti-dumping measures and countervailing duties, although they are called "non-tariff" barriers, have the effect of tariffs once they are enacted. Their use has risen sharply after the WTO rules led to a very significant reduction in tariff use.” Beghin, John C.( Dec. 2006), “Nontariff Barriers”, Working Paper 06-WP 438,Center for Agricultural and Rural Development, Iowa State University, Ames, Iowa, [Online: web]Accessed 7 June 2009,URL: [http://www.econ.iastate.edu/research/webpapers/paper\\_12703.pdf](http://www.econ.iastate.edu/research/webpapers/paper_12703.pdf).

<sup>79</sup>“The Cancun Challenge-Special Report World Trade Talks” (6-12<sup>th</sup> September 2003), *The Economist*, 368(8340): 64.

<sup>80</sup>WTO(2007),World Trade Organisation, “Understanding The WTO: The Agreements” [Online: web] Accessed 12 March 2009,URL:[http://www.wto.org/english/thewto\\_e/whatis\\_e/tif\\_e/agrm3\\_e.htm](http://www.wto.org/english/thewto_e/whatis_e/tif_e/agrm3_e.htm).

The problems with developing countries is that they don't have fiscal space to even take advantage of the permissible provisions for domestic support available in the form of green box and de minimis measures. The developed countries, on the other hand, have maneuvered domestic subsidy boxes and shifted most of the support to green and blue boxes leaving very little for amber box subject to reduction commitments.<sup>82</sup>

Import barriers (market access restrictions) and domestic subsidies have increased the prices of agricultural products in internal markets of developed countries leading to over production of agricultural products. By providing export subsidies and export credits developed countries have been able to effectively dump their excess production in international markets causing a fall in prices of agricultural products. Pakistan committed to bind more than 90 per cent of its agricultural tariff lines with most of these bound at 100 per cent. For cereals, coffee and tea the bound rate varies from 100-150 per cent. Applied tariff rates for agricultural items like cereals varies between 0-15 and for coffee and tea it varies between 25-35, which is much lower than the bound rates.<sup>83</sup>

#### **Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement)**

The Agreement deals with the enforcement of sanitary (related to human and animal life and health) and phytosanitary (related to plant life and health) laws. The Codex Alimentarius Commission (CAC) has developed the standards, guidelines and other recommendations as baseline for consumer protection. The SPS Agreement covers all food hygiene and food safety measures i.e. maximum level of plant protection chemical and veterinary medicines residues in plants and animals, food additives used in

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<sup>81</sup>IATP (2003), Institute for Agriculture and Trade Policy, "WTO Agreement on Agriculture Basics" WTO Cancun Series Paper, No.2, Minnesota, USA, [Online: web] Accessed 12 March 2009, URL: <http://www.iatp.org/iatp/publications.cfm?accountID=451&refID=25939>.

<sup>82</sup>WTO (2007), World Trade Organisation, "Understanding the WTO: The Agreements" [Online: web] Accessed 12 March 2009, URL: [http://www.wto.org/english/thewto\\_e/whatis\\_e/tif\\_e/agrm3\\_e.htm](http://www.wto.org/english/thewto_e/whatis_e/tif_e/agrm3_e.htm).

<sup>83</sup> Mustafa, Usman and et al (winter 2001), "Globalisation and its implications for Agriculture, food security and poverty in Pakistan", *The Pakistan development review*, part ii, 40(4):767-786.

food etc. It can also be restriction of import from a disease free area, special treatment or processing of products etc.<sup>84</sup>

Developing countries have to face tough resistance to gain access to the markets of developed countries on the basis of food safety, human, animal and plant health and safety standards. These quality standards and disease/pest control measures are based on internationally recognized scientific measures and standards. Pakistan has to establish chains of Laboratories which are internationally accredited and well equipped to deal with the requirements of local exportable produce are required to be established. Overall research and development environment in agriculture sector needs to be enhanced to cater to this challenge.

### **Agreement on Trade-related Intellectual Property Rights (TRIPs)**

This Agreement was also negotiated at the UR of GATT and is now implemented and monitored by WTO regime. The TRIPs Agreement covers a wide range of issues dealing with Intellectual Property Rights (IPRs). IPRs essentially refer to the following three legal entities: *Patents, Trademarks and Copyright*.<sup>85</sup>

Another problem for developing countries' agriculture arises out of TRIPS agreement. For centuries farmers had been saving, exchanging, using and selling farm saved seed. Multinational seed companies have now started claiming patent rights over the seed produced through their research by introducing some new gene sequence. TRIPS state that all countries should protect their plant varieties by patents or through a sui generis system.<sup>86</sup> Developing countries should therefore develop their own sui generis system balancing the rights of plant breeders and local farming communities. The international Union for the Protection of New Varieties of Plants (UPOV) was developed as a "sui generis" system in Europe and is widely viewed as tilted in favor of plant

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<sup>84</sup>Food and Agriculture Origination (2000), *Multilateral Trade Negotiations on Agricultural: A Resource Manual*, p.9, Rome.

<sup>85</sup>*Ibid.*

<sup>86</sup>Mustafa, Usman and et al (winter 2001), "Globalisation and its implications for Agriculture, food security, and poverty in Pakistan", *The Pakistan development review*, part ii, 40(4): 767-786.

breeders.<sup>87</sup> There is a need to balance the provisions of TRIPS with that of Convention of Biological Diversity, wherein the sovereign rights of nations over their genetic resources is recognized.

Pakistan needs to provide patent protection to its valuable export brands like Basmati Rice, varieties of mangoes, oranges etc. Traditional herbal and pharmaceutical knowledge needs to be documented and their link with community practices and ways of life established. Plant breeders rights legislation requires to be introduced which should be based on our own sui generis system.<sup>88</sup> It will be in the interest of Pakistan to voice the concerns of developing countries especially on TRIPS, SPS and special and differential treatment for developing countries. With this Pakistan also need to improve its production, storage, packaging, labeling, testing, processing and marketing facilities on scientific lines to pursue an export led growth strategy with adequate safeguards to ensure that the benefits reach teeming millions of our poor who are dependent on agriculture for their livelihood.<sup>89</sup> Agriculture has a very important role in the economy of Pakistan, it should be prioritized in the allocation of resources and all types of permissible domestic support should be extended to this sector.

Pakistan can increase support to agriculture in all forms as on domestic support, there is very little by way of constraint on policy. Pakistan's product-specific AMS was negative and non-product-specific AMS was less than 1 per cent of the value of agricultural production. It means Pakistan has a big cushion to provide domestic support first to reach a positive sign and then it can further utilize the de minimus provisions laid down in the agreement.<sup>90</sup> The AoA sets no ceiling on Green Box and SDT expenditures,

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<sup>87</sup>In the taxonomical structure "genus → species" a species that heads its own genus is known as **sui generis**. This does not mean, however, that all genera with only a single member are composed of sui generis species. It is only if the genus was specifically created to refer to that one species, with no other known examples, that the species is sui generis. If the species is alone merely due to extinction, as in the case of the Homo genus, the surviving species is not sui generis, because other members of the genus are known, even if they are not currently extant. [Online: web] Accessed 12 April 2009 URL: <http://www.answers.com/topic/sui-generis>

<sup>88</sup> Chishti, Anwar f. and Waqar Malik (winter 2001), "WTO's trade liberalization , agricultural growth, and poverty alleviation in Pakistan", *The Pakistan Development Review*, part ii, 40(4):1035–1052.

<sup>89</sup> Abdullah, A. Ahmed (1998), "Comments on Globalisation: Threat or Opportunity? By Paul Streeten." *The Pakistan Development Review*, 37(4):81–83.

<sup>90</sup> Badar, Hammad and et al (2007), "An Analysis Of Domestic Support To Agriculture Sector In Pakistan Under Wto Regime", *Pakistan Journal of Agriculture Science*, 44(4):679–683.

so there are no direct consequences for policy. Rather, the main problem seems to be very low levels of support to agriculture, given the important role of the sector in the economy.<sup>91</sup>

Pakistan's federal and provincial agricultural ministries should review the existing support provided under the Green Box policies and their impact on the output of Pakistan's agriculture sector. Although Amber Box type of domestic support bars provision of certain types of support but Green Box type domestic support has no limits. Therefore, the government should explore the possibilities to provide domestic support under Green Box. This will enable the needy sector to get due share. The developed world is also transforming its domestic support structure by curtailing its Amber Box type support and enhancing support falling under the category of Green Box. Pakistan should also vigorously pursue this Green Box type of support as if this will not be provided then Pakistan cannot compete in international agriculture business.<sup>92</sup>

## **Climate change**

It is important to review the potential impacts of climate change on food security. The Food and Agriculture Organization (FAO) defines food security as a “situation that exists when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life”.<sup>93</sup> This definition comprises four key dimensions of food supplies: availability, stability, access, and utilization. The first dimension relates to the availability of sufficient food, i.e. to the overall ability of the agricultural system to meet food demand.

Agriculture is not only a source of the commodity, but equally important source of income. In a world where trade is possible at reasonably low cost, the crucial issue for food security is not whether food is “available”, but whether the monetary and non

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<sup>91</sup>Chaudhry, M.G. (2001), “Impact of WTO Negotiations on Agriculture in Pakistan and Implications of Policy”, *Pakistan Journal of Agricultural Economics*, 4 (1):146-153.

<sup>92</sup>Badar, Hammad and et al. (2007), “An Analysis of Domestic Support to Agriculture Sector in Pakistan under WTO Regime”, *Pakistan Journal of Agriculture Science*, 44(4):679-683.

<sup>93</sup>Food and Agriculture Organization (2002), *The State of Food Insecurity in the World 2001*, Rome.



monetary resources at the disposal of the population are sufficient to allow individuals access to adequate quantities of food. An important corollary to this is that national self-sufficiency is neither necessary nor sufficient to guarantee food security at the individual level. It is note worthy that Hong Kong and Singapore are not self-sufficient (agriculture is nonexistent) but their populations are food-secure, whereas Pakistan is self-sufficient but a large part of its population is not food-secure.

### **Climate Change and Agriculture**

Climate change affects agriculture and food production in complex ways. It affects food production directly through changes in agro-ecological conditions and indirectly by affecting growth and distribution of incomes, and thus demand for agricultural produce.<sup>94</sup> Changes in temperature and precipitation associated with continued emissions of greenhouse gases will bring changes in land suitability and crop yields. Depending on the SRES emission scenario and climate models considered, global mean surface temperature is projected to rise in a range from 1.8°C (with a range from 1.1°C to 2.9°C for SRES B1) to 4.0°C (with a range from 2.4°C to 6.4°C for A1) by 2100. Climate change may be irreversible and is predicted to become more extreme in the future.<sup>95</sup>

### **Impact on the Stability of Food Supplies**

Global and regional weather conditions are also expected to become more variable than at present, with increases in the frequency and severity of extreme events such as cyclones, floods, hailstorms, and droughts. By bringing greater fluctuations in crop yields and local food supplies and higher risks of landslides and erosion damage, they can adversely affect the stability of food supplies and thus food security.<sup>96</sup>

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<sup>94</sup>Schmidhuber, Josef and Francesco N. Tubiello (11 Dec. 2007), "Global food security under climate change", *Proceedings of the National Academy of Sciences of USA*, 104 (50):19703–19708.

<sup>95</sup>Intergovernmental Panel on Climate Change (2007), "Climate Change: Impacts, Adaptation and Vulnerability", *Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge.

<sup>96</sup> *Ibid.*

### **Impact of Climate Change on Food Utilization**

The main concern about climate change and food security is that changing climatic conditions can initiate a vicious circle where diseases causes or compounds hunger, which, in turn, makes the affected populations more susceptible to infectious diseases. The result can be a substantial decline in labor productivity and an increase in poverty and even mortality.<sup>97</sup> Essentially all manifestations of climate change, be they drought, higher temperatures, or heavy rainfalls have an impact on the disease pressure, and there is growing evidence that these changes affect food security.

### **Impact of Climate Change on Access to Food**

Access to food refers to the ability of individuals, communities, and countries to purchase sufficient quantity and quality of food. Over the last 30 years, falling real prices for food and rising real incomes have led to substantial improvements in access to food in many developing countries. Increased purchasing power has allowed a growing number of people to purchase not only more food but also more nutritious food with more protein, micronutrients, and vitamins.

### **Impact on Food Prices**

Essentially all SRES development paths describe a world of robust economic growth and rapidly shrinking importance of agriculture in the long run and thus a continuation of a trend that has been underway for decades in many developing regions. SRES scenarios describe a world where income growth will allow a large part of the world's population to address possible local production shortfalls through imports and, at the same time, find ways to cope with safety and stability issues of food supplies.<sup>98</sup>

South Asia is particularly vulnerable to the effects of climate change. Much of the population of these countries will eventually be displaced by rising sea levels. Moreover,

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<sup>97</sup>Kovats, R S and et al. (July 2001), "Early effects of climate change: do they include changes in vector-borne disease?" *Phil. Trans. Royal Society, London.UK*, 356: 1057-1068, [Online: web] Accessed 12 March 2009,URL:

<http://www.pubmedcentral.nih.gov/picrender.fcgi?artid=1088500&blobtype=pdf>.

<sup>98</sup>Schmidhuber, Josef and Francesco N. Tubiello (11 Dec. 2007), *Global food security under climate change*, *Proceedings of the National Academy of Sciences of USA*, 104 (50):19703–19708.

the drinking water for much of India and Pakistan comes from the Himalayan, karakoram and Hindukush glaciers that are already beginning to melt from warmer temperatures. Heavily dependent on the agriculture, south Asian economies are most vulnerable to climate change.<sup>99</sup>

Pakistan contributes only 135<sup>th</sup> of the world's average of carbon dioxide emissions. It produces minimal chlorofluorocarbons and a few sulphur dioxide emissions and thus makes a negligible contribution to ozone depletion and acid rain yet it is likely to suffer disproportionately from climate change. The implications of the greenhouse effects for the country are difficult to predict, but could be large, affecting patterns of agriculture, fisheries and forestry. Wet areas could become drier, the receding of mountain glaciers may reduce inflows for irrigation, agriculture and low-lying areas may become stalinised by saltwater intrusion owing to rise in sea level. Pakistan is facing a number of environmental challenges due to accelerated economic and demographic changes.<sup>100</sup>

### **Climate change Affect on Pakistan**

Pakistan contributes very little to the overall Greenhouse Gas (GHG) emissions, but remains severely impacted by the negative effects of climate change by the following ways:<sup>101</sup>

- Glacier melt in the Himalayas is projected to increase flooding will affect water resources within the next two to three decades. This will be followed by decreased river flows over time as glaciers recede.

