

103

T. R. NO. 103

Technical Report

WP103
I INSTITUTE OF MANAGEMENT
WP
1976
(103)

IIM
WP-103



**INDIAN INSTITUTE OF MANAGEMENT
AHMEDABAD**

SCOPE OF AGRICULTURAL ECONOMICS
AND ROLE OF
AGRICULTURAL ECONOMISTS

by
P.S. George

T.R. No. 103
February 1976

Indian Institute of Management
Ahmedabad

SCOPE OF AGRICULTURAL ECONOMICS AND ROLE OF AGRICULTURAL ECONOMISTS

P.S. GEORGE*

Professional excellence in academic areas requires periodic review on the new developments in the profession and the role of professionals in fulfilling the needs of the society in which he belongs. The rapid developments in the agricultural and rural environments in India during the last decade suggests that agricultural economists should review their role as well as the scope of the subject. Such a review is important to provide meaningful directions to the profession, especially teaching and research activities, because of the following factors:

1. The scope of agricultural economics has been continuously expanding and at different periods of time any one dimension of the subject has dominated over other dimensions. Often this domination has been so great that the existence of other dimensions is not at all recognized. Thus, we have various streams like farm economics, rural economics, agricultural marketing, agricultural policy analysis, and so on considered in isolation.¹
2. Agricultural economists often assume the roles of teacher, researcher, policy adviser, and so on. Teaching programmes in agricultural economics should offer scope for persons to assume these roles and function successfully in their respective roles. Therefore, an understanding of the various roles is important.
3. Agricultural economics is heavily dependent on a number of disciplines. An understanding of the inter-relationships among these disciplines is possible only if one has a comprehensive view of the scope of agricultural economics and the roles expected of agricultural economists.
4. The diverse backgrounds of persons seeking training in agricultural economics also call for a careful consideration of the scope of the subject. A broad understanding of the scope of agricultural economics will indicate the nature of the prior training needs of the candidate. It is also possible that the needed prior training may not be available from a single discipline, in which case the training in agricultural economics should try to include relevant aspects from other disciplines also.

* Professor, Indian Institute of Management, Ahmedabad. The author is grateful to Professors Samuel Paul and V.S. Vyas for useful suggestions.

¹ Here, the purpose is not to argue against any specialization within agricultural economics, but to plead against the complete isolation of one aspect of agricultural economics from others.

Scope of Agricultural Economics

Agricultural economics has been recognized as that particular branch of economics which is primarily concerned with the analysis of problems relating to agriculture.² It was observed that "it (agricultural economics) can be described as a field without its own discipline - a field that has uniqueness primarily in terms of the problem orientation."³ This definition implies that to understand the scope of agricultural economics, it is necessary to have some agreement on the broad coverage of economics and agriculture.

Economists disagree about the scope of economics.⁴ Here it may be appropriate to follow Robbins' definition⁵ of the "economic problem" which leads to considerations of allocation of resources and efficiency at various levels of choices like individual consumers, producers, firms, and the community collectively acting through the political-government processes.

In many situations the definition of agriculture is confined to farming activity alone. But modern agriculture has reached a stage where farming activities depend heavily on factors outside the farming sector. The definition of agriculture has to be widened to incorporate the growing concerns of various individuals and organizations concerned with the agricultural sector. In this context, it may be appropriate to use Mosher's definition of modern agriculture. According to him:

Agriculture is an industry based on a unique production process, drawing its energy from sun and utilising that energy through the biological growth processes of plants and animals. It can and does produce many different products. It takes many economic forms varying all the way from purely subsistence to highly commercial farming. A modern agriculture is an industry having four functional components: (1) farm businesses within which agricultural production takes place; (2) commercial agri-support

² A number of articles attempt to classify agricultural economics as a science or an art: (For example, see the February and August 1965 issues of Journal of Farm Economics). However, for this paper, it is not necessary to take up a position on the matter, since we use the definition only to understand the scope of the subject.

³ R.G. Brosler, "Agricultural Economics in the Decade Ahead," Journal of Farm Economics, 47, 3, (August 1965), p.521.

⁴ A number of publications are available on the scope of economics and the history of economic thought. For example, see George J. Stigler, The Scope and Method of Economics, The Theory of Price, 1946, p.3-20; and Eric Roll, A History of Economic Thought (London: Faber and Faber Ltd., 1973).

