THE PRACTICE OF MANPOWER FORECASTING FOR SCIENTIFIC AND TECHNICAL PERSONNEL IN AGRICULTURAL SECTOR

A DISSERTATION

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by

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CHAPTER - I

INTRODUCTION:

Human resources hold the key to development. It is the human factor which, through its capacity of deciding the use of the other productive factors involved in any production system, determines the quality of the desired results. And it is now very well recognised that all developmental operations require special talents, i.e., highly trained personnel - who would carry out the essential scientific and technological tasks which need to be accomplished in order to ensure the very pace of change that has been initiated. The responsibilities carried out by these highly trained personnel are onerous because of their direct consequences for the gradually developing economies. In the developing countries, experience has shown that the provision of trained personnel has to go hand in hand with the introduction of advanced technologies and scientific practices in various sectors of production. The continuous availability of these personnel will hasten industrialisation and other development tasks.

The very importance of gearing the 'education expansion' programmes to meet these personnel requirements, has required intervention by the state, provision of large resources and planning of balanced advances in related sectors so that the appropriate categories of technical personnel are trained

in time. All these imperatives have forced many developing countries to establish statutory bodies and commissions etc. for performing the essential tasks involved in the manpower planning.

In a developing country, the task of projecting manpower requirements becomes primarily one of formulating new patterns, drawing in part on the experience of other countries in manpower planning. But all such exercises undertaken by developing countries by drawing partially on the experience of developed countries like U.S.A., Japan have not resulted in any perfect forecast and have received much criticism from many quarters[1].

The experience of the developing countries in manpower forecasting has not been very pleasant. It is quite common for most of these countries to have a significant deficit of certain categories of professionals for a long period and, a surplus of others. Their governments have tried to find a remedy for this situation by practicising short-term measures such as employment creating projects. But these short term measures have failed to provide an effective mechanism for making the best use of its financial and human resources. The importance of this problem is obvious. Given this importance, one must find a way of reinstating faith in manpower forecasting and methods of planning in these countries

Planning is a scientific method of managing the economy. It relies on the economic laws of socialism, the nature of

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1. Background papers on the Methodology of Manpower Forecasting, IAMR, 1972.

achievements in scientific and technical progress, the laws of nature and the evolution of society. But non-socialist countries have also resorted to the use of principles and methods of planning. The nature and the limits of their intervention is largely decided by the character of socio-economic organisation to which these states belong.

Economic and technological changes are so rapid that it is now impossible for any society to rely on the normal market mechanism to adjust supply and demand of the professional, technical and other allied personnel whose training period is long. These issues are particularly significant in those sectors where considerable intervention is practised through services like research, extension and education. The Government can act to control the size of these services either by (i) changing the pattern of utilisation of these personnel, or (ii) by affecting the supply through regulating the growth of educational and training institutions.

Education and planning represent a substantial investment, not only by state but also by persons who undergo education. The manpower projections can help the government to make the educational activity more economical and efficient in relation to needs. Recognition of such an imperative is observed, for example, in the reports of AGRICULTURAL PERSONNEL COMMITTEE, the ENGINEERING PERSONNEL COMMITTEE AND the SCIENTIFIC MANPOWER COMMITTEE.

In this study, the experience of the agricultural manpower forecasting will be reviewed with regard to the problems of

agricultural development in the Indian economy. The field of this study is restricted to agricultural personnel only. Fisheries, Dairying and Veterinary personnel requirements are not included. The limiting of this study to agricultural personnel only has been necessitated by shortage of time and the paucity of information in these areas. But it should be mentioned here that the provisions of the personnel for fisheries and dairying sectors etc. are equally important for agricultural development.

The importance of the study derives its strength from the fact that every seventh agricultural graduate is unemployed[1] and simultaneously certain categories of agricultural technical manpower, namely, water and soil management personnel and plant protection staff are in shortage. Further it derives its significance from the fact that Indian agriculture is still predominantly practised at a very low level of technique which can be characterised as 'the natural transformation of land' process. It is to recognise that the increase in agricultural production will depend upon the use of scientific practices and new technological inputs. This implies manpower planning. The bottleneck of agricultural development is becoming the main hinderance in the path of further industrialisation. Our country is still

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1. The number of unemployed agricultural graduates (including post-graduates) on the Live Registers of Employment Exchanges was around 10,000 by the end of 1973. The stock estimated by the Ministry is 72,000, in Demand and supply of Agricultural Technical Manpower, a paper on estimates, Ministry of Agriculture and Irrigation, 1975, page-22.

importing a significant amount of foodgrains from developed countries and is paying a heavy price for the backwardness of its agricultural sector. The meagre foreign currency reserves, have to be utilised for imports of grains; which could have been utilised otherwise for importing the crucial machinery for capital goods and technical knowhow. By increasing the non-cereal agricultural commodities production, the country would have increased its foreign currency reserves by exporting these commodities. Industrialisation, will depend upon the efforts to diversify agriculture and increase per hectare yields. These tasks may require special crop developmental personnel who need to be trained to meet the conditions of different agro-climatic regions. Similarly, the other tasks of technical transformation will require that manpower be trained for extension, research and development, and education. These personnel form the backbone of the process of modernising agriculture. And it will be stating the obvious that the continuous over production or shortages of certain types of agricultural/technical manpower overlong periods will cost the sector heavily and result in strangling the growth of economy. In order to avoid this kind of situation, a sound methodology for manpower forecasting which will take into account the local conditions of Indian agriculture, needs to be developed.

This section shall be completed with the citing of the observation made by the Fourth Evaluation Report of the

Intensive Agricultural District Programme. This remark supports the fact that the detailed analysis of manpower forecasting needs to be attempted in the light of experience of the country in agricultural development. The observation goes like this:

"Analysis should be made of the manpower needs for meeting the programme demands in the districts, in the state and in the country. Starting with the district, such analysis should be part of a broad study of development of an agricultural program attuned to the local conditions"[1].

THE OBJECTIVES OF THE STUDY

Firstly it is broadly aimed at tracing out the use of forecasting technique in the sphere of agricultural personnel and formulating the criteria to evaluate the procedures followed in computing of the requirements of agricultural personnel. Any planning technique for computing the requirements of technical personnel depends upon the information available. The information gap may lead to choosing of the unscientific assumptions which can result in placing the methodology of the forecasting on totally unreal basis and ends up in giving wrong results. The conceptual framework needs to be developed in order to identify the gaps in various aspects, such as utilization, job performance etc. So the second aim will be to review the organisation for collecting the information on which various committees based their assumptions and identity the crucial information gaps.

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1. Modernising Indian Agriculture, on IADP, Vol.1,p.47 Fourth Evaluation Report.

In short the process of evaluation mainly has three broad aims; stated in the following sequence :

(i) the review of the chosen forecasting technique and adequacy of available information;

(ii) the tracing out of actual reasons for over production and shortage of certain categories of agricultural personnel;

(iii) and the critical review of existing utilization strategy.

These objectives shall be discussed in more details in the next section : The statement of the Problem.

STATEMENT OF THE PROBLEM

The method which has been employed in all the corecasts under review can be stated in the following way. Manpower requirements are obtained by asking the existing employees what their manpower requirements will be at some time in future. This method is called employer forecasting method. In this method, to specify the value of a dependent variable - "the different specialized manpower categories requirements", the values of independent valuables like staffing norms, the level of investment, and nature of programmes etc. which are supposed to be determined by the policies practised, need to be determined. This implies that the policy makers are to observe these independent variables in the supposed manner as assumed in the forecast exercise. This pre-supposes that the substitution of these specialized occupations by personnel trained for different purpose is not possible. And in the case of surplus, specia-

lised agricultural technical personnel will not be absorbed by any other sector or branch. If employed, these shall be considered under-employed.

This method is going to be reviewed in this study, so it is necessary that relevant questions are asked, based on problems of this technique. The questions are stated in the following way :

(i) What are the general conditions for the cases in which desired norms and targets of investments will actually be observed?

(ii) What shall be the basis for assuming certain staffing norms?

(iii) Is the basis chosen by committees sound enough that it will fullfil the needs in relation to which the training pattern is linked because the satisfaction of certain need pattern only ensures the continuous inflow of financial resources, assuming that the reproduction cycle of investment or financial resources is shorter than the period for which manpower forcasts are made? For the sake of rigour in the analysis, one more assumption needs to be made: deficit financing, if observed, will lead actually to the situation of imbalances in the utilization of agricultural technical personnel in a non-socialist country. This assumption is made on the basis that continuous deficit financing in the service sector of the economy of a non-socialist country leads to inflation, and consequently the restriction of demand and reinvestment, resulting in either unemployment or under-employment.

(iv) What criteria must be used to choose institutional pattern for education and training?

(v) Are the chosen criterions consistent with the requirement pattern of agricultural personnel because an appropriate choice will only ensure the fullfilment of independent variable conditions?

(vi) What are the other factors controlling the reproduction cycles of financial resources and how are they related to other independent variables?

These questions shall form the guidelines for structuring the evaluation study. And also answers to these questions shall help us in developing a suitable technique of forecasting for agricultural technical manpower for an underdeveloped country.

CHAPTER - II

THE OPERATIONALIZATION OF ASSUMPTIONS FORMULATED IN VARIOUS MANPOWER FORECASTING EXERCISES *

This section shall cover the operationalization of the assumptions of the various committees either appointed by the Planning Commission or the Ministry of Food and Agriculture and state departments of agriculture. The operationalization design will be attempted keeping in mind the questions posed in the statement of the problem.

It has already been stated that the forecasting technique under review happens to be the same in all the studies, as far as broad aspects of manpower forecasting are concerned. The technique has been characterized as 'Employer Forecasting Technique'. This forecasting technique has used many implicitly and explicitily stated assumptions. The effort in this section is to focus on the implications of the implicit assumptions which can be thrashed out in the light of the information collected through the studies on Indian agriculture which are not directly concerned with manpower forecasting.

As the first substantial attempt in manpower forecasting for agricultural technical manpower is made by the AGRICULTURAL PERSONNEL COMMITTEE, one should begin with operationalizing its assumptions.

(a) Organization of Agricultural Services

Before we operationalize the actual assumptions taken by the Agricultural personnel Committee report, it will be

necessary that the organizational structure of services, then existing, shall be spelt out. Agriculture features in the state list of the seventh schedule of the Constitution of India under Item 14. The Entry is "Agriculture including agricultural education and research, protection against pests and prevention of plant diseases". The Constitution, however, also casts a number of responsibilities on the Centre which have a direct or indirect bearing on agriculture. The Centre, from the very beginning has been involved in drawing up of the agricultural programmes taken up by the State Governments. The Union Government is also responsible for regulating the agricultural educational institutions, declared to be institutions of national importance, and also Union agencies and institutions for professional and vocational training. As the activities like agricultural research and extension could not have been put in water tight compartments, the union government undertook the task of rendering help and guidance. To make the final remark on division of responsibilities between states and centre, it should be pointed out that the Centre took up the task of coordinating the major programmes of agricultural development; for example, education, extension and research.

To start with, we are taking the organisation structure built up since 1953 for our consideration. Because in the year 1953, the national extension service was initiated which being major source of employment introduced the organasational structure of district, block and village level

units for carrying out the diffusion of agricultural technology. This administration for extension and community development programmes, though in modified form to certain extent, continues to be operational till to-day. The salient features of this agricultural administration are elaborated in the following sections.

The system consists of three tiers of Zila Parishad at district level, Panchayat samiti at block level and gram panchayat village level. Thus, there were three units where technical staff according to certain hierarchical system was to be provided. These three units only cover development and extension staff - and the manpower for extension covers specialised categories like specialists, district agricultural officer, extension officers or agricultural inspectors and village level functionaries etc.

Similarly the technical personnel have been provided in various state departments for coordinating the various services like extension, research and education. This state level staff includes job designations like Directors, Assistant Directors and Divisional Head of Services etc. The other major source of employment is research and development organisations including the research institutes, regional stations, experimental farms and sub-stations. These employ technical personnel for different jobs like scientific officers, research officers and specialists etc. The education sector also employes personnel for various teaching occupations. The details of the organisational system of

employment, establishments and occupational structure have been given for the purpose of giving an idea that for this complex organisation structure, the staffing norms have to be established or assumed.