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<sup>99</sup>“Task force to tackle climate change issues”, *Daily times*, 14 October 2008, [Online: web] Accessed 2 April 2009, URL: [http://www.dailytimes.com.pk/default.asp?page=2008\10\14\story\\_14-10-2008\\_pg5\\_16](http://www.dailytimes.com.pk/default.asp?page=2008\10\14\story_14-10-2008_pg5_16)

<sup>100</sup>“Pakistan ranks 12th on the list of the country are most vulnerable to the impacts of climate change according to a recently published index. Scientists have warned that 80 per cent of bio-diversity will be at an increased risk. Food-grain production will sharply decline and signs of this effect are already visible.” “Pakistan most vulnerable to climate change”, *International The News*, [Online: web] Accessed 12 December 2008, URL: <http://www.thenews.com.pk/print1.asp?id=159301>

<sup>101</sup>“The potential Clean Development Mechanism (CDM) benefits of a given sum of money are greater in Pakistan than elsewhere. This mechanism allows businesses to collect “carbon credits” by reducing their emissions and then benefit from the costs of doing so by selling the “carbon credits” on an international carbon market.” Alam, Ahmad Rafay (2008), “Meeting the grim challenge of climate change”, *International The News*, [Online: web] Accessed 22 March 2009, URL: <http://www.thenews.com.pk/print1.asp?id=159301>

- Freshwater availability is also projected to decrease which will lead to biodiversity loss and reduce availability of freshwater for the population.
- Coastal areas bordering the Arabian Sea in the south of Pakistan will be at greatest risk due to increased flooding from the sea and in some cases, the rivers.
- Being a predominantly agriculture economy, climate change is estimated to decrease crop yields in Pakistan which in turn will affect livelihoods and food production. Combining the decreased yields with the current rapid population growth and urbanization in the country, the risk of hunger and food security will remain high.
- Endemic morbidity and mortality due to diseases primarily associated with floods and droughts are expected to rise. Increases in coastal water temperatures would exacerbate the abundance of cholera.

The impact of climate change will also aggravate the existing social inequalities of resource use and intensify social factors leading to instability, conflicts, displacement of people and changes in migration patterns.

According to R.K. Pachauri of the Inter-Governmental Panel on Climate Change, Pakistan is responsible for only a small fraction of global warming but is among the countries that will be hit hardest by the effects of climate change. Pakistan is witnessing severe pressures on its natural resources and environment. "Climatic changes are likely to exacerbate this trend. Water supply, already a serious concern in many parts of the country, will decline dramatically, affecting food production. Export industries such as fisheries will also be affected, while coastal areas risk being inundated, flooding the homes of millions of people living in low-lying areas."<sup>102</sup>

Pakistan contributes just one-35<sup>th</sup> of the world's carbon dioxide emissions but temperatures in the country's coastal areas have risen since the early 1900s by 0.6 to 1 degree Celsius. Precipitation has decreased 10 to 15 per cent in the coastal belt and

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<sup>102</sup>"Climate change to adversely impact Pakistan: Pachauri", [Online: web] Accessed 22 March 2008, URL: [http://www.thaindian.com/newsportal/south-asia/climate-change-to-adversely-impact-pakistan-pachauri\\_100142331.html](http://www.thaindian.com/newsportal/south-asia/climate-change-to-adversely-impact-pakistan-pachauri_100142331.html).

hyper-arid plains over the last 40 years, while summer and winter rains have increased in northern Pakistan. This apart, droughts in 1999 and 2000 have caused sharp declines in water tables and dried up wetlands, severely degrading ecosystems. The impact of such changes on Pakistan and on the lives of its people will be severe. The health of millions would be affected with diarrheal diseases associated with floods and drought becoming more prevalent. Intensifying rural poverty is likely to increase internal migration as well as migration to other countries. Given the enormity of the impact, adaptation and mitigation measures are critically important. "Although most societies have a long history of adapting to the impacts of weather and climate, climate change as all are experiencing it today poses new risks that will require new investments in adaptive responses."<sup>103</sup>

Pakistan already a water-stressed country, reduction in irrigation water will have an effect on crop productivity, something over and above the loss to yield caused by the heat stresses of global warming. Pakistan's economy is dependent on agriculture, as are its nearly 170 million people. But by 2030, its numbers are expected to double and that's a conservative estimate. Food security is a critically important issue raised by Climate Change. So far, the government of Pakistan has no policy on Climate Change. The Planning Commission constituted the Task Force on Climate Change with the stated objective to mainstream climate change into national and sectoral policies, but this and the other Planning Commission Task Forces have not been active recently.<sup>104</sup>

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<sup>103</sup>*Ibid.*

<sup>104</sup>"Meeting the grim challenge of climate change", International The News,[ Online: web] Accessed 22 March 2008,URL: <http://www.thenews.com.pk/print1.asp?id=159301>.

## Chapter Four

# Mechanism for Ensuring Food Security

## **Mechanism for Ensuring Food Security**

Maintaining food security at the national and household level is a major priority for most developing countries, both for the welfare of the poor as well as for political stability. In order to help assure food security, governments of the developing countries have adopted various strategies including efforts to increase production (often with an explicit goal of food self-sufficiency), government intervention in markets, and public distribution of food and maintenance of national food security stocks.<sup>1</sup>

### **Ensuring Food Security**

Food security has international, regional, national and household dimensions. Effective supply and demand and equitable distribution of food are the preconditions to secure food at any of these levels. A minimum level of health standard that can help convert food intake to support a healthy body is an additional requirement to measure effective food security. For sustainable food security at national and household levels, states need to provide its people an enabling environment by ensuring them an easy access to opportunities of having sufficient food.<sup>2</sup>

The factors determining food security can be grouped into those relating to the adequacy of food availability and those relating to the stability of food supply and of access to food. Adequacy means that the overall supply, if it is evenly distributed, should cover overall nutritional need in terms of both quantity and quality.

### **Availability of food grains**

Food insecurity is a major problem in all South Asian countries. Although energy availability per capita is above the national per-capita average requirement for light activity (roughly 2,050 kilocalories/day) in these countries, signaling that enough food is available for meeting the needs of all people, the per cent of people food energy deficient

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<sup>1</sup>Ninno, Carlo Del and et al. (2007), "Food aid, domestic policy and food security: Contrasting experiences from South Asia and sub-Saharan Africa", *Food Policy*, 32: 413–435, Received 3 November 2006.

<sup>2</sup>SDPI(2003), Sustainable Development Policy Institute, "Food Insecurity in Rural Pakistan 2003", Report, Islamabad, Pakistan, p.21.

is nearing or above 50 per cent.<sup>3</sup> Further, near or above 30 per cent of people are severely food energy deficient, meaning that they are at a high risk of food energy deficiency.<sup>4</sup>

Per capita per day caloric level in Pakistan (2466 kcal/day) is less than the Recommended Dietary Allowance (RDA) of 2550 kcal/day. However, the protein level is 7.2per cent more than the RDA of 60 grams/day. There have been slight reductions in total cereals (wheat, rice, maize, millet sorghum, barley), and meat. However, increases have been recorded in milk, eggs and edible oil.<sup>5</sup> Over the longer period of the last 45 years, total food availability (inclusive of cereals, pulses, sugar, milk, meat, eggs and edible oil) measured calories per day, has increased from 2078 in 1949-50 to 2340 in 2003-04.<sup>6</sup> While that of protein has increased from 61.5 gm per day to 64.3 per day.<sup>7</sup>

**Table13: Per capita availability of major food items in Pakistan (Kg/annum)**

| Food items | 1979-80 | 1996-97 | 1999-2000 | 2001-02 | 2002-03 |
|------------|---------|---------|-----------|---------|---------|
| Cereals    | 147.1   | 56.9    | 160.8     | 149.3   | 147.3   |
| Wheat      | 116.0   | 130.85  | 131.45    | 112.05  | 116.31  |
| Rice       | 23.4    | 16.85   | 20.78     | 13.97   | 17.24   |
| Edible oil | 6.8     | 11.42   | 12.66     | 11.57   | 11.95   |
| Sugar      | 28.8    | 27.88   | 26.40     | 26.10   | 27.80   |

<sup>3</sup>“In its most technical terms a calorie can be defined as a unit of measurement that is used to indicate the potential amount of energy provided to the body by a particular food. Also known as kilocalories (= 1000 calories), which the amount of energy that is needed to raise the temperature of 1 kilogram of water 1 degree Celsius. In its simplest form, a calorie can be considered just a unit of energy”. “What is Calories”, [Online: web] Accessed 3 April 2009 URL:[http:// www.professorshouse.com/family/.../what-is-a-calorie.aspx](http://www.professorshouse.com/family/.../what-is-a-calorie.aspx).

<sup>4</sup>IFPRI (August 2007), The International Food Policy Research Institute, “Is Food Insecurity More Severe in South Asia or Sub-Saharan Africa? A Comparative Analysis Using Household Expenditure Survey Data” IFPRI Discussion Paper 00712.

<sup>5</sup>FAO(1996), Food and Agriculture Organisation , “Priority Food Security Issues and the Implementation of the World Food Summit Plan of Action” [Online: web] Accessed 22 May 2009, URL: <http://www.ftp://ftp.fao.org/docrep/fao/meeting/008/ae014e.pdf>.

<sup>6</sup>“It is a vision paper on agriculture of Pakistan (2030), which calls for an efficient and competitive sustainable agriculture ensuring food security and with ability to contribute to the economic development and poverty alleviation in Pakistan”. IFPRI(2006),The International Food Policy Research Institute “Agriculture: Food, Water and Land”, [Online: web] Accessed 22 February 2009,URL:[http://www.parc.gov.pk/ifpri/Resources/vision\\_2030.pdf](http://www.parc.gov.pk/ifpri/Resources/vision_2030.pdf).

<sup>7</sup>*ibid.*



|                        |      |       |       |       |       |
|------------------------|------|-------|-------|-------|-------|
| Meat                   | 9.9  | 17.25 | 14.23 | 14.45 | 14.56 |
| Milk                   | 53.0 | 67.16 | 82.40 | 83.14 | 83.87 |
| Fish                   | 1.99 | 4.61  | 5.12  | 5.23  | 5.23  |
| Pulses                 | 6.3  | 6.00  | 7.20  | 6.10  | 5.80  |
| Vegetables             | 23.4 | 33.10 | 33.61 | 35.22 |       |
| Fruits                 | 29.7 | 48.60 | 46.60 | 48.70 | 47.38 |
| Eggs (Nos.)            | 15.0 | 44    | 61    | 55    | 55    |
| Calories/day<br>(Kcal) | 2301 | 2522  | 2625  | 2706  | 2466  |
| Protein/day<br>(grams) | 61.5 | 66.6  | 70.00 | 67.00 | 64.3  |

Source: [Online: web] Accessed 26 June2009,  
<http://www.ftp://ftp.fao.org/docrep/fao/meeting/008/ae014e.pdf>

Despite the fact that Pakistan has attained near self-sufficiency in food production, the improvement in malnutrition was almost invisible during the last 15 years, i.e. between 1<sup>st</sup> National Nutrition Survey (NNS) conducted in 1985-87 and 2<sup>nd</sup> NNS conducted in 2001-02. This is due to shortage of health care personnel, uneven distribution of health facilities, non availability of medicines, regional disparities in health care services and scarcity of administrative health care capabilities and facilities.<sup>8</sup> The most complex and contentious issue refers to what ought to be consumed in terms of diet composition and energy intake. Regulations may be imposed on farmers and also the food industry. But touching the right of consumers to decide what they eat and how much, is quite a sensitive issue. However, figures on food production are no longer considered adequate measures of food security. Today, the focus is more on chronic or transient food insecurity at household level.<sup>9</sup>

<sup>8</sup>FAO (1996), Food and Agriculture Organisation, "Priority Food Security Issues and the Implementation of the World Food Summit Plan of Action" [Online: web] Accessed 22 May 2009, URL: <http://www.ftp://ftp.fao.org/docrep/fao/meeting/008/ae014e.pdf>.

<sup>9</sup>Lundqvist, Jan (2005), "Food Consumption Trends and Pressure on Freshwater Resources", Session No.5, OECD Workshop on Agriculture and Water: Sustainability, Markets and Policies, South Australia, p.17.

Related to this an important aspect of food availability is a change in diet composition of various population groups, indicating a rise in the share of non-cereal consumption in general and animal products in particular. This suggests an increase in the availability of calories at a faster rate than the availability of foodgrains, particularly cereals. At the same time, changes in the diet composition and shift to superior cereals and animal husbandry products suggest that the *cost of calories* has increased. However, per capita availability of low-cost nutritious food, especially pulses, has declined in Pakistan. This raises the question whether the improvement in quality of diet is also true to the poorer groups. An important aspect of national food availability is the move towards national food self-sufficiency.<sup>10</sup>

**Table14: Aggregate Cereals and Pulses Production and Net Availability for Consumption:**

| Year | Production | Change In Stock | Import Export | Total Availability | Availability for Consumption | Per Capita Kg/Year | Per Cap. Availab-ility Index | Share of Trade |
|------|------------|-----------------|---------------|--------------------|------------------------------|--------------------|------------------------------|----------------|
| 1961 | 7101       | -308            | 910           | 7703               | 6648                         | 129.7              | 100                          | 11.81          |
| 1970 | 11780      | 236             | -106          | 11910              | 10610                        | 161.5              | 125                          | -0.89          |
| 1980 | 16191      | -1217           | -550          | 14424              | 12186                        | 142.9              | 110                          | -3.81          |
| 1990 | 20401      | 278             | 1339          | 22018              | 19220                        | 161.3              | 124                          | 6.08           |
| 1995 | 23830      | -2619           | 1066          | 22277              | 19201                        | 140.9              | 109                          | 4.78           |
| 1996 | 24112      | - 1312          | 647           | 23447              | 20280                        | 144.9              | 112                          | 2.76           |

Source: United Nations System in Pakistan (2000), "United Nations Statement on Food Security in Pakistan", Islamabad, p.5, [Online: web] Accessed 15 December 2008, URL:<http://www.rdfs.net/OLDSite/EN/News/Pakistan1.pdf>

<sup>10</sup>FAO (2 June 2005), Food and Agriculture Organisation, "World Cereal Production", Food Outlook, Statistical appendix,[Online: web]Accessed 2 June 2009, URL: [http://www.fao.org/documents/show\\_cdr.asp?url\\_file=/docrep/008/j5667e/j5667e00.htm](http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/008/j5667e/j5667e00.htm).

