FARM MANAGEMENT IN AGRICULTURAL EXTENSION IN PAKISTAN

By
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INTRODUCTION

Agriculture is the backbone of Pakistan's economy. It shares about 25 percent of the gross domestic product. Agriculture and agro-based products account for 75 percent of the country's total export earnings. It provides jobs to 44 percent of the labour force. Most of the agro-based industries are totally dependent upon this sector for their raw materials. For the development and prosperity of the country, there is strong need to enhance agricultural production many-fold to cope with the increasing demand for food and fiber resulting from the rising population. For the development of agriculture, many agencies are involved including the Department of Agricultural Extension. There is a strong need to keep farmers abreast of new technological developments in the field of agriculture. This job can be accomplished by providing extension services to the farmers. Whatever form these services take, farmers need to be made aware of agricultural innovations for the exploitation of inherent yield potential. Well organized extension services can bridge the gap between the potential productivity and the current productivity (Birkaeuser, Evenson and Feder 1991, p.608).

Agricultural Extension in the Institutional Context:

In Pakistan, public sector extension is organized provincially. The Director General of Agricultural Extension (DGA) is the overall administrator of the public sector organization in the province who is responsible to the Secretary of Agriculture. In the Punjab province, there are three regional Directors of Agriculture, Extension (DAE). Each DAE is responsible for the supervision and smooth functioning of the extension service in his respective region and is answerable to the DGA. At the district level, Deputy Director of Agriculture (DDA) is incharge of the extension. At the tehsil level, the responsibility for the provision of extension services lies with the Extra Assistant Director of Agriculture (EADA). The EADA is responsible for the supervision and monitoring of all extension activities undertaken by Agriculture Officers (AOs) and Field Assistants (FAs) both at the markiz and village level (Appendix-I). Agriculture Officer supervises the work of the Field Assistant. A FA is considered a front-line extension worker. He is the real contact between extension and farmers. He is the person who selects the contact farmers and motivates them to adopt new technology. He also feeds back the field problems to supervisors.

The institutional set up for public agriculture extension is well organized and over staffed particularly top heavy which had made it costly in terms of administrative overhead (Jalvi, 1990, p.65). Pre-service training of the extension staff at the professional level, or that of Agriculture Officers is practically non-existent (Khan and Chaudhry, 1986, p.165).

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However, the so called preservice training of these functionaries, as part of their degree programme at the Colleges/Universities of Agriculture is too theoretical and the quality is questioned. The pre-service training of extension sub-professionals (i.e. FA) is very weak. There is little practical work, high student to staff member ratio, lack of basic equipment for conducting practical, lack of farm mechanization equipment's for demonstration, lack of adequately trained staff and low motivation for the teaching staff (Rajput, 1986, p.154). At FA level, morale is low mainly due to lack of performance incentives, poor wage and salaries as compared to the private sector, Field workers have no say in the department. Top down planning and decision making have adversely affected the performance at the lower level. Severe financial stress in the Department of Agriculture has deprived the field workers for necessary facilities required for reaching the farmers. Political interference of the elected members of parliament has created inefficiency and ineffectiveness within the Department of Agriculture.

The organizational sector of a private sector firm i.e. Ciba, shows that the Managing Director is the overall controller of the firm. The Marketing Manager, the head of the agriculture division, is assisted by the six Regional Managers (RM) in the Punjab. Every RM has Zonal Field Managers (ZFM) and Technical Sales Officers (TSO). The TSO is regarded as front line worker. He acts as a sales representative for the company as well as extension worker. Its extension objectives are a means for achieving the commercial objectives.

There are three Agricultural Universities, three Agriculture Colleges and six Agricultural Training Institutes in the country. The number of graduates being produced in the Universities/Colleges is far more than can be absorbed into various government departments and private sector.

There are fifteen research organization at the federal level which are involved in conducting research relating to Agriculture. Besides, each province has an agriculture research institute on crops with substations. There are a number of commodity oriented institutes which are part of the main provincial institute. Research on crops is mainly looked after by the provincial Agriculture Department where as research on livestock, poultry and fisheries is done by the Provincial Departments of Livestock and Dairy Development, Poultry and Fisheries. Involvement of all the Agriculture Universities in research programme is limited (Pakistan Agriculture Research Council, 1986, pp.20-22).

In Pakistan linkages between research, extension and education are quite loose. The research workers at the Universities are more concerned with the writing of scientific papers or articles without considering that their research findings are applicable in the field or not. Mostly, work is done in isolation and therefore, their contacts with other organizations are quite limited. They seldom take part in extending their research findings in the farmers field. They seldom meet the extension people. This is particularly true about the University of Agriculture, Faisalabad and Sindh Agriculture University.

There is poor liaison between the research organizations resulting in research duplications, uncoordinated research programmes which are not aligned with the national needs and priorities, poor communications between the researcher, extension service and farmers (Hafiz, 1987, p.216).

Training and visit system of agricultural extension did not succeed completely to improve production practices, level of input use and crop yields. Most of the weaknesses

of traditional extension system still exist under T and V system. More efforts are required to improve efficiency of extension staff (Sharif et. al., 1987, p.395).

Agricultural Extension Programmes/Systems in Pakistan

Historically, on the recommendations of the Famine Commission, Agricultural Extension Department was established in 1905. In 1908, Punjab Agricultural College was set up offering three year degree programme (Malik, 1990 p.99 and Ahmad, 1998 p.32-33) at Lyallpur (now Faisalabad). In the pre-independence period (before 1947), agricultural services were not geared to meet the needs of farmers and field work (Malik, 1990 p.100).

