FORECASTING TECHNICAL MANPOWER NEEDS IN AGRICULTURE IN KERALA

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Thesis submitted in partial fulfilment of the requirement for the degree of

Master of Science in Agriculture

Faculty of Agriculture
Kerala Agricultural University, Thrissur

2004

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DECLARATION

I hereby declare that this thesis entitled "**Forecasting technical manpower needs in agriculture in Kerala**" is a bonafide record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award of any degree, diploma, associateship, fellowship or other similar title, of any other university or society.

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CERTIFICATE

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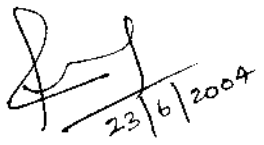

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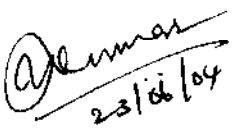

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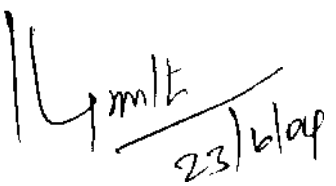

Dedicated to

My Mother

ACKNOWLEDGEMENT

I am gratefully indebted to Dr. A. K. Sherief, Assistant Professor, Department of Agricultural Extension and Chairman of Advisory Committee for his valuable advice, keen interest, constant encouragement and constructive criticisms throughout my postgraduate programme.

I express my gratitude to the members of my Advisory Committee:

Dr. C. Bhaskaran, Associate Professor and Head, Department of Agricultural Extension, for his sustained interest and help.

Dr. N. Kishore Kumar, Assistant Professor, Department of Agricultural Extension, for his sincere effort in moulding the thesis in a pucca form, within a stipulated time.

Dr. Vijayaraghavakumar, Associate Professor, Department of Agricultural Statistics, for his wholehearted effort in the statistical analysis and interpretation of the results.

I consider it a privilege to express my sense of gratitude and admiration to Dr. M. Mohammed Hussain, Associate Professor and Head (Rtd.) for his affection, keen interest and constant encouragement rendered throughout my study.

I wish to place on record my deep sense of gratitude to all the teaching and non-teaching staff of my Department for their help and support.

I am thankful to Sri. Biju, for the prompt computerized typesetting with good care

I am gratefully acknowledge all the respondents for their co-operation, without which my study would perhaps have been incomplete.

I wish to place on record my gratitude to Kerala Agricultural University for awarding me the fellowship for this PG programme.

I wish to place on my heartfelt gratitude to my Bijuchettan for his invaluable and firm support rendered throughout my study.

Certainly one of the most important acknowledgements would have to be my friends and colleagues, Fayas, Suthan, Deepthi, Priya, Geetha and Beena not only for discussion and moral support but also for their patient enthusiasm and companionship rendered towards me.

To all the PG students and Ph.D. scholars in the Department of Agricultural Extension who had been with me during the course of my study, I continue my indebtedness.

Above all, indebtedness to my mother, brothers and relatives without whose encouragements and sacrifices this study would have never come into light.

Suja S.L.

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INTRODUCTION

1. INTRODUCTION

Agriculture continuous to be the mainstay of our economy even after 56 years of independence. Development in India is synonymous with agricultural development since food grain production remained a matter of critical concern for nearly two decades after independence. Economic growth in a predominantly agricultural country like India is greatly dependent on agriculture.

It is true that agriculture in India had a break through during the late sixties, generally known as the "Green Revolution Period". Many attempts have been made to examine its impact on the nation's economy. The technological sophistication has brought a revolutionary change in the agricultural sector and the productivity has shown a progressive trend.

Human resources form a significant input in the production process. In the agricultural sector, professionals play an important role. It is the lever spring that infects life, strength and continuity to development of our national economy. So in achieving proper planning and implementation of agricultural development programmes the role of technical agricultural manpower cannot be ignored.

The technical agricultural manpower is not much exploited in India. So their manpower utilization has to be one of the paramount concerns of our planners and administrators. One of the major limitations of planning of India is that despite a cautious effort made by the planners to promote labour intensive techniques of production, the growth of employment has continuously lagged behind the growth of technical manpower.

Even in Kerala, the employment profile during the last few decades provides a shocking situation. Unemployment spreads like a disease in every field.

Moreover in Kerala, the agriculture sector is confronted with socio-economic and political forces, long term agricultural policies, lack of supportive government policies, declining investment level, lack of growth in corporate agricultural sector, growing population, low level of profitability, increasing disparity in income and poverty, lack of motivation in the agriculture sector, inadequate support for agricultural education and research and also competition for employment among the agricultural graduates from other disciplines.

The complexity in the agricultural scenario reiterates the need for manpower planning on a sound basis. So in the ultimate analysis, the solution to the complex unemployment problem in the agriculture sector lies in tapping our talent technical human resources and converting it into capital for economic development.

In general, manpower planning refers to the attempt to produce the right number of persons with right skills at the right time in order to achieve a particular objective or objectives. Manpower planning is essential for manpower development in all sectors like industry, agriculture, etc. Manpower forecasting is one of the major steps in the manpower planning.

At this juncture, the relevance of forecasting of technical manpower in agriculture in Kerala is felt. So in order to place the right man on the right job at the right time, forecasting of technical agricultural manpower and manpower planning are inevitable.

Scope of the Study

The forecasting of technical agricultural manpower can be made in two steps. The first step, by assessment of existing manpower and capacity utilization of qualified graduates and in the second step, forecasting of future needs in different sectors. But in Kerala there is no secondary source of data or readymade information regarding the technical

manpower forecasting. Lack of comprehensive data on socio-economic characteristics and employment pattern of agricultural graduates in different sectors limit the adoption of sophisticated methods for forecasting manpower requirements.

As this study is a pioneering research attempt in this area, it would certainly throw light on the various problems felt for the forecasting of technical agricultural manpower so that it will probably widen the scope and enable the concerned authorities to identify the gaps between the demand and supply positions of various categories of manpower and for the corrective actions, well in advance.

The overriding objective of the study is to forecast the technical manpower demand and supply in agriculture for a decade in Kerala. The present study was taken up with the following specific objectives:

a. To assess the characteristics of the existing employment pattern of technical manpower

b. To find out the technical manpower demand

c. To find out the technical manpower supply

d. To identify the constraints faced by the technical manpower in getting gainful employment in agriculture

Limitations of the Study

The study was undertaken as a part of the requirement for the postgraduate programme. So the study had the limitations of time and larger sample size. Hence it was not possible for the researcher to explore the area in greater depth and comprehensive manner. Even with the limited time and other resources available, sincere efforts have been made to make this study as objective and systematic as possible. Moreover,

since the study was based on the existing available primary information and expressed opinion of the respondents and it may or may not be free from their individual biases and prejudices.

Presentation of the Report

The remaining chapters of this report are presented as follows:

In Chapter II, theoretical orientation and defining concepts are furnished.

Chapter III covers the methodology followed for the study.

The results, interpretation and discussion are given in Chapter IV.

Chapter V gives the summary of the entire study emphasizing salient findings.

The references, appendix and the abstract of the thesis are given at the end.

THEORETICAL ORIENTATION

2. THEORETICAL ORIENTATION

Concepts relating to any systematic study must be defined clearly before presenting the results. A comprehensive review of literature is important as it helps in better understanding and conceptualization of the study. In this chapter, an attempt is made to develop a theoretical framework of the study. Review of available information from similar or related studies is made and organized under the following headings.

2.1 Concept of forecasting

2.2 Importance of forecasting

2.3 Need for forecasting

2.4 Importance of manpower planning

2.5 Relationship between manpower planning and forecasting

2.6 Characteristics of the existing employment pattern

2.7 Technical manpower demand

2.8 Technical manpower supply

2.9 Constraints faced by the technical manpower in getting gainful employment in agriculture

In Kerala, forecasting is mainly carried out for weather, market, labour etc. However, manpower forecasting is mainly carried out in industrial sector. In the agricultural sector there is no source that provides estimated requirement of technical agricultural manpower on a continuing basis. Moreover, it was found that not much research work has been made in forecasting of demand for manpower in agriculture. So there is serious paucity of research findings in this field. However, a sincere attempt is made here for including all available research findings related to this study.

2.1 CONCEPT OF FORECASTING

According to Sultan (1975) forecasting is the calculation of probable events, to provide against the future. It therefore, involves an idea of pre-determination of events and their financial implications.

Neter and Wasserman (1975) defined forecasting, as the statistical analysis of the past and current movement in the given time series so as to obtain clues about the future pattern of those movements.

According to Barnes (1975), business forecasting is the calculation of reasonable probabilities about the future, based on analysis of all the latest relevant information by tested and logically sound statistical and econometric techniques, as interpreted, modified and applied in terms of an executive's personal judgment and social knowledge of his own business and his own industry or trade or enterprise.

According to Massie (1976) forecasting is the process by which a manager looks to the future and discovers alternative courses of action open to him in order to overcome the future constraints.

Prasad (1979) defined forecasting as the process of estimating the relevant events of future, based on the analysis of their past and present behaviour.

Aggarwala (1989) opined that forecasting is predicting before hand the events, which may occur in the future and may greatly influence the functioning of the enterprise.

For the purpose of this study, forecasting agricultural manpower can be defined as the process of estimating the future technical agricultural manpower demand and supply, based on the analysis of their past and present employment pattern.

2.2 IMPORTANCE OF FORECASTING

Beatty and Schneier (1977) opined that developing a forecast of human resource requirements will enable to develop personnel training programmes and to anticipate personnel's future performance level based on their potential.

Richard (1981) reported that forecasting human resources requirements involves a forecasting of the number of personnel required, an inventory of current talent and specific actions to bring demand and supply into balance.

Need assessment study by Andhra Pradesh Human Resource Development (AHRD) Project, Andhra Pradesh (1998) revealed the projections of manpower needs for thirteen year period annually from 1997 to 2009. Based on this study recommendations for modifying the agriculture curriculum in universities were taken.

The Economic Review of the Government of Kerala (GOK, 2000) revealed that the total professional jobseekers in Kerala during 2000 were 166060.

Tripathi (2000) reported that to emerge as leaders in agricultural sector, manpower forecasting and planning will be the most potential area for attention in the new millennium.

Mathew (2001) opined that opportunities in agriculture are nothing less compared to the over-emphasized fields such as information technology. Hence it is worth to encourage the youth to become agricultural professionals.

In a study on national manpower need assessment in agriculture and allied sectors conducted by ICAR (2002) the Delphi technique was administered as an important manpower demand assessment technique and the direct enquiry method was used as an important manpower supply forecasting technique.

The Economic Review of the Government of Kerala (GOK, 2002) revealed that the total professional jobseekers in Kerala during 2001 was 177130.