In Pakistan average food consumption is 150 kg per person per year of cereals and pulses in total with a minimum of about 130 kg in 1961 and a maximum of 162 kg in 1993. Per capita availability, however, fell to 140 kg in 1995 and marginally went up to 145 kg in 1996.<sup>11</sup> Food availability can also be assessed on the basis of food production and consumption. Out of 120 district settings in Pakistan, 74 (62per cent) were found to be food deficit in terms of net availability. Wheat, a staple, catering for 48per cent of caloric needs in Pakistan, was found deficit in terms of net availability and the shortage was estimated at 3.2 million tons annually. Out of 120 districts, only 48 (40per cent) were producing surplus or enough to cater to the needs of these districts. In other words, 72 districts (60per cent) were deficient in wheat availability. In case of rice, the 2nd staple, only 37 (31 per cent) out of 120 districts were found to be production surplus. Cereals meet one-half of caloric needs in developing countries. On net cereal availability basis, out of 120 districts 31 (26per cent) had surplus production.<sup>12</sup>

Food production is one of the key elements of food availability. There has been considerable improvement in food production since the independence of Pakistan. This growth has mainly come from the introduction of green revolution technologies in mid 60's, especially fertilizer and responsive high yielding wheat and rice varieties.<sup>13</sup> Consequently, the productions of cereal crops and pulses have increased more than three and half folds since the early 1960's. The sixties was a period of green revolution wherein dwarf cultivars of wheat and rice with high turnover of photosynthesis were introduced. This brought a quantum jump in productivity of these cereals. This resulted in an average growth rate of 5.1per cent during the last four decade.<sup>14</sup> However, after allowing 10per cent to 16per cent of the production as feed, seed and wastage, Pakistan

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<sup>11</sup>United Nations System in Pakistan (2000), "United Nations Statement on Food Security in Pakistan", Islamabad, p.5, [Online: web] Accessed 15 December 2008, URL:<http://www.rdfs.net/OLDsite/EN/News/Pakistan1.pdf>.

<sup>12</sup>SDPI (2003), Sustainable Development Policy Institute "Food Insecurity in Rural Pakistan 2003", Report, Islamabad Pakistan, p.13.

<sup>13</sup>Ahmad, Imtiaz and et al. (Dec.2004) "Why The Green Revolution Was Short Run Phenomena In The Development Process Of Pakistan: A Lesson For Future", *Journal of Rural Development & Administration*, 35(1-4):268-287,

<sup>14</sup>Hanif, Muhammad and et al. (January 2004), "Agricultural perspective and policy", Ministry of Food, Agriculture and Livestock Islamabad, p.2.

has been importing significant quantities of wheat and pulses to feed its fast growing population.<sup>15</sup>

Food security based on selfsufficiency is a potentially costly policy and a major government priority. Agricultural policy is aimed at maintaining a growth rate higher than population growth.<sup>16</sup> With this there were sound economic and political reasons to stress for the growth of foodgrains production and it has made significant progress in achieving this objective.

## **Stability**

Stability of food supply presupposes environmental sustainability, implying that there is a societal commitment to use natural resources judiciously so as not to compromise future sources of food security.

Stability of food supplies is directly affected, in the first instance, from the performance of the agriculture sector. Any shortfall in the production of food crops has to be met through imports. Meanwhile, the country is facing a chronic balance of payment deficit and foreign exchange problem, which cannot assure stable supply of food all the year round and all over the country. The incidences of unstable supply of food in remote areas are frequent. The short availability of supply of some basic food items (i.e. atta) at some time of year is a very common phenomenon in some areas of Pakistan and hence affecting stability of food supplies.<sup>17</sup>

The other noteworthy achievement in this regard is the strengthened capacity of Pakistan to cope with the yearly fluctuations, and thus periodic shortfalls, in foodgrains production. During last two decades, there were few instances of death from starvation even though it faced severe droughts and floods which resulted in large shortfalls in agricultural production. This becomes more notable as the proportion of the food aid

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<sup>15</sup>“Wheat stocks decline by 1.131m tonnes, ECC told”, [Online :Web], Accessed 23 June 2008, URL: [http://www.dailytimes.com.pk/default.asp?page=2008\09\28\story\\_28-9-2008\\_pg5\\_1](http://www.dailytimes.com.pk/default.asp?page=2008\09\28\story_28-9-2008_pg5_1).

<sup>16</sup> Pakistan Agriculture Economy and Policy (February 2009), [Online :Web] Accessed 23 June 2008, URL: <http://www.fas.usda.gov/country/Pakistan/Pakistan%20Agriculture%20and%20Policy%20Report.pdf>

<sup>17</sup>United Nations System in Pakistan (2000), “United Nations Statement on Food Security in Pakistan”, Islamabad, p.16, [Online: web] Accessed 15 December 2008, URL: <http://www.rdfs.net/OLDsite/EN/News/Pakistan1.pdf>.

became negligible over the period. In this regard General Poverty Alleviation Programmes (PAP) and specially designed relief programme helps immensely. Thus, the shortfall in foodgrains production did not translate as shortfall in foodgrains availability, even when the former was of large magnitude.<sup>18</sup>

Because if the foodgrains availability in domestic and international markets as well as judicious price policies, the real prices of foodgrains did not increase food prices to any significant extent from the mid-70s to the early 90s. Households which practiced self-provisioning were not directly affected by the level of foodgrain prices. Foodgrains prices did not exacerbate the incapacity of even other sections of the population to obtain food. This factor further assisted the poor and food insecure households.<sup>19</sup> The same cannot be said about the seasonal fluctuation in foodgrains supplies which was reflected in sharp price fluctuations. Part of such fluctuations is inevitable, even desirable in agricultural products. Excessive fluctuations however hurt the poor. Instability in foodgrains prices over the seasons could not be muted. Seasonal fluctuations in foodgrains prices were more severe compared to intra year fluctuations in the general index of prices.<sup>20</sup>

### **Access to food**

Access has to do with household entitlements to food supplies. It can be defined as Individuals have adequate incomes or other resources to purchase or barter to obtain levels of appropriate foods needed to maintain consumption of an adequate diet/nutrition level.<sup>21</sup>

The most important aspect of food security is household access to food. Some progress has been made in this direction. The clearest evidence is provided by the

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<sup>18</sup>Ahmed, Ather Maqsood and Rehana Siddiqui (Winter 1995), "Food security in Pakistan: can it be achieved?" *The Pakistan Development Review*, 4: 5.

<sup>19</sup>United Nations System in Pakistan (2000), "United Nations Statement on Food Security in Pakistan", Islamabad, p.18, [Online: web] Accessed 15 December 2008, URL:<http://www.rdfs.net/OLDsite/EN/News/Pakistan1.pdf>.

<sup>20</sup>IFPRI (2006), The International Food Policy Research Institute, "Agriculture: Food, Water and Land", p.12, [Online: web] Accessed 22 February 2009, URL: [http://www.parc.gov.pk/ifpri/Resources/vision\\_2030.pdf](http://www.parc.gov.pk/ifpri/Resources/vision_2030.pdf).

<sup>21</sup>"Policy determination: definition of food security"( 13April 1992), Pd-19, [Online: web] Accessed 22 March 2009, URL:<http://www.usaid.gov/policy/ads/200/pd19.pdf>.

reduction in the proportion of households below the poverty line. In Pakistan poverty line is defined in terms of expenditure on food *plus* other essential expenditures.<sup>22</sup> The former can be translated in terms of calorie intake at the household level. The ratio of the households below the poverty line is therefore a sensitive indicator of the state of food security. However, Table 13 indicates a general decline in the poverty ratio during last two decades in Pakistan. But a hard core of poverty, ranging from 25 percent in Pakistan still persists.<sup>23</sup>

**Table15: Trends in Food Poverty Incidence in rural and urban Ares (per cent)**

| Year    | Pakistan | Rural | Urban |
|---------|----------|-------|-------|
| 1986-87 | 26.9     | 29.4  | 24.5  |
| 1987-88 | 26.4     | 29.9  | 22.7  |
| 1990-91 | 23.3     | 26.2  | 18.2  |
| 1992-93 | 20.3     | 22.5  | 16.8  |
| 1993-94 | 23.6     | 26.3  | 19.4  |
| 1998-99 | 32.6     | 34.8  | 25.9  |
| 2000-01 | 34.46    | 22.69 | 39.26 |
| 2004-05 | 23.94    | 14.94 | 28.13 |

Source: Economic Survey 2006-07, [Online: web] Accessed 2 November 2008, URL: [www.accountancy.com.pk/.../economic-survey-of-pakistan-2006-07.pdf](http://www.accountancy.com.pk/.../economic-survey-of-pakistan-2006-07.pdf)

Access to food is mainly related to poverty. Poverty is more than physical deprivation; it has social and psychological effects that prevent people from realising their potentials. Despite many shortcomings, most analysts follow the convention of regarding poverty as a function of income levels. Incidence of poverty is often referred to in terms of the segment of the population that does not have enough income to purchase a

<sup>22</sup>Government of Pakistan (2007), *Economic Survey 2006-07*, Ministry of Finance, Islamabad, P.37, [Online: web] Accessed 2 November 2008, URL: <http://www.accountancy.com.pk/.../economic-survey-of-pakistan-2006-07.pdf>.

<sup>23</sup>Government of Pakistan (2008), *Economic Survey 2007-08*, Ministry of Finance, Islamabad, p.45, [Online: Web] Accessed 22 December 2009, URL: <http://www.accountancy.com.pk/docs/economic-survey-pakistan-2007-08-02.pdf>.

reference food bundle yielding a specified amount of calories per day and to accommodate a modest non-food allowance.<sup>24</sup>

## **Policy initiatives for food security**

A number of measures towards food security were implemented in Pakistan. Important among these are macro policy interventions, including policies on population growth.

### *Macro policy interventions*

The success in ensuring food security, or addressing the lack of it, was conditioned by macro-economic developments as much as specific policies and programmes addressed to resolve this problem. Macro-economic policies were pursued in the context of progressive liberalisation, rather than de-bureaucratisation, careful sequencing of reforms (starting from the industrial and financial sector reforms), and concern for stable price levels (i.e. curbing excessive inflation). An important aspect of these reforms was to remove the special treatment given to domestic industries by way of tariff, quotas and licenses, which had tilted the terms of trade in favour of industry and to the disadvantage of agriculture.<sup>25</sup>

There is a need for a continuous review of macro-economic framework to remove the policy bias against agriculture. Policy distortions not only depressed the prices for major crops but also resulted in large price variations between years. There is a need to evolve a policy that keeps this variation within narrow bands. A stabilisation fund facility has to be created for this purpose. However, this facility should be carefully designed and

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<sup>24</sup>United Nations System in Pakistan (2000), "United Nations Statement on Food Security in Pakistan", Islamabad, p.18, [Online: web] Accessed 15 December 2008, URL:<http://www.rdfs.net/OLDSite/EN/News/Pakistan1.pdf>.

<sup>25</sup>Gardezi, Hassan N. (winter 2004), "Globalisation and Pakistan's Dilemma of Development", Pakistan Development Review, Part i, 43 (4):423-440.

given operational flexibility. There is a need for government to rationalise public investment as this encourages private investment in agriculture.<sup>26</sup>

### *Population growth*

Pakistan, with a population of 164 million, is the most populated country in the Eastern Mediterranean Region (EMR). The level of socioeconomic development is still low, human development index is 142nd in the world<sup>27</sup> and 24 per cent of the population lives below poverty line with 17 per cent earning less than a dollar a day. The health profile of Pakistan is characterised by high population growth rate, high infant mortality and child mortality rates of 78 and 97 respectively, a high maternal mortality ratio of 320 per 100,000 live births and a high burden of communicable diseases.<sup>28</sup>

Pakistan was a country of 34 million people in 1951, including the-then East Pakistan and now Bangladesh. By 2008, the population had risen to 171,853 million. Pakistan added 135 million Pakistanis in just four decades, and despite the recent decline in the rate of population growth from 3.2 percent to 1.6 percent,<sup>29</sup> Pakistan is expected to have a population size of 224 – 226 million by 2020 and by 2025, population is estimated at a staggering 333 million. At present, there are confirmed estimates that 70 percent of the Pakistani population is living either under, on or just above the poverty line and make two or less dollars a day. 49 per cent of the population is living absolutely below the poverty line.<sup>30</sup> According to a Population Welfare study, “the impact of population growth on poverty is obvious, since poorer families, especially women and marginalised groups bear the burden of a large number of children with much fewer

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<sup>26</sup>Akhtar, Waqar and Muhammad Sharif, “WTO Agreement on Agriculture Impact on Rice-Wheat Production System”, Pakistan Agriculture Research Council, p.14, [Online: web] Accessed January 2009, URL: <http://www.parc.gov.pk/articles/wto.html>.

<sup>27</sup>WHO(2008), World Health Statistics, [Online: web] Accessed 22 April 2009, URL: <http://www.who.int/whosis/whostat/2008/en/index.html>

<sup>28</sup>“Impact of food crisis on health”, UN inter-agency assessment mission on impact of food crisis in Pakistan, [Online: web] Accessed 22 April 2009, URL: [http://www.who.int/hac/crises/pak/pakistan\\_food\\_crisis\\_un\\_assessment.pdf](http://www.who.int/hac/crises/pak/pakistan_food_crisis_un_assessment.pdf).

<sup>29</sup>International Data Base - United States Census(2009), [Online: web] Accessed 12 April 2009, URL: <http://www.census.gov/ipc/www/idb/country.php>

<sup>30</sup>“Population Growth is a Security Issue for Pakistan” [Online: web] Accessed 20 April 2009, URL: <http://www.taraqee.wordpress.com/2008/11/04/population-growth-is-a-security-issue-for-pakistan/>.



resources further adding to the spiral of poverty and deterioration in the status of women.” Because of repeated population explosions, Pakistan is faced with serious socio-economic and a political crises.<sup>31</sup>

### *Agricultural growth*

Faster development of their agricultural sector enabled the countries in South Asia to make some dent in poverty and food insecurity. Majority of workers in these countries derive their livelihood from agriculture, and the food expenditures account for a high proportion of the total expenditure of the poor households. The experience of these countries suggests that direct and indirect effects of agricultural growth are positive in terms of poverty reduction.<sup>32</sup> Pakistan is a good example of this.