Since the inception of Pakistan in 1947, a number of agricultural extension programmes have been tried. These include the followings:

A. GOVERNMENT SYSTEMS/PROGRAMMES

1. Traditional Agriculture Research System
2. Barani Area Development Programme
3. Crop maximization Programmes
    a) Cotton maximization programme
    b) Rice maximization programme
    c) Pakistan Agriculture Research Council Italian Maximization Programme
4. Training and Visit system
5. Technology transfer programme of the NARC

B. PRIVATE SECTOR EXTENSION PROGRAMMES/SYSTEMS

1. Fertilizer Producing and Marketing Firms.
2. Pesticide companies, mostly involved in marketing their products.
3. Rafhan Maize Product/Sugar Mills.

C. NON GOVERNMENT ORGANIZATIONS

D. UNIVERSITIES OF AGRICULTURE

A. GOVERNMENT SYSTEMS/PROGRAMMES

1. Traditional Agricultural Extension System

Until 1978, prior to the introduction of Training and Visit (T and V) system, traditional agricultural research system had been in practice to disseminate the findings of research among the farming community. The following two approaches were used under this system (Ahmad, 1999 p. 40-41).

a) The Service to Farmers Approach: This approach was based on the philosophy of establishing model farms with progressive farmers which would have a trickle down effect on other farmers and ultimately adoption by the fellow farmers of the area. This approach turned extension into the hand maid of the big farmers and widened the gap between rich and small farmers in their access to information sources (Government of Punjab, N. D. p.5).

b) The Inputs at Farmers Door Steps Approach: Under this approach, extension personnel were entrusted the responsibility of providing agriculture inputs, such as improved seed, fertilizers, pesticides near door steps of the farmers. Government

subsidized these inputs to encourage their use. This approach helped in substantial increase in agricultural production but it turned the extension worker into a salesman for agricultural inputs (Government of Punjab N. D. p.6). This approach was replaced with the T and V system in 1978.

The organizational set up of the traditional extension system was as under (Chaudhry and Siddique, 1987 p.196).

Level	Office/Staff
Province	Director of Agriculture
Division	Deputy Director of Agriculture
District	EADA/Assistant Director of Agriculture
Tehsil/Markaz	Agriculture Officer
Union Council	Field Assistant

2. Barani Area Development Programme (BARD):

This programme was launched in 1978 for the rainfed areas. Later on Agency for Barani Area Development Agency (ABAD) took over the operational control of BARD. The programme was confined to crop production aspects of rainfed. The project is now headed by Project Director. The field staff at various levels remains the same as prevailing under the tradition extension system.

3. Crop Maximization Programme:

The crop maximization programmes were run in different parts of the country, both by research and extension organizations on cotton, rice, wheat and maize crops. The programmes aimed at maximizing commodity production through an integrated approach (Chaudhry and Siddique, 1987 p.189).

Cotton Maximization Programme: The cotton maximization project was implemented by the Punjab Agricultural Extension Department. The objectives of this project were (a) Intensifying availability of extension services to the farmers (b) Imparting necessary on farm training to the growers about the cotton production technology (c) Arranging major inputs at the door step of the farmer and (d) Enhancing the availability and use of supervised institutional credit. The project had a positive impact on the yield of seed cotton (Khan, 1987, p.95).

Rice Maximization and Italian Maximization Programmes: The rice maximization programme and the Italian crop maximization programme for wheat, maize and rice were launched under the supervision of Pakistan Agriculture Research Council in different parts of the country. The objectives of these programmes were (a) Demonstration of proven package of technology (b) Participation and coordination of all concerned nation building departments for the production of concerned commodity (c) Provision of feed back to the researchers etc. about the problems/constraints in the adoption of improved practices (d) Achievement of higher production within a short period (Chaudhry and Siddique, 1987 p.190).

4. Training and Visiting System:

It was felt by the Government of Punjab that the traditional extension service had the following shortcomings (Khan et. al. 1984, p.6-7 and Government of Punjab, 1978):

a. No effective liaison between research and extension.

b. Multifarious duties assigned to extension agents.
c. Lack of extensive and regular field demonstration programme.
d. Too vast operational area to give satisfactory coverage.
e. Unorganized and ineffective visits to the farmers.
f. Preferential treatment to big land owners.
g. Lack of effective organizational structure and proper programming.
h. Insufficient pre-service and in-service training facilities.
i. No specific evaluation of work.
j. Unsatisfactory terms and conditions of service concerning salaries, housing and mobility.

To overcome the above deficiencies, Training and Visit (T & V) system of extension was introduced in 1978 in the first phase in the five districts of Punjab province. In the second phase, it was extended all over the country in 1986-87 (Ahmad and Haq 1994, p.1). This system, which is top-down in approach, has three components: adaptive research, training and an extension wing. The adaptive research component is concerned for the testing of the findings of applied research at adaptive research stations established at the regional level. The most promising innovations selected by the adaptive research scientists for the region are delivered to the farming community by the personnel of extension wing Subject Matter Specialists (SMSs), along with the personnel of the training wing, conduct regular fortnightly training meetings for the extension personnel to strengthen their professional competencies. The main job of the extension wing is the transfer of the messages prepared by the SMSs and the training wing to the masses through the contact farmers. The system is based on two-step flow of information, from the contact farmers to the whole farming community. The number of farm families that an extension worker (locally designated as Field Assistant) can cover varies considerably from place to place depending on population density, roads, intensity and standard of cropping, and the types and diversity of crops grown. There is no fixed ratio of Field Assistants (FA) to farmers (Mullah, 1993, p.49). Generally speaking, the farm families on the jurisdiction of a FA are divided into 80 groups of about equal size. Then about 10 percent of each group are selected as contact farmers. Usually, on an average, the number of contact farmers in a group varies from eight to ten. FAs are supposed to visit the contact farmers according to a prefixed schedule known to the farmers as well as their supervisors (Ahmad, 1998, p.42-43). During a fortnight, the allocation of time of extension worker is eight days to contact farmers, two days each for training and extra visit/office work. The system still in operation did not yield the desired results as it strengthened the existing hierarchical tendencies with centralized management and top down planning (Antholt 1994 p.14 and Khan et. al. 1984, p.200) reported that the T and V programme failed to bring about the desired changes in production practices, input use level and crop yields. Further it tends to marginalise the benefits of agricultural development to small farm holders, tenant farmers and women.