⁵ Lionel Robbins, An Essay on the Nature and Significance of Economic Science (London: MacMillan and Co., 1946).

activities that provide farmers with the supplies, equipment and credit they need and that market, transport and process farm products; (3) non-commercial agri-support and for agricultural technicians; and (4) an agricultural milieu of legal arrangements, price arrangements, taxes and monetary policies, development policies, and social values that are conducive to agricultural growth.⁶

Desai made an attempt to elaborate on this definition.⁷ In his attempt to integrate the business and non-business components of the agricultural system, he includes 10 sub-systems, viz., agricultural production, agri-supply, agri-credit, agri-extension, agri-research, agri-education, agri-processing, agri-distribution, agri-development, and agri-regulatory (Exhibit 1). It is possible to identify a number of concepts in economics which can find direct applications to these sub-systems. In fact, some of the specializations within agricultural economics mentioned earlier are obtained as a result of such an application of economic theory to problems in these sub-systems. Thus agricultural economics covers the application of economic theory and concepts to a wide range of problems in the agri sub-systems mentioned above.

It is possible to look at the scope of agricultural economics from another angle, i.e., the type of research activities conducted by agricultural economists. Shah observes that in the initial stages research workers engaged in different types of problems depending on the exigencies of the time or their immediate interest. Of late two broad fields of research are becoming increasingly distinct. He says:

Most of the scholars in agricultural universities come to select for concentrated work the themes related to micro-level studies. The problems of farm management, allocation of resources at farm and regional level, the problems of marketing, behaviour of individual farmers, the structure of costs, the use of machinery, substitution between inputs etc., are some of the themes selected for research works by these scholars. Research workers in other institutes, by and large, select for their studies problems of macro-character.⁸

⁶ A.T. Mosher, To Create A Modern Agriculture (New York: Agricultural Development Council, Inc., 1971), p.14.

⁷ D.K. Desai, Planning Progressive Infra-Structure, (Sao Paulo: 1973). (Mimeographed).

⁸ C.H. Shah, A Survey of Agricultural Economics Research in India, (Bombay: 1970), p.5. (Mimeographed). Exhibit 2 gives a summary of research activities.

A brief account of research in agricultural economics up to the mid-fifties is provided by Dantawala.⁹ Also, Shah and Sundaram provide an analysis of articles published in the Indian Journal of Agricultural Economics from 1940 to 1964.¹⁰ According to Shah's survey, the following broad topics were researched in agricultural economics from 1955 to 1970:¹¹

1. Consumption and demand
 - Demand elasticities, demand projections
2. Supply analysis
 - Trends in yield, components of growth, stability, production functions (efficiency and scale of operation), supply response crops, and cropping patterns
3. Farm Management, cost, budgeting, and programming
4. Marketing
 - Market supply, market structure, price spread and cost of marketing, marketing efficiency, and marketing integration
5. Prices and terms of trade
6. Land Market, land values, and land reforms
7. Agricultural wages, trend, and structure
8. Debts, assets, and capital formation
9. Use of inputs
 - Irrigation, fertilizer, tractor power, and mechanization
10. Extension and technological change
11. Agro industries and management
12. Relationship between growth of agriculture and other sectors.
13. Village and regional surveys

⁹ M.L. Dantawala, "Progress in ~~research~~ research in Agricultural Economics in India" Studies in Agricultural Economics, J.P. Bhattacharjee (ed.), (Bombay: Indian Society of Agricultural Economics, 1958), pp.vi & 326.

¹⁰ C.H. Shah and T.R. Sundaram, "An Analysis of Articles Published in Indian Journal of Agricultural Economics, 1940-1964", Indian Journal of Agricultural Economics, Vol.xx, No.2 (April-June 1965), pp.83-90.

¹¹ C.H. Shah, Op.cit.

14. Problems of livestock
15. Taxation in agriculture
16. Problems of small farmers.

In addition, research has also been carried out in such areas as institutional problems (eg., working of co-operative and extensive agencies agricultural labour, and agricultural research. In most of these, the focus has been on one or more of the following aspects: a) exploratory research, b) descriptive analysis, c) establishing casual relationships, and d) analysing the effects of policy alternatives in agriculture.