From the mid-60s onwards, high-yielding varieties (HYV) of wheat, and later of rice, became popular. HYV technology had a significant impact on the production of wheat and rice, more so in the former. HYV technology was a package which included assured supply of water and adequate application of fertilizers, together with improved seed. Being input-intensive, it required better access to credit. Because of natural limitations and institutional inadequacies, not many agricultural producers could directly benefit from this technology.<sup>33</sup> A large number of producers in the rainfed, non-irrigated areas or inaccessible regions where inputs could not be brought easily, and agricultural producers, who could not avail of credit, did not benefit from the Green Revolution.

An equally important contribution of the public policies was in terms of public investment in improving rural infrastructure, particularly in extending irrigation. This also attracted private capital formation which was supplementary in nature. Capital formation in agriculture, led by public investment, plays a major role in agricultural growth. Unfortunately, with misplaced emphasis on curtailing government expenditure,

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<sup>31</sup>*Ibid.*

<sup>32</sup>Ahluwalia, Montek. S. (1985), “Rural Poverty, Agricultural Production, and Prices: A re-examination” In John D. Mellor and Gunwant M. Desai (ed.), *Agricultural Change and Rural Poverty*, Baltimore and London :Johns Hopkins University Press,p.67.

<sup>33</sup>Mtiyaz Ahmad, Syed and et al. (Dec.2004), “Why The Green Revolution Was Short Run Phenomena In The Development Process Of Pakistan: A Lesson For Future”, *Journal of Rural Development & Administration*, 35(1-4):104.

public investment in agriculture has slackened in the 1990s, resulting in the faltering growth of agriculture.<sup>34</sup>

Pakistan introduced price incentives by subsidising inputs and guaranteeing remunerative minimum support prices. With an improvement in minimum support prices, the terms of trade between agriculture and non-agriculture sector which were heavily biased against agriculture started improving. The macro economic reforms, particularly since the beginning of the 1990s, also contributed to this process. Favourable agricultural prices and guaranteed minimum support prices created a conducive environment for the adoption of input-intensive high-cost technology. This indirect effect of price policy was more important than the direct impact of the rise in agricultural prices on agricultural production.<sup>35</sup>

In the context of food security, price policy is a double-edged sword. The countries in South Asia used price policy to create an environment conducive for the producers. However, that also meant high prices for the consumers of foodgrains. It should be noted that few agricultural producers in these countries have a marketable surplus and few therefore benefit from the high prices. Others who depend wholly or partially on the market for their food supply pay a heavy price.<sup>36</sup> The bulk of such “net buyers” which include landless agricultural labourers and marginal farmers, i.e. the poor majority of the rural areas, are losers in the first instance. The impact of high prices on these sections, however, could be neutralised to the extent that rise in prices leads to higher production and larger employment, and agricultural growth leads to improved demand for non-agricultural goods and services and consequent rise in non-farm employment. Such developments, however, did not take place to any remarkable extent.<sup>37</sup>

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<sup>34</sup>Hanif, Muhammad and et al. (January 2004), “Agricultural perspective and policy”, Ministry of Food, Agriculture and Livestock Islamabad, p.7.

<sup>35</sup>Government of Pakistan (1997), “*Pakistan Economic Survey 1996–97*”, Ministry of Finance, Islamabad, Economic Affairs Division.

<sup>36</sup>Faruqee, Rashid (winter 1998), “Pakistan agriculture in 21<sup>st</sup> century”, *The Pakistan development review*, part ii, 37:4, 245-256.

<sup>37</sup>Vyas, V.S. (1990), “Food Policies and Food Security in Asia, with Particular Reference to South Asia.” In D.S. Tyagi and Vi.S. Vyas, (ed.), *Increasing Access to Food - The Asian Experiences*, New Delhi: Sage Publications, p.47.

## **Poverty Alleviation Programmes**

Another important influence on ensuring food security was the PAP. Pakistan has a long tradition of such programmes which are normally divided into three categories: those that provide social safety net; those intended to create assets for the poor households; and those that generate wage employment. Pakistan has accepted the responsibility of coping with food scarcity during emergencies such as natural disasters, when food is distributed free among the affected households.<sup>38</sup>

The more sustainable programmes of poverty alleviation and food security are those which involve the distribution of assets among the needy households, or provision of gainful employment. The emphasis is now on the distribution of reproducible assets (livestock, tools and implements, credit) among the poor.<sup>39</sup> The distribution of land resource is skewed. This is evident from the fact that about 40 per cent of total farmland is in the control of 7 per cent of the farmers. In addition, large farmers have easier access to resources like water, and credit. Small farmers suffer from resource starvation. Even within the small farmer category, there is a case for improving the conditions of the poorest of the poor i.e. those that own one hectare or less. Approximately 60 per cent of all farmers in Pakistan fall into this category.<sup>40</sup>

The Pakistan Poverty Alleviation Fund (PPAF) was established in 1997, it seeks to alleviate poverty and empower the rural and urban poor, by providing them with access to resources and services. As a not-for-profit private company sponsored by the Government of Pakistan and funded by the World Bank, inspired by the success in Bangladesh of Palli Krama Sahayak Foundation (PKSF), which has a more narrow focus on Microfinance the project provides access to much-needed microcredit loans and grants for infrastructure and capacity building. As such, the PPAF project aims to help the rural poor in Pakistan get out of a cycle of misery, and get into a virtuous cycle of

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<sup>38</sup>Anwar, Talat (Winter 2005), "Prevalence of Relative Poverty in Pakistan", *The Pakistan Development Review*, Part II, 44 (4): 1111–1131.

<sup>39</sup> SAARC (1992), "Report of the Independent South Asian Commission on Poverty Alleviation", Kathmandu.

<sup>40</sup>United Nations System in Pakistan (2000), "United Nations Statement on Food Security in Pakistan", Islamabad, p.18, [Online: web] Accessed 15 December 2008, URL: <http://www.rdfs.net/OLDSite/EN/News/Pakistan1.pdf>.

opportunities.<sup>41</sup> As an Apex fund, PPAF disburses soft loans to a myriad of microfinance organisations in Pakistan. It also provides grants on a cost-sharing basis for development of small scales community infrastructure, and strengthen development and microfinance institutions by supporting their capacity building activities.<sup>42</sup>

### **Public Distribution of Foodgrains**

Pakistan's ration system was established in 1942 to deal with shortages of basic goods caused by wartime disruption in supply. At that time, the ration shops handled wheat and sugar, tea, matches, kerosene, yarn, and cotton cloth. After partition, the system was continued to control hoarding and profiteering of scarce goods. Public Distribution System (PDS) is run through food procurement in the domestic market at a pre-announced procurement price. Foodgrains are distributed through PDS (or 'fair-price' shops) at the "issue price".<sup>43</sup> As the gap between procurement and issue prices is usually narrow, the state subsidises the PDS operations. The ration system is remarkable for its widespread accessibility. In urban areas, 95 per cent of the population has access to a shop within a half-hour's distance on foot, and more than 99 per cent could reach a shop within an hour.<sup>44</sup>

In 1987, Pakistan replaced a 44-year-old system of food rationing with a new system of food pricing and food distribution. It is said that a system of universal food rationing, to provide a minimum quantity of food to all citizens, is a complex undertaking. Apart from the possibility of large scale corruption and misuse, a major

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<sup>41</sup>Pakistan poverty alleviation fund project (PPAF) is designed and funded World Bank program in Pakistan: [Online: web] Accessed 13may 2009, URL: <http://www.worldbank.org.pk/.../pakistanextn/0,,contentmdk:21609794~menupk:293057~pagepk:2865066~pi>.

<sup>42</sup>Financing deployed in 124 districts, and more than 45,000 villages/rural and urban settlements. 2.8 million microcredit loans (46per cent women) with a 100per cent recovery rate and a market share of almost 40per cent of the microfinance sector. "Pakistan Poverty Alleviation Fund, Fact File", [Online: web]Accessed 13may 2009,URL:[http://www.ppaf.org.pk/at\\_glance4.asp](http://www.ppaf.org.pk/at_glance4.asp).

<sup>43</sup>The price at which foodgrains are offered to the market by government agencies for the first time, which might be at par or at a premium or discount. When they begin to be traded, the market price may be above or below the issue price.

<sup>44</sup>Rogers,Beatrice Lorge(1988), " Pakistan's Ration System: Distribution of Costs and Benefits",[Online: web]Accessed 13may 2009,URL:<http://Www.ifpri.org/pubs/books/ppa88/ppa88ch17.pdf> - .

difficulty arises from rising budgetary costs. Rationed food is generally provided at subsidised prices.<sup>45</sup>

On the other hand, efforts to increase food production require assurance of higher producer prices to growers. It is politically difficult to raise the price paid by consumers for food purchased in ration shops every time the official price paid to farmers is increased. The resultant gap in the two prices has therefore a tendency to widen.<sup>46</sup> As seen in the light of the Pakistan experience, this not only increases the total cost of the programme but also the temptation to draw off a part of the subsidy. Government purchases grain at a fixed support price and therefore prevents prices from falling below the desired minimum in years of good harvest. Similarly, by releasing wheat at a fixed price, it prevents food prices from rising above that level.<sup>47</sup>

Pakistan has used all the above discussed modes to ensure food security to poor households. The efforts were in right direction, but because of faulty implementation, the benefits accruing to the poor were not commensurate to the resources expended.

### **Regional collaboration for food security**

Alleviation of poverty as an important goal of public policy is shared by all countries of South Asia. Progressively greater emphasis is placed on food security for the poor households in their policies and programmes. Several common points in the development strategy are pursued by the South Asian countries to achieve these goals. This in itself is a promising start for collaborative action. Added to that is the fact of geographical proximity which can facilitate coordinated activities in a variety of fields. The more promising among the areas of collaborative action, from the point of food security, are the following:

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<sup>45</sup>Aziz,S (1990), " The New System of Food Marketing in Pakistan" , Discussion Paper - United Nations Research Institute for Social Development",[Online: web]Accessed 13may 2009,URL:<http://www.cababstractsplus.org/abstracts/Abstract.aspx?AcNo=19901881388>.

<sup>46</sup>*Ibid.*

<sup>47</sup>"Poverty and Social Impact Assessment: Pakistan Microfinance Policy" (2006),[ Online: web] Accessed 23 February 2009,URL:<http://www.dfid.gov.uk/Documents/publications/pakistan-micro-final.pdf>.

*Early Warning Systems:* South Asia is a disaster-prone area. Large parts of the region are subject to floods and droughts, sometimes both. Earthquake, fire and frost are common occurrences. There is a view that deforestation and extension of cultivation on marginal lands have increased the incidence of natural disasters. The region will benefit from an early warning system that will forewarn the countries about the impending calamity. Renowned farm scientist M S Swaminathan flagged concerns over dwindling global food stocks and rising prices. “We are entering a difficult stage globally and nationally in agriculture and therefore sharing of ideas and experiences among SAARC countries would be beneficial,”<sup>48</sup> He suggested that the SAARC countries should develop jointly a surveillance and early warning system for managing the trans-boundary pests.<sup>49</sup> With modern advances in techniques and instruments of surveillance, this would be a manageable undertaking. As a next step the countries may think of establishing a Disaster Management Authority (DMA) for the region as a whole.

*Conservation and Proper Utilisation of Natural Resources:*

Consumption and degradation of water, land, and air resources are going on unhindered. It is because of continuous growth in the scale of human enterprise worldwide. Development and economic growth have also perhaps destroyed irreversibly the scale of natural biodiversity, with result that the eco-system now has lesser capacity to sustain waste or human life. Land degradation is a serious problem both in irrigated and less favourable areas. In irrigated areas, monoculture and excessive or unbalanced use of chemical inputs resulting from pricing and subsidy policies has been the main cause of environmental degradation. In less favourable areas, mining of soil nutrients, erosion and deforestation are the major causes.<sup>50</sup>

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<sup>48</sup>Bhattacharya, Pallab “SAARC countries urged to give big push to farm investment”, *The Daily Star*, 06 March 2008, New Delhi.

<sup>49</sup>*Pawar for more SAARC ties in farm sector*(2008), The Hindu Business Line, 06 March 2008, [Online: web] Accessed 23 May 2009, URL: <http://www.thehindubusinessline.com/.../2008030652001000.htm>

<sup>50</sup>“Agriculture: Food, Water and Land” ,[ Online: web] Accessed 23 February 2009, URL: [http://www.parc.gov.pk/ifpri/Resources/vision\\_2030.pdf](http://www.parc.gov.pk/ifpri/Resources/vision_2030.pdf),p12.

In this resource poor region priority should be given to the efficient and sustainable use of natural resources. One of the most important areas for collaborative action from this perspective is the integrated use of the water of international rivers. Basins of major rivers in the region straddle across national borders. Upper as well as lower riparian states can make best use of these waters in irrigation, hydro-power generation, navigation, fishery development, and for drinking purposes if they can agree on comprehensive planning of water resources in their common rivers. The Indo-Pak treaty on the Sindhu river system, mediated through the World Bank, provides an excellent example.<sup>51</sup>

Hundreds of millions of South Asians face growing water stress due to over exploitation, climate change and inadequate cooperation among countries, which are threatening river basins that sustain about half of the region's 1.5 billion people. The three trans boundary river basins include the largest in South Asia: the Ganges-Brahmaputra-Meghna (GBM) river basin (which spans Bangladesh, Bhutan, China, India and Nepal), the Indus river basin (in Afghanistan, China, India, Nepal and Pakistan) and the Helmand river basin (which covers Afghanistan, Iran and Pakistan). UN Under-Secretary-General and United Nation Environment Programme (UNEP) Executive Director Achim Steiner said "These river systems are major economic arteries as well as social and environmental assets for South Asia".<sup>52</sup> These crucial transboundary river basins are depleting due to climate change, overuse and mismanagement of water resources, warns a new UN report. To avoid further water-related vulnerability, urgent policy attention and need for improved cooperation between countries in the region. Indeed there should be mutual consultation and exchange of information among these Countries right from the start.<sup>53</sup>

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<sup>51</sup>Sinha, Uttam (November 2008), "India and Pakistan: Introspecting the Indus Treaty", *Strategic Analysis*, 32(6):963-967.