5. Technology Transfer Programme of NARC

The Technology Transfer Unit (TTU) was created in 1982 by the Pakistan Agricultural Research Council at its National Agricultural Research Centre (NARC) in Islamabad. It provides a link between the scientists and farmers. It disseminate modern technology among the farmers and provides feedback to researchers. It also arranges

training courses and field demonstration for both the farmer community and extension workers. The unit is multi-disciplinary in its nature. Village cooperative societies are organized to conduct both agricultural and non-agriculture functions. Besides, the unit provides assistance in the fields of fisheries, livestock, dairy development and soil conservation. Its area of operation is confined to rural Islamabad (Mullah, 1993 p. 56). The staff of the unit consist of one Director, three Assistant Directors and the supporting staff at NARC (Chaudhry and Siddique, 1987, p.168).

B. PRIVATE SECTOR EXTENSION PROGRAMMES/SYSTEMS

1. Fertilizer Producing and Marketing Firm:

Currently fertilizer, pesticide and agricultural machinery are in the private sector National Fertilizer Corporation (NFC), Fauji Fertilizer Co. (FFC), Exxon Chemical Ltd. and Dawood Hercules Ltd. (DHL) are the producers and marketers of fertilizers. NFC and FFC have the most extensive extension programme. However the NFC programme is briefly discussed here. NFC programmes aims at reaching all sort of farmers by employing simultaneously three extension approaches: Extension agronomy, Zarai (i.e. Agriculture) Service and Mass Media (Bajwa 1987, pp.44-48).

Extension agronomy entails activities pertaining to advisory service through farmers calls, farm visits, group discussion, farmer's meeting, demonstration and field days, crop/agriculture seminars, agriculture exhibitions, crop movies, soil testing and farm adoption.

Zarai service encompasses issuance of quarterly magazine in local language, letter service for literate farmers, posters containing crop production and protection recommendations, publication and dispersal of crop and product folders containing full information on crops and products, mainly fertilizers and pesticides.

Mass Media includes NFC sponsored radio agricultural programmes, news paper and magazines, roadside boardings bearing slogans on modern agriculture management practices and TV brand promotion programmes which in part display production technology.

FFC has similar extension programme to the NFC. However, this organization is also involved in training of sugar mills technical staff and in training dealers. The dealers are imparted training about soil fertility and plant nutrient, time and methods of fertilizer application, seeds, pesticides, agricultural implements etc. (Chaudhry, 1990, p.115-116). Further FFC initiated Mobile Farm Extension Services in 1987 (Sadiq, 1990, pp.123-132).

2. Pesticide Companies:

Pesticide companies, about hundred in number, are mostly the marketers of imported products and the giants are Ciba Giegy, Jaffar Brothers Ltd., ICI, Granulars Ltd. Ciba's agricultural division in Pakistan is at the forefront of the private firms involved in extension work and is discussed here. It has the following objective.

1. Introducing new pesticides on to the market.
2. Providing facilities to the dealers for the betterment of the farming community.
3. Providing technical services to the progressive farmers at their door steps concerning the safe use of pesticides.

4. Conducting free pesticide trials at progressive farmers field and to arranging field days to show the results of the pesticides.

The objective of conducting extension work and reaching farmers by the extension personnel has the inherited objective of promoting sales through popularizing their products among the farmers and ultimately earning more profit for the firm (Ahmad, 1998, p.92).

The firms has its own dealers and marketing network all over the country. It also sells its products directly to the big farmers by giving them dealership. The firm also provides advisory and supervisory services to the dealers/farmers. It also has a dealers training programme from time to time, visit to demonstration plots was a part of training. For farmers, the firm has demonstration plots, film shows, large farmer gathering and other extension services (i.e. pest scouting, time of application and supervised spraying operation), through the trained and qualified persons (Qureshi, 1985, pp.66-78).

3. Rafhan Maize Products:

The firm concerned with maize processing helps the farmers in the production and marketing of maize. The firm enters into forward contracts with the farmers, provides them inputs (i.e. seed, fertilizers, insecticides/pesticides etc.) on credit, provides technical know how for the maize crop and purchases unshelled maize directly from the registered farmers at the guaranteed minimum price at the mill gate and bears the transportation cost. The yield realized by the registered growers was 43 percent higher than on the common farmers (Ahmad, 1987, pp. 3-57).

One of the sugar mills has a similar agriculture extension and procurement programme for the sugarcane crop like the Rafhan Maize Products.