(b) Assumptions Formulated by Agricultural Personnel Committee

After having given the broad idea of organizational system, one shall proceed to operationalize the assumptions formulated by the Agricultural Personnel Committee. As it was necessary that growth assumptions are stated explicitly, the Committee desired that "even as a minimum programme" it would be necessary to provide annual expansion of agricultural production at the rate of about 5 per cent in the third plan[1]. After making the growth assumptions, the task was that the Committee should elaborate the strategy of achieving this growth rate.

So the Agricultural Personnel Committee stated that it would require a considerable strengthening of the existing set up for agricultural research, extension and education[2]. In order to create these conditions, the Committee assumed that by the year 1963, "the entire country will be covered by the national extension service which was started for the first time in 1953[3]".

This assumption was based on the observations made by the study team on community projects and national extension service.

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1. The Report, Agricultural Personnel Committee, Planning Commission, 1958, p.6
2. Ibid, page.6
3. Ibid, page.9

The next assumption it made was about the programmes to be launched to achieve the desired growth rate. It went on to uncover the sub-sectoral programmes for agricultural marketing, plant protection, soil conservation and farm management etc. All these programmes, by then, had been initiated in some form to a certain extent during first and second plans and the Committee's task was to assume the programmes for third plan to further its objectives, mainly of increasing the agricultural production and diversification in agricultural commodities. For example, it mentioned "cattle improvement programmes and desired that increasing attention should be paid to crop rotation and land management etc."[1].

Further it went on to make assumptions about the establishment of the norms for research effort. These norms are established with the help of information sought from the reports of joint Indo-US Commission (1955)[2]. The Joint Indo-American Team had made the following observations[3]:

(i) The Research Programmes till now practised are inadequate;

(ii) The present development of expanded facilities has not yet reached even the half way point.

To unfold the details of research programme, the Agricultural Personnel Committee proceeded to make assumptions that there is a need of permanent higher centres of research

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1. The Report, Agricultural Personnel Committee, Planning Commission 1958, page.9
2. Ibid, page.10
3. Ibid, page.10

a large network of research stations and experimental stations. And it stated that "we feel, however, at least 50 major research stations could be needed to be developed by the end of Third Five Year Plan. Each of these stations would need to be supported by a number of sub-stations and we assume that an average of two sub-stations would be provided for each major research station during Third Plan"[1]. It further said that it would be necessary to set up experimental farms in areas served by new irrigation methods to evolve new methods. "It estimated that requirements of such programmes to be 34 for second Five Year Plan and 16 for the Third Five Year Plan"[2]. Similarly it envisaged that the scheme of fertilizer trials on cultivated fields which need to be extended to the remaining 120 districts during the Third Plan period, because it expected the agricultural personnel department to cover 200 districts by the end of Second Five Year Plan itself[3].

It also desired that plant protection measures are important means of raising agricultural production, so it would be necessary that every state department should have entomology and mycology sections. It also envisaged that there would be need for special development staff appointed during the Third Plan period for stepping up the production of some commercial crops.

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1. The Report, Agricultural Personnel Committee, Planning Commission page.11
2. Ibid, page.12
3. Ibid, page.12

The Agricultural Personnel Committee, after making assumptions on research effort, proceeded further to outline the programmes of soil conservation, plant production and agricultural marketing etc. in separate sections. According to the Committee, the soil conservation programme is essentially one of (i) contour bunding, (ii) regeneration of grass lands, (iii) aforestation of waste-land and (iv) reclamation of alkali and saline lands[1]. It assumed that soil conservation work will be carried out over 6.25 million acres. The additional staff was required for an area of 3 million acres[2]. It assumed that there would be need of two regional research stations for design and development of agricultural implements[3]. And fifty ad hoc schemes for promoting agricultural implements may be taken up[4]. No other details were given on programmes required to be launched in agricultural engineering sections. It stated that the requirements of irrigation and land drainage have not been taken into account because these tasks are carried out by the Ministry of Irrigation & Power.

It further desired that 30 to 40 million acres area is to be supported by plant protection measures by Third Plan. It also assumed that block level will also be provided quali fied plant protection personnel. It felt that state departments and central organisation for plant protection need to be

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1. The Report, Agricultural Personnel Committee, Planning Commission, 1958, page.49
2. Ibid, page.49
3. Ibid, page.80
4. Ibid, page.80

strengthened[1].

For the agricultural marketing programmes, the Committee assumed that personnel would be required to strengthen state agricultural marketing organisation. The marketing schemes launched by the states included in the second plan work, related to market surveys and research, expansion of quality control work, promotion of grading of agricultural commodities, development of regulated markets and provisions of training facilities for training of state marketing personnel. The number of regulated markets, by the end of Second Plan, will be one thousand nearly. District agricultural marketing organisations will be set up in the Third Five Year Plan. The Central Directorate for Regulated Markets will need strengthening. Warehousing has to be equipped with technical personnel. The personnel required for these programmes would have to be just ordinary graduates or agricultural graduates.

This section on the assumptions operationalization completes with the desired projects to be taken up in food and vegetable processing industries and farm management. The target for Third Plan may be set at 1,00,000 tons by 1965-66[2] The Central Marketing Organisation and Research Stations have to be staffed. The farm management programmes would

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1. The Report, Agricultural Personnel Committee, Planning Commission, 1958, page.83

2. The Report, Agricultural Personnel Committee, Planning Commission, 1958, page.57

cover personnel for agro-economic research centre, farm management investigations. Fourteen agricultural-farm management investigation centres, four agro-economic research centre, one agricultural college in each state having agricultural economics section would be set up.

After the Agricultural Personnel Committee had defined its basic strategy for growth in agriculture, it proceeded to make assumptions on staffing norms for the organisation of various programmes. As the organisation hierarchy for extension had been elaborated by earlier reports[1], the Committee's task was to make assumptions about the quantum of personnel who will assume different operational responsibilities at various levels. The assessment of requirements was made separately for -

(a) Superior key personnel who were to be posted at state level organisation;

(b) senior posts for which the post graduate training in some branch of science or in agriculture would ordinarily be necessary;

(c) the junior posts for which graduates in agriculture, or allied subjects would be required;

(d) the sub-ordinate posts for which the basic qualifications would be lower than a degree but for which specialised training in agriculture or an allied branch of science would be necessary.

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1. These reports have been brought out to review agricultural administration for extension from time to time by Ministries of Food & Agriculture and Planning Commission. To name a few, one shall give examples of Balwant Rai Mehta Committee and the Nalagarh Committee etc.

The sectors in which these personnel were to take employment were only government and semi-government departments. The demand estimates were not calculated for private sector except in the few subjects like agricultural marketing, engineering and economics. As it has been already stated that the demand estimates were, mainly, covering extension, research, development and education; the estimation of demand for teaching personnel was based on the norms of educational institutions to be opened, and enrolment of students which was based on requirements of different levels of institutionalised training desired for extension and research.

The demand estimates for extension were based on the following norms of staffing[1] :

(i) Four or five subject specialists in agriculture for every district having post-graduate qualifications in at least one of the following disciplines : horticulture, agronomy, soil science, plant protection, plant breeding and agricultural engineering etc.

(ii) Three or four agricultural graduates having some specialized training in at least one of the above mentioned categories of agricultural technology.

(iii) One village level worker for every ten villages.

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1. The Report, Agricultural Personnel Committee, Planning Commission, 1958, page.9.

It expected that the graduate village level functionaries will be provided at least in one block of every district in third plan.

This yardstick along with the number of villages, community development blocks, districts was used to work out the requirements of different specialized categories of personnel having desired qualifications.

For the soil conservation programmes[1], the Committee assumed that one working unit would comprise of one officer, five assistants and twenty sub-assistants for five thousand acres a year. The officer for soil conservation would be required to be given training. Others would require qualifications lower than degree and will be trained in regional centres. Similarly for agricultural marketing mostly the personnel were required to acquire training in agricultural marketing training centres. Only three hundred and thirty personnel will require graduate degree in commerce, economics or pure science and for other hundred, the desired qualifications is post-graduate education in agricultural economics.

Similarly, for the plant protection personnel the norms were established[2]. The Committee said that since the main burden of giving technical advice and assistance must fall on the personnel recruited and maintained exclusively for plant protection purposes, qualified graduate

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1. The Report, Agricultural Personnel Committee, Planning Commission, 1958, page.50
2. The Report, Agricultural Personnel Committee, Planning Commission, 1958, p.84.

plant protection officers are to be appointed. Plant protection regional establishment shall also provide training.

In order to estimate discipline-wise or specialised training demand, the Committee used the following assumptions :[1]

(i) It is assumed that three specialists out of five will be provided in each district in general agriculture, plant protection and soil science.

(ii) The remaining two specialists out of recommended five and . two extension officers at block level having regard their competence in dealing with two of the following four subjects ; viz, horticulture, agricultural engineering, farm management or rural economy all depending upon the pattern of agricultural area, will be provided.

(iii) It has been also assumed that half of the posts can be filled by science graduates for plant protection.

(iv) It also divided the workload according to specialized training for graduates at block level. But this specialized training is to be taken care of by non-institutionalized pre-service or inservice training.

In the same manner, estimates were made for research establishments basing them on certain assumptions on norms

1. The Report, Agricultural Personnel Committee, Planning Commission, 1958, page.84

of provisions of graduates and specialists.

The following assumptions were made for agricultural research programmes. Along with the yardstick of number of research stations etc.[1]

(i) It was assumed that each major research station would require on the average three officers for plant, breeding work, one or two each for agricultural chemistry, entomology and mycology, three for agronomy and two for horticulture.

(ii) The requirements of particular stations would depend upon the number of crops dealt with at the station and the intensity of the problems involved.

(iii) It is also assumed that each sub-station would require on the average four scientific officers for plant breeding work, one of whom will be provided for the agricultural plant breeding work and remaining three specialists in agronomy, chemistry, entomology, mycology or horticulture depending on the problems dealt with.

(iv) It is also assumed that about 350 ad hoc schemes may be taken up.

(v) For purposes of estimation it is assumed that one scientific officer would be assisted on an average by three research assistants.

(vi) Additional staff has been proposed for thirty five research stations on the assumption that existing research staff would meet the requirements of 15 such stations.

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1. The Report, Agricultural Personnel Committee, Planning Commission, 1958, page. 12

The above mentioned assumptions implicitly point out an approach for deciding about requirements of research organisations. The approach includes the following elements :

(i) These personnel will be supported with necessary equipment, research problems and financial resources.

(ii) The amount of research activity is determined by needs and the resources for it and depends upon the benefits it provides to economy.

After estimating the demand for extension and research personnel, the Committees went into the task of translating the requirements into number of educational institutions and annual enrolment in different levels of qualifications. The annual enrolment was dependent upon the length of courses; these different personnel are supposed to undertake. The number of institutions were accounted by taking into account the factors of mobility. So it recommended that at least one agricultural college should be established in each state. Based on this, the Agricultural Personnel Committee estimated the requirements of teaching personnel.

This completes our task of operationalization of assumption of Agricultural Personnel Committee. The Committee's independent variables which are policy conditional determined the demand estimates of different categories of manpower requirements. Though the evaluation will mainly be around the assumption of the Agricultural Personnel Committee, yet one will consider the validity of approach or assumptions made by manpower units or estimates made by manpower unit of union ministry of Food and Agriculture for Fifth Plan -

wherever desired. Their assumptions are also elaborated in succeeding section though at considerable length but this task of operationalization is mainly an overview, so that their evaluation can also be integrated with the analysis of the approach adopted by the Committee on Agricultural Personnel in 1958; appointed by the Planning Commission.