The studies reviewed depict that forecasting of technical manpower in agriculture will enable the efficient utilization of available manpower resources for agricultural development of the state.

2.3 NEED FOR FORECASTING

Newport and Trewatha (1976) observed that effective decisions can not be made without forecasting personnel requirement and production levels.

Norman *et al.* (1982) reported that human resources forecasting is necessary for the scientific management of personnel in an organization.

Nangia (1982) reported that the real purpose of the forecast of manpower requirement is to do as much as possible to reduce the area of uncertainty and to minimize the unknown factors.

Alauddin (2002) reported that forecasting of the technical manpower in agriculture will lead to adequate appreciation, investments, infrastructural development and use of the training institutions.

The studies reviewed depict that manpower forecasting is necessary for the scientific management of technical manpower in agriculture.

2.4 IMPORTANCE OF MANPOWER PLANNING

According to Baron and Campbell (1982) the purpose of human resources planning is to assure that a certain desired number of persons with the correct skills will be available at some specified time in the future.

Saksena (1984) opined that scientific procurement and placement of right man at the right job is one of the most important functions of manpower planning.

Amjad (1987) opined that investment in human capital in agriculture sector, must consider not only the traditional 'supply side' of human resources, but also give emphasis for the crucial role of 'demand' in ensuring the optimal utilization of human resources.

Subramanyan (1996) made a conclusion in engineering field for a period of 1984-87 that there was surplus manpower in engineering market in Tamil Nadu. Hence there is no need for expanding the intake capacity in any of the discipline currently offered at degree and diploma level in the state, he opined.

Sharma (2003) observed that for the betterment of the country, the farm sector should explore the human resources in information and communication technology.

Mulji (2003) opined that agriculture has a pool of potential surplus manpower both in terms of technical and non-technical. Hence manpower planning is essential in agriculture.

The studies reviewed reveal that for the planned development of agriculture technical manpower in different sectors of agriculture is required. So it is necessary to organize them and channalise their energy towards desirable goals in the interest of nation's development. For the effective utilization of the above said resources it is essential to find out their existing and future employment pattern in agriculture in Kerala also.

2.5 RELATIONSHIP BETWEEN MANPOWER PLANNING AND FORECASTING

According to Taylor and Lippitt (1975) manpower forecasts are part of a planning process which is essentially the provision of the best possible framework of information for decision making in conditions of uncertainty.

According to Bhushan (1976) personnel or technical manpower planning implies forecasting the future need of the staff and their availability in the organisation.

Aggarwal and Varma (1996) opined that forecasting future manpower requirement is an essential ingredient in manpower planning.

Varadharajan (2002) found that manpower planning in agriculture sector is actually an in-depth evaluation of future manpower requirement based on the clear assessment of existing and future potential. This in-depth evaluation is known as forecasting.

Swaminathan (2002) opined that the most effective method of meeting challenges like population growth, unemployment and natural resource degradation is planned human resource development. For this, forecasting of existing employment potential is essential.

The studies reviewed depict that manpower planning is an important ingredient of any manpower development. But its process depends largely on how well and adequately one can predict future manpower requirement. This prediction is known as forecasting. So forecasting of technical manpower requirement is essential for technical manpower planning is agriculture.

2.6 CHARACTERISTICS OF THE EXISTING EMPLOYMENT PATTERN

2.6.1 Functional Area of the Organization

According to Sharma and Prasad (1972) the productive efficiency of any organization depends mainly on the conduciveness of its working environment and functional area of the organization which can and should be reflected in the extent of satisfaction of the personnel.

Misra (1990) identified eight major job areas namely area acquaintance job, educational job, training job, visit job, organizational job, planning job, office job and input coordination job.

Reddy (1990) identified seven job areas such as planning, education, supply and services, supervision, coordination, office works and evaluation.

For the purpose of the study, functional area of the organization can be defined as area of specialization of work that the agriculture graduate has to do for the organization.

2.6.2 Technical Qualification

According to Bingham and Moore (1984) technical qualification refers to the educational qualifications required to fill the positions as determined from the job specifications.

For the purpose of this study, technical qualification refers to the technical qualification or professional qualification possessed by the agriculture graduate.

2.6.3 Nature of Job

Steers and Porter (1987) observed that restructuring the nature of job will raise the will to work in some people in the organization.

For the purpose of this study, nature of job means whether the agriculture graduate do research or management job in the organization.

2.6.4 Wage Payment

According to Rudrabasavaraj (1969) to attract and retain well qualified staff, the organizations have to pay attractive salaries.

According to Acharya and Goveker (1970) wages are price for the services rendered. Wage structure denotes the methods of wage payment by the organization to its employees.

For the purpose of this study, wage payment can be defined as mode of salary payment by the organization to the agricultural graduates working in that organization.

2.6.5 Role Assigned

According to Yoder (1948) job is defined as a collection of tasks. duties and responsibilities which as a whole is regarded as the regular assignment to individual employees.

According to Pigors and Myers (1951) 'role assigned' refers to the scope of responsibility and continuing work assignments that are sufficiently different from those of other jobs' to warrant a specific title. Role assigned is thus also known as 'job designation'.

According to Shartle (1952) the job describes the work performed and responsibilities involved and job assigned describes the type of employee in terms of skill required for the job.

To Joslin (1977) job designation is an organized, factual statement of the duties and responsibilities of a specific job.

Harigopal and Ravikumar (1978) observed that role ambiguity is negatively related to job involvement.

Smith *et al.* (1983) found positive relationship between job autonomy, organizational commitment and job performance in the Ohio Co-operative Extension Service.

According to Flippo (1984) job is actually a group of positions that are similar as to the kind and the level of work.

Jhansirani (1985) found no significant association between perception of workload and extension productivity of agricultural scientists.

Gulothungan (1986) classified the selected job items into roles: such as education, training, planning, supervision, organizing, service and supply, administration and assessment and evaluation.

Nehru (1993) identified the job dimensions of Agricultural Officers as planning, co-ordination, human relation, office management, professional competency and farmer development.

For the purpose of this study, role assigned can be defined as the role of work that the agriculture graduate has to do for the organization in which he / she is employed.

2.7 TECHNICAL MANPOWER DEMAND

2.7.1 Existing Employment Pattern

Satapathy and Choudhary (1990) in their study at the Orissa University of Agriculture and Technology observed that factors like recognition of work, status and position, job security and freedom to work were closely related with output of the scientists.

Sabarathnam (1992) observed that the number of research projects a scientist had at a time showed negative correlation with scientific manpower efficiency in ICAR research system. However, he also observed that the provision of additional technical and secretarial assistance, fund and other facilities to scientists, timely filling up of sanctioned posts and clear-cut division of responsibility of work among scientists would result in better utilization of scientific manpower in the ICAR research system.

For the purpose of this study, the existing employment pattern means the number of technical agricultural employees working in the identified organizations.

2.7.2 Future Technical Manpower Demand

According to Smith (1975) forecasts of future manpower demand should take account not only of established trends and relationships between organizational objectives and staff needs, but of development, which may break those trends and relationships.

To Dwivedi (1980) the general limitations of manpower demand forecasting are limitation of information, time limit and administrative limitations.

Frantred (1981) reported that in making short-term projection of human resources needs, the most common approach is to rely most heavily

on the judgmental forecasts of unit managers supplemented with some basic statistical analysis.

Pursell (1981) reported that the basic factors associated with manpower demand forecasting are the economy, technological trends. social trends, demographics production schedules and budgets.

Nanda and Rao (2002) reported the aggregate demand for agriculture professionals in government services in Haryana based on the demand analysis for government, financial, research / academic, non-government and industrial sectors.

For the purpose of this study, technical manpower demand can be defined as the agriculture professionals required in different sectors of agriculture in future based on the past and existing trend.

2.8 TECHNICAL MANPOWER SUPPLY

According to Smith (1970) forecasts of manpower supply usually depends on statistical methods or models which treat manpower as a dynamic system with 'stock' determined by 'flows' of recruitment, promotions, wastage etc.

Hedges (1977) opined that though the available supply of human talent would appears to be easy to determine than projected needs, the factors like productivity level, current inventory turnover rate, movement among jobs should also be considered.

According to Indian Institute of Personnel Management (1984) the employment exchanges under National Employment Service and professional colleges act as important sources of technical manpower supply.

Vijay (2003) opined that by placing the agricultural manpower supply in efficient rigid compartments, one can convert the subsidy driven agricultural sector into a value driven business.

For the purpose of the study, technical manpower supply can be defined as the technical agricultural manpower available for utilisation for the agricultural development in the state.

2.9 CONSTRAINTS FACED BY THE TECHNICAL MANPOWER IN GETTING GAINFUL EMPLOYMENT IN AGRICULTURE

Sandhu (1968) reported that the undergraduate students of agriculture belonging to rural areas possessed better knowledge about agricultural subject matter than undergraduates of urban areas.

Miner and Walker (1969) reported that by the mid-1980's the major constraint on corporate growth be the shortage of good efficient managerial resources. They conducted a study on the supply of managers and college graduates in United States.

Oliver *et al.* (1975) reported from Tamil Nadu that 97.74 per cent of agricultural graduates were willing to join the Department of Agriculture and only 2.26 per cent desired to go back to their farms. It was also reported that 58.8 per cent of respondents with urban background preferred the research sector while 51.65 per cent with rural background preferred extension sectors.

Subramanyan (1975) reported that agricultural graduates generally preferred employment in the nationalized banks and State Department of Agriculture. Quick promotion, high salary, prestige or recognition, more freedom and good treatment were reported as the principal reasons for preferring bank jobs. Those who had opted for Sate Department of Agriculture opined that job security, interest in extension work and rural life were the main considerations for the choice.

Nair (1980) suggested that lack of proper guidance and placement, absence of diversified courses, education not related to community needs and systems not linked with local crafts and industries were the main

drawbacks of the present system in reaching prescribed educational objective.

Jobe (1984) revealed that lack of materials and facilities, lack of finance, shortage of trained agricultural teachers and unbalanced agricultural curriculum were the most important problems affecting agricultural education in Gambia.

Makhija and Singh (1985) found that 69.98 per cent of the agricultural graduates were interested in crop production, 25.91 per cent interested in plant protection and 4.11 per cent interested in farm machinery.

George (1996) observed that by establishing a human resource development cell in the Kerala Agricultural University, evolving an agricultural education, research and extension policy for the nation, providing enriched jobs and opening up the university system to the dynamics of entrepreneurship will bring the agricultural students and teachers development in the state.

Selvaraj (2003) reported that the new empire of globalisation runs by the multinational corporations and their mega technology alleviate the unemployment problem in agriculture.

Sharma (2003) reported that government policy of banning new appointments causes frustrations among students in Uttar Pradesh as they do not get jobs in agriculture.