This brief discussion of the scope of agricultural economics based on either the conceptual approach or on the research angle gives the impression that agricultural economics is primarily concerned with problems of farms and marketing firms (both agricultural inputs and output), and the performance of the food and fibre systems. One major drawback of this analysis is that the focus of the subject is not adequately highlighted. Many agricultural economists will agree that the major focus of agricultural economics is on the rural people and the institutions that provide various facilities to the rural community. Though there is a recent tendency to include such topics as rural development, quality of life, and environmental quality within the scope of agricultural economics, it is not quite clear whether the needed focus on people and their problems has been sharply brought out. Castle¹² raises some of these concerns through the following questions:

1. To what extent is the current concern for the quality of life and environmental quality a function of an affluent society? Is quality of life a concern mainly to those who have sufficient income to permit them to become satisfied with that which the market system is producing?
2. What is the role of economics and the economists in public policy related to quality? Will social scientists, other than economists, achieve great importance in public policy at the expense of economists, or is there an unexploited complementarity?
3. Do the current concerns with quality of life and environmental quality have, at least in part, an economic base? If so, is this a common base, or are they distinct economic issues?

However, he also stops short of reaching the focal point, i.e. the rural people, their welfare, their environment and institutions supporting the rural community.

¹² Emery N. Castle, "Economics and Quality of Life," American Journal of Agricultural Economics, 54, 5, (December 1972), p.723.

One possible explanation for this may be that not all problems facing the rural community can be brought under the purview of agricultural economics. Unfortunately, the problems of the rural community cannot be brought under neat subject matter classifications like economics, sociology, anthropology and so on.¹³ No society which has a concern for the rural poor, the unemployed, and the disadvantaged can indefinitely wait for academic disciplines to reach an agreement on which discipline should tackle the problems of these groups. It is unrealistic to assume that any discipline can expand its scope to cover the complex and often bewildering combinations of issues that are involved in solving the problems of the rural community. At the same time, this complexity provides an opportunity for agricultural economics to demonstrate the comparative advantage it has over other disciplines. To reduce the hardships of the rural community, it is necessary to understand the current state of affairs and the factors influencing the current situation, and develop institutions and management techniques to produce the desired outcome. Agricultural economics has the unique ability to handle many of these aspects and, therefore, it is in a position to expand its scope to assume a coordinating role in solving the problems of the rural population. In many practical policy decisions, it is possible to avoid errors by properly applying the principles of economics. There is sufficient reason to be optimistic that agricultural economics will move in this direction and within a few years will sharply focus on the rural people and their welfare.

Role of Agricultural Economists

The scope of agricultural economics should be broad enough to incorporate the various roles performed by agricultural economists. Therefore, here an attempt is made to identify the role of agricultural economists and to suggest some requirements to be effective in these roles.

The role of agricultural economists is clearly identified in three major areas, viz., teaching, research, and public policy planning. Often, there may be diverse views regarding the role of agricultural economists in each of these areas. Further, each of these roles can itself become subject matter for lengthy papers. In the present treatment of the subject, it is proposed to provide some identifications of the roles of agricultural economists as teachers, researchers, and policy analysts to the extent they have relevance to the teaching of the subject.

¹³ Kelso brings out this point very explicitly when he observes: There is no such thing as agricultural economics - there is only economics applied to the problems of agriculture. Indeed there is no such thing as economics - there is only social science applied to economic problems. More disturbingly, I fear there may not even be such a thing as social science - there may only be science applied to the agricultural economic problems of society ... Art, as well as science, must be applied to the agricultural economic problems of society. See M.M. Kelso, "Agricultural Economics in the Mid Sixties", Journal of Farm Economics, 47,1, (February 1965). p.10.

To specify the role of agricultural economists in teaching, it is necessary to have a broad understanding of the objectives of teaching agricultural economics. Johnson specifies that the objectives of graduate education in agricultural economics are not to provide the graduates "with answers to a series of specific questions, but rather to provide them with the principles and tools that will permit them to answer the important questions that will arise in the years ahead.... If the function of our education was to provide answers to questions, rather than providing the capacity for answering questions we would almost certainly be answering yesterday's questions and not even those of today, let alone tomorrow's."¹⁴ Further, Johnson specifies four objectives of the educational system. They are:

1. Development of a firm understanding of the major principles and theories of economics.
2. Providing a grasp of the fundamentals of empirical analysis adequate to permit undertaking research on important economic problems involving the application of economic analysis.
3. Development of an understanding of essentials of the analysis of public policies including an appreciation of the strength and limitations of economic analysis in such evaluations; and
4. Development of the capacity to grow and develop one's capacity as a scholar, researcher, administrator and policy analyst.