C. NON-GOVERNMENT ORGANIZATIONS:

A number of non-government organizations are involved in the rural development activities including agriculture. Big organizations like the Agha Khan Rural Support Programme (AKRSP), the National Rural Support Programme, Punjab Rural Support Programme, the Sarhad Rural Support Corporation and many small NGO's whose number is not known are actively involved, in undertaking rural development initiatives using the principles of participatory development and the methodology demonstrated by AKRSP. They all place emphasis on the participatory approach designed to build on local leadership skills (Malik, 1993, p.20 and SRSC, 1991, p.32). Their extension programmes aim at increasing the income of the farmers by: (a) imparting training to representatives of VOs in agriculture and livestock management (Bajwa, 1999, p.20). (b) facilitating timely arrangement and supply of agricultural inputs (c) introducing technological innovation such as inter cropping, Bee keeping etc. (d) introducing improved farm machinery (e) demonstrating and experimenting high yielding varieties of crops etc. (SRSC, 1991, p.32).

D. UNIVERSITIES OF AGRICULTURE:

Agriculture Universities in the country make use of their extension departments and wings to translate the research material in simple language. The literature is, then widely distributed in the form of pamphlets, books and through university journals, printed and published at their own level (Chaudhry, 1987, p.62). The Universities also provide

extension services to the farming community in the form of farm seminars, workshops, agricultural fairs and other continuing education activities (Mullah, 1993, p.57). However, there is wide variation in the extension activities of the agricultural universities. For example, Sindh Agriculture University, Tandojam has established a Farmers Advisory Cell, which is responsible for coordination between farmers who need technical help and the scientists of the University. University of Agriculture, Faisalabad has established the Institute of Applied Research and Technology Transfer. This Institute provides extension services to the established community organizations and to the general farmers at two project sites in Faisalabad and Khushab districts. NWFP Agriculture University implemented the TIPAN project to strengthen and further develop the areas of teaching, research and outreach to improve the lives of the farmers. Major cooperation between the extension and outreach programme of the NWFP Agriculture University is in the areas of technology development, the Integrated Village Demonstration Programme, Communication, Training and Continuing Education (Seiders, 1987, p.257).

Dynamics of Commercialization of Agricultural production Systems and Farming Systems

Agriculture sector in Pakistan is passing through transition from subsistence to commercial farming. Many years ago under the subsistence farming, farmers purchased very few inputs from other sectors, depending mainly on farm yard manure, family labour and animal draught power. A small portion of their output was marketed. Now, a significant proportion of the farmers are practising commercial farming. They are buying seed, fertilizer, pesticides, electricity, gasoline and installing tubewells with the objective of maximizing profit from farming. Use of fertilizer and pesticide per cropped hectare has increased from 53 to 120 kg and 0.03 to 2.04 respectively over the period 1980 to 1998. Consumption of electricity and petroleum on per thousand cropped hectare basis has increased from 9.83 to 32.89 GWH and 8.22 to 14.90 kg. respectively over the period 1980 to 1997. Number of tubewells has increased from 9.83 to 22.31 per thousand cropped hectare (Appendix - II). Further over time tractor power has replaced the animal power even on small farms. Marketable surplus is a high proportion of the total produce of major crops (Appendix - III). This clearly indicates the trend towards commercialization.

These changes are not confined to any particular area or farming system. All the farming systems like cotton - wheat, rice - wheat, multiple cropping systems etc., in various parts of the country having been experiencing dynamism in terms of use of various inputs including land (Byerlee and Hussain, 1999, pp.1-12). The adoption of improved varieties, fertilizer, pesticides, mechanical innovation has resulted in significant improvement in the yields of various crops. It is hoped that these inputs will continue to play an important role in increasing productivity in Pakistan. A large share of future yield increase will have to come from improved crop management. It is a common observation that under similar conditions progressive farmers are realizing two to three time higher yield than the average farmers. The difference in performance can be attributed to the difference in the management of resources. The commercialization of agriculture, among others, necessitates factual quantification of input - output data, costing and pricing of both inputs and outputs, scientific selection and combination of enterprises as well as of the techniques. The foundations of commercial agriculture are always based on farm management information and analysis. Communication of relevant farm management

advice through the extension worker to the farmer can contribute significantly in increasing their profit.

Status of Farm Management in Extension:

The extension task encompasses the following major activities (Malik, 1993, p.18).

1. The dissemination of improved technology through various methods to persuade the farmer to adopt new practices.
2. Assistance in plant protection services in certain areas.
3. Maintaining demonstration farms.
4. Conducting crop estimate survey.
5. Developing and maintaining nurseries of fruit and forest plants.
6. Carrying out low cost control measures in the event of attack.
7. Assisting farmers in gaining access to credit, input supplies, land reclamation services, farm machinery etc.

Traditionally, extension in Pakistan has followed the generalist approach. Front-line workers i.e. agricultural officers and field assistants are generalist in the sense that they are supposed to have the answer to all types of questions from insect identification, to fertilizer recommendation, to best crop varieties for the area, and so forth. Thus the farm management and business advisory services provided by the public and private extension institutions are almost non-existent. This is partly due to (a) inadequate training of the front line workers in the discipline of farm management (b) non-application of the training they received over many years at farm level and (c) high illiteracy rate among the farmers in the rural areas. The same holds true for farm record keeping activities.

Farm Management Training and Materials:

Communication of technical information through printed material becomes necessary when the literacy rate increases among the people. The analysis of present extension and research subsystems shows that both are producing publications for the farmers. The most commonly written materials are leaflets, hand outs and farm journals (Malik, 1990, pp.225-227). Besides, the government channels, the private sector suppliers and dealers are also involved in distributing printed information to farmers. Most of these publications are supplied either free or at a very nominal price.