(c) Assumptions Formulated in exercises made by State Manpower Cells

The State manpower cells have also conducted certain manpower forecasting exercises for agricultural development. All these exercises have been carried out to supplement the work done by the Agricultural Personnel Committee. The Agricultural Personnel Committee had recommended that State Ministries for Agriculture shall start collecting data regarding their stock and make adequate arrangements for future forecasting exercises. The reports have been available only for the following States -

(1) Andhra Pradesh
(2) Rajasthan
(3) Punjab
(4) Haryana
(5) Uttar Pradesh*

In the case of Andhra Pradesh, the methodology followed was based on the following assumptions[1].

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1. ANDHRA PRADESH, Planning Commission & Local Administration Department, Manpower Studies No.4, Study on the requirements of Agriculture, Co-operation, fisheries, forests, animal husbandry during IIIrd Plan.

*. The methodology followed by these state manpower cells is the same as followed by state manpower cell of Andhra Pradesh

(i) Agricultural graduate required for setting other government departments;

(ii) Agricultural graduates requirements were based on actual plan scheme-wise requirements, but it was not known what method did they use in order to estimate demand for actual schemes.

(iii) The requirements did not cover personnel for agricultural engineering, agronomy, farm management, soil conservation, mainly estimated for seed farms, plant protection, assistant agricultural officers for oil seeds, sugar cane, publicity work, marketing etc.

The Andhra Pradesh made this study for Third Plan. This study has been made when actual plans were available and resources allocated for them were known.

The assessment of manpower requirements for Rajasthan for 1961-66 was made by joint efforts of IAMR and State Manpower Cell[1]. This report also bases itself on the actual plans which were to be launched in the Third Plan. It provides information on allocated financial resources and uses the EXPENDITURE TO PERSONNEL ratio approach to estimate demand. The actual outlay for every scheme is known. It is not known whether the Committee did it on the basis of wage bill allocated or projected on the basis of past expenditure to personnel ratio. Of course, in this approach, the provision has been made for the demand caused by replace-ment of the existing trained personnel on account

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1. Manpower Requirements for Rajasthan during 1961-66 for Agricultural and Allied Sectors, Rajasthan Government, 1960.

of retirement due to old age, death, accident etc. Allowances for leave and deputational work have been also computed. If we come to the nature of the scheme, it is found that different schemes having its special requirements did exist. To give an idea of nature of schemes, the following schemes are mentioned :

(i) Seed Farms
(ii) Fertilizer
(iii) Night soil compositing and rural compositing programme
(iv) Pest control
(v) Improved agricultural practices
(vi) Oil seed development
(vii) Cotton development
(viii) Sugarcane development
(ix) Horticulture
(x) Farm advisory service
(xi) Seed multiplication farms
(xii) Modernising implements programme
(xiii) Strengthening research
(xiv) Hybrid maize
(xv) Coordinated economic state farms
(xvi) Feed and fodder development
(xvii) Veterinary research schemes
(xviii) Camel development, bull breeding schemes
(xix) Milk goat breeding farm
(xx) Poultry
(xxi) Dairy Scheme
(xxii) Rinder pest eradication
(xxiii) Fisheries development

The information provided in the report appears to assume that agricultural graduates will be provided for all

the schemes. It does not state that if the state has any plans for pre-service or in-service training programmes to serve, the particular needs of schemes. This raises the obvious question that whether graduates will be competent enough to serve the various schemes having varied aims?

The study carried out by Punjab State manpower Cell is more explicit and clearly states its assumptions[1].

The Study Group on Manpower for Agriculture has estimated the demand for Third Plan and Fourth Plan. The assumptions made by this Report are the following :

(i) There will be no such likely institutional or technological changes to take place in the agricultural field during Third Plan which may change altogether the existing pattern of employment in the agricultural field and require certain new categories of trained personnel for whom training facilities may be provided.

(ii) Demand in private sector is going to increase.

(iii) Third Plan tentative estimate of investment is known.

(iv) Fourth Plan assumed that 50 per cent investment more than Third Plan will be provided.

(v) Employment - investment norms approach is followed. It is computed that one agricultural trained person was employed against Rs.9.2 thousands. The proportion between graduate and sub-inspector levels persons, prevailing at the end of March, 1956, is 5 grad, 9 sub-inspectors.

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1. Report of the Study Group on requirement of the Agricultural Personnel, Punjab Economics & Statistical Organization, Chandigarh, 1960.

> In 1959, the ratio of expenditure to agricultural graduate is computed as 1:Rs.8.5 thousands and along with the yardstick of 1 ag grad; 4 sub-inspectors is estimated. The slight variations can be attributed to occasional shift in emphasis of various aspects of the programmes and also differences in workload. The demand projections for the Third Plan and Fourth Plan, however, have been based on the norms prevailing in 1959.

This approach for calculating manpower requirements is qualitatively different from the methodology followed by Agricultural Personnel Committee and most of other state manpower units. So it will require, especially, the critical evaluation and see it in the perspective of the other approach which was used most of the times in India for estimating the requirements of agricultural technical manpower.

THE ASSUMPTIONS OF FIFTH PLAN FORECASTING EXERCISE

The study in the requirements of agricultural technical manpower for the Fifth Plan has been made by the manpower unit of the Ministry of Agriculture and Irrigation, Department of Agriculture[1].

The Report claims that the general approach of estimation of demand has been through the programmatic-cum-normative approach[2]. This approach broadly proceeds on the coverage of the plan programmes and recommended staffing norms.

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1. A paper on Fifth Plan Estimates, Ministry of Agriculture and Irrigation, 1975.

2. Ibid, page 28

The report adopts the approach by which demand may be estimated for public sector at (i) the organization level, i.e., blocks, district, state and control levels, (ii) agricultural research, training and education, (iii) banking sectors etc. The private sector demand is not fully known and so is the case with self employment opportunities for agricultural personnel.

It observes that the constraints involved in projecting the demand estimates for the Fifth Plan are broadly given below -

(1) The number of vacant posts which are likely to spill over into the Fifth Plan period, is not known.

(2) Information on agricultural personnel requirements received from the State Governments, etc. is not complete, and is very tentative.

(3) A clear picture of allocation of funds for different programmes is still not available.

For extension, the demand is estimated on the norms assumed by it as 5 agricultural extension officers per block. Then it has sought information on requirements of manpower from Centre about centrally sponsored scheme, the department of Community Development and Cooperation, nationalized banks. It has also adopted the estimates of "steering group on employment and manpower, June, 1974" on agricultural research and education.

These are the assumptions, constraints observed. This report claims to be improvement over all the existing reports.

so it will also be necessary that its approach analysis is also integrated with evaluation of the Agricultural Personnel Committee.

This completes our review of the assumption taken by various reports and in the next section we shall begin with the evaluation of forecasting technique.

CHAPTER - III

EVALUATION OF THE PRACTICE OF MANPOWER FORECASTING

This section deals in critical review of the technique used in manpower forecasts made by various committees to this time since independence. The assumptions of these manpower forecasts have been enumerated in the last Chapter.

As the Agricultural Personnel Committee was the first one to conduct exercise in agricultural manpower forecasting its technique shall remain the Central issue to the review for the purpose of this evaluation study. The Agricultural personnel Committee, as already pointed out, has used EMPLOYER FORECASTING TECHNIQUE to estimate the agricultural technical manpower requirements. As in the case of agricultural technical manpower; the government happens to be the main employer itself, the Committee had sought information from various research organizations state extension departments and educational institutions. The aspects, on which the information was collected, are elaborated in the following section.

During the year 1957, the Agricultural Personnel Committee sent out questionnaires to the relevant organizations to seek information on -

(i) The current employment of degree holders

(ii) Unfilled vacancies

(iii) likely programmes to be launched; and

(iv) future requirements for the third plan.

Another questionnaire was sent out to identify the current position on stock of qualified agricultural personnel and collect information on trends in out-turn and wastage etc.

On the basis of this information, the Committee was supposed to make its assumptions on norms, targets and requirements etc. But the Committee failed to acquire information on the characteristics, it had asked for. The Agricultural Personnel Committee itself has admitted that "the information supplied by the State Governments was in many cases incomplete and details for many schemes, which have been included in the plan were not available at the time[1].

The more surprising thing is that the same situation has continued till to-day. The paper prepared by the Central manpower unit in the Ministry of Agriculture and Irrigation had to state that 'in the absence of proper statistics' the exercise on estimation of demand has been very difficult. The inadequacy of information, statistics and absence of proper reporting systems have made the estimation exercise to be one of the educated guess. Seventeen years back, the Agricultural Personnel Committee had pleaded for better information systems but the state of affairs has not improved in any way. The information gap has become one of the main handicap and the evaluation in face of such situation has been very difficult. The question does arise that on what aspects, the information

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1. The Report, Agricultural Personnel Committee, Planning Commission, 1958, page.6.

needs to be collected. The identification of such aspects will remain one of the main aim of the evaluation study in the coming sections. The aspects on which information is absent or incomplete are elaborated in the conclusive section of this Chapter*.

Due to the lack of information, the attempt will be to formulate only the tentative hypothesis. So the study does not pretend to come up with definite solutions for issues that it discusses. While this study will not refrain from offering solutions and putting forward positive suggestions on the basis of the best evidence available, every solution or suggestion should be regarded as a hyphothesis, subject to further testing.

This study can offer essentially two things: First a method of looking at the certain issues involved in manpower forecasting - a conceptual framework model; second an analysis that brings key issues to the fore.

FACTORS AFFECTING THE CHOICE OF GROWTH RATES

One shall begin with the discussion on assumptions about the growth rates; with which the committee initiated its exercise. The following criteria are evolved or taken for discussing the validity of the crucial assumption on growth rate.

(1) The growth rates shall be based on the evaluation of actual and potential resources needed for economic development. These resources are generally determined on the basis

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* Please refer Section on Conclusions for the identification of information collection framework.

of expert estimates. Of course, the expert estimates are checked and cross checked on the data about past trends, imput - out systems behaviour etc.

These estimates cover, in the case of agricultural sector, the area to be brought under intensive cultivation, domestic and the other resources for the provision of supplies because the technical personnel are considered viable or useful only then, the prospects for development of all size holdings, the farmers with different resources who will require expertise in various aspects of agricultural technology and the existing stock of technical personnel etc. Expert estimates are incorporated by the planning body into the system of financial balances and other forecasting studies of scientific and technical progress. And on the basis of this exercise, a preliminary growth target can be assumed. The growth rate is but only a summary evaluation of the possible development of the sector.

(ii) Financial resources have a special importance among the factors influencing the manpower requirements. Here the task consists mainly in determining the sources of finance, the possibilities of using them in the planning period and the search for new resources for broadening the financial base.

If one evaluates the assumption of growth rate of 5% on these criterions, it is found that the Committee does not even satisfy the fulfilment of one of these criterion. The Committee has assumed the 'desired growth rate'; not

the possible growth rate for which the programmes need to be evolved. The desired growth rates can be also of some use, if it had decided them with the help of information on atleast possible financial resources. Then the alternative assessments could have been made on the basis of different estimates of resources and for alternative assessments, the different and appropriate strategies would have been stated. The implications of alternative assessments could be left in the hands of policy makers in this case so that they regulate the supply conditions and take decisions on the expansion in education and training. The Committee, nowhere, mentions about trends in past resources provided and relationship of resources to employment opportunities, leaving aside the statement on likely future resources which are to be provided for even meeting the conditions of desired growth rates. Because such a pre-requisite is completely absent, the Committee should be considered responsible for making an uneducated guess. The well known manpower policy analyst, Mark Blaug, states that 'it is worth noting that unless employers are asked to forecast their requirements at various weges, the forecasts cannot be interpreted as forecasts of manpower demand[1]. This condition can be met only while the various resources and their relationships to employment opportunities are known. If certain information on likely provision of financial resources could have been collected, the estimate of demand of manpower at its price or wages, would have been

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1. Bashir Ahmed & Mark Blaug, The practice of manpower forecasting, page.19

possible. The programmes could have been chosen in much more concrete way also.