The studies reviewed depict that agriculture graduates are facing several constraints in getting gainful employment in agriculture. Thus a regular assessment of these constraints will help to identify their problems and take suitable actions, well in advance. With this objective, the present study was taken.

2.10 CONCEPTUAL MODEL OF THE STUDY

The conceptual model of the study is illustrated in Fig. 1. It was predicted that there might be a significant relationship between technical manpower demand and technical manpower supply for agricultural graduates in different organizations.

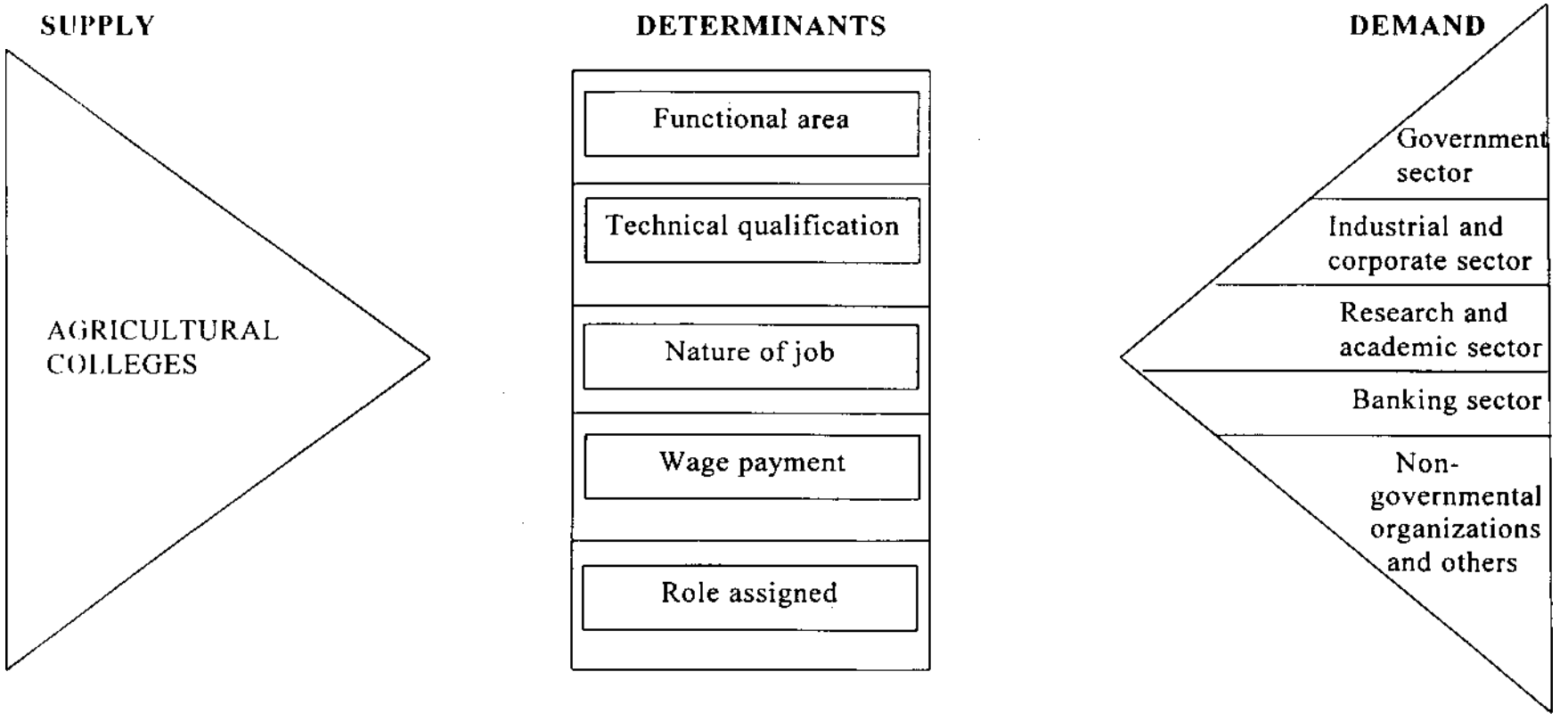

Fig. 1 Conceptual model of the study

METHODOLOGY

3. METHODOLOGY

The methodology followed in the study is presented under the following heads.

3.1 Locale of the study

3.2 Selection of the respondents

3.3 Operationalisation and measurement of the variables

3.4 Methods used for data collection

3.5 Statistical tools used for the study

3.1 LOCALE OF THE STUDY

The agricultural graduates in the Kerala state are employed or engaged in different sectors of agricultural development. The sectors are (a) Government sector (b) Research and academic sector (c) Industrial and corporate sector (d) Banking and (e) Non-governmental sector. Various organizations working in the field of agriculture in each of the above sectors were identified with the aim to survey the employment profile of agricultural graduates.

3.2 SELECTION OF THE RESPONDENTS

In line with the objective of the study the respondents from five categories were selected for studying the characteristics of existing technical agricultural manpower. They include the agricultural graduates working in government sector, research and academic sector, industrial and corporate sector, banking and non-governmental sector.

Agricultural graduates working in state and central government offices as technical officers formed the government sector respondents for the study.

Agriculture graduates working in various research stations as scientists or teachers constituted the respondents from the research and academic sector.

Agriculture graduates working in various input agencies and chemical firms formed the respondents of industrial and corporate sector.

Agriculture graduates working in banking sector like National Bank for Agriculture and Rural Development, other nationalized banks and Co-operative banks constituted the respondents of fourth category.

Agriculture graduates working in non-governmental organizations were selected as fifth category respondents.

Respondents from the government sector: Agriculture graduates who are working in State Department of Agriculture, State Seed Farms and Nurseries, Laboratories, Farm Information Bureau, Department of Soil Conservation and Soil Survey formed first category of respondents. Total number of respondents contacted was 80 Out of them, 60 respondents gave their response through the questionnaire. Respondents from the governmental sector are considered more because in Kerala the government sector is the main organizational sector engaged in the development of agriculture in the state.

Respondents from the research and academic sector: Agriculture graduates working in various research stations in Kerala formed the second category of respondents. They were working in various institutions of Kerala Agricultural University, Central Tuber Crop Research Institute, Central Plantation Corps Research Institute, Tropical Botanic Garden and Research Institute, Indian Institute of Spices Research, Centre for Water Resources Development and Management, National Research Centre for Cashew, Central Integrated Pest Management Centre, Oil palm India and Rajiv Gandhi Centre for Biotechnology. Total number of respondents

contacted was 88 of whom 50 respondents returned the completed questionnaire.

Respondents from the industrial and corporate sector: Agricultural graduates working in organizations like Fertilizer and Chemicals Travancore (FACT), Hindustan Insecticides Ltd., National Seed Corporation, KERAFED, SERIFED formed the third category of respondents. Total number of respondents contacted was 33 of which 20 respondents returned the completed questionnaire.

Respondents from the banking sector: Agricultural graduates working in National Bank for Agriculture and Rural Development Bank(NABARD) and other Nationalized Banks and Co-operative Banks formed the fourth category of respondents. Total number of respondents contacted was 37 of which 10 respondents returned the completed questionnaire.

Respondents from the non-governmental Organization: Agricultural graduates working in Non-government Organizations formed fifth category of respondents. Total number of respondents contacted was 25 of which 10 gave the completed questionnaire.

Thus the total number of respondents for studying the existing employment pattern characteristics of technical manpower was 150.

Table 1. Distribution of respondents in various categories

Sl. No.	Group	Number of agricultural graduates selected
1	Government sector	60
2	Research and academic sector	50
3	Industrial and corporate sector	20
4	Banking sector	10
5	Non-governmental organizations sector	10
	Total	150

3.3 OPERATIONALISATION AND MEASUREMENT OF VARIABLES

Not much research studies have been carried out so far in this area. Hence there were a few criteria for selecting and measuring the identified variables. So it was necessary to develop scales for each of the selected variables.

3.3.1 Existing employment pattern of technical manpower in agriculture

3.3.1.1 Functional area of the organization

3.3.1.2 Technical qualification

3.3.1.3 Nature of job

3.3.1.4 Wage payment

3.3.1.5 Role assigned

3.3.2 Technical manpower demand

3.3.2.1 Existing employment pattern

3.3.2.2 Future technical manpower demand

3.3.2.3 Factors affecting technical manpower demand

3.3.3 Technical manpower supply

3.3.4 Constraints faced by the technical manpower in getting gainful employment in agriculture

The procedures of operationalisation and measurement of these variables are outlined as follows.

3.3.1 Existing Employment Pattern of Technical Manpower in Agriculture

3.3.1.1 Functional Area of the Organization

This is operationalized as the area of work that the agricultural graduate has to do for the organization where he or she works. It is measured by constructing a scale consisting of six functional areas of the organization. They are categorized as follows.

1. Extension
2. Research and development
3. Production
4. Planning, administration and management
5. Marketing
6. Banking

3.3.1.2 Technical Qualification

Bisen *et al.* (1965) measured technical qualification on the basis of academic qualification of the respondent.

Technical qualification is operationalised as the educational status of the respondent *i.e.*, whether the respondent was graduate or postgraduate or doctor of philosophy at the time of data collection. Scoring procedure is as follows :

Graduation	:	1
Post Graduation	:	2
Doctor of Philosophy	:	3

3.3.1.3 Nature of Job

This is operationalised as the nature of work done by the agricultural graduate for the organization. They are categorized as follows:

1. Research
2. Extension and management

3.3.1.4 Wage Payment

This is operationalised as the mode of salary payment to the agricultural graduate in the organization. They are categorized as follows.

1. Monthly

2. Daily

3. Contract basis

3.3.1.5 Role Assigned

This is operationalised as the role to be performed or designation of job that an agricultural graduate has to do for the organization. They are categorized as follows.

1. Education

2. Teaching, research and development

3. Extension and management

4. Banking

3.3.2 Technical Manpower Demand

3.3.2.1 Existing Employment Pattern

It is operationalised as the number of technical manpower in agriculture. This variable has been measured by asking the experts in the identified organizations to indicate the total number of employees, number of technical employees and the number of agricultural graduates.

3.3.2.2 Future Technical Manpower Demand

This is operationalised as the future requirement of technical manpower in agriculture. This variable is measured by asking the experts in the identified organizations about the information regarding last five years employment pattern in their establishments and existing employment pattern, based on which an analysis is done to find the trend of variation. Based on this trend prediction on future technical manpower requirement is done.

3.3.2.3 Factors Affecting Technical Manpower Demand

The various factors affecting the future expansion of technical manpower were identified through review of literature, discussion with experts and officials in the identified organizations. These factors were finalized and consensus rating obtained using Delphi analysis as followed by Prakash (1989). The details of the procedure employed are furnished as follows.