Handouts on wheat, sugarcane, cotton, rice and other major/minor/horticulture crops and other commercial agriculture enterprises (like sericulture, apiculture, etc.) are available from the Directorate of Publication, Pakistan Agriculture Research Council at the Federal level, while the same is also available from the offices of Director General Extension and Director General Research in the provinces. These leaflets provide information about the recommended varieties, time and method of sowing, recommended doses of fertilizer and their application, incidence of insect attack of various insects, type of pesticide and its time of application etc. and the other recommended farm practices. None of these publications contain any material pertaining to farm business advice.

Formally, a course of farm management is taught each to the front-line extension workers i.e. Field Assistants and Agriculture Officers in their pre-service training programmes.

Scheme of studies for Field Assistant course being conducted at various in-service Agriculture Training Institutes in the Punjab shows that two courses are offered each in the subject of agronomy, horticulture, plant protection, farm mechanization and extension

education. However, one course is taught each in the discipline of poultry farming, Islamiat, dairy farming and farm management. Farm management's share is about eight percent in the total credit hours of two years programme of field assistant. The contents of the farm management course are as under:

> "Introduction of the subject of farm management. Definition of farm management. Objectives and scope of farm management of Pakistan. Farm laout. Layout of irrigated, barani and commercial farms. Different systems and types of farming. Factors affecting the systems and types of farming. Importance of keeping accurate farm records for planning and analysis, Inventories, To maintain the diaries and financial records. Importance and need of estimating cost of production. Uses of cost of production. Definition of land. Peculiarities of land. Factors affecting the efficiency of land. Labour: Definition of labour. Peculiarities of labour. Factors affecting the efficiencies of labour. Capital: Definition of capital. Kinds of capital. Importance and function of capital. Factors affecting the efficiency of capital. Organization: Meaning of organization. Importance and duties of entrepreneur. Different forms of business organization i.e. one man or individual enterprize partnership, corporation, cooperative society, public or state enterprize. Duties of Farm Manager. Qualities required to be a good Farm Manager. Qualities of a good Farm Labourer. How to control farm labour. How to get good work from labour. Deployment of labour keeping in view capabilities. Standard of work for different farm operations. Problems of Agricultural Marketing. Solution of the problems of the market. What is the cooperative society. Objectives of cooperative society. Role of Cooperative society in Agriculture. What are the post harvest losses of the crops and their control".

The Department of Farm Management has been teaching a course (i.e. Farm Records and Planning) for about last thirty years to the students pursing their studies for the degree of B. Sc.(Hons.) Agriculture four year course. The content of the course were as under:

> "Kinds and use of farm records, analysis of farm records, apportioning of expenditure to farm enterprises to work out unit cost of production. Definition and measurement of farm efficiency and ways to increase it. Definition, scope and goals of farm planning. Type of data needed. Steps in planning: collection of requisite data, taking farm inventory, analysis of existing agricultural economy and locating its merits and demerits, planning land and water use, developing optimum cropping patterns and intensities, crop rotations. Selection of efficient techniques of production. Economic comparison of old and new farm plans. Need and procedure to revise plans overtime. Types of farm risks and uncertainties and precautions against them".

This course has been replaced by a new course titled, "Agri. Business Management" since last year. The contents of this course include:

> "Definition and the objectives of science of Agri. Business Management. Features of Agri. Business Management. Elements of good management. Functions of Management. Planning, organizing, directing, coordinating and controlling. Forms of business organization, their advantages and disadvantages. Cooperatives

in Agri. business Economics, principles and allocation of agricultural resources. Various types of costs, economic principles to maximize profit. The role and organization of Agri. business. Inventory and types of assets. Financing the Agri. business. Business aspects of agricultural marketing. Marketing Management and decision making. Managing human resource in Agri. business".

The Department of Farm Management also offer two courses i.e. "Principles of Farm Management", and "Land Economics and Farm Appraisal" to students who major in Agricultural Economics in their degree of B.Sc. (Hons.) Agriculture four year course.

Like the B. Sc.(Hons.) Agriculture degree programme, the Department of Farm Management, University of Agriculture, Faisalabad, offers a course titled, "Planning for Livestock Production" to the students pursing B.Sc.(Hons.) Animal Husbandry. The contents of the course are as under:

"Importance of livestock in the farm economy and need for its development. Relationship of livestock to crop culture. Taking Inventory of Livestock venture, Sources and types of data on livestock, Economic analysis to locate merits and demerits of existing system of livestock, Economics of feed use. Economics of disease control, losses due to diseases. Depreciation and appreciation of livestock. Projecting fodder needs of animals. Working out annual cost of animals, sheds and other capital inputs, apportioning costs to various types of livestock, and working out cost of production per unit of output.

Definition, scope and goals of livestock planning. Developing new plan: Steps in planning, determination of most efficient feeds, optimum level of feed, selection of type of livestock enterprises, combination of livestock and crop cultures. Optimum size of herd/flock, Comparison of old and new plans. Economic indicators for future planning".