The problem of identifying the relationship between financial resources and employment opportunities at certain wage is not easy one to handle in the agricultural sector. The Punjab State manpower unit had adopted the approach in which this relationship assumption was the fundamental basis for estimating the manpowers requirements. Employment - investment norm of one agricultural graduate to rupees eight thousand and five hundred - was used to estimate future staffing norms. The linear relationship has been assumed in this case between investment and employment opportunities. The objections to the assumption of linear relationship are based on the following evidence.

(i) During the fourth plan, it is observed that in the post stage II and stage II blocks, the expenditure has been decreasing where as the employment opportunities have remained the same. This kind of situation has emerged because all the programmes do not have similar kind of pattern in allocation of financial resources between development expenditure, maintenance expenditure and indirect recurring expenditure etc[2].

(ii) The cost of supplies & equipment has risen due to increase in prices and the share of resources by which emplly-ment opportunities are maintained has decreased affecting hardly the employment situation. This evidence cautions against

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2. Draft Fourth Five Year Plan, Planning Commission 1969-74, pages.168-169.

assuming simple linear relationships and make it clear that the pattern of financial resources in its parts is different for stage I, stage II and post stage II blocks. The relationship of resources and employment opportunities in each case separately has to be accounted for.

The other important condition for continuous utilization of trained personnel is the consistent supply of adequate financial resources. The reports produced by all the committees have neglected these aspects of the manpower forecasting. It is essential that the committees shall determine the sources of financial resources and evaluate the adequacy of them. There is enough evidence in support of the fact that the resource position of agricultural sector is highly uncertain. One of the ministerial report brings out it very clearly that the main handicap, thus, is inadequate finances and it would be ridiculous to expect results from a set up which does little besides maintaining its staff (i.e., existing employed staff). Panchayati Raj institutions have generally been reluctant to raise resources in exercise of the taxation powers vested in them. Taxation of agricultural sector has generally been well below its capacity, and what is more, there is trend towards stabilising such taxation at the present level and in some instances to do away even with the present receipts. This naturally results in constraint on resources and financing development becomes very difficult"[1]. This information on the state of resource mobilization is itself provided by one of the governmental organs and explains that

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1. Ministry of Food, Agriculture, C.D. & Co-operation, State manpower unit, Organising Extension in India.

it will be highly unscientific to be convinced of the consistent and adequate provision of resources for financing services like extension and research.

The fact is that the Agricultural Personnel Committee and others estimates were made totally independent of the review of the conditions prevailing in the agricultural sector. The policy imperatives could not be implemented at all. The resource position remained so much inadequate and uncertain that the employment of new stock and effective utilization of existing staff could not be carried out. Reproduction of the resources is ultimately related to many other policies followed in agricultural sector. For example; land distribution pattern in India is such that the capabilities to reinvest in land or pay higher taxes are concentrated in few hands. Given such situation, large majority of people based on agriculture are unable to contribute to the process of achieving higher level of resource mobilization. On the other side the large land-owners are taxed below their capacity. This kind of phenomenon has led to uncertain and inadequate resource mobilization. The above mentioned facts brings out one condition clearly that fullfilment of manpower forecasts is dependent upon the nature of other policies over which the choice of independent variables of employer forecasting technique is based.

The non-fullfilment of predictions about derived growth rates is self evident. If one accounts for the results of Third and Fourth Five Year Plans. The working group of Directorate of Manpower rightly recognises that the assumption about continued target of 5% annual growth rate in agricultural

production and the staffing norms and workload for the extension organization at different administrative levels pushed up the demand projections for agricultural manpower as in the Third Five Year plan agriculture grew only at the rate of about three per cent per annum. Some of the manning norms which would have resulted in increasing the demand could not be implemented during largely due to resources being constant[1]. The independent variable like resource adequacy can be assumed as rational choice only when its coherence with the conditions of resource mobilization is ensured by following appropriate policies on taxation and land reforms.

Many conclusions can be derived from the conditions explained about the derived strategy on resource mobilization, the changes in social and economic relations, relationship between resources and employment opportunities and on the adoption of method for estimating the financial resources. One can tentatively conclude that unless the above mentioned conditions in complete package are observed, the exercise in manpower forecasting or evaluation of it won't result in positive situation.

CHOICE OF NEED PATTERN AND PLANNING OF MANPOWER

Next one shall take the assumptions on programmes and their nature, design etc. because the determining of the requirements of appropriate categories of technical manpower, depends upon the kind of the programmes the committee conceives. As one had now raised the problem of programme oriented technical

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1. Ministry of Home Affairs, Directorate of manpower working group on Technical manpower for agriculture in seventies, page.10

experts, it will be necessary to go into the methodology adopted by the committee for 'need analysis'.

To neglect systematic analysis of needs may result in expensively wasteful efforts to produce the wrong kind of skills, while really most crucial requirements for other type of skills that are so scare as to constitute bottlenecks in the country's development go unattended. The analysis of needs on which the programmes are based should not be limited to national or even state aggregates and averages, even more important when it comes to planning specific programme, is analysis of the needs each agro-climatic region. The situation in each of the areas is sure to be far different from the national average. It shall be recognised that the correct decision on programmes depend to a great deal on the success with which the task of assessing the needs is accomplished. The drawing of the programmes constitute the issues of compilation of complex, inter-related plans which are directed towards the fulfilment of prediction of growth rates and aims at outlining and developing suitable types of means for it.

In agricultural sector, the success and affectiveness in the formulation of the programmes largely depends on the level of prefection by research effort, methodology and organisational mechanism made for formulating and dovetailing projects for each agro-climatic region. Proper planning of the manpower consists not merely or even mainly in determining the amounts of education and training to be provided but it is also necessary to plan carefully for the most suitable

specialized categories of technical manpower for each region, i.e., in the case of agriculture sectors, the agro-climatic region. To have perspective on the whole range of tasks that a manpower forcaster in agricultural sector would have to confront, it may be useful to discuss the specfic problems of the analysis of agricultural development with regard to the effort in need analysis made by the Agricultural Personnel Committee.

The Agricultural Personnel Committee compiled information on the 'growth' of extension service, research organization and educational institutions. The growth variable is decided by obtaining information on resources and nature and magnitude of the needs of a certain sector. The nature end magnitude of the needs of the agricultural sector shall form the issue for evaluation in the following section.

The background paper prepared by the Institute of Applied Manpower Research advances the hypothesis that the approach of the Agricultural Personnel Committee was oriented towards estimating desirable needs rather than requirements in the sense of an economic demand which was likely to be consistent with the availability of resources in the plans.

In this evaluation study, the available evidence does not support the proposition that the approach was oriented towards estimating DESIRABLE NEEDS. The evidence is discussed in the following sections with respect to criteria evolved for evaluation. The concept of desirability consists of two aspects. One is the problematic of priority to be given to the programmes

which will allow the objectives of optimum growth or productivity increase and egalitarian income distribution to be fullfilled. Second is the problematic of identification of complete activity pattern and corresponding skill institutionalization.

The problematic of priority is evaluated against the information on the needs of extension service.

The extension service programme is to incorporate the crucial process of extending useful scientific facts of agricultural research in each aspect of agricultural technology in such a way that the farmers might put them to use in their own farms. The extension service programmes should be framed in such a way that they meet the crucial needs and overcome the bottlenecks of the farmers who possess different characteristics due to difference in their resources, nature of soil in their land and irrigation facilities etc. The growth rates can never be fulfilled if extension service programmes do not cater to the needs of most handicapped farmers who constitute the majority among cultivators. If one identifies the crucial bottlenecks, it is found that soil and water conservation programmes are the most needed for helping the majority of farmers in the country.

The eight states of Uttar Pradesh, Andhra Pradesh, Punjab, Tamil Nadu, Rajasthan, Bihar, Haryana and West Bengal together account for seventy seven per cent of the net irrigated area[1]. These eight states also altogether account

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1. Deptt. of Agriculture, the Agricultural Census, 1975 Reported by 25th December Economic Times, page.4

for the 77 per cent of the minor irrigational facilities (like tube-wells) in the country[1]. Of the 23 million hactares of area under rain fed rice in the country, the region characterised by recurring flooding and drought alone accounts for 20 million hectares[2]. The other vast zone of wholly unirrigated holdings is the western part of the country comprising the states of Rajasthan, Gujarat, Maharashtra and the adjoining areas in the states of Madhya Pradesh, Andhra Pradesh and Karnataka. Wholly unirrigated holdings in this region, that add upto some 17 million; represent about two fifth of country[3]. In all, according to Census Report, 41 million wholly irrigated holdings operating over a total area of 77 million hectares characterised by rain fed agriculture, i.e., 48 per cent of total area 162 million hectares over which Indian agriculture is spread over, is rain fed only[4]. The regions of rain fed agriculture, flooding and drought impose automatically priorities on the tasks of soil and water management "especially when the 50 per cent of holdings are less than one hectare[5]" and their cultivation is completely dependent on adequacy of water and the appropriate conditions of soil. The small holdings constitute the main category among the partially and wholly unirrigated holdings, and even among wholly irrigated holdings the share of small and marginal and semi-medium holdings is not very large. Six

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1. [illegible], The Agricultural Census, 1975, reported by Economic Times (25th Dec.), page.4
2. Ibid, page.4
3. Ibid, page.4
4. Ibid, page.1
5. The Agricultural Personnel Committee states that two hundred million acres area requires soil conservation measures and only four million acres area will be covered till the end of IInd Plan.(p.51).It further states that by Third Plan total 9.25 million acres area will come under soil Conservation

million hectares characterized with small and semi-marginal holdings falls in the partial irrigated area of total 'partial irrigated holdings' over an area of 46 million acres[1]. These small holdings are more prone to water logging, salinity, alkalinity and user problems etc. The extension service for soil and water conservation programmes comes out to be first priority of indian agriculture. All this information provides sufficient evidence to arrive at the conclusion that the most desirable need of Indian agriculture is scientific extension service in soil and water management which would raise the productivity of small farms in a radical manner. It shall be mentioned here that the green revolution has hardly raised the productivity of small and semi-marginal holdings ~~raised~~. The inadequacy of attention to soil and water management can be taken as one of the factors to explain the existing state of these holdings. In the following section, the information is collected from the various reports and shown that these programmes were given very low priority.

The Agricultural Personnel Committee chose to draw the strategy of soil conservation for four million acres area only in the Second Plan and another five million acres area in the Third Plan. This fact is an indicator that a very low priority was assigned to the extension service to be provided in soil and water management*.

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* The Agricultural Personnel Committee states that two hundred million acres area requires soil conservation measures and only four million acres area will be covered till the end of Second Plan (p.51). It further states that by the Third Plan total 9.25 million acres area will come under Soil Conservation Programme (p.52).

1. The Agricultural Census, 1975, reported by Economic Times, 25th December, page.4

The Agricultural Personnel Committee states that "the requirements of trained personnel for soil conservation work during the Third Plan would be largely influenced by the machinery that will be built up at the end of Second Plan and the rate at which soil conservation measures are desired to be executed during the next Plan"[1]. One has to see how it decidedthe rate at which soil conservation work is desired. The Agricultural Personnel Committee explains the operation of existing framework of working units consisting of one scientific officer, five assistants and 20-sub-assistants for five thousand acres in a year for soil conservation work and according to the Committee, the working unit mainly functions to do soil survey work[2]. But the soil conservation work does not just consist in soil survey and includes the following tasks.

(1) Research work on salinity, water logging, land shaping, land reclamation, choosing of suitable varieties, evaluation of suitable cultural practices to prevent soil erosion, dry farming practices, etc.

(2) Soil testing

(3) Extension work

(4) Follow-up investigational work

The Agricultural Personnel Committee indicates the amount of soil survey work in its report on the criterion of extrapolating the Second Plan work in a normative fashion to

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1. Planning Commission, the Agricultural Personnel Committee, p. 51
2. Planning Commission, the Agricultural Personnel Committee page. 49.

the Third Plan. It does not make any effort to identify the activities other than general soil survey work and suggest the requirements of trained personnel for all activities of soil and water conservation programmes. Only in intensive district programmes, the specialists at district level for soil conservation extension work are provided and there too, the evaluation reports have been continuously repeating that extension work on soil and water management is inadequately tackled. In other districts, i.e., 94 per cent of the total districts, there is no organisation which deals in extension work on soil and water management. The situation was much worse in 1958.