<sup>52</sup>UNEP (09 Feb 2009), United Nation Environment Programme, "Hundreds of Millions of South Asians Face Increasing Water Stress", Press releases, [Online: web] Accessed 11 May 2009, URL: <http://www.grida.no/>.

<sup>53</sup>"Depleting river basins threaten water security in South Asia", [Online: web] Accessed 9 March 2009, URL: <http://southasia.oneworld.net/todaysheadlines/depleting-river-basins-threaten-water-security-in-south-asia>.

*Collaborative Activities and Mutual Learning in Agricultural Research*

The National Agricultural Research Systems (NARS) in some of these countries are fairly well developed and have reached international standards. India's agricultural research system is considered one of the best in the developing countries. Pakistan has made significant advances in the use of water in agriculture while Sri Lanka has a fairly well developed system for plantation crops.<sup>54</sup>

Other countries have also specialised in some crops or resource use. All countries of the region can benefit from information exchange and collaboration in organising relevant research activities. Such collaboration has great potential in the region because of the large, contiguous, agro-ecological tracks; two Punjab in India and Pakistan, West Bengal State of India and Bangladesh, Tarai region of Nepal and the eastern Uttar Pradesh and Bihar in India, share more or less similar agro-ecological features.<sup>55</sup> Research findings applicable to one part could be of use to other parts as well.

Secondly, cropping patterns in these countries are dominated by rice and wheat for which generic research would be useful for large areas in different countries. Third, some countries in the region, India in particular, have made significant advances in frontier research in biotechnology, tissue culture, plant genetics etc. Other countries in the region should be enabled to take advantage of these advances in crop and animal sciences, rather than reinvent the wheel.

*Taking a Common Stand*

Momentous changes which have serious implications for the food security in the developing countries are taking place on the international plane. Most important among these are the Uruguay Round (UR) agreements and the establishment of the World Trade

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<sup>54</sup>FAO (1999), Food and agriculture Organisation, "Implications for Regional Collaboration", [Online: web] Accessed 23 May 2009, URL: [www.fao.org/DOCREP/004/AB981E/ab981e08.htm](http://www.fao.org/DOCREP/004/AB981E/ab981e08.htm) -.

<sup>55</sup>FAOUNROAP (Dec.1998), Food and Agriculture Organisation of the United Nations Regional Office for Asia and the Pacific, "Food Security in South Asia", [Online: Web] Accessed 11 November 2008, URL: <http://www.fao.org/docrep/004/AB981E/ab981e0a.htm>.



Organisation (WTO). UR agreements have, for the first time, brought agricultural trade under international discipline. Developed countries have made firm commitments to bring down the level of subsidies and give larger access to their markets. Also, some provisions have been made to help developing countries, especially the poor food importing countries, during the transitional period, gradually adjusting their trade regimes to the changed economic environment.<sup>56</sup> The 148 members of the WTO met in Hong Kong in December 2005 to discuss the Doha round issues. The only limited progress is: the key outcome was the agreement on 2013 as the end date of agriculture export subsidies.<sup>57</sup> In the changed economic environment, WTO and its specialised committees have acquired great importance. The countries of South Asia whose interests converge should act with solidarity. They have to watch that the developed countries do not take away the gains of tariff liberalisation by imposing non-tariff barriers, or by bringing in extraneous matters such as environmental concerns or child labour, in trade negotiations.<sup>58</sup> There is a worldwide move towards regional economic blocks with varying degrees of economic integration. South Asia lags in this respect. Meaningful regional cooperation can be forged around the fulfillment of a basic and pervasive need such as assuring food security to the poor people of the region.

*Advancing Research for Productivity/Yield Enhancement*

In last decade or so the stagnation in productivity of major food crops has become a cause of concern in the rural areas. Several national and international research agencies are already working in this direction. However, there is scope for initiating joint research projects at the regional level to address these concerns.<sup>59</sup>

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<sup>56</sup>Chishti, Anwar F. and Malik Waqar (winter 2001), "WTO'S Trade Liberalisation, Agricultural Growth, and Poverty Alleviation in Pakistan" *The Pakistan Development Review*, part ii, 40 (4): 1035-1052.

<sup>57</sup>"South Asia in the WTO Concept Note", Institute of Policy Studies of Sri Lanka", Colombo, [Online: web] Accessed 9 March 2009, URL: [http://www.ips.lk/events/workshops/06/18\\_19\\_05\\_sa\\_wto/concept\\_note.pdf](http://www.ips.lk/events/workshops/06/18_19_05_sa_wto/concept_note.pdf) -.

<sup>58</sup>Shiva, Vandana and Bedi, Gitanjali(Eds) (2004), "Sustainable Agriculture and Food Security: The Impact of Globalisation" New Delhi: Sage publication, p. 23.

<sup>59</sup>"Regional Cooperation for Poverty Alleviation and Food Security in Asia" (15 July 2005), RIS Policy Briefs # 15, [Online: web] Accessed 9 March 2009, URL: [http://www.newasiaforum.org/ris\\_policy\\_briefs.htm](http://www.newasiaforum.org/ris_policy_briefs.htm).

Biotechnology offers several ways by which average yields can be directly increased. One is through improvements in the “architecture” of the plant to enable it to absorb more photosynthetic energy or convert a larger portion of that energy into grain rather than stem or leaf. This was, in essence, the “Green Revolution” approach of breeding dwarfing genes into plants so that the plants could make better use of fertilizer and water and produce more grain. This approach is being pursued again in the new rice architecture being studied by the International Rice Research Institute (IRRI), as well as by some private sector interests undertaking research in the fundamental mechanisms that control plant architecture. Another approach, for climates where this is useful, is to modify the plant for a shorter growing season by enhancing its efficiency in the use of fertilizer, pesticides and water.<sup>60</sup>

#### *Sharing experiences in rural development*

All countries in this region have implemented a variety of rural development and poverty alleviation programmes. They have made several innovations in their programmes on asset distribution, employment generation, social security and public distribution. Many of these innovations have succeeded while quite a few have failed. Other countries can learn valuable lessons from these successes and failures. Experience in targeting the programmes, in involving people in identification and management, and in making the projects and the schemes financially viable, are of relevance to the countries with similar objectives.

#### *Promoting Technical Work on Integrated Pest Management (IPM) for Sustainability*

In past few years, the twin agricultural problems which have received constant attention in developing countries are the rising cost of agricultural production and environmental pollution caused by agricultural inputs. Increase in pesticide use has been one of the major contributing factors in this regard. The global pesticide market is now

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<sup>60</sup>FAO (22 - 24 September 1999), Food and Agriculture Organisation, “Biotechnology Developments and Their Potential Impact on Trade in Cereals”, Rome, [Online: web] Accessed 13 May 2009, URL: <http://www.fao.org/docrep/Meeting/X2556E.htm>.

estimated at \$ 38 billion, of which Asia accounts for about \$ 7 billion. In this context, integrated pest management (IPM) has been a widely recognised alternative technique towards the development of an environmentally sustainable agriculture. Biopesticides are being produced by a handful of private companies and, at present, it accounts for only three to four per cent of the global pesticide market.<sup>61</sup> However, timely access to techniques like IPM has helped farmers to retain their export share without compromising with the quality and environment.<sup>62</sup>

### *Work on Microfinance*

Microfinancing, along with social entrepreneurship, should be an essential component of non-government efforts in Pakistan and other developing nations to empower ordinary people to become self-reliant by lifting them out of poverty and teaching them the right skills to help themselves.<sup>63</sup> In South Asia two important organisations Self Employed Women's Association (SEWA) and Grameen Bank have worked for popularising microfinance as an instrument by empowering community especially women in rural villages. A sharp focus would have to be on women as they share the larger burden of food insecurity. It is often observed that several women workers and producers are involved in production, trading and the service sector but they do not have access to financial services. As a result often their productivity declines.<sup>64</sup>

The work of SEWA and Grameen Bank makes it clear that banking with poor is viable and peoples' ownership of the organisation is important along with that poor women can save and have the capacity to repay loans even at market rates of interest. But the poor need Suitable Delivery Mechanisms as door-to-door services, simple procedure, need for assistance in banking operation and matching of collection schedule with cash

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<sup>61</sup>Biopesticides (also known as biological pesticides) are certain types of pesticides derived from such natural materials as animals, plants, bacteria, and certain minerals. For example, garlic, mint, and baking soda all have pesticidal applications and are considered biopesticides. [Online: web] Accessed 12 March 2009 URL: <http://www.healthgoods.com/education/.../Pesticides/biopesticides.htm> -.

<sup>62</sup>Joshi, P. K., and et al. (June 2004), "Agriculture Diversification in South Asia: Patterns, Determinants and Policy Implications", *Economic and Political Weekly*, 4:2457-2467.

<sup>63</sup>Haq, Riaz "Poverty Alleviation and Microfinancing in Pakistan", [Online: web] Accessed 23 February 2009, <http://www.zimbio.com/South+Asia+Investor+Review/articles/121/Poverty+Alleviation+Microfinan>

<sup>64</sup>Chaturvedi, Sachin(2004), "Regional Cooperation for Poverty Alleviation and Food Security in South Asia", p.23, [Online: web] Accessed 23 May 2009, URL: [http://www.ris.org.in/dp87\\_pap.pdf](http://www.ris.org.in/dp87_pap.pdf).

flow. Further, it is found that continuous contact is the key for success. There is need for information sharing and training, financial counselling and integrated financial services.<sup>65</sup> In addition to microlending for the traditional small businesses, there is a need in Pakistan to expand this effort by emulating the work of Grameen Shakti to empower villagers with electricity, water, sanitation and other necessities. It is one of more than two dozen organisations within the Grameen family of enterprises that is dedicated to improving the quality of rural life in Bangladesh.<sup>66</sup>

### **Food Bank**

The Colombo statement on food security, adopted by the leaders of the South Asian Association for Regional Cooperation (SAARC) at the 15th summit, brings into focus one of the basic issues confronting the peoples of the region. This is a laudable initiative that could make a difference to the region, which is home to 40 per cent of the world's poor.<sup>67</sup>

In order to overcome the inadequacies of the food reserve and to improve its functioning, the Leaders at the Twelfth SAARC Summit (Islamabad, 4-6 January 2004) recommended establishment of a Regional Food Bank. Later, an Inter-governmental Expert Group met in New Delhi on 1-2 March 2007 and finalised the text of an Agreement on Establishing the SAARC Food Bank. The Agreement was signed during the Fourteenth SAARC Summit. As agreed, the Member States would endeavour to complete the national procedures, including ratification, by end July 2007.<sup>68</sup>

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<sup>65</sup> *Ibid.*

<sup>66</sup> Haq, Riaz "Poverty Alleviation and Microfinancing in Pakistan", [Online: web] Accessed 23 February 2009

URL: <http://www.zimbio.com/South+Asia+Investor+Review/articles/121/Poverty+Alleviation+Microfinan.>

<sup>67</sup> "For a food-secure South Asia" (2008), *The Hindu*, 07 August 2008, ePaper, [Online: web] Accessed 22 April 2009, URL: <http://www.hindu.com/2008/08/07/stories/2008080754791000.htm>.

<sup>68</sup> "SAARC Food Bank: The need of a food reserve was felt by the SAARC nations more than 20 years ago." [Online: web] Accessed 22 April 2009, URL: [http://www.slmfa.gov.lk/saarc/index.php?option=com\\_content&view=article&id=61:saarc-food-bank](http://www.slmfa.gov.lk/saarc/index.php?option=com_content&view=article&id=61:saarc-food-bank).

Scope of the Food Bank has been expanded beyond emergencies. The Bank would act as a regional food security reserve for the SAARC Member Countries during normal time food shortages and emergencies (Article-II). The Agreement contains broad principles for determination of price. The prices, terms and conditions of payment in respect of the food grains would be the subject of direct negotiation between the concerned member countries based on the guidelines for price determination to be approved by the Food Bank Board periodically (Article-IX). The Agreement sought to rationalise and improve the provisions on the procedures for withdrawal and release of food grains. It delineates roles of the Board to administer functioning of the Food Bank and its policymaking, distinct from the designated Nodal Point(s), responsible for transacting all business at the national level related to operations of the Food Bank.<sup>69</sup>

The Food Bank would act as a regional food security reserve for the SAARC member countries during normal time food shortages and emergencies; and provide regional support to national food security efforts; foster inter-country partnerships and regional integration, and solve regional food shortages through collective action.<sup>70</sup>

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<sup>69</sup>“The South Asian Association for Regional Cooperation (SAARC) was established when its Charter was formally adopted on December 8, 1985 by the Heads of State or Government of Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Afghanistan and Sri Lanka. SAARC provides a platform for the peoples of South Asia to work together in a spirit of friendship, trust and understanding. It aims to accelerate the process of economic and social development in Member States”. [Online: web] Accessed 22 April 2009, URL: <http://www.saarc-sec.org/?t=2.13.2>.

<sup>70</sup>“Food reserve for SAARC nations: The first step of this endeavour was the Agreement on Establishing the SAARC Food Security Reserve which came into force on 12 August 1988”. [Online: web] Accessed 22 April 2009, URL: [http://www.slmfa.gov.lk/saarc/index.php?option=com\\_content&view=article&id=61:saarc-food-bank](http://www.slmfa.gov.lk/saarc/index.php?option=com_content&view=article&id=61:saarc-food-bank).

## Chapter five

# Conclusion

## Conclusion

Wide fluctuations in world prices of food-grains, especially rice and wheat, in the seventies and the early eighties forced many developing countries to strive for self-sufficiency in food-grain production. Pakistan is among the countries where near self-sufficiency was achieved in wheat in the early eighties. It also maintained its status as a leading rice-exporting country. However, a continuously high rate of population growth, a changing pattern of income distribution, and a greater level of urbanisation have greatly influenced the demand for food-grains. At the same time, additional factors like a sharp rise in the cost of irrigation, a dramatic decline in the world price of rice, a heavy debt burden, the lack of technology and human capital development, and mismanagement in the distribution system have contributed towards a slower growth of grain production as compared with the levels achieved in the sixties and the eighties.<sup>1</sup>

This change in the demand and supply situation with respect to food has necessitated the need to re-evaluate the existing agricultural policies. Within demand and supply constraints, the question is whether or not Pakistan can attain self-sufficiency in wheat while at the same time maintaining its status as a significant exporter of rice. In the immediate future, the situation appears desperate, but in the long-run, when available resources are adequately utilised and consistent policies are adopted, there is hope and optimism.