Besides the above undergraduate courses, the Department of Farm Management, University of Agriculture, Faisalabad offers the following courses at the graduate level:

Course No.	Title	Credit Hours
FM-700	An Introduction to Farm Business	4(3-2)
FM-701	Methods of Farm management Investigation	3(3-0)
FM-702	Farm Costs and Farm Appraisal	3(2-2)
FM-703	Advanced Farm Planning and Budgeting	3(3-0)
FM-704	Applied Linear Programming	3(3-0)
FM-705	Econometric Methods in Farm Management	4(4-0)
FM-706	Economics of Agricultural Production	3(3-0)
FM-707	Applied Production Functions	3(3-0)
FM-708	Project Preparation and Appraisal	3(2-2)
FM-712	Dynamic Agricultural production Economics	3(3-0)
FM-713	Operation Research Approach to Farm Management	3(3-0)
FM-714	Advanced Quantitative Production Economics	3(3-0)
FM-719	Special Problem	1(1-0)
FM-720	Seminar	1(1-0)
FM-721	Advanced Econometrics	3(3-0)
FM-722	Natural Resource Economics	3(3-0)
FM-723	Advanced Production Economics	3(3-0)

FM-724	Application of Mathematical Techniques to Farm Management	3(3-0)
FM-725	Farm Management's Role in Farming Systems Research	3(3-0)

STAKEHOLDER NEEDS ASSESSMENT

Agriculture, like the other sectors of the economy, is undergoing rapid changes due to technological and scientific developments and improved methods of organization and management. If we see the growth of agriculture sector over time, we find that the value of agricultural output increased from Rs.43580 million in 1965-66 to Rs.167584 million in 1999-2000 at constant factor cost. At the current factor cost, total value of agriculture output increased from Rs.11227 million to Rs.762527 million for the same period (Government of Pakistan, 1998 and Government of Pakistan, 1999-2000). Land prices are showing continuous increase. These facts show that farming is big business. Narrow margins between cost of production and selling price make it necessary for the farmers to analyse their business in order to allocate resources to get maximum returns. At present farmers are not doing farm business analysis.

Present extension service emphasizes approved practices as they apply to various enterprises. At farmers gathering/meeting, due to variety of topics and the variation in attendance, it is difficult for the extension worker to become familiar with each farm operation to make worthwhile on-farm instructions. Further, on farm recommendations usually deal with approved practices which have little relevance to the entire farming operation.

Farmers in Pakistan are rational. They respond to changes in technologies, prices of inputs and outputs. They calculate the profitability of various enterprises in their minds and not on papers. Progressive and educated farmers realize that they can make better decision about resource allocation by maintaining farm records and their analysis. Their interest needs to be stimulated in developing a new profitable farm business through farm records.

Extension farm management education has not started as yet in Pakistan. Programmes about the farm records and business analysis need to be developed and delivered by extension workers to meet the producer's business management needs. The need vary depending on the size of farm, mix of enterprises, type of farming, region. The majority of the farmers in Pakistan operate small farms. Almost 100 percent are full time farmers. There is need to design special extension farm management programmes for small farmers as they focus relatively more on livestock (more specifically dairy animals and goat farming) and on crops that have the potential for higher net returns. Poultry farming on a very limited scale is another activity of the female labour force on small farm households. Large farmers mainly focus on general farming and on orchards. These farms have heavy investment in farm machinery and earn high annual gross income. Extension farm management programmes need to be tailored to the needs of these farmers. Extension Department should provide help to the farmers into the selection of combination of enterprises that will return the most profit to land, labour, capital and management. The objective should be to help farmers apply farm business management principles that will improve net farm income. Agricultural extension workers are not aware of farm management techniques and farm business analysis starting from the lowest FA level to the Director General Agriculture level. However, they all appreciate that maximization of

profit from the farm is a very important consideration of most of the farmers. Extension worker and well to do progressive farmers need training in the farm management techniques. This should provide adequate guidance on resource allocation, so that farmers improve their proficiency. The above named service will enable the farmers make prudent decisions on what to produce, how much to produce and how best to produce. Extension workers, who are supposed to train the farmers, need training in preparation, maintenance and analysis of farm business record, gross margin and production costs, partial and enterprises budget and in the assessment of farm efficiency measures.

RECOMMENDATIONS

Present agricultural extension service is placing emphasis on the major crops grown in the various farming systems. These include wheat, rice, cotton, sugarcane, maize, gram, oilseeds and orchards. Very little emphasis is placed on vegetables and fodders. These crops cover about 95% of the total cropped area in Pakistan. Agriculture extension services recommend the use of various inputs and farm practices to obtain the maximum yield of farm enterprises. Mostly emphasis is placed on a single dose of each input (may be fertilizer, pesticides etc.). Consequently, the recommendations are not made on the basis of optimum use of various inputs which result in getting maximum profit.

Among the various crops mentioned above, wheat is the most important in terms of acreage followed by cotton. However, in terms of contribution of various commodities to gross domestic product originating from the agriculture, milk is very important. Therefore initially extension workers may be trained in the maintenance of commodity specific records and in the formulation of enterprise budget. Wheat and milk production are important in all the crop ecological zones. Therefore, preference to these commodities may be given in each zone. Besides these products, each zone has other important crops, like rice in wheat - rice farming system, cotton in wheat - cotton farming system. While training the extension workers, this aspect may also be taken into account for the effective introduction of farm management techniques. Therefore, the following steps may be followed:

1. Identification of various cropping systems in the country: These cropping systems may be identified on the basis of studies conducted in Pakistan.
2. Distinguishing relevant homogeneous groups in the given cropping system: Homogeneous groups can be identified on the basis of farm size or on the basis of commodities produced.
3. Determination of priorities for each of the group: Depending upon the farm size/types of commodities, crop and livestock enterprise records and other necessary records may be developed. These records must contain all the necessary information to secure a complete farm business analysis.
4. Training of extension workers and literate farmers in the farm management techniques in the context of priorities identified in the previous step.