The practices on landshaping, levelling, soil reclamation and maintenance of soil fertility acquire specialized character; requiring engineering skills, soil science and agronomic knowledge in the soil conservation extension. The existing extension service has no specialized personnel at block level. Similarly the Committee did not estimate manpower requirements for soil testing. Although the Committee recognised that soil conservation work is possible by specialized categories of technical expertise[1], yet it did not suggest for institutional training for the specialized categories of personnel. The IADP experience testifies to one's observations. The Evaluation Reports have repeatedly pointed out that there is lack of trained staff for soil

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1. Planning Commission, the Agricultural Personnel Committee, page.51.

testing laboratories[1].

Soil test-co-relation work has suffered due to the lack of the trained staff. It has been also pointed out that for this, immediately, organisation needs to be strengthened. The following statements will testify one's observations legtimacy. "The present programme of soil testing at the field level largely caters to the needs of large cultivators and that too to the more progressive ones (A.P., Madras, Mysore and M.P.). The number of soil testing laboratories in the States were inadequate compared to the needs of numerous soil types and mass of cultivators to be covered under programme. Adequate number of these were not set up because of foreign exchange difficulty, some of these could not effectively function for want of suitable equipment, material and trained personnel (Assam and Orissa)"[2].

The soil conservation work and water management are closely related programmes from the point of view of the agricultural technology. The water management programmes were totally absent from the strategy drawn up by the Agricultural Personnel Committee. The water use and management received so little attention in the country that it has adversely affected the achievement of the targets. The evaluation reports on IADP districts have highlighted the fact that the management of irrigation, drainage had become one of the worst bottlenecks. The study on Thanjavure district

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1. IV Evaluation Report, the Intensive Agricultural District Programmes, Vol., I, page.16

2. Modernising Indian Agriculture, IV Report on IADP, Vol.I, page.11.

mentions that proposed or already introduced patterns require different arrangements of supplying of water. Maintenance of field channels need improvement. The prevalent practice of irrigation in the district for rice is continuous flooding of fields. Though the practice helps in controlling weeds and keeping away rats, it results in heavy loss of nutrients by deep percolation of water which could be used for a second crop, if properly used. It further points out that the need of land remodelling, funds, demonstration-cum-trials on drainage, field channels is crucial. It also mentions that drainage continues to be a major problem in the district. There is need of undertaking a scientific survey of irrigation and drainage problems in the scheme and integrated programmes for development may be formulated"[1]. It stresses the fact that the water use and management is of key importance in this district"[2]. Similarly in the case of Shahabad district the evaluation report brings out that in the absence of field channels there is wastage of water. Water use and management deserves major attention. Since the agricultural background of the irrigation engineers is not adequate, responsibility might be entrusted to agricultural engineers"[3]. Similarly the evaluation studies on districts like Aligarh, Raipur and Pali have been pressing for the fact

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1. Modernising Indian Agriculture, IV Evaluation Report, IADP, Vol. 2, page 11.
2. Ibid, page. 24
3. Ibid, page. 109.

that water use and management programme is conspicuously absent from the package strategy. It is obvious that normal districts would be suffering from the problems of soil and water conservation even much more.

The lack of trained staff for these programmes has been more clearly mentioned in the summary evaluation of IADP reports. It is stated that "water use and management" received some attention in the IADP districts. Several good demonstrations on water use and management were laid out in some of the districts but the work done was inadequate. The main difficulties in organising work in this field were non-availability of trained staff and lack of enough research information in the field of water management and water requirements of crops under local conditions"[1].

The separation of water management from soil conservation measures and lack of attention to water management can be attributed to the reason that the water management was left under the control of irrigation department. Irrigation Engineers, being the civil engineers mainly, are not trained in the field of water management for crops. But the question does arise that why did all the forecasts have failed to recognize the desirability of handing over the tasks of water management to trained personnel, Under the supervision of agricultural department. The Fifth Plan paper is the most recent and claimed to be based on appropriate needs of the Indian agriculture. Since the Third Plan, the various evaluation studies have been pointing out the need of trained

1. The Fourth IADP evaluation report, Vol. 1, page. 17.

personnel in the area of water management. The Fifth Plan paper does not consider or evaluate the suggestions made by IADP evaluation reports in this respect. It is evident that an unsystematic approach of choosing the programmes without actually assessing the real urgent needs of the agriculture has been followed. These facts essentially reflect the poor applications of need analysis to the conditions of Indian agriculture. It shall be recognised that the reproduction of financial resources or fullfilment of the other aims of a manpower forecaster are very much dependent upon the identification of desirable needs. Poor conception of need analysis, not only, creates shortages but generates conditions for the perpetuation of continuous unemployment.

It is clear from the discussion in the preceding section at the Agricultural Personnel Committee and other Committees have been unsuccessful in choosing a desirable need pattern. Not only that the committees failed to bring out the desirability of certain top priority programmes but even did not recognise that the appropriateness of agricultural technology to a large extent depends upon the agro-climatic region. The choice of agro-climatic region as a micro unit for identification of need pattern has been raised as one of the essential methodological aspect of scientific need analysis in the preceding section. In the following section, the validity of the choice of such a methodological construct has been assessed. And also the consequences of not adhering

to this have been evaluated.

FORMULATION OF THE PROGRAMMES AND THE USE OF AGRO-CLIMATIC REGION CONCEPT

The Fourth Report on intensive agricultural district programme identifies that "the areas of area zones like Pali district where rainfall is not only scarce but also erratic and undependable. Soils very from area to area, are generally shallow in depth and also saline over extensive areas"[1]. There is no assured irrigation and the main crops growth in the area were maize, bazra and wheat. The package identified for Pali district has been recognised as inappropriate programmes. This happened due to the fact that the appointed extension staff was not trained in the field of arid agriculture. The evidence for this is clearly reflected in the following comment made by fourth evaluation report on Intensive Agricultural District Programme: that the extension staff was not given adequate training in dry farming in such area".[2] "The technical staff assigned to the programmes should have been given specialized training in different branches of arid agriculture such as conservation farming, range management, farm forestry and animal husbendary etc., so that they can educate the farmer properly"[3]. This one example clearly demonstrates the fact that there was need of formulating the programmes to suit the local conditions of the area so that appropriate educational and training

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1. The Fourth Evaluation Report, IADP, Pali District in brief, IV Report, Vol.2, page.32
2. Ibid, page, 320
3. Ibid, page, 320

courses for extension staff could have been organized. The question of specialization in this case becomes very important and it would appear logical that arid agriculture specialization could have been identified as one of the discipline in which personnel could have been trained. This particular suggestion raises also another pertinent question: how should one organise the institutional education and in-service training? This problematic issue shall be resolved in the latter section.

The IADP experience shows it clearly that the zonal programming needs to be taken as the essential characteristic of agricultural development programmes. Hilly areas in which IADP programme has not been launched, also pose certain specialized problems. Mixed farming, irrigation, water use practices have specialized character in the hilly areas. It can be studied that whether specialised institutional courses or pre-service training are needed for this area or not.

The experience of IADP districts has pointed out that sometimes even the district is not a homo-geneous unit for the purpose of planning and execution of agricultural development. The district may comprise of several agro-climatic zones. To be really effective it is necessary to evolve specific programmes to suit the agro-climatic conditions in each zone and to communicate the specialized, localized aspects of this programme to all farmers in the zone. Some of IADP districts learnt that the staff strength within the

zones should be adequate to the programme needs of each zone. There is a significant departure, 'now tried', from the usual rigid staffing pattern uniformly applied over the whole district. The zonal approach results in better utilization of the available material and human resources"[1]. Till now IADP had to do experiments with available human resources but if one can scientifically take agro-climatic areas conditions as one of the factors in choosing staffing pattern in the manpower forecasting methodology, probably one will achieve much better results. The institutional or pre-service training again gains importance in this particular aspect of manpower planning. The pre-service training has to be evaluated against the efficiency of institutional specialized courses on certain criteria, which are discussed as a specific area in the latter section.

THE NEED ANALYSIS IN AGRICULTURAL RESEARCH

Similarly, the 'drawing of strategy for agricultural research poses the problem for any manpower planning body. The task of assessing the needs in the case of different agro-climatic regions and specialized nature of disciplines like agronomy, mycology, entomology, soil sciences, geo-chemistry and engineering skills etc., make it imperative that one does not stick only to global questions of adequacy or inadequacy of research effort. The scarce resources need to be allocated in a way so that maximum use is made of these resources. The

1. Modernising Indian Agriculture, IV Evaluation Report on IADP, Vol.1, page.14.

Agricultural Personnel Committee started with the recommendations made by the joint Indo-US Commission (1956) on agricultural research. The joint Indo-US Commission had pointed out that the research effort put by India was inadequate and needed to be stepped up. The Committee made it as a reference point and took the task of evolving programme for research effort.

The existing strategy has mainly concentrated on plant breeding and genetics. It neglected the research work for development of soil and water management practices to suit the local conditions. Number of times public opinion has been raised to change the priorities in agricultural research. Recently, in the editorial in Economic Times, it was stressed that it is time to consider change-ing the sights of our agricultural research to some extent. The emphasis has so far been mainly on Plant Breeding and genetics. This has brought rich dividends in the form of high yielding breeds. But even this gain is confined mainly to the irrigated area, constituting only 40 million hectares out of a total cultivated areas of 156 millions.[1] Techniques of soil and water management are not being utilized. The need is for extensive soil testing and a rational use of fertilizers to ensure high return on investments. It is necessary to dovetail cropping systems to provide nutrition to soil while increasing production. Another neglected area of research has been Dry Farming Research. A comprehensive programme was evolved for improving

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1. Agricultural Research, The Economic Times, New Delhi October 5, 1974.

rain fed farming which formed the basis for dry farming schemes initiated by the Indian Council of Agricultural Research in 1933 at Rohtak, Sholapur, Bijapur, Raichur and Nagali. A series of dry farming practices were formulated in this programme which had an impact on yields from dry lands when applied as a package."[1] After this the area has never got prominence until the All India Co-ordinated Research projects on Dryland Agriculture was implemented by the ICAR in 1970. It is only five years old. "The research has been organized in 23 centres located in typical agro-climatic zones. This programme is to concentrate on better moisture conservation measures, cropping patterns, crop geometry, life saving techniques for crops under stress and mid season corrections in drought prone areas".[2]

The uneven emphasis is even recognised by a noted scientist B.P. Paul in one of the background paper presented in National Seminar on Management of Scientific Research Laboratories. It is observed that the very moderate resources available in the past for agricultural research had to be thinly spread over a large number of items. It was natural in these circumstances that some disciplines and some crops received more attention than others".[3] Though the uneven emphasis seems to be natural to him, yet it will be evident from the following facts that it has occured due to unscientific planning.

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1. Dry Farming can be made Productive. Hindu, c/12/73.
2. Ibid 2.
3. Organization and management and progress of Agricultural Research in India, Cost-ASCI SEMINAR ON Management of Scientific Research Laboratory, 1970.

As mentioned earlier that the major emphasis in the agricultural universities has been on the plant sciences the factors for the occurence of such phenomenon are explained by Dr. Sukhdev Singh, Director of Research, Punjab Agricultural University, Ludhiana in one of his paper presented at the First Convention and Workshop of Agricultural Universities in India. He states that till now the major emphasis in the agricultural Universities has been on the plant sciences. The need appears to be apparent for putting greater emphasis on animal sciences and agricultural machinery". "The important point which needs consideration is that the ability of the Universities to do really productive and worthwhile research is not constrained by the allocation of funds alone. In some of the new areas like animal sciences, agricultural engineering* marketing and food processing and technology, there is a great dearth of properly qualified persons to tackle processing problems. Attention should, therefore, be paid to draw up well-planned programme of training in areas which are at present lagging behind".