The experience of the past two decades in Pakistan has thrown some important lessons to ensure food security to the poorer households. A large section of its households, ranging between 22 and 49 percent, is still below the poverty line. Economic growth is modest and rate of population growth is high. Agriculture is the mainstay of its economy. It's a barely food self-sufficient. The world Food Summit in 1996 defined "*sustainable food security*" as a situation in which "*all people at all times have physical*

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<sup>1</sup>Ahmed, Ather Maqsood and Rehana Siddiqui (Winter 1995), "Food Security in Pakistan: Can it be Achieved?", *The Pakistan Development Review*, 34(4): 723-731 .

and economic access to sufficient, safe and nutritious food to meet their dietary needs, and food preferences for an active and healthy life”.<sup>2</sup> This seems a helpful definition because it emphasises the importance of access to food over food production. We must be clear that poverty and food insecurity are closely linked.

### **Driving Force of Sustainable Food Security**

There are many factors that influence the prospects for sustainable food security. These sets of driving forces are of global importance, and more particularly relevant to Pakistan's context to achieve sustainable food security, which are as follows:

#### **A Large Degree Of Food Self-Sufficiency Is Desirable To Ensure Food Security:**

Agriculture is the dominant sector of Pakistan's economy, in terms of its contribution to national GDP, share in international trade and share in employment. Foodgrains production is the dominant sub-sector of its agriculture. Growth in agricultural output, particularly in foodgrains production is important from the point of view of availability, stability, as well as access to food for the large masses. It could make a dent in the problem of food insecurity by raising the level of domestic foodgrains production, particularly of cereals. At lower income levels, cereals and other vegetable products are the main source of calories. It is only at a later stage of development that non-cereal foodgrains, i.e., animal husbandry and fisheries products, gain in importance.

The option of importing foodgrains in any but marginal quantities is not an easy option for it, due to the foreign exchange constraint which can be relaxed in non-oil exporting economies only by a higher level of agricultural production and export. From the point of view of availability and to ensure stability, major reliance will have to be placed on government stocks. Pakistan needs sufficient quantities in “buffer stocks” to support stabilisation programmes in the face of fluctuating production. Fluctuations in

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<sup>2</sup>Rome Declaration and Plan of Action(1996),[Online: web]Accessed 8 May 2009,URL: <http://www.fao.org/docrep/003/w3613e/w3613e00.HTM>.



foodgrains production would put a severe pressure on the poor households. Importing foodgrains would drain the meager foreign exchange resources. Within the country, foodgrains production will have to be given high priority in inaccessible regions which face serious problems in the event of production shortfalls in any particular year.

The main argument for augmenting domestic agricultural production rests on the fact that a large proportion of the workforce is employed in agriculture. Their gradual withdrawal is generally conditioned on the availability of surpluses from agriculture for investment in non-agricultural sector. The direct and salutary impact of growth of agricultural output would be on the income and employment of these workers. Growth in agricultural production will also generate secondary effects as the demand for non-agricultural goods would rise and provide conditions for faster growth of non-agricultural sectors. Implicit in the policies pursued by Pakistan in recent years, especially after their disenchantment with the "forced industrialisation" approach to economic growth, is a notion of agriculture led growth. Because of their comparative advantages (dynamic, if not current) this model is valid even in an era of progressively integrating world economies.

**The Route To Food Self-Sufficiency Should Be Through Improved Agricultural Productivity:**

Pakistan has reached the limits of extensive cultivation, and the scope for further expansion of cultivated area is not very bright. In fact, there is a need to withdraw some of the marginal lands as cultivation has been extended to areas which are ecologically unsuitable for crops. At the same time, the possibility of encouraging foodgrains production by raising productivity is quite substantial, primarily because the yield levels of most crops grown in, is still fairly low. It has used non-price as well as price measures to induce farmers to produce more. The experience has shown that the route towards

increasing agricultural productivity in a sustainable and equitable manner lies mainly in *the improvement of technology and institutions.*

The large scale adoption of superior technology e.g., the spread of HYVs in areas suitable for their adoption has increased the chances for raising agricultural production. But there is now a growing apprehension that “technology shelf” is almost empty. It is important to raise the level of yield-augmenting technology. It is also clear that a few precautions not exercised in the past, have to be taken to make agricultural growth sustainable.

These include, first and foremost, a *greater concern for environmental and ecological factors.* Care has to be taken that the natural resource base for agriculture is not damaged. This particularly applies to the efficient use of water resources. Raising productivity in water use in a cost-effective way is as important as increasing land productivity.

Secondly, *research and development efforts should be geared towards evolving labour-intensive yield-augmenting technologies,* i.e., the type of technologies which could be more easily adopted even on the small resource-poor, farms.

Thirdly, to the extent feasible, *research should be geared to develop more robust varieties,* i.e., those which can stand the vagaries of nature.

Fourthly, *systematic efforts should be made to bring the fruits of technological advances for crops grown in the poor regions by the poor farmers.*

Finally, to the extent possible, *research on, and extension of, nutritionally superior crops and varieties should be encouraged.*

**Need to Strengthen the Delivery Systems:**

The agrarian structure in Pakistan is dominated by small and marginal holdings. On the other hand, the delivery systems, i.e., institutions for input supply, credit, marketing, and extension, serve medium to large farmers rather than those with small farms. Once their operations are brought to the level of the marginal farmers, the transaction costs of these institutions rise. This makes them bypass the small farmers. Similarity between the recipient system characterised by the small and marginal farmers, and the delivery systems geared to the requirements of large holdings, does not exist. This has to be provided principally through institutional innovations.

Genuine cooperative institutions could meet the requirements of the small farmers. However, a cooperative in Pakistan has degenerated into inefficient state enterprises in which people have neither participation nor involvement. Strengthening these institutions should be taken as a priority task. Similarly, NGOs have an important role in achieving the objective of “reaching the unreachable”.

**Price Policies Should Not Be Used As A Vehicle For Transferring Incomes:**

While the importance of non-price factors should be fully appreciated price policies have an important role in attaining food security. The main function of prices is to *act as the signal for allocation of resources*, to which function it is legitimate to add the “insurance” function by *declaring and implementing the Minimum Support Prices*. Beyond these two functions, price policies should not be pressed to improve producers' incomes. In other words, by encouraging technological improvement and reforming institutions, efforts should be made to raise crop yield in cost-effective ways and thus achieve higher productivity and enhanced production.

A reasonable stability in market prices, an environment conducive to the adoption of superior technologies, an insurance element provided by measures such as minimum

guaranteed prices, need for procuring grains for public distribution system, a reasonable incentive element for producers, *plus* the state of international prices. These factors should be plugged in to develop the price policy guidelines.

**Public Investment in Agricultural Sector:**

Agricultural growth requires strong infrastructure support, R&D efforts and enhanced institutional capability. These are capital-intensive efforts. One of the undesirable features of the recent developments in these countries is the slackening in the pace of public investment in agriculture. The limited resources available are being diverted to subsidise inputs or output of agriculturists. Subsidies are *crowding out* investments on agricultural development.

Growing shortfalls in public investment in agriculture cannot be compensated by private investment. In any case, private sector investment in agriculture is generally complementary to public investment; private investment is attracted when public investment makes returns on private investment attractive. Generally, private resources will not be invested in lumpy or long-gestation or low return activities, or in activities where benefits cannot be ascribed to an identified group or individuals, i.e., in investments which create public goods or externalities. Much of the investment in agriculture is precisely of this nature. A certain proportion of the State's revenue has to be earmarked for public investment in agriculture. This should be emphasised because of the recent tendency of withdrawal of the State from economic activities. The state cannot abdicate its responsibility of creating basic infrastructure, strengthening research and extension and development of institutions for enhancing human capabilities.

**Rural Development Programmes Should Be Continued And Strengthened:**

Experiences in Pakistan show that growth in GDP, unless the rate is very high, will be unable to generate measurable "spread-effects." Wherever the trickle-down effect

has taken place, the rate of growth of the economy has been substantial. Apart from the *rate* of growth, its *composition* also matters. In this respect the growth led by agriculture is more effective in fulfilling the objectives of poverty alleviation and food security. However, it is not realistic for a large portion of the poor households to assume that economic growth would make them food-secure. It needs to have direct public interventions to eradicate poverty.

Employment elasticity of agricultural growth is low, and is probably declining. For small and marginal farmers as well as landless labourers and poor artisans, employment opportunities outside agriculture are becoming progressively more important. Looking to the slow growth in the non-farm sector, employment opportunities cannot be provided on the requisite scale in non-farm activities for some years to come. Thus, other opportunities either in the form of self-generated or wage employment have to be created by public programmes, mainly in the infrastructure building activities. Pakistan recognises this fact and has launched various schemes to provide employment. The outcome is positive but the costs are high. It is important to bring down costs and ensure that employment is self-sustaining. This need, apart from a more comprehensive micro-level planning, the use of labour to strengthen the agriculture base and enhance the value of natural resources. In the absence of such long term strategies the *employment for the sake of employment* would prove to be unaffordable in time to come.

The scope of poverty alleviation programmes should include not only a rise in wages or in current income. It should also aim at providing assets and skills to these sections. The poor households will be able to respond to economic stimuli only if their capacity is enhanced. Without access to productive assets, which also include the marketable skills, the poor cannot contribute to, and benefit from, the growth process.

**Public Distribution Of Foodgrains In A Reformed Way Is Essential For Ensuring Food Security To The Poor:**

Pakistan has had long experience in public distribution of foodgrains. These programmes have helped a segment of the vulnerable households. As pointed out by several critics, the public distribution system in the country suffers from severe defects. Needy households are not covered under Public Distribution System (PDS), or they avail only a part of their foodgrains requirement from PDS. It is the non-poor urbanites, government servants etc. who take the maximum advantage of the system.

The objectives of PDS will be served only when it is targeted to the poor. This is difficult to achieve in societies where the poor constitute a large segment of the population and the non-poor are only marginally better off. Efforts to link PDS with some measure of income, for example, denying PDS supplies to the income-taxpayers, etc., have not been successful. The only realistic way to target PDS for the poor is by some method of self-selection.

The other feature of PDS which prohibits the poor from taking maximum advantage of the system is the recent tendency to push up the issue price of the foodgrains distributed through PDS in order to reduce food subsidies. Efforts should be made to economise on the cost of PDS by looking closely into existing arrangements for procurement, storage and distribution, and by ensuring that the really needy groups are informed of such arrangements. In order to achieve the latter, PDS for example can be related to the extent of poverty in a region, or to the groups who volunteer for rural employment work. Another way is for the commodities and varieties which are generally consumed by the poor to be distributed through PDS.

**The Dimension Of Nutrition Should Be Added To The Food Security Issue:**

Studies show that *deprivation in terms of hunger* is not a widespread phenomenon. *Malnutrition* is the more pervasive deficiency. Also, while there has been improvement in ensuring food to the people, little progress has been done to improve their nutrition. A major cause of malnutrition is poverty which has to be tackled by rapid growth, preferably in the agricultural sector.

But poverty by itself does not explain the high prevalence of malnutrition. There is a need to supplement poverty alleviation programmes with specific nutrition enhancing programmes. Dissemination of information is an important part of such efforts. Nutrition is not just a matter of adequate intake of calories or protein or micro-nutrients. Two other factors are important to extend food security to nutrition security: *availability and access to health services, and environmental hygiene and sanitation*. Provision of these should also form a part of the food security agenda.

**Continued Conflict:**

Violent conflicts continue to cause severe human misery to a large number population of Pakistan. The impact of these conflicts on food security, nutrition, and natural resource management are severe. While humanitarian assistance may be effective in providing food and shelter for millions of refugees, policy action is needed to deal with the underlying causes and the resulting impact on the people in war-torn and neighbouring areas. Achieving sustainable food security for all is unlikely to be possible in the midst of conflict.

**Degradation of Natural Resources and Increasing Water Scarcity:**

There is unprecedented consumption and degradation of water, land, and air because of continuous growth in the scale of human enterprise worldwide. Development and economic growth have also perhaps destroyed irreversibly the scale of natural

biodiversity, with result that the eco-system now has lesser capacity to sustain waste or human life. Land degradation is a serious problem both in irrigated and less favourable areas. In irrigated areas, monoculture and excessive or unbalanced use of chemical inputs resulting from pricing and subsidy policies has been the main cause of environmental degradation. In less favourable areas, mining of soil nutrients, erosion and deforestation are the major causes. The rapidly increasing demand for meat and livestock products, and the resulting pressure on livestock production could cause similar or more environmental degradation in this sector, if science-based high yielding technologies are not adopted/developed. In fisheries, production has also increased significantly over the last two decades in response to increasing demand and this has led to severe strain on coastal resources. There is therefore need for sustainable management of natural base to meet the needs of present and future generations.

### Climate Change:

Global change, especially in biophysical environment, is impacting the lives of all inhabitants. Ramifications of global warming are having disastrous consequences in the form of drought, floods, low and high temperatures extremes and hurricanes. The monsoon season has been shifting both in intensity and time resulting in heavy losses to national economies. Therefore, comprehensive and careful research studies are needed to understand the nature and the extent of this climatic change and develop plants and animals types and farming systems, which are less vulnerable to such climatic changes.

Models show that Pakistan will grow warmer by 1.0 degree C by 2030; this may require extra water for wheat. It will also need wheat varieties which are more drought as well as more flood resistant. On the whole, wheat yield is likely to go up, even though its geographical distribution will change, while rice will not be affected.<sup>3</sup>

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<sup>3</sup> "Agriculture: Food, Water and Land"[Online: web]Accessed 12 January 2009,URL: [http://www.parc.gov.pk/ifpri/Resources/vision\\_2030.pdf](http://www.parc.gov.pk/ifpri/Resources/vision_2030.pdf)



Most of the corrections, as well as new initiatives, in public policies have to be instituted at the national level. However, there are some areas where regional cooperation may make these efforts easier as well as more effective.