Initially Subject Matter Specialists (SMS) (Agricultural Economics and Farm Management) appointed at the district levels may be trained in farm management techniques. These trained SMS (may be called Master Trainers) should impart training to the Agriculture Officers and Field Assistants. Agriculture Officers can help educated farmers and teachers in their regions in maintaining records and educating them in farm

business management. Farm Management Specialist may also be involved in providing necessary training to farmers who have special interest in new enterprises.

FAO may develop the relevant material with the assistance of local experts. Initially, the material may be developed for the important crops and livestock which are grown/raised in each cropping system. The course should contain an introduction and explanation of basic terms of farm management such as variable costs, fixed costs, gross output, gross margin, farm enterprise. To give a detail into the principle and methodology of gross margin calculation, wheat crop and dairy buffalo are used, as examples.

For the wheat crop, explain the various items of the (a) gross output: grain output, wheat straw output. (b) variable costs: Ploughing cost, seed cost, fertilizer cost, insecticide cost, irrigation cost, harvesting cost, threshing cost etc. (c) Labour requirements: Labour requirements for ploughing, fertilizer application, harvesting, threshing etc.

For the Dairy Buffalo, explain the various items of the (a) gross outputs: Output from milk, output from culled buffalo, output from calves, output from manure. (b) variable costs: Replacement costs, feeding costs, medicine costs. (c) Nutrient requirements: Requirements for maintenance, milk production etc. (d) Labour requirements: Labour requirements for milking, watering, fodder cutting, chaffing and feeding, dung removal etc.

Subsequently, such relevant material may be prepared for the other enterprises. Further, material may be developed for physical records, financial record, net worth statement and income statement, analysis of farm business records, farm efficiency measures, identification of weaknesses and strengths in the farm business, determination of most profitable cropping system and livestock programme. All the material should be simple and of practical nature.

Adequate training of the extension personnel of all categories is essential in farm management techniques and business analysis for the sustainable and profitable development of agriculture in Pakistan. Pre-service training of field assistants is imparted at the agriculture training institutes. One of the main constraints in improving the standard of teaching of Agricultural Training Institute is the lack of adequately trained and experienced staff in general and more particularly in the discipline of farm management. Mostly, the farm management course which need substantial revision, is taught by a teacher who himself is trained in a subject other than farm management. Consequently, the training imparted at Agricultural Training Institute is not adequate to fulfill the requirements of farm management of Field Assistants. The training of Field Assistants should be made more realistic and emphasis should be given in the farm records and farm business analysis (especially in practical work) besides the usual training.

The trainer occupies a pivotal position in any training programme. The success of a training programme is mainly dependent upon his skill, attitudes and performance. Thus the training and retraining of the trainer must be made a continuous process. The staff available at these institutions do not have adequate fund provisions for their own training inside the country. For the training of the trainers, involvement of the Agricultural Universities is strongly recommended.

Professional agriculture staff in the Agricultural Training Institutes find the job less attractive as compared to other branches of the Department. Usually, the staff which is in the bad books of the extension wing are transferred as teaching staff members in the Institutes as a punishment and in view of this they continue in trying to get back to the Department. Because of ad-holism they take very little interest in teaching and improving

the standard of education (Rana, 1986, p.174). It is suggested that the competent staff may be selected/appointed permanently like that of Universities.

Pre-service training to Agriculture Officer is imparted by the Agriculture Universities and Colleges. The courses offered for graduate programme tend to be more theoretical than practical. The applied side of the subject matter is very weak, with the result that the graduates of agriculture when appointed as extension workers fail to discharge their duties effectively. The farmers who have long practical experience of different farm operations and farming conditions can only be convinced if anything of practical value is introduced which may contribute to an increasing the yield significantly. To overcome this deficiency, it is advisable that the graduates who plan their career as extension workers should take special course on farm management techniques and farm business analysis. It is also essential that the teachers responsible for conducting practical classes should be fully trained and experienced.

FAO may provide funds for the development of training material by using the services of local and foreign farm management specialists. This material should be simple, practical and problem oriented. It should contain a detailed description of the lectures and of practical problems.

FAO may organize National level workshops to train the trainers in farm management techniques and farm business analysis. The workshop should include farm management specialists/participants from all the institutions imparting agricultural education at various level. FAO may also organize short courses in farm management of about three weeks to impart practical training to the Agriculture Officers and other professionals.