The preliminary analysis of the information on research projects provided by the Directory of Scientific research in Indian Universities does also support the observation made in this study. About 300 projects in Soil Conservation and Soil science, 25 projects in dry farming and 60 projects

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*. Instead of shortages of the agricultural engineers, the pheonoemon of unemployment is taking place. It is due to the reason that sufficient resources to research areas in soil conservation and agricultural machinery aremot provided. The gap of research in soil conservation, water management still continues to exist. The implication of such an evidence is that the resource mobilization has to be combined with effective manpower planning.

in agricultural implements [illegible] have been taken up by various Universities. The total number of projects, currently in operation in the field of agriculture, are 3500. The information on current distribution of stock of various post-graduate specialists is not available but given the fact that undue over emphasis and insufficient attention to certain research areas is being paid, the imbalances in post-graduate training are bound to occur.

As selection of research projects is mainly influenced by the kind of training or specialization, of scientists have, it is evident that the imbalances in stock of post-graduate specialization are there. In case intake to different branches of agricultural science is regulated on the basis of identified priorities in research needs, the appropriate emphasis on different research areas can be achieved. Manpower planning in this respect, based on scientific need analysis acquires significance and ensure the appropriate planning of research projects.

It is clear that no systematic methodology was adopted to identify the nature of the inadequacy of research effort. Ofcourse, the research institutions pose less problems because pure science personnel can also be employed to fulfil certain operational responsibilities of many programmes. But it does not follow that the specialist staff who has sufficient knowledge of agricultural technology does not need to be employed for research programmes. Atleast in the case of research projects for implements, improvements, seed development, and improvement and reclamation of land,

the specialists can only handle them effectively. The study in utilization on agricultural manpower has also to take into account the recent trends of inter-disciplinary training of personnel and multi-disciplinary trends. These trends are bound to affect the questions of methodology of estimating post-graduate trained personnel for agricultural research establishment. The stress shall be more on project needs. As the ICAR has been already coordinating the research work of all the research stations, institutes and sub-stations, it can chalk out the strategy for next five years atleast for research programmes. Project activity analysis can be employed and the perspective utilization trends in various programmes can be identified. Project activity analysis has to be based on expert estimates and as far as possible the expert estimates can be substantiated with observations made from the past experience in the research projects. The research projects can be broadly classified into the main aspects of agricultural technology like plant protection, soil conservation, water management, seed development, implements design and standardisation, agronomic practices, post harvesting technology, i.e.g, warehousing storage etc.

This kind of analysis has its limitations, the details of projects in applied research in various establishments are dependent or determined by local conditions of area for which the project is going to be launched. And the conditions will determine that what kind of team shall be provided. These many details cannot be acquired by the Committee well in advance. Because the projects in applied research can come up at any stage of the year during the long

term plan for which manpower forecasting is made. Keeping all these restraints in view, the manpower forecastes shall try to acquire information on broad trends in the nature of projects. The classification of projects can be perfected with experience and then the information on utilization of specialists will be more easy to handle.

Till now the approach has been to decide arbitrarily the distribution of post-graduate specialized categories among various disciplines for the purpose of estimating the demand. The Agricultural Personnel Committee seems to have adopted the distribution pattern without studying utilization trends and gaps in research areas. But this is definitely unscientific because the priorities should be determined and a balance should be struck in relation to needs. The given distribution pattern does not seem to be the plausible assumption. But it is unfortunate that certain committees have not even estimated the demand of various specializations in post-graduate training. The paper on Fifth Plan Estimates does not touch the issue of post-graduate training.

It is equally unfortunate that most of the committees have felt confident enough to identify the appropriate shortages and recommended a large scale expansion in the institutional training. The institutional education and training is a matter in fact of large investments and cannot be suggested without actually studying the existing employment pattern and the required changes in the delivery system of technical expertise. The delivery system for technical expertise for different levels should correspond

to the identified need pattern. All these steps are must before any manpower forecast is made.

THE CHOICE OF DELIVERY SYSTEM

The choice of delivery system actually is the most problematic step in the whole series of steps of manpower forecasting methodology. To evaluate such issues in methodology of estimates of requirements, one needs to examine the validity of the assumptions regarding the chosen delivery system by looking at the evidence on actual employment pattern of personnel. For example, there are at present 5265 community development blocks in the country. The staffing pattern recommended by the agricultural personnel committee has been observed in only IADP blocks which only cover 6 per cent of the total blocks.

Other blocks only employ one each at block level. These other blocks do not have any specialist staff at district level[1]. These deviations from the recommended staffing pattern have resulted into the situation of surplus in the stock; leading to unemployment. The data is not available in order to realise overall position of agricultural graduates at the end of the third plan. But it is known that the stock at the end of year 1967 was 40844 of graduates. Though agricultural manpower is employed for the most part by central and state governments, the manner in which the stock is being utilised is not known.

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1. Ministry of Home Affairs, Directorate of Manpower, Working Group on Technical Manpower for Agriculture in Seventies, page.10.

The Working Group on Agricultural Technical Manpower of Directorate of Manpower, Ministry of Home Affairs has tried to estimate some how the utilization for the Fourth Plan. According to it, in the beginning of the Fourth Plan, about 12,000 agricultural graduates were engaged in extension work at various levels, 10,000 in research stations including 3000 in ICAR and the remaining 1000 in State Government farms and subresearch stations etc., and other 3000 in agricultural colleges. The above mentioned figure broadly indicates that 25000 agricultural graduates were utilized out of the total stock of 51000 (1968) in public sector. Even if the Census 1971, employment distribution is taken[1], it is not known how 18,000 of the agricultural graduates are utilized. Given the situation it is expected that they were either unemployed or utilized in non-technical (non-agricultural) sectoral employment. Similar kind of situation is revealed by the estimates made by Bhutani[1]. According to him, we have some idea of the manner of utilization of about thirty five thousands agricultural graduates and post-graduates but there is no information about the remaining sixteen thousands.

This information gap is bound to present difficulties for a manpower forecasting committee. Shortages or surpluses cannot be determined unless actually the state of the utilization of the whole stock is known. Neglecting the implications

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1. According to Census 1971, the Employment Distribution is: Public Sector - 84.7, Private Sector - 11.6 Self Employed - 3.7%, Census, Scientific & Technical Personnel, 1971, page.12

2. Bhutani. Demand and Supply of Agricultural Technical Manpower. Manpower Journal, Vol.V, No.2, July-Sept.1969

of such an information gap, the fourth plan working group on Agricultural Education and Manpower has estimated that the country would require sixteen thousands agricultural graduates for the implementation of the programmes envisaged in the fourth plan. There are also sixteen thousand agricultural graduates for which the information on utilization was not known. The details of requirements are given in appendix one. When complete utilization is not known, the issue of deciding implications for future rate of enrolment cannot be suggested. The working group on the fourth plan remains silent on the issue and avoids the discussion on consequences of such a situation.

The paper on the fifth plan estimates has tried to work out the existing utilization pattern of agricultural graduates post-graduates and agricultural engineers. It failed to acquire information from West Bengal, Assam and Manipur and estimated that 5,000 personnel would be atleast employed in those states and union territories. It thus estimated that about 44,200 agricultural graduates and post-graduates would have been employed by the various states and union territories. It also did not have information on graduates/post-graduates employed in the ICAR but presumed that 5000 personnel (graduates and post-graduates) are employed. The details of the utilization pattern are given in appendix Two.

This utilization pattern, as shown, still leaves a balance of nearly eight thousands agricultural graduates/ post-graduates whose utilization is not known. This paper

also avoids discussing the implications of such information gap for suggesting the growth rate of the enrolement. It is interesting to note that the paper on Fifth Plan Estimates has adopted the same approach for which it has raised objections in introduction.*

This paper also makes another error which can result into tremendous unemployment. It is known that till now the assumptions or independent policy imperatives given by the Agricultural Personnel Committee have not been implemented. Only six per cent of total blocks have adopted the actual recommended staffing pattern. This paper without discussing the implications of resource mobilization, assumes that during the Fifth Plan, the Agricultural Personnel Committee recommendations on staffing pattern will be followed and implemented. This paper expects that the extension service strength will be made four times the existing number of employed agricultural extension personnel during the Fifth Five Year Plan. This paper has considered two alternatives on staffing norms but adopts the alternative in which the recommendation is made for comparitively much larger number of extension personnel per block. The details of the alternatives are given in the appendix Three.

The error is not only anticipated but to a large extent can be confirmed by the evidence brought out on the basis

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* It accepts the objections of IAMR background paper on the neglecting of implications of incorrect information on utilization.

of recommendations made in draft Fifth Five Year Plan. The Fifth Five Year has made allocations of resources in a manner that at the block level, in a discriminating manner, increase in number of agricultural extension officers is proposed to be carried out[1]. This draft was prepared in June 1973, even before the Ministry of Agriculture estimated the requirements of technical personnel for Fifth Five Year Plan

Other aspects of delivery system like composition of staffing norms and the nature of training of the personnel of a team for block level are completely neglected by the paper prepared for Fifth Five Year plan. The gaps identified during need analysis have obviously implications for composition of staffing norms. As this paper has made no demand estimates for post-graduate specialists, the choice of composition and nature of training of each member of the team cannot be evaluated. It fails to recognise the fact that IADP experience has been repeatedly making the point that no mismatching of the specialists shall occur in future.

It estimates the stock of agricultural engineers but it does not estimate the demand of agricultural engineers for the Fifth Five Year Plan. It is known that about 300 of agricultural engineers, i.e., 20 % of total are unemployed. And each year addition in stock is going to be atleast two hundred and fifty engineers. Silence on this issue was totally unwarranted.

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1. Report of STEERING GROUP ON FIFTH FIVE YEAR PLAN Relating to Agriculture, Irrigation AND ALLIED SECTORS.

The choice of delivery system in the case where demand of post-graduate specialists and agricultural engineers is not calculated, is bound to remain inappropriate and add further to the situation of simultaneously existing shortages of certain categories and unemployment of others.

SECTION - II

PLANNING OF THE TRAINING

This Section will exclusively deal in the question of translating manpower requirements into different levels of educational categories. In all the IADP reports and studies carried out in various universities, the issue of institutional education, vs. in-service and pre-service training has been implicitly brought out. Especially the village level worker expertise has been the most controversial aspect of the delivery system for extension. One has traced out the problem of training of village level worker since it was raised first time by the Agricultural Personnel Committee. The following issues have been mooted out in the case of village level worker training:

(i) Jurisdiction over number of villages which a village level worker will cover;

(ii) The competence of village level workers;

(iii) Multi-purpose character of extension worker vs. agricultural extension work.

The Agricultural Personnel Committee recommended that the jurisdiction of each V.L.W. should be reduced to five villages comprising of 500 to 600 farms and the village level workers competence or qualification level should be raised to agricultural graduate over a period of time. The Working Group on IV Five Year Plan (1964) also laid stress on the need of giving adequate training to the village level worker, reducing his jurisdiction to a smaller area. According to the Working Group[1] the VLW serves at present more or less

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1. Working Group of Ministry of Agriculture, the formulation of IV Five Year Plan proposals of Agricultural administration and personnel and education and training, p.12

Table - I

[redacted]HORS	AREA IN WHICH STUDY IS CONDUCTED	YEAR OF THE STUDY	OBJECT OF INVESTIGATION	MAJOR FINDINGS
Pishareddy* T.N.P.	Kerala	1962	V.L.W.	The practical aspect of the training is inadequate. There is need of lengthening the pre-service training period. There is need of on-the job training or in service training.
2. Choukidar,* V.V	C.D. Blocks in Poona district	1968	V.L.W.	There is need of training different categories of personnel to suit the training needs of different regions. The complete training in theory and practical aspects is inadequate.
5. Rai, K.N.**	N.A.	1962	V.L.W.	The practical aspect of training is inadequate. V.L.W. should not be a multipurpose worker.
Singh & ** Singh	N.A.	1966	A.E.O.	The training in Farm planning, communication and subject matter of agriculture in the given order was inadequate. On-the job training is recommended.

B.N. Sahay* Training of farmers and extension personnel; in "Research in Extension Education for Acclerating Development Process" by K.N. Singh, C.S.S. Rao, B.N. Sahay. Indian Society of Extension Education, Page-72.