Delphi technique is a systematic method of collecting opinions from a group of experts through a series of questions using a standard questionnaire. It is used to gather information from selected experts independently and to feed back the resulting collective responses again independently and anonymously to the same group of experts. At this feed back stage each person is asked to reconsider his or her initial responses by taking into account responses of other experts. It is an objective assessment method having number of variables, which have impact on manpower demand projections. In current extension research, the Delphi technique has become a fundamental tool in the area of technological forecasting.

In this study the Delphi technique was used in three steps. The first two steps for the identification of factors affecting future technical manpower requirement and the third step for rating the factors affecting future technical manpower requirement in the agriculture stream.

(a) Step I

Based on review of literature and discussion with experts in the identified organizations, ten factors affecting future technical manpower demand were identified and were distributed for relevancy rating to experts in the identified organizations in the fields of education, research, extension, management and banking. The judges were asked to rate the factors on a four point continuum and they were asked to add additional factors, if any along with their rating of these factors also.

The scoring procedure adopted was as follows.

Rating	Score
Most relevant	4
More relevant	3
Less relevant	2
Least relevant	1

The total scores were worked out and converted into ratios. They were arranged in the descending order.

(b) Step II

All the factors affecting future technical manpower demand rated during Step I were again rearranged with inclusion of additional factors based on the total scores and again given to the same experts for relevancy rating. There were 15 factors of future technical manpower requirement and the experts were asked to rate the factors on a four point continuum from most relevant to least relevant.

Total scores of the factors affecting future technical manpower demand were worked out and converted into ratios. They were arranged in descending order.

(C) Step III

Form the factors noted during the Step II and having the maximum scores, seven factors were selected for inclusion in the final test.

The selected factors included in the final test were given to the respondents in each organizations for rating.

The scoring pattern followed was as follows.

Rating	Scores
Most important	4
More important	3
Less important	2
Least important	1

On the basis of the importance assigned to each of these factors they were arranged in the descending order.

3.3.3 Technical Manpower Supply

This is operationalised as the actual annual outturn of agricultural graduates at a point of time from institutions involved in offering agriculture courses. For this information is collected from Kerala Agricultural University and employment exchanges regarding the total number of students enrolled at undergraduate, postgraduate and at doctorate level from 1995 to 2002. Then the annual supply of agricultural graduates from 1994 to 2002 in Kerala is measured by taken into consideration the other students come from outside Kerala. It is assumed that about 25 per cent of the students are coming from outside Kerala.

3.3.4 Constraints Faced by the Agriculture Graduates in Getting Gainful Employment in Agriculture

According to Pandya and Trivedi (1988) constraints are those items of difficulties or problems faced by individuals in adoption of technology. For the purpose of this study, constraints are operationalised as the difficulties or problems faced by the agricultural graduates in getting gainful employment in agriculture.

The methodology followed is as follows. A list of constraints faced by the agricultural graduates was prepared based on review of literature

and discussion with subject matter specialists. From the available register for agricultural graduates for the year from 1995 to 2000, 50 agricultural graduates and alumni who were unemployed were identified. From this 30 were selected. They were asked to indicate, whether they are experiencing these constraint or not. The frequency of each constraints was found separately and their individual percentage score was worked out. On the basis of this, higher percentage constraint was ranked as first followed by the next higher score and so on.

3.4 METHODS USED FOR DATA COLLECTION

The data were collected using the pre-tested interview schedule developed for the study. The interview schedule was prepared in English and administered to the respondents.

3.5 STATISTICAL TOOLS USED FOR THE STUDY

Percentage analysis

Percentage distribution of respondents on all variables was worked out by dividing the frequency in each category with the total number of respondents and multiplying by 100. It was done to make simple comparisons whenever necessary.

Regression Analysis

To find out the trend of variation in the variables, simple regression analysis was carried out. In this study it was used for estimating the technical manpower demand in agriculture based on the past and present data.

RESULTS AND DISCUSSION

4. RESULTS AND DISCUSSION

The results of the study are presented and discussed in this chapter under the following subheadings:

4.1 Characteristics of the existing employment pattern

4.2 Technical manpower demand

4.3 Factors affecting future technical manpower demand

4.4 Sector wise characteristics of technical manpower demand

4.5 Technical manpower supply

4.6 Demand – supply gap analysis

4.7 Constraints faced by the technical manpower in getting gainful employment in agriculture

4.8 Suggestions to overcome the unemployment problems of technical agricultural manpower

4.9 Empirical model of the study

4.1 CHARACTERISTICS OF THE EXISTING EMPLOYMENT PATTERN

4.1.1 Functional Area of the Organization

Table 2. Distribution of the respondents with respect to functional areas of the organizations n = 150

Category	Frequency	Percentage
Extension	50	33.33
Research and development	55	36.67
Production	0	0.00
Planning, administration and management	35	23.33
Marketing	2	1.33
Banking	8	5.33
Total	150	100.00

From Table 2 it is revealed that about 37 per cent of the respondents were working in organizations whose main functional area was research and development. The 33 per cent were working in extension field and 23 per cent were working in organizations where the main management functions were planning, administration and management. It was therefore clear that research and development, extension and planning, administration and management were more or less equally important areas for utilizing technical agricultural manpower. In industrial sector, agricultural graduates were working in marketing field as area managers or marketing managers. These officers were responsible for developing and implementing innovative sales strategies to promote the marketing of agricultural inputs and products.

4.1.2 Technical Qualification

Table 3. Distribution of the respondents with respect to technical qualification n = 150

Category	Frequency	Percentage
Graduation only	45	30.00
Post graduation	65	43.33
Doctorate	40	26.67
Total	150	100.00

A cursory view of Table 3 shows that about 27 per cent of the respondents had technical qualification upto doctorate and another 30 per cent had basic degree graduation. However, 43 per cent of the respondents were postgraduates.

In the case of agricultural industry and corporate jobs, agricultural graduates had been facing a high level of competition from other fields of study such as management, commerce, botany, engineering etc. in the area

of production and management. In the case of jobs in the government sector, undergraduates compete with postgraduates in certain jobs. This coupled with shrinking opportunities in the government sector, makes it more difficult for the undergraduates in getting permanent and earlier employment. The postgraduates were the higher number of specialized manpower in their respective areas of specialization.

4.1.3 Nature of Job

Table 4. Percentage distribution of respondents with respect to nature of job

n = 150

Category	Frequency	Percentage
Research	60	40
Extension and Management	90	60
Total	150	100.00

It was observed that the most of the technical manpower selected were doing management job in the identified organizations. Forty per cent of the respondents were doing research work for the organizations.

4.1.4 Wage Payment

Table 5 Distribution of the respondents with respect to wage payment

n = 150

Category	Frequency	Percentage
Monthly	145	96.67
Daily	5	3.33
Contract basis	0	0.00
Total	150	100.00

Table 5 revealed that, a vast majority of the respondents (97 per cent) were receiving monthly wage or salary. Only 3.3 per cent were on daily wages as they were working as research assistants or field assistants in projects or short-term contracts.

4.1.5 Role Assigned

Table 6 Percentage distribution of the respondents with respect to role assigned

n = 150

Category	Frequency	Percentage
Education	20	13.33
Teaching, research and development	50	33.33
Extension and management	70	46.67
Banking	10	6.67
Total	150	100.00

From Table 6 it is understood that 47 per cent of the respondents selected were working as extension agents and or managers role for the organization. The 33 per cent of the respondents were working as scientists or academicians in the identified research organizations under Indian Council of Agricultural Research (ICAR) and Centre for Scientific and Industrial Research (CSIR).

The table also revealed that majority of the agricultural graduates was carrying out manager's role in sales, marketing or related activities in the reputed firms or organizations. They were responsible for the top line and bottom line growth of the organizations. They contribute innovative strategies for the achievement of ambitious targets and also motivate the clients.

The agricultural graduates working as extension agents play an important role in bringing prosperity and happiness to the farming community as they help in the useful transfer of technology from lab to land.

The table also revealed that research and development was also an important functional area for the agricultural professional. Through R and D activities they provide solutions to farmer's problems and also help in the effective utilization of modern farm techniques.

The table also revealed that 13 per cent of the respondents were working as teachers in Vocational Higher Secondary Schools in the educational field.

The table also revealed that six per cent of the respondents were working in the banking field for credit disbursement and as teachers in training institution under different banks.

4.2 TECHNICAL MANPOWER DEMAND

4.2.1 Existing Employment Pattern

Table 7 Distribution of the existing employment pattern

Category	Total number of employees	Technical employees	Number of agricultural graduates
Extension	2344	2209	1022
Research and development	5912	1855	812
Industries	-	7032	111
Banking	-	-	840
NGO and others	-	-	-

*Data from private sector and different boards are not available

A glance at the Table 4 reveals that a vast majority of the agricultural graduates are working in extension field and research and

development area. It reveals that these two are the major organization employing agricultural professionals.

4.2.2 Future Technical Manpower Demand

The aggregate demand for agricultural professionals in Kerala is estimated after analysing the past and present employment patterns in the identified organizations from 1997 to 2003. Based on this trend, regression technique is used to find the manpower demand at different points of time. Such a regression equation would therefore indicate values of manpower demand as a trend over time. So it is actually a probabilistic approach of manpower demand estimation. The regression equations used in different sectors are given in Table 8.

Table 8 Regression equations used in different sectors

Sl. No.	Sectors	Regression equations used
1	Government	$y = 29.6667 - 2x$ $x = -0.9607$
2	Industrial and corporate	$y = 33 + 1.5x$ $x = 0.866$
3	Research and academic	$y = 7.3333 + 2.5x$ $x = 0.993$
4	Banking	$y = 8.33 + 2x$ $x = 0.961$
5.	NGO and others	$y = 18.6667 + 1.5x$ $x = 0.98198$

Based on the regression the aggregate demand for agricultural professionals in Kerala is presented in Table 9.

Table 9 Aggregate demand for agricultural professionals in Kerala

Year	Government	Industrial and corporate	Research and academic	Banking	NGO and others	Total
2001	28	35	10	10	20	103
2002	25	35	12	13	22	107
2003	24	38	13	14	23	112
2004	22	39	15	16	25	117
2005	20	41	16	18	26	121
2006	18	42	18	20	27	125
2007	16	44	19	22	29	130
2008	14	45	21	24	31	135
2009	12	47	22	26	32	139
2010	10	48	24	28	34	144

From Table 9 it is clear that in the industrial and corporate sector there will be an increase in the demand for technical agricultural manpower, but in the government sector there will be a decrease in the demand eventhough the number of vacancies would rise due to retirement of the employees. The government is currently not planning to fill these vacancies, as restructuring of different departments is on now as a policy. But a phased programme to clear the vacancies can provide some help to the government job seekers in Kerala.