The above specification of the objectives provides answers to two questions: a) What should be the content of agricultural economics course and b) What should be the role of the teacher in agricultural economics? While the depth of coverage will vary from the undergraduate level to the graduate level, the elements will not vary to a large extent. While discussing the scope of agricultural economics, it was pointed out that the most important feature of agricultural economics is the specific problem orientation. Teachers of agricultural economics have a responsibility to translate this concern to the students. As Schultz points out, it is the responsibility of the teachers in agricultural economics "to give the student the basis on which he can build and shape his skills as they have to be altered in this rapidly changing society in which we live. Thus we ought

¹⁴ D. Gale Johnson, "Objectives of International Training in Agricultural Economics," American Journal of Agricultural Economics, 56, 5, (December 1974), p.1177.

to give the lowest rating to training that is specific. We ought to give a higher rating to learning principles and theories. We should give the highest priority to instruction which is devoted to problem solving, based on analytical methods and processes."¹⁵ The teachers of agricultural economics have a major role in shaping these faculties. In particular, it may be desirable for them to:

1. Develop an understanding of the particular problems of rural areas, the rural population, and the institutions involved. Economic analysis provides only a partial explanation of human behaviour. Even with this limitation, it is possible for agricultural economists to develop the right framework to view the rural community. What Swaminathan observes in a different context is equally applicable in this situation. He points out, "What is needed, however, is a close and detailed understanding of the local eco-systems, and its application to those who are fully informed of the parameters of the problem. If development is not to be destructive, then the developing countries must take responsibility for understanding their own ecological needs, resources and patterns and planning their development accordingly."¹⁶
2. Carefully choose concepts and tools useful for handling the problems of the rural population.
3. Effectively allocate time between teaching and research activities. Often the rate of obsolescence in academic disciplines is very high. Also, the problems in the rural areas go on changing continuously. Problem orientation in agricultural economics will have to continuously assume the role of a researcher, and learner.
4. Develop a multi-disciplinary approach because teaching oriented towards the problems and issues of society and towards finding appropriate approaches for solving them requires such an approach.¹⁷ The students should also develop a proper value system in which individual and group values necessary for understanding and developing appropriate solutions to the problems of the rural community can be solved. Teachers of agricultural economics have a major role in developing in their students such values through conceptual discussions as well as theory discussions of problem areas brought to the class-room.

¹⁵ Theodore W. Schultz, "Reflections on Teaching and Learning in Colleges of Agriculture," Journal of Farm Economics, 47, 1, (February 1965), p.19.

¹⁶ M.S. Swaminathan, Our Agricultural Future, (Sardar Patel Memorial Lectures) All India Radio, New Delhi, 1973.

¹⁷ Lack of proper problem-orientation in teaching often raises student complaints of irrelevance. Therefore, the teaching programme should try to bring the relevance of concepts and tools to solve real world problems.

Research

Research by definition implies an activity that produces new information or knowledge useful to society. Agricultural economists are involved in both disciplinary and multi-disciplinary research activities. Johnson defines the functions of these two types of agricultural research activities as follows:

Demand for the disciplinary concepts and quantitative techniques of economics originates in problem solving research and investigation. As members of multi-disciplinary problem solving teams, agricultural economists are expected to be able to use these theories and techniques in closer cooperation with others using fundamental theories and techniques from genetics, sociology, agricultural engineering, law, animal husbandry, psychology, political science etc.¹⁸

Disciplinary research in agricultural economics could make important contributions in:

1. describing the economic problem and identifying factors contributing to the current situation.
2. identifying alternative solutions to the problem and evaluation of these alternatives, especially in terms of providing an analysis of the possible outcomes of alternative policies.
3. conducting basic research in the areas of production economics and demand analysis which provide the basis for any meaningful appraisal of the various options before society.