**Globalisation:**

Globalisation offers developing countries new opportunities for broad-based economic growth and poverty reduction. However, it carries significant risks. Globalisation has made mandatory for developing countries to introduce new regulatory rules and bring fundamental changes in its agricultural production regimes. The competitiveness will be strengthened by adopting Good Agricultural Practices (GAP) and Good Manufacturing Practices (GMP) in agricultural production and processing. In this way, by meeting WTO requirements and standards, agricultural commodities from Pakistan can get more opportunities of export due to dynamic market evolution, continued social change and shift in consumer preferences for high value crops. Investments in the transport and preservation, technologies through appropriate government interventions and triggers, will improve the entire value chain in agro industries.

Without appropriate domestic economic and agricultural policies, developing countries in general and poor people in particular will not fully capture potential benefits from trade liberalisation. The distribution of benefits will be determined largely by the distribution of productive assets and governments policies regarding rural development. Poor people can only hope to benefit from globalisation if they have access to resources, infrastructure, and markets. Developing-country governments need to ensure that policies are not biased against small farmers and other poor people.

**Inter-Regional and Urban-Rural Disparity:**

In spite of adequate food production at the national level, severe food shortages have been experienced in certain parts of the country. These food shortages are

considered to be the most significant threat to food security in these areas. Besides, growing urban populations coupled with decreased economic activities has resulted in massive urban slums with millions of food insecure people including female-headed households. Similar population increases in rural areas has exasperated the food insecurity situation. The traditional coping mechanisms of rural societies are severed in the urban areas with little or less reliable substitutes. This adds a drastic complication to the food insecure urbanites. Investments in agriculture and related rural infrastructure would sustain more population in the rural areas thus benefiting the immediate area as well as relieving urban areas of future immigrants.

**Rapid Urbanisation:**

By 2020 about half of the people in the developing world will live in urban areas, where they will make heavy demands on the capacity of cities to provide jobs, education, health care, and food. Although current policies must continue to focus on the countryside, where the majority of poor and food-insecure people still live, future policy actions must pay increasing attention to growing poverty, food insecurity, and malnutrition in urban areas. Since most urban dwellers secure their food through purchases rather than production, policies must enhance access to income-earning opportunities. Policies are also needed to support environmentally sound urban and periurban agriculture, which can supplement incomes as well as improve diets among urban poor people.

**SAARC Food Bank:** In order to effectively and efficiently operationalise the Food Bank:

- Make an institutional arrangement for periodic estimations of food demand; and undertake measures to increase the storage capacity of the Member States.
- Relax the withdrawal conditions and the replenishment requirements of the bank by taking into account the national capacity of the Member States.

- Set up a Central Information System (e.g., websites for real time data sharing); and form a SAARC Food Security Monitoring Committee, including civil society representatives, and also task this committee with the role of: making arrangements for a regional mapping of vulnerable regions and populations, as well as preparing a vulnerability calendar for the effective distribution of food and response systems. Such regional food mapping can also guide the concerned authorities to establish community food centres which are needed mainly to enhance access to food in remote and inaccessible areas.
- Set up a Negotiation Committee for price determination and a Dispute Settlement Mechanism to resolve disputes concerned with the bank's operationalisation.
- Agree to authorise Parliamentary Committees of the Member States to look into its operational issues for wider political support and cooperation, as well as contribute ideas for the effective operationalisation of the bank.
- Work out detailed procurement modalities in addition to ensuring timely, localised and transparent procurement as well as rationalisation of procurement prices. Ensure that public-private partnership be an integral part of the procurement modality.
- Utilise the SAARC Development Fund to facilitate the procurement process.
- Make distribution systems responsive to regional and seasonal food insecurity, as well as non-political and non-partisan.

It has become widely accepted that “political will” is the key ingredient in any recipe for sustainable food security. Political will neither come from heaven - nor from summits or conferences. It is driven by pressure from below and must come from those who are hungry and poor. Political will means more than assenting to declarations filled with ringing rhetoric. It means a high place for food security on the policy agenda, new programmes and institutions, new partnerships, and new ways of thinking, and most of

all, economic and political empowerment of poor people. Collective empowerment of the poor requires new political initiatives and new partnerships between national and international stakeholders.

Sustainable food security for Pakistan (developing countries) can be achieved if there is strong political will to provide following five “Is” for agricultural growth and improved livelihood in rural areas:<sup>4</sup>

- **Incentives:** Remunerative prices for agricultural produce and products.
- **Innovation:** Strong national agricultural education, research and extension systems (both public and private) to generate and disseminate productivity-enhancing technologies.
- **Infrastructure:** Good roads and transport systems, power supply and irrigation systems.
- **Inputs:** Efficient delivery systems for agricultural services, especially for modern farm inputs, agro-processing and credit.
- **Institutions:** Efficient, liberalised markets that provide farmers with ready access to domestic and international markets and effective public institutions to provide key services where these cannot be devolved by the private sector.

Based on the analytical discussions and case study, it seems that the challenge of achieving food security for Pakistan remains a real one notwithstanding the progress in agriculture output since it depends on both *availability* of food as well as its *access* and

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<sup>4</sup> “Reaching Sustainable Food Security for All by 2020: Getting the Priorities and Responsibilities Right” (2002), International Food Policy Research Institute, Washington, D.C.

affordability. For Pakistan, the notion of food security should move beyond a relatively static focus on food availability. Higher agricultural growth, particularly emanating from the crop sector, will provide food security by increasing supply, stabilising prices, and raising incomes of poor farm households. To benefit from the current global food crises, Pakistan needs to change its policy-orientation from the current practice. Focusing exclusively on price and move towards yield enhancement and address, structural issues such as poor crop management skills of farmers; use of cheaper seeds, lack of agricultural infrastructure and higher post-harvest losses; limited research as well as the gap between available research and practical applications; and inadequate funding for research and development. Agriculture will continue to acquire the highest priority from the government for its role in poverty reduction as well as from a food security point of view.

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# APPENDIX

**TABLE 2.1 (A)****INDEX OF AGRICULTURAL PRODUCTION**

| Fiscal<br>Year | 1980-81 Base       |               |                |                | 1999-2000 Base     |               |                |                |
|----------------|--------------------|---------------|----------------|----------------|--------------------|---------------|----------------|----------------|
|                | All major<br>crops | Food<br>crops | Fibre<br>crops | Other<br>crops | All major<br>crops | Food<br>crops | Fibre<br>crops | Other<br>crops |
| 1991-92        | 143.7              | 122.5         | 305.9          | 120.5          | -                  | -             | -              | -              |
| 1992-93        | 141.0              | 124.0         | 216.0          | 118.0          | -                  | -             | -              | -              |
| 1993-94        | 155.0              | 123.6         | 191.8          | 137.5          | -                  | -             | -              | -              |
| 1994-95        | 165.4              | 133.1         | 207.5          | 146.0          | -                  | -             | -              | -              |
| 1995-96        | 163.3              | 137.0         | 252.8          | 140.1          | -                  | -             | -              | -              |
| 1996-97        | 155.3              | 136.5         | 223.6          | 130.3          | -                  | -             | -              | -              |
| 1997-98        | 186.2              | 150.2         | 219.1          | 164.5          | -                  | -             | -              | -              |
| 1998-99        | 189.8              | 147.6         | 209.7          | 170.9          | -                  | -             | -              | -              |
| 1999-00        | 178.4              | 167.7         | 268.2          | 143.7          | 100                | 100           | 100            | 100            |
| 2000-01        | 165.9              | 152.8         | 256.0          | 135.1          | 93                 | 91            | 96             | 94             |
| 2001-02        | 172.1              | 142.9         | 253.2          | 148.7          | 97                 | 85            | 94             | 104            |
| 2002-03        | 185.4              | 153.9         | 243.6          | 160.9          | 104                | 92            | 91             | 112            |
| 2003-04        | 190.7              | 159.6         | 239.7          | 165.1          | 107                | 95            | 89             | 115            |
| 2004-05        | -                  | -             | -              | -              | 104                | 106           | 127            | 102            |
| 2005-06        | -                  | -             | -              | -              | 101                | 107           | 116            | 96             |
| 2006-07        | -                  | -             | -              | -              | 117                | 115           | 114            | 118            |
| 2007-08        | -                  | -             | -              | -              | 126                | 108           | 104            | 138            |
| 2008-09 P      | -                  | -             | -              | -              | 114                | 123           | 105            | 108            |

P: Jul-Mar

Source: Federal Bureau of Statistics.

**TABLE 2.1 (B)****BASIC DATA ON AGRICULTURE**

| Fiscal Year | Crop-ped Area (million hectares) | Improved seed dis-tribution (000 Tonnes) | Water* Availa-bility (MAF) | Fertilizer off-take (000 N/T) | Credit disbursed (Rs million) |
|-------------|----------------------------------|--|----------------------------|-------------------------------|-------------------------------|
| 1990-91     | 21.82                            | 83.27                                    | 119.62                     | 1892.90                       | 14,915.29                     |
| 1991-92     | 21.72                            | 65.93                                    | 122.05                     | 1,884.00                      | 14,479.31                     |
| 1992-93     | 22.44                            | 63.93                                    | 125.12                     | 2,147.61                      | 16,198.11                     |
| 1993-94     | 21.87                            | 63.27                                    | 128.01                     | 2,146.50                      | 15,674.05                     |
| 1994-95     | 22.14                            | 76.87                                    | 129.65                     | 2,183.06                      | 22,373.27                     |
| 1995-96     | 22.59                            | 145.10                                   | 130.85                     | 2,515.05                      | 19,187.31                     |
| 1996-97     | 22.73                            | 137.67                                   | 132.05                     | 2,413.01                      | 19,547.67                     |
| 1997-98     | 23.04                            | 130.50                                   | 122.15                     | 2,646.00                      | 33,392.30                     |
| 1998-99     | 23.07                            | 167.38                                   | 133.78                     | 2,583.00                      | 42,852.00                     |
| 1999-00     | 22.74                            | 194.30                                   | 133.28                     | 2,833.50                      | 39,687.60                     |
| 2000-01     | 22.04                            | 193.80                                   | 134.77                     | 2,966.03                      | 44,790.40                     |
| 2001-02     | 22.12                            | 191.57                                   | 134.63                     | 2,929.00                      | 52,446.30                     |
| 2002-03     | 21.85                            | 172.07                                   | 134.48                     | 3,020.00                      | 58,915.27                     |
| 2003-04     | 22.94                            | 178.77                                   | 134.78                     | 3,222.00                      | 73,445.86                     |
| 2004-05     | 22.78                            | 218.12                                   | 135.68                     | 3,694.04                      | 108,732.91                    |
| 2005-06     | 23.13                            | 226.07                                   | 137.78                     | 3,804.19                      | 137,474.31                    |
| 2006-07     | 23.56                            | 218.60                                   | 137.80                     | 3,672.00                      | 168,830.45                    |
| 2007-08     | 23.68                            | 264.67                                   | 142.44                     | 3,581.00                      | 211,560.66                    |
| 2008-09 P   | 23.68                            | 296.91                                   | 142.86                     | 2,691.00                      | 151,860.60                    |

.. not available

P : Provisional, Jul-Mar

\* : At farm gate

(Contd.)

**TABLE 2.2****LAND UTILIZATION**

| Fiscal Year | Total Area | Reported Area | Forest Area | Not Avail-<br>able for<br>Cultivation | Cultivated Area     |                   |                  | Total Area<br>Cultivated<br>(7+8) | Area Sown<br>more than<br>once | Total<br>Cropped<br>Area<br>(8+10) |
|-------------|------------|---------------|-------------|---------------------------------------|---------------------|-------------------|------------------|-----------------------------------|--------------------------------|------------------------------------|
|             |            |               |             |                                       | Culturable<br>Waste | Current<br>Fallow | Net Area<br>Sown |                                   |                                |                                    |
|             |            |               |             |                                       | 1                   | 2                 | 3                |                                   |                                |                                    |
| 1990-91     | 79.61      | 57.61         | 3.46        | 24.34                                 | 8.85                | 4.85              | 16.11            | 20.96                             | 5.71                           | 21.82                              |
| 1991-92     | 79.61      | 57.87         | 3.47        | 24.48                                 | 8.86                | 4.87              | 16.19            | 21.06                             | 5.53                           | 21.72                              |
| 1992-93     | 79.61      | 58.06         | 3.48        | 24.35                                 | 8.83                | 4.95              | 16.45            | 21.40                             | 5.99                           | 22.44                              |
| 1993-94     | 79.61      | 58.13         | 3.45        | 24.43                                 | 8.74                | 5.29              | 16.22            | 21.51                             | 5.65                           | 21.87                              |
| 1994-95     | 79.61      | 58.50         | 3.60        | 24.44                                 | 8.91                | 5.42              | 16.13            | 21.55                             | 6.01                           | 22.14                              |
| 1995-96     | 79.61      | 58.51         | 3.61        | 24.35                                 | 8.87                | 5.18              | 16.49            | 21.68                             | 6.10                           | 22.59                              |
| 1996-97     | 79.61      | 59.23         | 3.58        | 24.61                                 | 9.06                | 5.48              | 16.50            | 21.98                             | 6.23                           | 22.73                              |
| 1997-98     | 79.61      | 59.32         | 3.60        | 24.61                                 | 9.15                | 5.48              | 16.48            | 21.96                             | 6.56                           | 23.04                              |
| 1998-99     | 79.61      | 59.27         | 3.60        | 24.52                                 | 9.23                | 5.35              | 16.58            | 21.93                             | 6.28                           | 22.86                              |
| 1999-00     | 79.61      | 59.28         | 3.78        | 24.45                                 | 9.09                | 5.67              | 16.29            | 21.96                             | 6.45                           | 22.74                              |
| 2000-01     | 79.61      | 59.44         | 3.77        | 24.37                                 | 9.17                | 6.73              | 15.40            | 22.13                             | 6.64                           | 22.04                              |
| 2001-02     | 79.61      | 59.33         | 3.80        | 24.31                                 | 8.95                | 6.60              | 15.67            | 22.27                             | 6.45                           | 22.12                              |
| 2002-03     | 79.61      | 59.45         | 4.04        | 24.25                                 | 8.95                | 6.61              | 15.60            | 22.21                             | 6.25                           | 21.85                              |
| 2003-04     | 79.61      | 59.46         | 4.01        | 24.23                                 | 9.10                | 6.23              | 15.89            | 22.12                             | 7.05                           | 22.94                              |
| 2004-05     | 79.61      | 59.48         | 4.02        | 24.39                                 | 8.94                | 6.86              | 15.27            | 22.13                             | 7.51                           | 22.78                              |
| 2005-06     | 79.61      | 57.22         | 4.03        | 22.87                                 | 8.21                | 6.72              | 15.39            | 22.11                             | 7.74                           | 23.13                              |
| 2006-07     | 79.61      | 57.05         | 4.19        | 22.70                                 | 8.30                | 5.72              | 16.16            | 21.87                             | 7.40                           | 23.56                              |
| 2007-08     | 79.61      | 57.05         | 4.22        | 23.43                                 | 8.25                | 4.92              | 16.25            | 21.17                             | 7.43                           | 23.68                              |
| 2008-09 P   | 79.61      | 57.05         | 4.22        | 23.43                                 | 8.25                | 4.92              | 16.25            | 21.17                             | 7.43                           | 23.68                              |

P: Provisional

Source: Ministry of Food and Agriculture

Note:

TOTAL AREA REPORTED is the total physical area of the villages/deh, tehsils or districts etc.