The table however excludes the job opportunities in the private sector.

The average aggregate demand for agricultural professionals within the industrial and corporate sector is around 40 agricultural professionals per annuum. This trend may likely to continue if there is considerable industrial growth in Kerala.

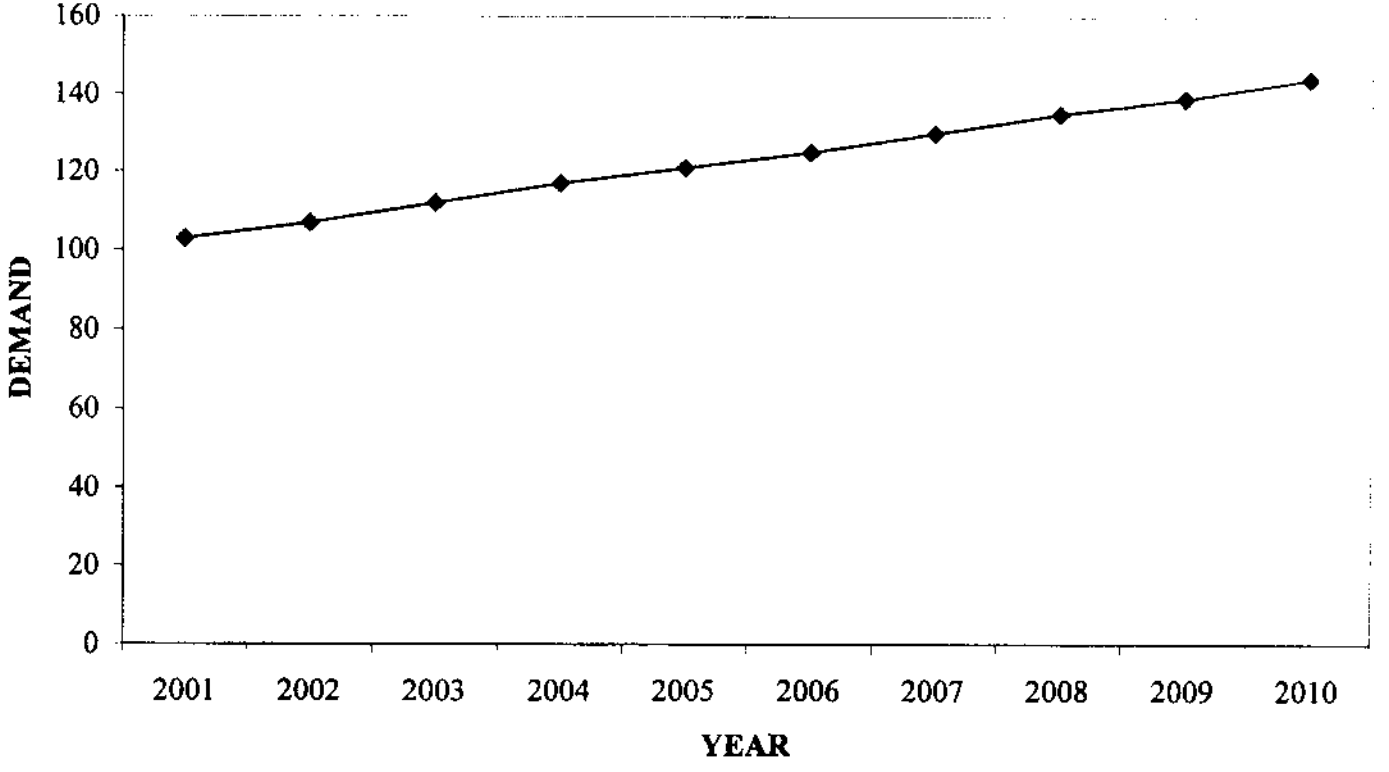

Fig. 2 Demand of agricultural professionals in Kerala

It is assumed that in the case of research and development activities the demand shall arise due to retirement of the existing positions. So the demand for research and faculty positions show an increasing trend in the next decade.

The demand for non-governmental organizations shows an increasing trend as the agriculture related NGO activity in Kerala is higher compared to rest of the country. This may be due to success level of farming achieved with higher NGO support.

4.3 FACTORS AFFECTING FUTURE TECHNICAL MANPOWER DEMAND

Results regarding the factors affecting future expansion of technical manpower are epitomised in Table 10.

Table 10 Factors affecting future technical manpower demand

Sl. No.	Factors	Mean score	Rank
1	Emerging technological development	3.69	1
2	Impact of GATT and WTO agreements	3.38	2
3	Government policies related to agriculture, industry and economy	3.23	3
4	Competition between different enterprises in agriculture field	3.22	4
5	Opening new areas of employment	3.21	5
6	Higher salary expectation of employees	3.20	6
7	Improved mechanisms for rural credit	3.06	7

A perusal of the Table 10 revealed that the officials in the identified organizations considered emerging technological development, impact of

GATT and WTO agreements and government policies related to agriculture, industry and economy as the most important factors whereas competition between different enterprises in agriculture field, opening new areas of employment, higher salary expectation of employees and improved mechanisms for rural credit as the least important factors affecting future expansion of technical manpower. These factors are explained one by one as follows.

4.3.1 Emerging Technological Development

Table 10 depicts that the most important factor affecting future technical manpower expansion is the emerging technological development. Technology changes its face in every moment. So this will bring development in emerging fields like information technology, biotechnology, communication technology, organic farming, bioorganic farming, floriculture, mediculture etc. These frontier technologies offer immense potential for the future technical manpower resources.

The developments in the field of biotechnology will result in the introduction of new cross species. This will require more number of specialized agricultural manpower in the area of crop improvement, seed certification and management.

The development in the field of computer, information technology, communication technology and bioinformatics help to restructure the technical agricultural manpower and change the traditional agriculture into a profit oriented one.

There is a scope for mediculture in Kerala. As cultivation of aromatic and medicinal plants is highly specialised, technical and remunerative venture, there is a tremendous scope for domestic as well as export. Examples are lemon grass, vetiver, tulsi etc. There is a vast opportunity to produce export quality flowers, fruits and vegetables. Their production and marketing at best prices require higher number of

specialised technical agricultural manpower in the next decade. So export oriented floriculture, mediculture and mushrooms should be encouraged in the state.

4.3.2 Impact of GATT and WTO agreements

From Table 10 it is clear that impact of GATT and WTO agreements is the second most important factor affecting future expansion of technical manpower. The GATT and WTO agreements bring opportunities for marketing agriculture produces and products all over the globe through patents and intellectual property rights. These developments and shift in agriculture cropping pattern from subsistence to commercial agriculture changes in the future expansion of technical agricultural manpower.

WTO agreements would open global production market for agriculture products. This is resulted in the diversification and value addition of agricultural products and by-products. So higher market intelligence is required for branding and certification of these products. As a result of WTO regime, the Agriculture Export Zones (AEZ) are being established all over the world. This will necessitates the utilization of agricultural professionals in the field of production, branding, certification, marketing and sales.

There would be increased investments in research and development due to introduction of product patents as per GATT norms. This may create some demand for research and academics in agriculture.

4.3.3 Government Policies Related to Agriculture, Industry and Economy

From Table 10 it is understood that another most important factor affecting future expansion of technical manpower is the government policies related to agriculture, industry and economy. Government policy for improving agriculture credit to rural areas shall enhance the employment for agricultural graduates in banking sector. The globalization has removed the trade barriers around the world and

Agricultural Export Zones (AEZ) are being established. So agriculture becomes an agribusiness and attracts more number of technical agricultural manpower.

4.3.4 Competition between Different Enterprises in Agriculture Field

From the data in Table 10 it is clear that competition between different enterprises in agriculture field is one of the factors affecting future manpower expansion in the field of technical agriculture. So these enterprises prefer qualified and efficient agricultural graduates who are equipped with technical, managerial, communication and business skills. These enterprises also prefer candidates who have the ability to develop and implement innovative strategies to promote the development of enterprises. This will definitely influence the future expansion of technical agricultural manpower in industrial and corporate sector.

4.3.5 Opening New Areas of Employment

From Table 10 it is understood that opening new areas of employment is one of the factors affecting future technical manpower expansion. This will generate a potential large area for employment of agricultural graduates in existing and new enterprises. Food processing industry is one of the examples for this. In Kerala a significant number of units are relatively small to medium sized with a very few units employing state-of-the-art preservation and processing technologies. These units have come up primarily in the areas of juices, pulps and concentrates. These units should be encouraged to make it economically viable to recruit more number of agricultural graduates for their operations.

In industrial sectors in addition to marketing area, production, certification and sales area will open new areas of employment for the agricultural graduates.

4.3.6 Higher Salary Expectation of Employees

From Table 10 it is clear that higher salary expectation of employees is one of the factors having impact on future technical manpower expansion in agriculture. This will boost the morale and efficiency of employees and will help in the development of the organization.

4.3.7 Improved Mechanisms for Rural Credit

From Table 10 it is clear that improved mechanisms for rural credit favour future technical manpower expansion in agriculture. This would increase the availability of capital with the farmers and thus make farming more capital intensive. This would increase the market for industries supplying inputs to the agricultural sector such as fertilizers, pesticides etc. Infrastructure bottlenecks in the implementation of reforms would slow down the growth of these industries. This will influence the future technical manpower expansion.

The policy of Government of India to provide micro credits to the self help groups will increase self-employment opportunities in the agriculture sector. This will definitely enhance the employment for agricultural graduates in the banking sector.

4.4 SECTOR WISE CHARACTERISTICS OF TECHNICAL MANPOWER DEMAND

4.4.1 Demand in Government Sector

The demand in the government departments was estimated based on the following.

1. The researcher visited the government departments and collected the information on the last ten years and existing employment pattern of agricultural graduates
2. The officials opined that the number of vacancies would arise in future due to retirement of employees in these departments

3. Due to changing needs, the restructuring of departments may occur. This will affect the future technical agricultural manpower demand.

4.4.2 Demand in Research and Academic Sector

Traditionally this segment has been requiring agricultural graduates with technical skills. Future research scientists would be required to have commercial as well as communication skills for interacting with other research institutions within Kerala, in India and abroad. These managerial skills are also required for running research institutions more effectively.

In the case of research and development activities in the agricultural sector, there is almost equal contribution by the doctorates, post graduates and qualified professionals. The quality of this human capital can be improved by preventing the brain drain and attracting their talent.

In the academic sector, the National Eligibility Test (NET), Junior Research Fellowship (JRF) and Agricultural Research Scientist (ARS) will supply qualified technical agricultural manpower. These future scientists and academicians will have the ability to implement innovative programmes by their concrete and substantial accomplishments in their operational areas.