In the area of multi-disciplinary research, agricultural economists can play a major role in three broad aspects, viz., agricultural systems, emerging new institutions, and developmental tasks in rural areas. The inter-relationship among individuals and organizations involved in input supply, production, procurement, processing, and distribution of finished products can be conceptually established. Yet there are not many studies which attempt to highlight the nature of such inter-relationships. A large number of institutions are being introduced in the agricultural sector. Often, there is a tendency to multiply institutions without properly understanding the problems of existing institutions and the possible remedies to these problems through appropriate research. Again, there is a lack of adequate research on the development of rural areas, especially in terms of identifying activities and plans capable of helping the poor and vulnerable sections in rural areas. It is true that many of these problems cannot be solved by the research activities of agricultural economists alone.

¹⁸ Glen. L. Johnson, "The Quest for Relevance in Agricultural Economics," American Journal of Agricultural Economics, 53, 5, (December 1971), p.734.

However, as Ruttan has pointed out, multi-disciplinary research is promoted when agricultural economists take the lead in pointing out constructively how the discipline can contribute to the solution of the pressing problems of the rural community.¹⁹

As in the case of teaching, the relevance of research in agricultural economics can be made explicit by properly orienting the research projects towards the problems of rural society. This implies that agricultural economists should properly identify important issues and problems of society. It is often stated that the correct definition of the problem itself goes a long way in solving the issue.

While there is no need for agricultural economists to avoid basic research, the major role of agricultural economists should be in adaptive research. Often, agricultural economists are called upon to do research on many vital issues such as the consequences of technological innovations, changing institutional systems of input supplies and marketing, poverty, regional economic analysis, and international trade.

The quality of research activities carried out by agricultural economists are reflected in their ability to be good teachers and policy analysts. As pointed out earlier, the effectiveness of an agricultural economics teacher is greatly influenced by his ability to introduce relevance into the concepts and tools taught in the class-room. Such relevance is brought to the class-room through the teacher's own research or the research activities of other agricultural economists. Similarly, the soundness of policy recommendations also depends upon the analysts' knowledge of the background factors influencing the behaviour of rural communities and the likely impact of the suggested policy measures.

The test for judging the effectiveness of the role performed by agricultural economists in research can be derived from a modified version of Kelso's questions:²⁰

1. Have these research activities endowed agricultural economists with a greater ability to predict occurrences and consequences in the rural economy?

¹⁹ V.W. Ruttan, "Technology and Environment," American Journal of Agricultural Economics, 53, 5 (December 1971), pp. 707-717.

²⁰ M.M. Kelso, op.cit., p.6

2. Have they made them better forecasters of agricultural economic phenomena? Better prescribers of individual or group choices in the interest of increasing the welfare of the rural population? Better analysts and critics of private and public economic policies?
3. Have the research activities helped to answer questions like: What goals and what values held by the society can economic analysis help to achieve? What prescription of economic-social-political institutions can ensure the attainment of these goals, at what opportunity cost and with what degree of risk and uncertainty?

Public Policy Analysis

Agricultural economists are increasingly called upon to play a major role in analysing public policy alternatives and in advising policy makers in shaping the future course of action.

Public policy implies changes in formal rules, regulations, and institutions that regulate the activities of members of society. According to Shaffer:

Effective public policy requires management of the evolving system, and effective management requires an understanding of the dynamic system. But even more, it depends upon organising our institutions to direct the system to achieve desired goals rather than accept whatever pattern of organization evolves. An essential input to the system is organised intellectual effort directed at institutional innovation.²¹

The above discussion on the requirement of an effective public policy indicates the type of background and attitudes required for a meaningful evaluation of existing as well as developing institutions. The earlier discussion on the scope of agricultural economics and the role of agricultural economists as researchers indicates that they have a comparative advantage over others to handle policies for agriculture and rural development activities.

It is possible to indicate certain specific roles for agricultural economists in policy analysis. These are:

1. The primary role in policy analysis is essentially similar to the roles specified in research. The agricultural economists involved in policy analysis will be required to predict the outcomes of alternative courses of action. Further, in a political process, value judgements are required. Though there may be situations where the values of the agricultural economist may be in conflict with those of the politician, the agricultural economist involved in policy analysis becomes a participant in the policy making process by bringing his value judgements with his analysis.