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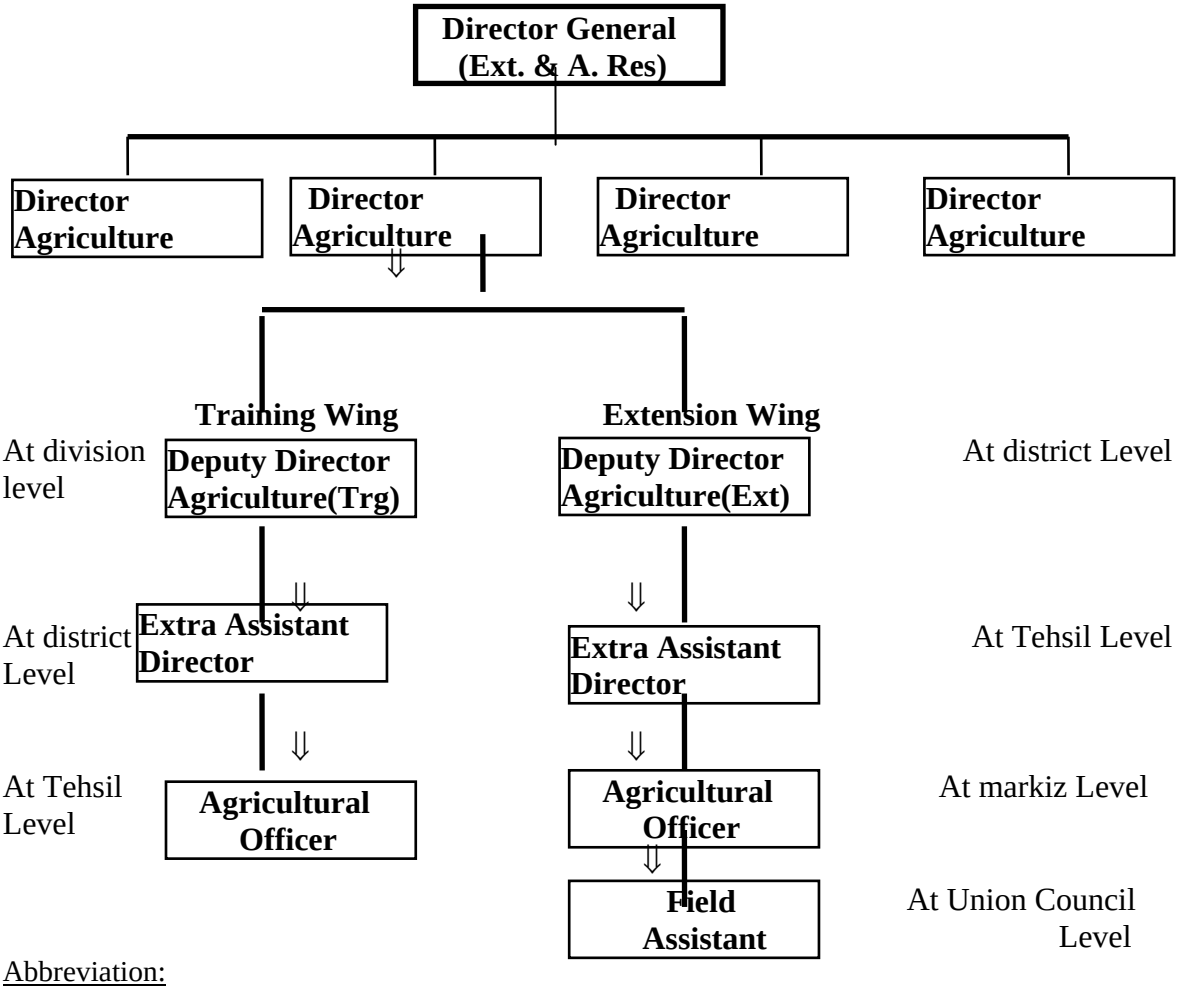
APPENDIX - I

Organisational Chart[1] of the Department of Agriculture (Extension Wing)



Abbreviation:

Ext.	= Extension	DDA	= Deputy Director of Agriculture	
Trg	= Training	EADA	= Extra Assistant Director of Agriculture	
A.Res	= Adaptive Research	AO	= Agricultural Officer	FA =Field Assistant

Ext. Staff Strength in Punjab

a) Extension Wing

DDAs(Trg + Ext) = 31
EADAs (-d0-) = 85
AOs (-do-) = 533
FAs = 4263
Total Ext. staff = 4812

b) Training Wing

DDAs = 8
EADAs = 30
AOs = 85

Total Trg. staff =123 **Total Staff strength = 4935**

Source: Organisational Chart of Agriculture Department, prepared by Agriculture House, Lahore.

[1] The organisational set-up of the adaptive research wing is not shown in this chart, because it is not directly concerned with the job of extension.

APPENDIX - II

USE OF VARIOUS INPUT OVER TIME ON OPER CROPPED HECTARE BASIS

Year	Fertilizer use (Kg./ha)	Consumption of pesticide (Kg./ha)	Tubewells per 000 ha.	Consumption of electricity per 000 ha. (GWH)	Consumption of petroleum products per 000 ha (Kg.)
1980-81	53.18	0.03	9.83	10.51	8.22
1981-82	52.89	0.18	10.14	11.60	6.08
1982-83	61.08	0.25	10.47	12.56	7.92
1983-84	59.15	0.32	11.34	13.15	8.52
1984-85	60.81	0.45	12.08	13.57	10.62
1985-86	73.10	0.60	12.44	14.02	11.73
1986-87	85.27	0.69	12.83	16.59	11.49
1987-88	83.26	0.72	13.96	21.37	15.99
1988-89	82.77	0.62	14.52	20.83	14.16
1989-90	90.26	0.70	15.53	24.01	13.70
1990-91	90.31	0.70	16.21	27.77	12.65
1991-92	89.45	0.96	16.90	27.76	13.37
1992-93	100.36	1.10	17.48	26.33	13.42
1993-94	99.80	0.94	18.11	26.83	14.30
1994-95	101.30	1.15	21.50	29.07	12.63
1995-96	115.66	2.00	22.31	30.89	13.15
1996-97	111.58	2.00	N.A.	32.89	14.90
1997-98	120.49	2.04	N.A.	N.A.	N.A.

Source: Calculated from Government of Pakistan, 1999-2000.

APPENDIX - III

CHANGES IN MARKETABLE SURPLUS OF MAJOR COMMODITIES IN PAKISTAN

(Percent of total Production)

Farm Size	Wheat	Cotton	Sugarcane	Rice	Maize
0 - 12.50 acres	33.89	73.97	86.71	62.24	88.70
12.00 - 25.00 acres	82.11	85.88	88.81	88.38	81.57
Above 25.00 acres	82.11	85.88	88.81	88.38	81.57

Source: Islam N. 1992.