FOREST AREA is the area of any land administered as forest under any legal enactment dealing with forests. Any cultivated area which may exist within such forest is shown under heading cultivated area.

AREA NOT AVAILABLE FOR CULTIVATION is that uncultivated area of the farm which is under farm home steads, farm roads and other connected purposes and not available for cultivation.

CULTURABLE WASTE is that uncultivated farm area which is fit for cultivation but was not cropped during the year under reference nor in the year before that.

CURRENT FALLOW (ploughed but uncropped) is that area which is vacant during the year under reference but was sown at least once during the previous year

CULTIVATED AREA is that area which was sown at least during the year under reference or during the previous year.

Cultivated Area = Net Area sown + Current Fallow.

NET AREA SOWN is that area which is sown at least once during (Kharif &amp; Rabi) the year under reference.

AREA SOWN MORE THAN ONCE is the difference between the total cropped area and the net area sown.

TOTAL CROPPED AREA means the aggregate area of crops raised in a farm during the year under reference including the area under fruit trees.



**TABLE 2.3****AREA UNDER IMPORTANT CROPS**

(000 hectares)

| Fiscal Year | Wheat | Rice  | Bajra | Jowar | Maize | Barley | Total Food Grains | Gram  | Sugar-cane | Rapeseed and Mustard | Sesamum | Cotton | Tobacco |
|-------------|-------|-------|-------|-------|-------|--------|-------------------|-------|------------|----------------------|---------|--------|---------|
| 1990-91     | 7,911 | 2,113 | 491   | 417   | 845   | 157    | 11,934            | 1,092 | 884        | 304                  | 53      | 2,662  | 44      |
| 1991-92     | 7,878 | 2,097 | 313   | 383   | 848   | 149    | 11,667            | 997   | 896        | 287                  | 70      | 2,836  | 54      |
| 1992-93     | 8,300 | 1,973 | 487   | 403   | 868   | 160    | 12,191            | 1,008 | 885        | 285                  | 82      | 2,836  | 58      |
| 1993-94     | 8,034 | 2,187 | 303   | 365   | 879   | 151    | 11,919            | 1,045 | 963        | 269                  | 73      | 2,805  | 57      |
| 1994-95     | 8,170 | 2,125 | 509   | 438   | 890   | 165    | 12,297            | 1,065 | 1,009      | 301                  | 80      | 2,653  | 47      |
| 1995-96     | 8,376 | 2,162 | 407   | 418   | 939   | 171    | 12,473            | 1,119 | 963        | 320                  | 90      | 2,997  | 46      |
| 1996-97     | 8,109 | 2,251 | 303   | 370   | 928   | 152    | 12,113            | 1,100 | 965        | 354                  | 100     | 3,149  | 49      |
| 1997-98     | 8,355 | 2,317 | 460   | 390   | 933   | 163    | 12,618            | 1,102 | 1,056      | 340                  | 96      | 2,960  | 53      |
| 1998-99     | 8,230 | 2,424 | 463   | 383   | 962   | 137    | 12,599            | 1,077 | 1,155      | 327                  | 71      | 2,923  | 57      |
| 1999-00     | 8,463 | 2,515 | 313   | 357   | 962   | 124    | 12,734            | 972   | 1,010      | 321                  | 72      | 2,983  | 56      |
| 2000-01     | 8,181 | 2,377 | 390   | 354   | 944   | 113    | 12,359            | 905   | 961        | 273                  | 101     | 2,927  | 46      |
| 2001-02     | 8,058 | 2,114 | 417   | 358   | 942   | 111    | 12,000            | 934   | 1,000      | 269                  | 136     | 3,116  | 49      |
| 2002-03     | 8,034 | 2,225 | 349   | 338   | 935   | 108    | 11,989            | 963   | 1,100      | 256                  | 88      | 2,794  | 47      |
| 2003-04     | 8,216 | 2,461 | 539   | 392   | 947   | 102    | 12,657            | 982   | 1,074      | 259                  | 60      | 2,989  | 46      |
| 2004-05     | 8,358 | 2,519 | 343   | 308   | 982   | 93     | 12,603            | 1,094 | 966        | 243                  | 66      | 3,193  | 50      |
| 2005-06     | 8,448 | 2,621 | 441   | 254   | 1,042 | 90     | 12,896            | 1,029 | 907        | 217                  | 82      | 3,103  | 56      |
| 2006-07     | 8,578 | 2,581 | 504   | 292   | 1,017 | 94     | 13,066            | 1,052 | 1,029      | 256                  | 71      | 3,075  | 51      |
| 2007-08     | 8,550 | 2,515 | 531   | 281   | 1,052 | 91     | 13,020            | 1,107 | 1,241      | 224                  | 76      | 3,054  | 51      |
| 2008-09 P   | 9,062 | 2,963 | 470   | 263   | 1,118 | 86     | 13,962            | 1,094 | 1,029      | 209                  | 91      | 2,820  | 52      |

Note 1 ha = 2.47 acres  
P Provisional (Jul-Mar).

Source: 1. Ministry of Food and Agriculture  
2. Federal Bureau of Statistics

**TABLE 2.4****PRODUCTION OF IMPORTANT CROPS**

(000 tonnes)

| Fiscal Year | Wheat  | Rice  | Bajra | Jowar | Maize | Barley | Total Food Grains | Gram | Sugar-cane | Rapeseed and Mustard |      | Sesamum | Cotton (000 Bales) |     | Tobacco |
|-------------|--------|-------|-------|-------|-------|--------|-------------------|------|------------|----------------------|------|---------|--------------------|-----|---------|
|             |        |       |       |       |       |        |                   |      |            |                      |      |         |                    |     |         |
| 1990-91     | 14,565 | 3,261 | 196   | 239   | 1,185 | 142    | 19,588            | 531  | 35,989     | 228                  | 21.4 | 1,637   | 9,628              | 75  |         |
| 1991-92     | 15,684 | 3,243 | 139   | 225   | 1,203 | 140    | 20,634            | 513  | 38,865     | 220                  | 28.7 | 2,181   | 12,822             | 97  |         |
| 1992-93     | 16,157 | 3,116 | 203   | 238   | 1,184 | 158    | 21,056            | 347  | 38,059     | 207                  | 34.0 | 1,540   | 9,054              | 102 |         |
| 1993-94     | 15,213 | 3,995 | 138   | 212   | 1,213 | 146    | 20,917            | 411  | 44,427     | 197                  | 32.3 | 1,368   | 8,041              | 100 |         |
| 1994-95     | 17,002 | 3,447 | 228   | 263   | 1,318 | 164    | 22,422            | 559  | 47,168     | 229                  | 36.2 | 1,479   | 8,697              | 81  |         |
| 1995-96     | 16,907 | 3,966 | 162   | 255   | 1,504 | 174    | 22,968            | 680  | 45,230     | 255                  | 39.5 | 1,802   | 10,595             | 80  |         |
| 1996-97     | 16,651 | 4,305 | 146   | 219   | 1,491 | 150    | 22,962            | 594  | 41,998     | 286                  | 44.9 | 1,594   | 9,374              | 92  |         |
| 1997-98     | 18,694 | 4,333 | 211   | 231   | 1,517 | 174    | 25,160            | 767  | 53,104     | 292                  | 42.5 | 1,562   | 9,184              | 99  |         |
| 1998-99     | 17,858 | 4,674 | 213   | 228   | 1,665 | 137    | 24,773            | 698  | 55,191     | 279                  | 32.1 | 1,495   | 8,790              | 109 |         |
| 1999-00     | 21,079 | 5,156 | 156   | 220   | 1,652 | 118    | 28,380            | 565  | 46,333     | 297                  | 35.4 | 1,912   | 11,240             | 108 |         |
| 2000-01     | 19,024 | 4,803 | 199   | 219   | 1,643 | 99     | 25,987            | 397  | 43,606     | 230                  | 50.7 | 1,826   | 10,732             | 85  |         |
| 2001-02     | 18,226 | 3,882 | 216   | 222   | 1,664 | 100    | 24,311            | 362  | 48,042     | 221                  | 69.6 | 1,805   | 10,613             | 94  |         |
| 2002-03     | 19,183 | 4,478 | 189   | 202   | 1,737 | 100    | 25,889            | 675  | 52,056     | 215                  | 19.3 | 1,737   | 10,211             | 88  |         |
| 2003-04     | 19,500 | 4,848 | 274   | 238   | 1,897 | 98     | 26,855            | 611  | 53,419     | 221                  | 25.0 | 1,709   | 10,048             | 86  |         |
| 2004-05     | 21,612 | 5,025 | 193   | 186   | 2,797 | 92     | 29,905            | 868  | 47,244     | 203                  | 30.0 | 2,426   | 14,263             | 101 |         |
| 2005-06     | 21,277 | 5,547 | 221   | 153   | 3,110 | 88     | 30,396            | 480  | 44,666     | 172                  | 35.0 | 2,215   | 13,019             | 113 |         |
| 2006-07     | 23,295 | 5,438 | 238   | 180   | 3,088 | 94     | 32,337            | 838  | 54,742     | 212                  | 30.0 | 2,187   | 12,856             | 103 |         |
| 2007-08     | 20,959 | 5,563 | 305   | 170   | 3,605 | 87     | 31,198            | 475  | 63,920     | 176                  | 33.0 | 1,982   | 11,655             | 108 |         |
| 2008-09 P   | 23,421 | 6,952 | 296   | 165   | 4,036 | 83     | 34,953            | 760  | 50,045     | 147                  | 41.0 | 2,010   | 11,819             | 113 |         |

P: Provisional (Jul-Mar)

Source: 1. Ministry of Food and Agriculture  
2. Federal Bureau of Statistics

**TABLE 2.9****FERTILIZER OFFTAKE AND IMPORTS OF PESTICIDES**

| Fiscal Year | Fertilizer off-take (000 N/Tonnes) |        |       |          | Import of fertilizers<br>000 N/T | Import of Insecticides |                   |
|-------------|------------------------------------|--------|-------|----------|----------------------------------|------------------------|-------------------|
|             | N                                  | P      | K     | Total    |                                  | Quantity<br>(Tonnes)   | Value<br>(Mln Rs) |
| 1990-91     | 1,471.63                           | 388.50 | 32.75 | 1,892.88 | 685.00                           | 13,030.14              | 1,489.43          |
| 1991-92     | 1,462.60                           | 398.02 | 23.30 | 1,883.92 | 632.00                           | 15,258.30              | 1,945.98          |
| 1992-93     | 1,635.34                           | 488.20 | 24.07 | 2,147.61 | 759.10                           | 14,434.80              | 1,730.60          |
| 1993-94     | 1,659.36                           | 464.24 | 23.17 | 2,146.77 | 903.00                           | 12,100.40              | 1,706.30          |
| 1994-95     | 1,738.12                           | 428.40 | 16.54 | 2,183.06 | 261.00                           | 21,776.10              | 2,978.10          |
| 1995-96     | 1,990.90                           | 494.45 | 29.70 | 2,515.00 | 581.00                           | 30,479.00              | 5,080.70          |
| 1996-97     | 1,985.10                           | 419.51 | 8.40  | 2,413.01 | 878.10                           | 30,855.90              | 5,272.49          |
| 1997-98     | 2,075.00                           | 551.00 | 20.00 | 2,646.00 | 714.00                           | 29,224.90              | 4,801.19          |
| 1998-99     | 2,097.00                           | 465.00 | 21.00 | 2,583.00 | 866.00                           | 31,893.40              | 5,515.12          |
| 1999-00     | 2,217.80                           | 597.16 | 18.50 | 2,833.50 | 662.80                           | 26,123.90              | 4,691.71          |
| 2000-01     | 2,264.49                           | 676.73 | 22.75 | 2,966.03 | 579.10                           | 21,255.00              | 3,476.50          |
| 2001-02     | 2,285.30                           | 624.54 | 18.75 | 2,928.60 | 625.70                           | 31,783.20              | 5,320.49          |
| 2002-03     | 2,349.11                           | 650.17 | 20.49 | 3,019.76 | 766.10                           | 22,241.66              | 3,440.86          |
| 2003-04     | 2,526.73                           | 673.46 | 21.79 | 3,221.98 | 764.10                           | 41,406.36              | 7,156.66          |
| 2004-05     | 2,796.42                           | 865.11 | 32.51 | 3,694.04 | 784.71                           | 41,561.41              | 8,280.64          |
| 2005-06     | 2,926.62                           | 850.53 | 27.04 | 3,804.19 | 1,268.31                         | 33,953.90              | 6,804.02          |
| 2006-07     | 2,650.00                           | 979.00 | 43.01 | 3,672.00 | 796.00                           | 28,089.45              | 5,848.44          |
| 2007-08     | 2,924.60                           | 629.70 | 26.90 | 3,581.20 | 876.30                           | 27,714.00              | 6,353.00          |
| 2008-09 P   | 2,205.00                           | 452.00 | 23.00 | 2,691.00 | 401.00                           | 16,495.00              | 5,498.00          |

P Provisional, (Jul-Mar)

Source: 1. Federal Bureau of Statistics.

2. National Fertilizer Development Centre.