²¹J.D. Shaffer, "On Institutional Obsolescence and Innovation - Background for Professional Dialogue on Public Policy," American Journal of Agricultural Economics, 51, 2, (May 1959), p.246

2. As in the case of research, the effectiveness of policy measures depends to a large extent on the reliability of the predictions. Therefore, both researchers and policy analysts have a role to play in improving the reliability of prediction. In many situations analysis based on time series data and using econometric approaches "probably leads more to analysis explaining "how things were" than to normative analyses explaining "how things ought to be."²² This aspect should be carefully brought into the policy analysis.
3. Agricultural economists working in staff positions in government and other organizations have a major responsibility for determining the directions of change in public programmes. As Nielson points out, these agricultural economists are "in best position to determine which programmes it is feasible to undertake, the techniques appropriate to the problems, and the amount of resources that are needed to carry out the activities."²³
4. Agricultural economists can expand their current role in policy analysis if the research emphasis can be changed from "after-the-fact" analysis of programmes to one of advancing policy measures to the government. Often agricultural economists are good in making post-mortem of development programmes. But when it comes to suggestions for tackling a given situation, often there are not many specific proposals. It is easy to find out what has gone wrong in a past programme. It is quite possible that many policy makers could have avoided their mistakes if somebody had predicted the outcomes more accurately at the planning stage. While an analysis of the past performance of a given programme provides very useful insights for future planning activities, it is not possible to influence future policies unless concrete suggestions are offered to remedy the current problems of society.

²² E.O. Heady, "Allocation of Colleges and Economists," American Journal of Agricultural Economics, 54, 5, (December 1972), p. 940.

²³ J. Nielson, "Accountability and Innovation: Challenges for Agricultural Economists," American Journal of Agricultural Economics, 56, 5, (December 1974), p.873.

Summary

This paper attempts to specify the scope of agricultural economics and the roles expected of agricultural economists as teachers, reachers, and policy analysts. While no specific curriculum is developed in the paper, it is hoped that a proper perspective of the scope of the subject and the role of agricultural economists will lead to the development of appropriate curriculum for different levels of training in agricultural economics. The major points raised in the paper can be summarized as follows:

1. The focus of agricultural economics should be sharpened to make the problems of the rural people and the institutions needed to solve their problems the central theme. While there is adequate scope to continue some of the activities based on a narrow definition of agricultural economics, the time is appropriate to give agricultural economics this broader framework required to analyse the problems of the rural sector.
2. This broader definition of the scope of agricultural economics implies that emphasis should be placed on multi-disciplinary activities. Concepts and theories from economics should be supplemented with these from other areas such as rural sociology, theory of decision making, statistics, and operations research.
3. The training programme in agricultural economics should be made problem-oriented so that the students can understand the relevance of the concepts and tools taught in various courses. The curriculum should be designed such that an appropriate mix of concepts and tools is taught. If the existing boundaries of agricultural economics departments do not provide teachers with the necessary background to introduce this problem-orientation, some amount of co-ordination should be established with other departments.
4. Agricultural economists are involved in both disciplinary and multi-disciplinary research. The findings of the research can be useful in teaching and policy analysis. To be effective in both these areas, it is necessary that research topics be carefully chosen to incorporate the concerns of society. While there is some meaning in studying the nature of past problems and the effectiveness of past efforts to solve these problems, these studies should serve as a basis for understanding the current and future problems and their possible solutions.