4.4.3 Demand in Industrial and Corporate Sector

The average estimated demand is around 40 agricultural professionals per annuum by 2010. For postgraduates, no clear-cut recruitment preferences were observed. The industrial sector mainly requires graduates with sound technical skills, good personality and generally some industry experience in the relevant area. Table 11 depicts the segment wise characteristics of agricultural professionals in industrial and corporate sector.

Table 11 Segment wise characteristics of employment for agricultural professionals

Criteria	Industries			
	Fertilizers	Pesticides	Agricultural machinery	Seed
Job profile	Marketing	Marketing	Marketing operations	Certification marketing and sales
Skill set requirements	Theoretical and communication skills	Primarily personality based	Personality based as well as general management skills	General management skills/ technical skills/ personality skills
Qualification preference	M.Sc./ B.Sc. (agri)	M.Sc. / B.Sc. (agri)	B.Sc. (agri) B.E.	M.Sc. / B.Sc. (agri)
Competition	Other graduates / chemical technologists	Other graduates/ chemical technologists	Mechanical engineers/ diploma holders	Genetic graduates/ other graduates
Experience	Important	Important	Important	Important

In the case of fertilizer and pesticides industries the competition is mainly from MBAs having technical background. In the case of seed industry, the competition is mainly between agricultural graduates. The starting salaries vary from organization to organization.

Opening of new areas of employment within existing industries and corporates through skill enhancement of graduates and concerted action by the agricultural university will generate a potential large area for employment of agricultural graduates.

4.4.4 Demand in Banking Sector

The vacancies in banks are primarily due to retirements. The competition is mainly between agricultural graduates and management graduates with maths or science background.

4.4.5 Demand in NGOs and Other Organizations

There is very limited number of successful NGOs which appoint agricultural graduates in Kerala state.

4.5 TECHNICAL MANPOWER SUPPLY

The total number of agricultural students enrolled at different levels of Kerala Agricultural University during 1995 to 2002 is presented in Table 12.

Table 12. Total number of agricultural graduates and postgraduates enrolled in KAU

Year	Undergraduate	Postgraduate	Doctorate	Total
1995	185	44	15	244
1996	188	48	14	250
1997	168	85	13	266
1998	213	79	15	307
1999	183	79	23	285
2000	138	94	30	262
2001	123	40	27	190
2002	122	43	34	199

The duration of the courses is presented in Table 13.

Table 13. Duration of the courses

Courses	Duration
Undergraduation	Four years
Postgraduation	Two years
Doctorate	Three years

An assumption is made here that 25 per cent of undergraduate. postgraduate and doctorate students come from outside Kerala. So the actual annual outturn would be equal to intake of undergraduates plus 25

per cent of intake at postgraduation plus 25 per cent of intake at doctorate level plus 25 per cent of undergraduates outside Kerala Agricultural University. Therefore, the actual annual outturn or supply of graduates in Kerala is presented in Table 14.

Table 14. Actual supply of agricultural professionals in Kerala

Year	Outturn	
1995	161	
1996	180	
1997	181	
1998	162	
1999	184	
2000	202	
2001	193	
2002	202	
2003	240	
2004	177	Estimated
2005	177	
2006	177	
2007	177	
2008	177	
2009	177	
2010	177	

The estimated annual outturn is 177. It is assumed that if there occurs no change in the number of seats in the next decade, the same trend will continue.

4.6 DEMAND – SUPPLY GAP ANALYSIS

The demand – supply gap for agricultural professionals in Kerala is presented in Table 15.

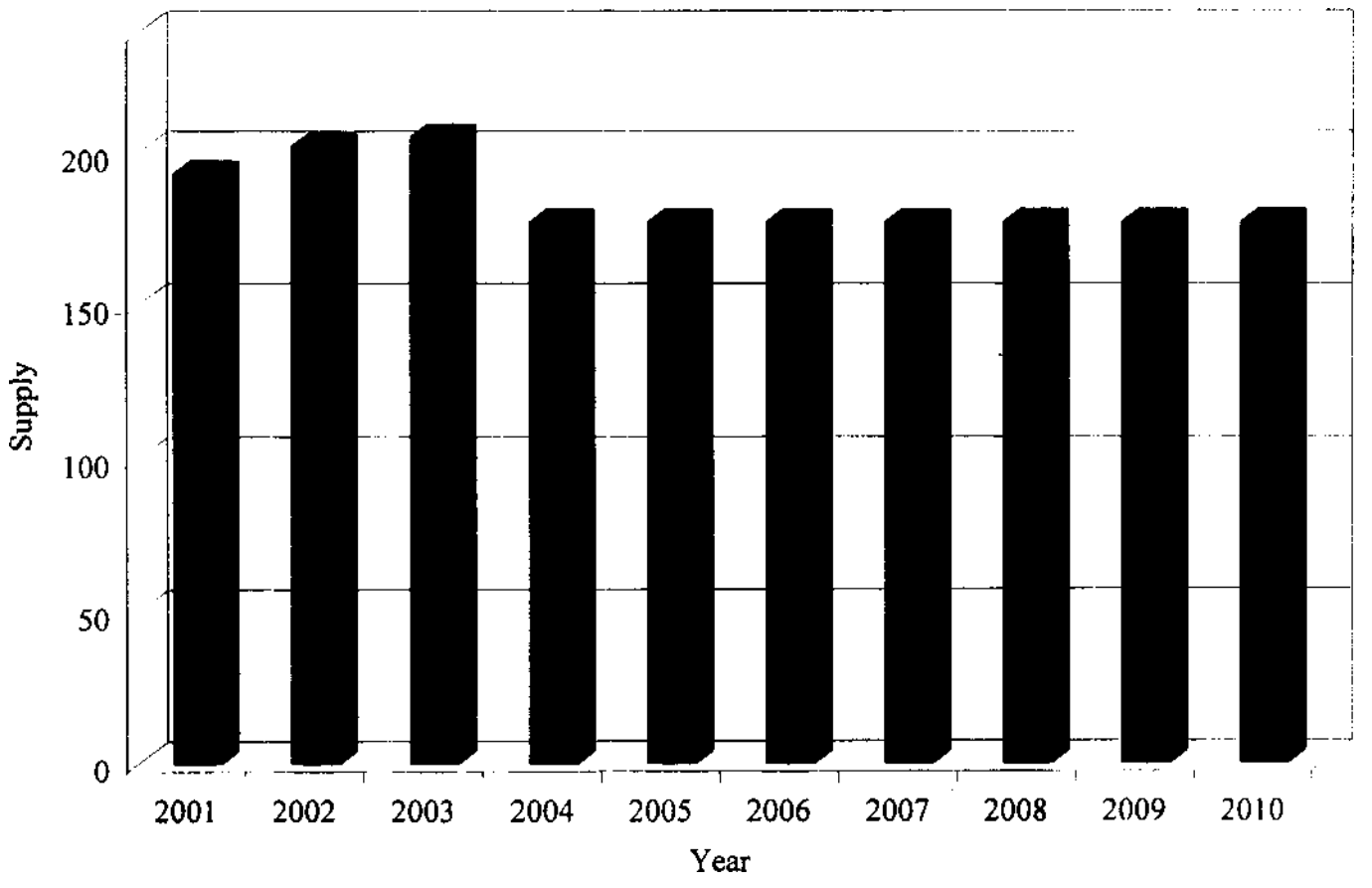

Fig. 3 Supply of agricultural graduates in Kerala

Table 15. Demand - supply gap for agricultural professionals

Year	Demand	Supply	Gap	Percentage of supply	Cumulative gap
2001	103	193	-90	-46.63	-90
2002	107	202	-95	-47.03	-185
2003	112	240	-128	-53.33	-313
2004	117	177	-60	-33.90	-373
2005	121	177	-56	-31.64	-429
2006	125	177	-52	-29.38	-481
2007	130	177	-47	-26.55	-528
2008	135	177	-42	-23.73	-570
2009	139	177	-38	-21.47	-608
2010	144	177	-33	-18.64	-641

A critical review of the above data from Kerala unfolds a stage of potential unemployment of agricultural graduates. The present level of potential unemployment in the state as per the study is about 53.33 per cent of the supply. The cumulative potential unemployment at present is 313 and it is expected to increase over the years. This potential unemployment can be reduced if the unemployed graduates utilize self-employment opportunities in the state.

4.7 CONSTRAINTS FACED BY THE TECHNICAL MANPOWER IN GETTING GAINFUL EMPLOYMENT IN AGRICULTURE

The results in the constraints analysis made in the study are given in Table 16.

For a majority of the respondents (86.67 per cent) narrow focus on employment was the major constraint regarding gainful employment in

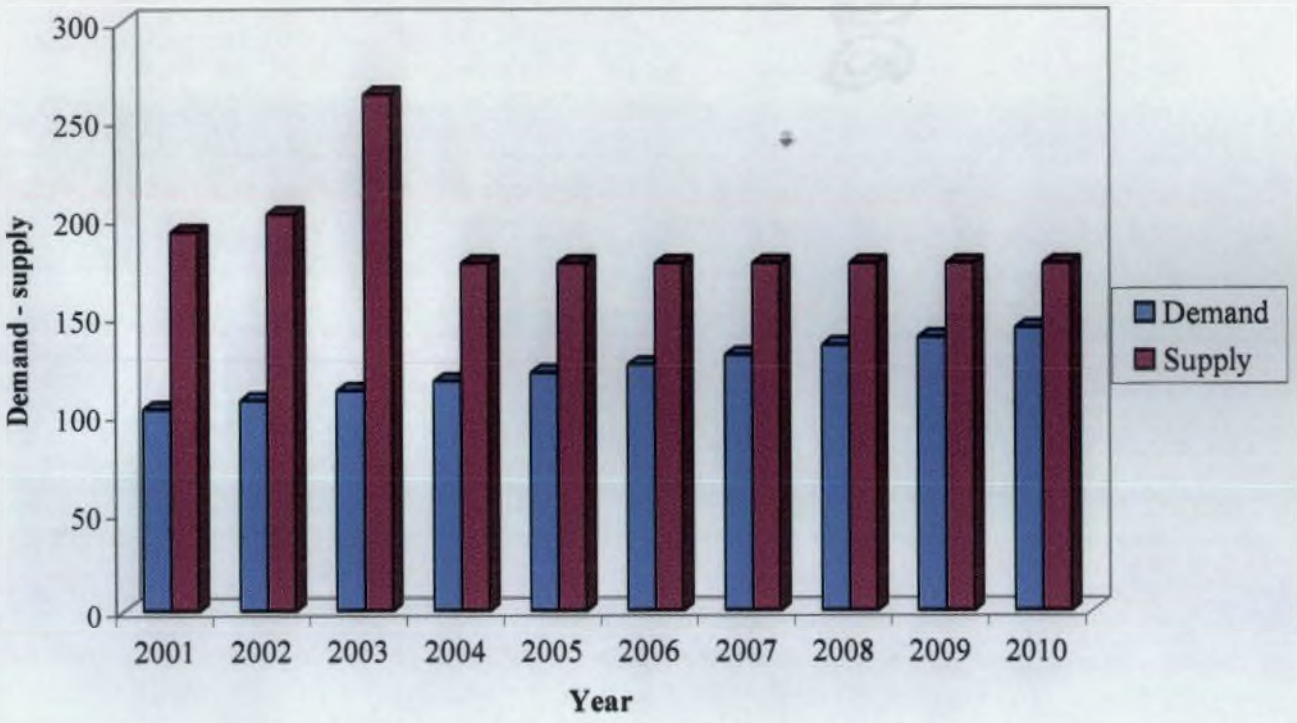

Fig. 4 Demand supply gap of agricultural professionals in Kerala

agriculture. Agriculture is a service-oriented field. So there is less diversification of employment opportunities. Moreover, the available self-employment opportunities are not fully utilized because of less training and exposure received by agricultural graduates.