R.P. Singh** : Training of farmers and extension personnel; in "Research in Extension Education for acclerating Development Process" by K.N. Singh, C.S.S. Rao, B.N. Sahay. Indian Society of Extension Education, Page-79.

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	D.R. Sarkar*	West Bengal	1965-66	V.L.W.	Pre-service training is found inadequate. Institutional tr ining was unproductive. Refresher training is inadequate.
6.	Sinha & Gill**	N.A.	1967	V.L.W.	Pre-service training in practical aspects is not given. Pre-sertice training in live stock management and plant protection needed. In-service training inadequate.
7.	Rama Somayajulu+	A.P.	1968	V.L.W.	The knowledge in the areas of plant protection, mechanised agriculture & high yield varieties of crops.
8.	Nooruddin & Somasundram	+ GTC Rajender Nagar.	1966	V.L.W.	Animal husbandry aspects were insufficiently dealt in pre-service training.
9.	Mishra(1960)++ Yadav(1960), Singh(1961), Najamuddin(1964).	N.A.	1960-64	Ext. personnel	Lack of trained personnel and too much time is devoted to office work.

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* P.R.R. Sinha & P.N. Kaul,: Training of farmers & Extension personnel; in "Research in Extension Education for Acclerating Development Process" by K.N. Singh, C.SS Rao, B.N. Sahay. Indian Society of Extension Education, Page-88.

** Ibid, Page-85.

+ K.Bhaskaran: Training of farmers & Extension personnel in "Research in Extension Education for Acclerating Development Process" by K.N. Singh, C.S.S. Rao, B.N. Sahay, Indian Society of Extension Education. Page-87-88.

++ Administration in Community Development in relation to agricultural Development, in "Research in Extension Education for Acclerating Development Process" by K.N. Singh, C.S.S. Rao, B.N. Sahay, Indian Society of Extension Education, Page 281-283.

Cont.....

	Mallik Narayana Reddy & Babu.**	IADP, IAAP & Normal districts of A.P.	01967	A.E.O.	It was found that the AEOs in general devoted 55-53% of their time for extension, supplies work, 25% for offic work, 14.85% for travelling, and 6.65% for non-extension work - the difference in three categories of district negligible.
1.	Venkataramana Reddy & Bhaskaran**	Package district & Normal district	1966	A.E.O.	The barriers to good extensio work are supply situation too much office work and lack of facilities for increased mobility.
2.	Sood (1966)***	N.A.	1966	V.L.W.	Farm crops consumed the maximum (22%), time of VLW whereas animal husbandry consumed the minimum time (6.4%); about 55% of the time was spent on extention. This being more for IADP as compared to IADP ones.
	Sarang (1966)***	N.A.	1966	A.E.O.	IADP AEO spent mass time on field but this situation gets revised in the case of non-IADP areas. The officers in IADP areas spent more time on all non-agricultural activities than those in non-IADP areas.

K. Bhaskaran: Agricultural Administration: in "Research in Extension Education for Acclerating Development Process" by K.N. Singh, C.S.S.R/Rao, B.N. Sahay, Indian Society of Extension Education, page-270-272.

***Agricultural Administration in relation to new strategy of Agricultural Production, in "Research in Extension Education for Acclerating Development Process" by K.N. Singh, C.S.S. Rao, B.N. Sahay, Indian Society of Extension Education, Page- 273-275.

as a man responsible for supplies and cannot be expected to serve as an effective functionary who can comprehend and help solve the problems of farmers. So it stated that merely reducing the area of jurisdiction would not, therefore, offer an adequate remedy, something more is to be done. The Committee felt that the VLW having training ranging from months to two years; in the majority of cases are unable to effectively organise demonstration and inspire confidence in the farmer. The group recommended finally that the VLW should be replaced by graduates in some or all of the IADP districts because due to the lack of resources, it would not be possible to cover all the blocks in the country.

The Table -1 on the findings of various research studies carried out in the last ten years reflects the following points:

(1) The practical aspect of VLW training is insufficient and inadequate especially in certain disciplines like Animal Husbandry, plant protection, mechanized agriculture.

(2) V.L.W. should not be a multi-purpose worker

(3) There is need of lengthening the pre-service training.

(4) The in-service training is inadequate

(5) There is need of training different categories of village level workers for different agro-climatic regions.

These issues which have been repeatedly mentioned in the research studies carried out on the utilization of extension personnel in certain areas, bring out the fact that the decision needs to be taken, regarding them and otherwise the extrapulation of existing trained manpower requirements

for future period will just result in perpetuation of the undesired state of affairs. The problem of appropriate training, needs to be looked at from wider perspective of organisation of the extension service. The Ministry of Agriculture pointed out this problem in the following manner:

"That a very disconcerting feature of the extension service is inadequate training imparted to the village level worker. And it further states that there is usually lapse of about six years that the refresher training is given. And unfortunately, emphasis on refresher programmes seems to be declining. The reasons for this is found in non-availability of reserve force to fill up the vacant positions. It also feels the need of intensifying the extension work through reduction of the area allotted to the village level worker".[1]

The problem in this statement implicitly brings out that there is need to evaluate whether institutional training (i.e. occupational education) needs to be upgraded or not. Because the refresher programmes are difficult to be organised for village level workers due to the reasons of absence of large reserve, declining interest in motivation for further training due to service conditions.

This paper further makes certain observations on the recommendations of agricultural personnel committee on the upgrading of the competence of village level worker to the qualification of agricultural graduate from a totally different view point. It states -

"The point that is sought to be made now is that the reorganisation of extension services is much

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1. Ministry of Food, Agriculture, Community Development & Co-operation, Organising Agricultural Extension In India,

> larger than the supplanting of the existing V.L.W. by an agricultural graduate. There is little evidence that an agricultural graduate would automatically make a better extension worker. As a matter of fact there is wide spread feeling that agricultural graduates do not comprehend practical agriculture. This deficiency, assuming that it exists, is remediable and it would be unscientific to start with a bias against higher education. The primary consideration in deciding on the question should be objectives of extension activities which should determine the type of agent necessary at various levels"[1].

Number of issues concerning the role and competence of extension workers emerge in the preceeding discussion. The issues raised are operationalized and evaluated in the following section.

(i) Is it not that the more qualified extension workers will continue to attend to fewer farmers, and the number of farmers who would be outside the scope of extension would increase if the jurisdiction is remaining the same or not reduced.

(ii) Is it not that there is need of training farmers and their sons who will be able to comprehend the practical aspects of agriculture and use theoretical knowledge imparted to them.

(iii) Is it not that the problem of adequacy of well trained extension staff for certain operational work unit can be

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1. Ministry of Food, Agriculture, Community Development and Co-operation, Organising Agricultural Extension in India, 1970, page.16

solved by making certain changes in the land ownership and mode of co-operation among various farmers having different means of production.

The solution to the first issue is implied in the simultaneous solution of last two issues. Given the situation that majority of farming population is illiterate and deprived of sufficient resources to use capital intensive techniques at the first adoption itself, they are not able to make full use of the trained personnel who have acquired a good amount of theoretical knowledge about agriculture. In case the compaign on training farmers and enrolment of large number of young persons from countryside in agricultural schools, rural institutional polytechnics are encouraged and implemented at large scale, the more successful use of agricultural graduates can be made by the farmers. Trained farmers and educated sons of their will also be able to practice the techniques of soil conservation and water management which are relatively less capital intensive. The problem of reducing the jurisdiction over the area for an agricultural graduate will not also remain an issue because the handling of more trained farmers will become easier.

As far the existing situation is concerned, the training of farmers and enrolement of young persons from countryside in vocational agricultural institutions have been neglected. Vocational agricultural schools have not increased in number or their capacity since the third plan. Priority to agricultural schools, polytechnics has been very low since sixties.

In case the policy is revised in the favour of vocational agricultural schools and farmers' training programmes, the manpower forecasters will be able to find solutions to the defects of inadequate practical training of agricultural graduate and large jurisdiction which is unmanageable by the existing agricultural extension team. Otherwise it is evident that the issues of practical training adequacy and unmanageable jurisdiction will keep finding one-sided solutions and without making significant impact on the growth of Indian Agricultural production. The methodology of manpower forecasting shall view the issues of staffing norms for an appropriate delivery system in a manner in which the total agricultural labour force,(i.e., including non-technical personnel) education and training also form the integral part of analysis.

The existing methodology of employer forecasting technique has remained seriously handicapped for the fact that it neglected the significance of changing the emphasis on education and training of total agricultural labour force for manipulating the staffing norms and the composition of delivery system to find optimal solutions.

Similarly the changes in land ownership and the mode of co-operation among farmers have very crucial implications for obtaining an instrument of effectively changing the size and composition of delivery system for affecting the effectiveness of extension service. The paper prepared by Ministry of Agriculture and on organizing Agricultural extension shall has also pointed out that the question of nature of agricultural

extension shall not be merely reduced to academic qualification of any particular category of workers, but dealt in an integrated manner. It is pointed out in the following manner[1] that the use of some agricultural dust and sprays for pest control is economic only if undertaken on a large geographic area and wiedespread coverage means that either, the government must provide a protection service on a large area, or neighbouring farmers must decide to undertake a joint protective programme. Decisions to build farm to market tools often require group participation and group action. Decisions to construct field water courses and farm drains must be arrived by some consensus or enforced by the government. Modern water control requires a simultaneity in the conduct of farm operations over a fairly larger area. Common agreement must be reached on the use of a particular variety and the date of planting so that irrigation water can be provided for the whole area when it is needed to support crop growth. Increases where farms are small, group decisions may have to be made on the use of farm tracters and modern implements".

The manpower unit paper quotes the above mentioned facts in order to demonstrate that long term growth in agriculture is inconceivable without collective endeavour", and very rightly points out that the significant differences in results are unlikely through the replacement of present village level workers alone, and if reorganisation in the functions and organisation of the extension service is contemplated, the present VLW can be adapted at a much lower cost, to the changed

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1. Organising Agricultural Extension in India, Ministry of Food, Agriculture, Community Development & Co-operation 1970, page 17.

set up. In some of the aspects, the system is being evolved but it caters to large cultivators only. So there is need of changing pattern of land ownership so that co-operation can be effectively used to find optimal solution for evolving an appropriate delivery system.

It will be more clearly evident in the following sections where co-relation of changes in mode of co-operation of extension are operationalized.

(1) Firstly, dealing with more farms having their specialized needs because of the varying resources is amounting to heavier work than communicating the scientific knowledge to organized co-operative farming where more uniform practices can be extended.

(2) The refreshment courses or pre-service training courses can become more useful because the trainers will be able to depend on simple job charts based on uniform practices and orientation of the courses will be much more definitive and effective.

(3) Under the changed set up, the burden on heavy institutional training will not be that much because in existing framework complexity of needs for smaller, middle and large cultivators is such that highly trained graduate only can effectively solve all their problems.

The assumptions at their face value seem to be very much justified. Workload conditions get improved and the nature of training courses becomes more definitive and clear.

The practical aspect of training also seems to get more importance because the "on-the-job"training and in-service training programmes do not face the tremendous job of training VLW in the practical aspects of all size resources farms. The institutional training can be made more detailed in emphasis on theoretical knowledge in agriculture for village level workers because in new framework, the on-the-job training or in-service training and pre-service training will become more effective due to reasons eerlier mentioned. The village level workers will be able to handle specialized localized jobs of the specific region. Here it is essential to point out that the farmers education and training programmes if pursued seriously in newer framework, can relieve to a great deal the excessive work load of village level worker and agricultural extension officer. The issue of farmer education and training programmes till now have not received much attention and so its implications for extension set up have gone unattended. The village level worker and agricultural extension officers have largely been functioning as supplies personnel. Because the emphasis on supplies oriented extension has been the feature of all programmes and this has largely been encouraged by the policy makers due to the fact that the success of programmes themselves is largely judged by the targets of supplies they achieve. And the supplies have been 'large holding cultivator or owner' oriented. Due to this phenomenon, the small and semi-medium holding have gone unattended which needed the practice based scientific knowledge the most.