Exhibit 1 AGRICULTURAL SYSTEM

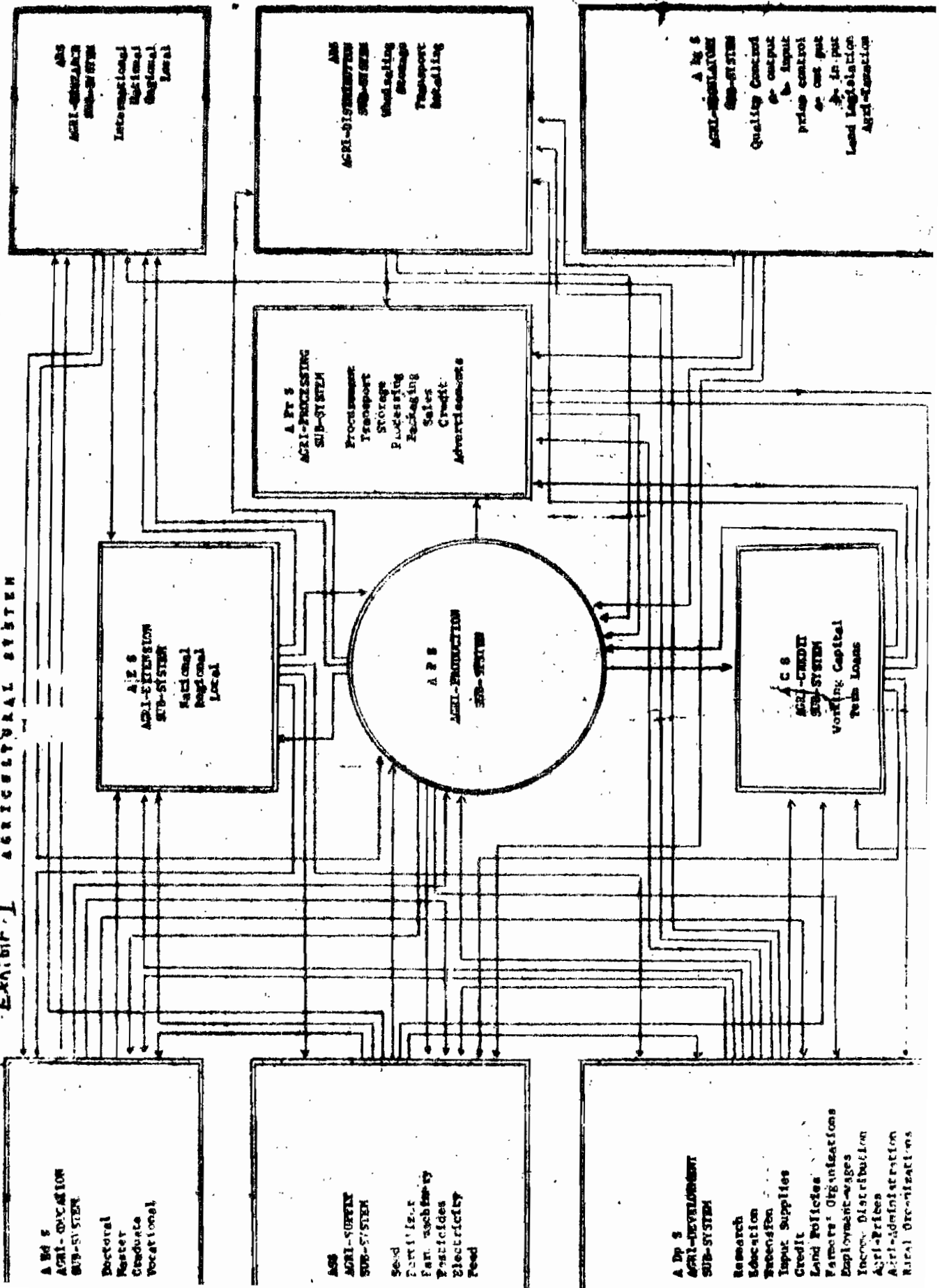


EXHIBIT 2RESEARCH WORKS IN AGRICULTURAL ECONOMICS - 1955-1970

Subject	Books/Reports		Articles/Papers		
	Unpublished	Published	Unpublished	Publi- shed	
	Reports	Ph.D. Thesis			
(1)	(2)	(3)	(4)	(5)	(6)
<u>COMMUNITY DEVELOPMENT</u>					
General	12	..	4	..	..
Impact	3	..	..	..	..
Evaluation	..	1	..	..	1
Extension	11	1	..	..	15
I.A.D.P.	83	..	1	..	5
Tribal Economy	5	..	1	..	..
Total for Community Development:	114	2	6	..	21
<u>AGRICULTURAL FINANCE AND ASSETS, DEBTS AND INVESTMENT</u>					
Agricultural and Commercial Banks	1	..	..	2	1
Agri-Credit Institutions	3	..	..	..	1
Capital Formation	5	2	2	4	42
Agri.Credit, Loan, Individual Loan Private Agencies	14	3	1	77	12
Rural Debt	1	..	2	..	12
Total for Agricultural Finance and Assets, Debts and Investment	24	5	5	13	68