The second important constraint regarding getting employment was the mismatching of education and job. As a result the graduates who are less equipped with technical, organizational, managerial, communication and business skills lose the job opportunities.

Table 16. Constraints to gainful employment in agriculture as perceived by the respondents (n = 30)

Sl. No.	Constraints	Frequency	Percentage	Rank
1	Narrow focus on employment	26	86.68	I
2	Education not matched with jobs	24	80.00	II
3	Lack of supportive government policies	21	70.00	III
4	Delay in updating the curriculum	17	56.67	IV
5	Lack of practical exposure in starting and running enterprises	14	46.67	V
6	Competition faced by agricultural graduates from other graduates	13	43.33	VI
7	Diversion of agricultural graduates from main agricultural stream	11	36.67	VII
8	Impact of green revolution	8	26.67	VIII
9	Competition from multinationals in starting and running enterprises	6	20.00	IX

The next important constraint was the lack of supportive government policies. The long-term agriculture policies result in the low governmental support and declining investment level in agriculture. The economic policies of Government put restrictions to traditional agriculture. These global agreements opened global market for agriculture.

But it created lot of competition for the fewer jobs available among the unemployed graduates and postgraduates.

Delay in updating the curriculum was one of the major constraints in getting gainful employment in agriculture as pointed out by the respondents.

Lack of practical exposure in starting and running enterprises was another major constraint for the agricultural graduates. The agricultural graduates who start small-scale industries related to agriculture can not utilize their entrepreneurial skills. This can result in failures and cause damage to the professional life of the agricultural graduates.

4.8 SUGGESTIONS TO OVERCOME THE UNEMPLOYMENT PROBLEMS OF TECHNICAL AGRICULTURAL MANPOWER

Based on the observations made by the researcher and discussions with officials, subject matter specialists and agricultural graduates the following suggestions are put for the effective utilization of technical manpower in agriculture in Kerala.

- Developing skills through institution-industry linkage and skills improvement is required on practical orientation, management / technical skills and entrepreneur skills.
- The course curriculum has to be updated through the introduction of postgraduate programmes in advanced fields like Information Technology, Agribusiness Management, Communication Technology, Biotechnology, Bioinformatics, Development Journalism, Organic Farming etc. This will definitely improve the managerial skills as well as equip themselves with the current state of knowledge in the subject of the graduates.
- Self-financing postgraduate programmes in Agri-business Management, Biotechnology, Information Technology, Communication Technology, Development Journalism, Bioinformatics etc. should be introduced. The

government should not have enough funds for supporting these new technologies. So the self financing programmes should enable the use of sophisticated techniques for their training and development.

- Behavioural trainings to the agricultural graduates have to be offered. For that, communication and personality development courses have to be introduced.
- Agricultural education policy has to be developed so as to regulate the intake capacity in agricultural universities on par with the demand of the agricultural professionals in the state. This will reduce the demand – supply gap for agricultural professionals in the state.
- The agricultural graduates have to be encouraged to take up jobs outside Kerala and give them placement support for the same. This will help to reduce the potential unemployment.
- The state government must clear the back-log of vacant positions in a phased manner and regularly recruit agricultural graduates on an annual basis.
- Private sector should be promoted and encouraged to absorb the agricultural graduates the new areas of employment within the existing industrial and corporate sectors. This will help in the effective utilization of the technical agricultural manpower.
- In Kerala, the Department of Agriculture is the main organization engaged in the development of agriculture in the state. The departmental setup in agriculture in the state has to be restructured to promote entrepreneurial quality among the farmers. This will help in the effective transfer of useful technologies from lab to land.

In short, a new agricultural manpower and educational policies should be developed and implemented in the state. This will help in reducing the demand – supply gap of agricultural professionals in the next decade.

4.9 EMPIRICAL MODEL OF THE STUDY

The results discussed are given in empirical form in Fig. 5. The estimated demand and supply of technical agricultural manpower estimated as per the study are shown in the figure with their determinants in the identified organizations.

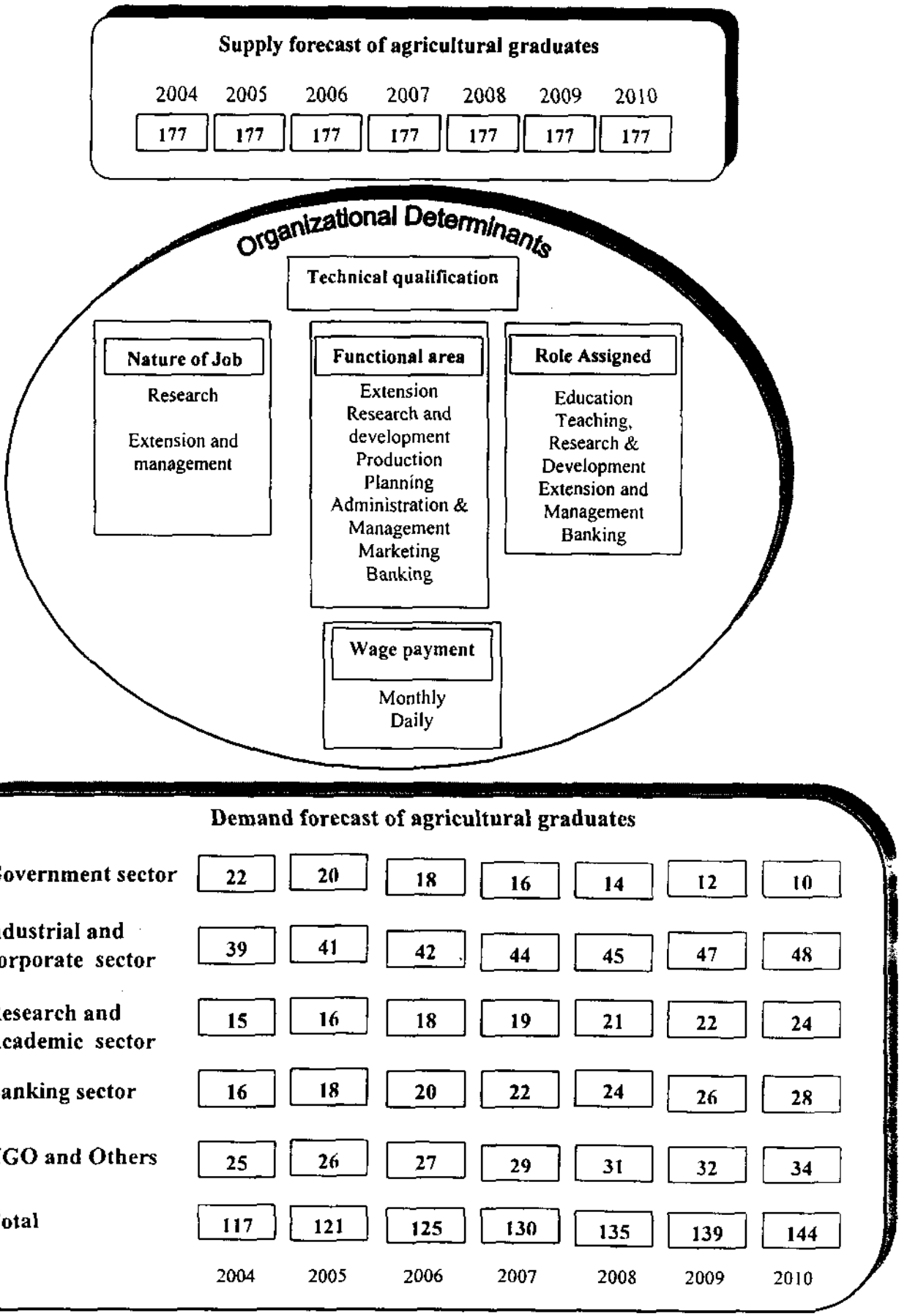

Fig. 6 Empirical model of the study

SUMMARY

5. SUMMARY

Human resources are the participants and the beneficiaries of any development process. The nation's technical agricultural manpower are the most potent and talented resources in channelising their energy towards the nation's development. Due to changing policies and strategies in the agricultural production and marketing field, there occur a drastic variation in the need of technical manpower in agriculture. So the forecasting the demand and supply of human factor in the most important pre-requisite for modernizing agriculture.

Decentralised agricultural administration and development requires personnel having very high technical ability and dedication to public service with missionary zeal and spirit. So forecasting of technical manpower demand and supply is one way to fulfil the requirement. It is essential to place the right number of persons with right skills at the right time.

In Kerala, there is no secondary source of information regarding the technical manpower forecasting in agriculture. It limit the adoption of sophisticated methods for constructing manpower requirements. This study is the first of its kind. The study aims to forecast the technical manpower demand and supply in agriculture for a decade in Kerala.

The study was undertaken with the following objectives:

1. To assess the characteristics of the existing employment pattern of technical manpower
2. To find out the technical manpower demand
3. To find out the technical manpower supply
4. To identify the constraints faced by the technical manpower in getting gainful employment in agriculture

The agricultural graduates employed in different sectors of agricultural development in Kerala was selected for the study. The sectors selected include (a) Government sector (b) Research and academic sector (c) Industrial and corporate sector (d) Banking and (e) Non-governmental sector.