Reorganisation of co-operative farming for smaller semi-medium and medium holdings will facilitate the framing of effective course material based on uniform job charts. The duration of the course, even, won't have to be increased. The two-year course can exclusively deal in broad theoretical knowledge needed for different agro-climatic regions. The courses have to be framed, ofcourse, to suit different agro-climatic regions. And then, the pre-service training will be able to cover practical aspects of agro-climatic region agriculture effectively due to the fact that definitive and uniform practices are being utilised in large areas of different agro-climatic regions.

So the issue needs to be assessed in the light of more information on utilisation of village level workers in extension service. This pre-requisite is must, otherwise, the task of just estimating the amount of education and training will go futile.

THE CHOICE OF INSTITUTIONAL PATTERN FOR TRAINING

This brings us to the often emerging question in our study - of the organisation of institutional training, pre-service and inservice training. All the three levels serve different purpose. But different combinations with varying contents can be utilised to serve the aims of the agriculture decided for a definitive time period. All education and training programmes are framed to serve the given local conditions of a area in a certain period. On one hand the needs of agriculture keep advancing and demanding the skills to serve those, and on the other hand agricultural technological advances require that the extension workers make use

of newly developed agricultural practices in order to achieve the aims of agricultural production, growth, and income generation more effectively. The institutional training is given to equip an extension worker with theoretical and practical aspects of general agriculture. Pre-service training is supposed to concern itself more with specialized needs of area, crops and other conditions. Naturally, the pre-service training has to incorporate the education of practical aspects of the agricultural technology to be introduced there. Refresher or in-service training serves the purpose of enhancing their knowledge, because of the gaps arising due to advances in agricultural technology and developing needs of agriculture.

There are many alternatives worth consideration which will increase the effectiveness of delivery system. For example, diploma holders in different disciplines who will have sufficient theoretical knowledge along with the reasonable education in practical aspects of that specialized service can replace the agricultural graduate. Institutional aspect of training is to decide on whether diploma education or degree courses shall be developed, so that needs of the area can be fully served. The specialization issue is the implicit problem related to this aspect of institutional choice in the training organisation. The Agricultural Personnel Committee recommended that the agricultural graduate with specialized training in one of the discipline among plant protection, agronomy, agricultural implements

and soil and water management. The graduate education in agriculture has been in case of a theoretical nature and has not been very successful in catering to the needs of various farmers. Especially plant protection has been referred as a widely felt need. The IADP reports have suggested it continuously since the Third Report[1]. The paper brought out by manpower unit of Ministry of Food and Agriculture even states that it may also be expedient to post a specialist at the block level. While the subject to specialization would vary from area to area[2]. The preliminary analysis of Indian Agricultural situation even supports the desirability of providing soil and water management specialist at block level. Enough evidence for this need has been given while the strategy in agricultural development was discussed. It is not to suggest that only these two specializations need to be covered at block level but it to open the point that a scientific survey needs to be conducted by drawing a job chart and comparing it with the training level, or competence of different levels extension workers.

Pre-service training supplementing graduate institutional training might be also one of the options. There is need to experiment it on pilot project basis and complement it with the assessment studies on job requirements training. All the educational and training programmes have their functional aspect as one of the main aims along with the

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1. Modernizing Indian Agriculture, IV Evaluation Report on IADP Districts, Vol. I, p.

2. Organising Extension in India, State Manpower Unit, Ministry of Food, Agriculture and Co-operation.

social demand of education. But to assess the effectiveness of financial aspects of training which is the issue of consideration in this study, a scientific approach of beginning with need analysis; supplementing it with activity analysis has to be adopted. Then only experts estimates can be utilised on the question of organisation of education and training. Otherwise occupational analysis will remain ~~the~~ ineffective and wrong choices will be made in deciding on the appropriateness of skills. These tasks have been very much neglected by all the Committees and working groups.

It is important that a systematic research study on organisation of education and training is under-taken. Man-power forecasting without analysing the organisation of institutional choices for education and training will perpetuate the ineffective system and in the long term become a constraint on the decision making. The decisions on the training of village level workers have met this fate. Because of the lack of reserves, the institutional in-service training, we have not been able to organise while keeping the occupational education level to six month or two years courses. The alternatives have remained unexploited and the ineffective extension set up has continued to exist like a drag on agricultural development.

CONCLUSION

This section, in fact, aims at summarising the tentative conclusions in the study and to formulate the steps of a scientific

methodology for estimating the requirements of agricultural technical manpower in the course of evaluation of the practices employed in the estimation of manpower requirements, by the committees appointed by the Indian Government.

It will be useful to begin with identifying the main information gaps and their consequences on the forecasts fulfilment. The constraint of information gaps had actually made one's task very difficult, even for the evaluation of methodology. The information gaps have been mainly pointed out in following areas (i) Sector-wise employment data, (ii) under-utilisation and unemployment characteristics of agriculture graduates and post-graduates; (iii) time utilization of agricultural graduates in extension and village level workers, (iv) activity pattern and gaps in competence of various personnel (v) resource mobilization, (vi) characteristics of utilisation of research personnel, etc. Due to the fact that the latest forecast made by manpower unit in Central Ministry also complains of lack of information, it is essential that the research information shall be collected on the discussed areas.

It has been identified that the forecasts have neglected the importance of estimation of resources, especially on financial resources. The fact that the forecasts have refrained to discuss the past trends in resource mobilisation and allocation, the forecasts have tended to be over optimistic. The predictions which were made since Third Plan have not been fulfilled. The policy conditional forecasts, as these were

supposed to be, failed to make implications for likely future utilisation, growth, education and training in a scientific manner. So the rule of thumb was frequently employed to decide the expansion in programmes for which the personnel were to be provided.

The methodology employed for need analysis was based on extrapolation of past trends and not on desirable needs or requirements. The agro-climatic region was not taken as a unit for manpower forecasting. So the analysis of needed skills was incomplete and resulted into various shortages. There was no attempt of determining the priorities among programmes so that specialised personnel could have been trained to meet the needs of crucial programmes. Soil conservation, water management and plant protection are much needed programmes which have been adversely affected by the discrepencies in the methodology of need analysis employed by the various committees.

The need analysis in the case of research personnel was faculty due to the fact that the committees failed to account for multi-disciplinary nature of projects and needed specialization of various personnel according to the requirements of each agro-climatic zone. Norms of providing post-graduate personnel for research establishments were not based on the actual utilisation of resources in these organisations. Due to lack of information on utilisation of research personnel, one could not attempt, in a comprehensive manner, the identification of the key characteristics of need pattern in research

establishment. Still certain tentative hypotheses about desired characteristics of research personnel have been discussed.

After evaluating the methodology of need analysis, one proceeded to make the assessment of the technique of occupational analysis which has been employed implicitly in most of the forecasts. Occupational-analysis consists in the careful identification based on research studies. Observations, expert estimates - of the functions and tasks actually performed in a given sector by various occupational categories. In certain occupational roles like soil conservation, water management, extension education and plant protection service personnel at block level organisation are absent inspite of the evidence provided by various governmental reports on intensive, high yielding varieties and multiple cropping districts programmes etc. The forecasters have neglected the recommendations of others committees which have tremendous implications for manpower forecasting. Of course the Committees appointed for manpower forecasting have to do further research on these recommendations and base their decisions on the basis of organised research on functional activity analysis.

Activity analysis is carried out to find out actual job requirements, time devoted to them by existing personnel, workload conditions and desired institutionalization of education and training in order to have effective delivery system, consisting of generalists and specialized personnel. No exercise was conducted to obtain information on these

aspects. So the forecasts failed to resolve issues of competence of village level workers, multipurpose character of VLW and specialized training of extension officers. The classification of clusters of occupations concept was inadequately formed, so the committees failed to account for specialization of village level workers for different agro-climatic regions. Decisions on institutional choices in organisation of education and training programmes for various personnel were taken only on the basis of self-styled experts information, not on the information of actual utilization of agricultural personnel. Staffing norms had to be decided just by comparing the general conditions of Indian agriculture to other countries situation. Specific conditions of each agro-climatic region in Indian agriculture were not taken into account. The alternatives among institutional patterns for training different kind of agricultural personnel could not be brought into considerations. The job requirements in specific regions were not known. Inadequate training of various categories among agricultural personnel continued to be a bottleneck. If one could have studied actual job requirements and compared it to workload situation competence of different categories of personnel, then probably one would have been able to identify even the need of certain occupational categories which not provided till now, but form crucial bottleneck of the existing delivery system of technical expertise.

Activity analysis is carried out precisely for the reason that occupational education and training programmes should be planned with reference to actual priority needs of employment system. Not simply adopted haphazardly and in piecemeal fashion. In order to acquire a desired balance of output of personnel qualified for different occupational jobs, there should be continuous study of the changing requirements of the sector and each of its sub-sectors. The forecasts did not attempt at all to collect information on the performance of existing personnel with reference to job requirements and effectiveness of delivery system etc.

The analysis of institutional choices was completely neglected. Institutions that can help to carry out the practical work of occupational education and training can be organised in different ways. The continuation of occupational education courses, pre-service training and in-service training shall keep changing to adjust to the developing needs of the sector. As it has been pointed out that needs in plant protection, soil and water management, implements improvement and extension are acquiring specialised character and can be met with one of the following alternatives :

(1) provide diploma holders at the desired level of organisation;

(2) organise in-service training or refresher training course for existing extension personnel;

(3) organise custom service where specialists in these areas will suprevise the work in these activities with the help of technicians trained

in sub-professional schools.

(4) Organise farmers education and training camps of sufficient durations to meet the required gaps of these activities.

Similarly the issue of village level worker competence can be tackled. So the aim of providing actual examples from Indian agriculture with regard to required changes in delivery system is to point out that the forecasts were too narrow and sectoral and failed to consider alternatives which would have served the aims of organisation more effectively.

The practice of manpower forecasting has remained till now constrained within the boundaries of quantitative estimates of education and training which has serious implications for the issues of expansion of certain existing categories or initiation of new courses to meet the developing needs of two sectors has been neglected. In case the forecasters keep neglecting the actual changes occuring in various sub-sectors of Indian agriculture, the situation is bound to occur that the Indian agriculture will face severe shortage of certain trained categories whereas surplus of others. Even to-day the signs of such a crisis are apparent.

APPENDIX - I

AG. GRAD./P.G.S REQUIREMENTS FOR IV PLAN IN THE PUBLIC SECTOR

	GRADUATES	POST GRADUATES
BLOCK LEVEL	8000	950
DISTRICT LEVEL	550	950
STATE & CENTRAL STAFF	-	200
RESEARCH	-	1200
EDUCATION	-	1000
TOTAL -	8550	3350
TRAINING & LEAVE	855	335
REPLACEMENT	2595	715
TOTAL -	12000	4400

Source: Working Group of Directorate of Manpower, Technical Manpower in Seventies, Sub-group on Agricultural technical manpower, p.36

APPENDIX - II

STOCK ESTIMATES MADE BY FIFTH FIVE YEAR PLAN PAPER ON AGRICULTURAL TECHNICAL MANPOWER

ORGANISATION	GRADUATES & POST-GRADUATES	
State Govts. & Union Territories	44200	
ICAR	5000	
Central	500	
Public Corporations & State Agro-Industries Corporations	1900	
Banking Sector (Public)	2400	
	54000	
Unemployed agricultural graduates on live register	10000	
Private Sector	1000	(approximately)
	65000	

Source: Ministry of Agriculture & Irrigation, A Paper on Fifth Plan Estimates, 1975, page.22.

APPENDIX - III

Source	Norm	Total requirements
Sub-group on Agricultural Extension and Administration	One additional AEO for 850 blocks & 2AEO for misc. intensive areas	12,750
Estimate accepted by Fifth Plan papers	Five AEO per block for 4962 blocks	24,180 - 5,762 *
		19,048

* Number of extension officers in Sept. 1971

Source: Demand and Supply of Agricultural Technical Manpower, a paper on Fifth Plan estimates, Ministry of Agriculture, 1975.

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