(1)	(2)	(3)	(4)	(5)	(6)
<u>LAND ECONOMICS</u>					
Land Tenure, Private Ownership	5	4	3	2	6
Small Farmers	5	..	3	2	10
Land Values & Land Market	1	1	5	1	5
Total for Land Economics	11	5	11	5	21
<u>IRRIGATION</u>					
Irrigation General	3	1	1	1	6
Well Irrigation	3	2	..	2	4
(Major) Tube Well Dam	..	..	..	..	1
Canal	..	..	..	..	1
Lift (Minor)	3	..	1	..	..
Water-Management	1	1	..	1	..
Rates	2	..	..	..	..
Cost Benefit	17	..	..	..	..
Impact	3	..	3	..	..
Irrigation Policy	2	..	1	1	..
Pump Sets	..	..	..	..	..
Methods of Irrigation	..	..	..	..	1
Total for Irrigation	34	4	6	5	13
<u>AGRICULTURAL TAXATION</u>					
<u>PRODUCTION ECONOMICS</u>					
Production, function, Factor Substitution, Productivity, Gen. Use of resources, weather effects	3	6	5	3	52

	(1)	(2)	(3)	(4)	(5)	(6)
<u>AGRICULTURE</u>						
General		4	5	4	1	12
Agri. Development & Growth		12	3	4	1	6
Production Statistics & Production Index.		1	..	..	..	16
Demand Projection		5	..	2	6	96
State Policy		1	..	..	..	1
Education Impact on Agriculture		1	..	..	2	2
Research		2	..	4
Regions (India)		8	..	..	5	37
Agricultural Statistics		1	2
Agriculture with relation to other sectors		1	..	..	..	7
Agricultural Prices		33	7	4	4	60
Agricultural Price Policy		5
Agricultural Marketing & Marketing Programmes		19	6	4	18	40
Futures Trading (Forward Markets) Mal-adjustment in Agricultural Productions.		..	1	4	1	8
Famines - Floods		2	..	1	..	..
Risk-uncertainties		12
Cropping Patterns		12	1	1	6	26
Specific Agricultural Products and their Marketing		19	1	1	10	60
Total for Agriculture		118	24	27	55	394

	(1)	(2)	(3)	(4)	(5)	(6)
<u>F O O D</u>		1	1	..	3	..
Food Demand		1	..	..	5	9
Supply - Supply Function		9	4	.2	2	31
Food Distribution		9	1	1	6	9
Marketable Surplus		9	3	1	4	38
Total for Food		29	9	4	20	87
<u>FISHERIES</u>		1	..	..	..	..
<u>MECHANIZATION AND MODERNIZATION</u>		6	1	1	3	19
<u>MANAGEMENT OF AGRI. BUSINESS</u>		4	1	2	..	10
<u>ECONOMIC PLANNING, LOCAL PLANNING</u>		2	..	..	..	2
Income - Principle of Measurement		3	1	..	1	3
Cost of living		8	..
Consumption - Agr. Commodities		5	1	..	4	5
Crop Insurance	
Internal Trade		1	..	..	..	9
Rural Electrification		1	..	..	..	6
Rural Life - Village Surveys		55..	4	18	9	21
T o t a l :		67	6	18	22	46

(1)	(2)	(3)	(4)	(5)	(6)
FARM MANAGEMENT	28	3	4	3	34
Farm Accounts	2	..	..	..	..
Input-Output Efficiency, Enterprises Combination	8	2	..	7	22
Linear Programming	..	6	..	1	19
Management - Individual Crops	9	1	1	..	8
Technology - Benefit - Cost	..	..	..	..	1
Rural Transportation	1	..	..	..	2
o t a l :	48	12	5	11	86
Technique of Production, Technological Change	8	..	..	1	14
Improved Seeds	3	..	..	..	1
H.Y.V. Programmes	65	..	1	3	18
Transplanting Drill Sowing	..	..	..	1	1
Dry Farming	..	..	..	..	..
Mixed Farming	..	..	..	..	3
Technological Employment	1	..	..	..	..
Fertilizer - manuring	8	3	1	6	23
Forest - Economy	1	..	..	1	4
Animal Husbandry	9	1	..	1	12
Dairy Industry	8	2	2	5	19
o t a l :	103	6	4	18	95
TOTAL CARDS	552	81	92	155	928

Source : C.H. Shah, Op. cit