Functional area of the organization, technical qualification, nature of job, wage structure and role assigned were selected as the characteristics of existing employment pattern of technical agricultural manpower. Technical manpower demand in the study include details of past five years employment pattern, existing employment pattern, future technical manpower demand and factors affecting technical manpower demand. For forecasting the technical manpower demand in the next decade, data regarding the employment pattern during the last five years was collected from identified organizations in the government sector, industrial and corporate sector, research and academic sector, banking sector, non-governmental organizations and others. Technical manpower supply in study include the total number of students enrolled at undergraduate, postgraduate and at doctorate level from 1995 to 2002 in Kerala Agricultural University and the annual supply of agricultural graduates in Kerala from 1995 to 2002. In this study, based on the data it was assumed that 25 per cent of the students come from outside Kerala. The identification of the constraints faced by the agricultural graduates in getting gainful employment in agriculture was also included for the study.

A well structured and pre-tested interview schedule was used for data collection. The data collected were statistically analysed using percentage analysis and regression analysis. The salient findings of the study were summarized below:

1. The frequency distribution of the functional area of the identified organizations revealed that 36.67 per cent of the respondents were

working in organizations whose main functional area is research and development.

2. The frequency distribution of respondents with respect to technical qualification revealed that 43 per cent of the respondents were post graduates.

3. The percentage distribution of the respondents with respect to nature of job revealed that most of the agriculture graduates were doing management job for the identified organizations

4. The frequency distribution of wage structure of respondents showed that a vast majority of the respondents (97 per cent) were receiving monthly wage or salary.

5. The frequency distribution of role assigned of respondents showed that 47 per cent of the respondents selected were working as extension agents and or manager's role for the identified organizations. The 33 per cent of the respondents were working as scientists or academicians in the identified organizations. The 13 per cent of the respondents were doing a role related to agricultural education in identified organizations and the rest 6.67 per cent respondents were related to banking sector.

6. The aggregate demand for agricultural professionals in Kerala was estimated after analysing the past and present employment patterns in the identified organizations. Then the trend of variation in the employment pattern was analysed. Then based on this trend the technical manpower demand in agriculture for the next decade in different sectors were estimated by using regression analysis. The estimated total aggregate demand for agricultural professional in government sector, industrial and corporate sector, research and academic sector, banking and non-governmental organizations and others during 2001 was 103. During 2002, 2003, 2004, 2005, 2006,

2007, 2008, 2009 and 2010 it was estimated as 107, 112, 117, 121, 125, 130, 135, 139 and 144 respectively.

7. The factors affecting future technical manpower demand were identified using Delphi technique. The most important factors were emerging technological development, impact of GATT and WTO agreements and government policies related to agriculture, industry and economy. The other factors include competition between different enterprises in agriculture field, opening new areas of employment, higher salary expectation of employees and improved mechanisms for rural credit.

8. The estimated annual supply of agriculture graduates in Kerala is 177. This include the agriculture students enrolled at graduate, postgraduate and doctorate level in Kerala Agricultural University and also students outside from Kerala. This supply will continue if there occur no change in the number of seats in the agricultural college.

9. The demand-supply gap of agricultural professionals during 2003 as per the study was 53.33 per cent of the supply and the cumulative potential unemployment at that time was 313.

10. The constraints felt by the agricultural graduates were narrow focus in employment that was ranked first. The other constraints realized were education not matching with jobs, lack of supportive government policies, delay in updating the curriculum, lack of practical exposure in starting and running enterprises.

Implications of study

By observing the results of the study it can be said that research and development and extension and management are the important functional areas of the different organizations in agriculture field. It may help the future researches to go deep into the study. In this study, the

researcher consider the past and present data regarding the employment pattern for estimating the technical manpower demand. Considering the employment characters of the agricultural graduates working in different sectors will help the future investigators to go more research in the area. The technical manpower demand supply gap analysis may give a clear picture about the forecasting of technical manpower requirement in agriculture. It may boost the researchers who wish to undertake a study on human resource development. The constraints realized by the agricultural graduates in getting gainful employment in agriculture should be given due consideration and the sufficient remedial measures suggested should be taken to overcome the unemployment problem.

Suggestions made from the study

The suggestions made from the study are given below :

- Developing skills through institution-industry linkage and skills improvement is required on practical orientation, management / technical skills and entrepreneur skills.
- The course curriculum has to be updated through the introduction of postgraduate programmes in advanced fields like Information Technology, Agribusiness Management, Communication Technology, Biotechnology, Bioinformatics, Development Journalism, Organic Farming etc. This will definitely improve the managerial skills as well as equip themselves with the current state of knowledge in the subject of the graduates.
- Self-financing postgraduate programmes in Agri-business Management, Biotechnology, Information Technology, Communication Technology, Development Journalism, Bioinformatics etc. should be introduced.

- Behavioural trainings to the agricultural graduates have to be offered. For that, communication and personality development courses have to be introduced.
- Agricultural education policy has to be developed so as to regulate the intake capacity in agricultural universities on par with the demand of the agricultural professionals in the state.
- The agricultural graduates have to be encouraged to take up jobs outside Kerala and give them placement support for the same. This will help to reduce the potential unemployment.
- The state government must clear the back-log of vacant positions in a phased manner and regularly recruit agricultural graduates on an annual basis.
- Private sector should be promoted and encouraged to absorb the agricultural graduates the new areas of employment within the existing industrial and corporate sectors.
- In Kerala, the Department of Agriculture is the main organization engaged in the development of agriculture in the state. The departmental setup in agriculture in the state has to be restructured to promote entrepreneurial quality among the farmers.

Suggestion for future research

The present study had been conducted only among the identified organizations involved in agricultural development in the state. In future, researchers can adopt sophisticated methods for studying the socio-economic characteristics of the agricultural graduates working in different sectors of agriculture using standard forecasting techniques.

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APPENDIX

APPENDIX – I

INTERVIEW SCHEDULE

PART – A

1. Name of the Institution :

2(a) Sector of employment :

- Government
- Non-government
- Research academic
- Banking
- Industry and co-operative
- Others

(b) If individual sector, specify industry type :

- Fertilizers
- Pesticides
- Seeds
- Machinery

3. Functional area of the organizations :

- Extension
- Research and development
- Production
- Planning, administration and management
- Marketing
- Banking

4. Technical qualification : B.Sc. (Agri)
M.Sc. (Specify discipline)
Ph.D.
Others (specify)

5. Nature of job : Research
Management

6. Wage structure : Monthly
Daily
Contract basis

PART – B

8. Employment pattern in the last five years

Year	Total number of employees	Total number of persons engaged in technical activities	Number of agriculture graduates
1997			
1998			
1999			
2000			
2001			

9. Existing employment pattern :

Year	Total number of employees	Number of persons engaged in technical activities	Number of agriculture graduates
2002			
2003			

10. Factors affecting future technical manpower demand

Factors	Most important	More important	Less important	Least important
Emerging technological development				
Impact of GATT and WTO agreements				
Government policies related to agriculture, industry and economy				
Competition between different enterprises in agriculture field				
Opening new areas of employment				
Higher salary expectation of employees				
Improved mechanisms for rural credit				

PART - C

11. Total number of students enrolled at different levels in Kerala Agricultural University from 1995 to 2002

Year	Undergraduate	Postgraduate	Doctorate
1995			
1996			
1997			
1998			
1999			
2000			
2001			
2002			

12. The outturn of students of Agricultural University from 1995 to 2002 at different levels

Year	Undergraduate	Postgraduate	Doctorate
1995			
1996			
1997			
1998			
1999			
2000			
2001			
2002			

13. Students joined in the Kerala Agricultural University from other Universities

Year	Number of students joined		
	Undergraduate	Postgraduate	Doctorate
1995			
1996			
1997			
1998			
1999			
2000			
2001			
2002			

PART – D

14. What would be new avenues or grey areas for employment to agricultural graduates in the next decade?

- Information technology
- Communication technology
- Biotechnology
- Agribusiness
- Others (specify)

15. Constraints faced by the agricultural graduates in getting gainful employment in agriculture

	Statements	Agree	Disagree
i.	Narrow focus on employment		
ii.	Education not matched with jobs		
iii.	Lack of supportive government policies		
iv.	Delay in updating the curriculum		
v.	Lack of practical exposure in starting and running enterprises		
vi.	Competition faced by agricultural graduates from other graduates		
vii.	Diversion of agricultural graduates from main agriculture stream		
viii.	Impact of green revolution		
ix.	Competition from multinationals in starting and running enterprises		
x.	Others		

FORECASTING TECHNICAL MANPOWER NEEDS IN AGRICULTURE IN KERALA

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Abstract of the
thesis submitted in partial fulfilment of the requirement
for the degree of

Master of Science in Agriculture

Faculty of Agriculture
Kerala Agricultural University, Thrissur

2004

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ABSTRACT

The study entitled "Forecasting technical manpower needs in agriculture in Kerala" was undertaken to forecast the technical manpower demand and supply in agriculture for a decade in Kerala. It was also aimed to study the characteristics of the existing employment pattern of technical manpower. Its aim also included to identify the constraints faced by the technical manpower in getting gainful employment in agriculture.

The study was conducted in identified organizations in Kerala state. A sample of 150 agriculture graduates who were working in different sectors of agricultural development in the state were selected for studying the characteristics of existing employment pattern in the state. The study developed after having discussion with the officials and subject matter specialists. Well structured and pre-tested interview schedule was used for data collection. For forecasting the technical manpower demand in the next decade, data regarding the employment pattern during the last five years and at present were collected from the government sector, industrial and corporate sector, research and academic sector, banking sector, non-governmental organizations and others. Then the trend of variation in the employment pattern was analysed. Based on this trend future technical manpower requirement in different sectors was worked out by regression analysis. For technical manpower supply forecasting agricultural students enrolled in Kerala Agricultural University from 1995 - 2002 were collected. In this study based on the data it was assumed that 25 per cent of the students were coming from outside Kerala.

The study revealed that most of the respondents were working in identified organizations whose functional area is research and

development. Most of the respondents were postgraduates and they receive monthly salary for the service or work rendered by them in the identified organizations.

The study revealed that in the government sector there will be a decrease in the demand for the technical manpower in the next decade even though number of vacancies will rise due to retirement of the employees.

The factors affecting future technical manpower demand in the identified organizations were emerging technological development, impact of GATT and WTO agreement and government policies related to agriculture, industry and economy, competition between different enterprises in the agricultural field, opening new areas of employment, higher salary expectation of employees and improved mechanisms for rural credit.

As per the study the estimated annual outturn of agricultural graduates from 2004 to 2010 will be 177.

As per the study the technical manpower demand – supply gap analysis revealed that the present level of potential unemployment in the state is about 53.33 per cent. The cumulative potential unemployment is 313.

Among the constraints listed out, narrow focus on unemployment mismatching of education with jobs, delay in updating the curriculum and lack of adequate practical exposure in starting and running enterprises were considered to be the major constraints felt by the agricultural graduates in getting gainful employment in agriculture.