AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D. C. 20523

BIBLIOGRAPHIC INPUT SHEET

FOR AID USE ONLY

Batch #22

1. SUBJECT CLASSIFICATION	A. PRIMARY: Serials	Y-AE10-0000-0000
	B. SECONDARY: Agriculture--Agricultural economics	

2. TITLE AND SUBTITLE
The impact of new technology on rural employment and income distribution; annual research report,1972

3. AUTHOR(S)
(101) Cornell Univ. Dept.of Agr.Economics

4. DOCUMENT DATE	5. NUMBER OF PAGES	6. ARC NUMBER
1973	103p.	ARC

7. REFERENCE ORGANIZATION NAME AND ADDRESS
Cornell

8. SUPPLEMENTARY NOTES *(Sponsoring Organization, Publishers, Availability)*
(Research summary) q

9. ABSTRACT

10. CONTROL NUMBER PN-RAB-388	11. PRICE OF DOCUMENT
12. DESCRIPTORS Employment Technological change	13. PROJECT NUMBER
	14. CONTRACT NUMBER CSD-2805 Res.
	15. TYPE OF DOCUMENT

AID 590-1 (4-74)

January, 1973.

ANNUAL RESEARCH REJORT
THE IMPACT OF NEW TECHNOLOGY ON RURAL EMPLOYMENT AND INCOME DISTRIBUTION

Contract No. AID/csd-2805

John W. Mellor, Director

Report Summary

A. 1

B. Narrative Summary of Accomplishments and Utilization 1

Annual Research Report

A. General Background 5

B. Statement of Project Objectives as Stated in the Contract 6

C. Continued Relevance of Objectives 6

D. Accomplishments to Date 8

E. Dissemination and Utilization of Research Results 13

F. Statement of Expenditures and Obligations and Contractor Resources 16

G. Work Plan and Budget Forecast for Coming Year 17

H. List of Appendices 21

1. List of Occasional Papers 22

2. Schedule for Sub-project and Project Completion 29

3. D.2. Supporting Evidence for Interpretation of Data 30

4. E.1. (1) Bibliographic List and Abstracts 73

5. E.1. (2) Statement Identifying Use of Material 88

6. E.2. Evidence of Findings of the Research Being Used in LDCs and the U.S. 91

REPORT SUMMARY

A. 1. Project Title and Contract Number: "The Impact of New Technology on Rural Employment and Income Distribution." Contract No. AID/csd-2805

2. Principal Investigator, Contractor and Mailing Address: John W. Mellor, Department of Agricultural Economics, Cornell University, Ithaca, N. Y. 14850

3. Contract Period: from June 30, 1970 to June 30, 1973

4. Period covered by report: from January 1, 1972 to January 1, 1973

5. Total A.I.D. funding of contract to date:

June 30, 1970 to April 1, 1972	$200,643.74

6. Total expenditures and obligations through previous contract year:

April 1, 1971 to April 1, 1972	$102,825.17

7. Total expenditures and obligations for current year:

April 1, 1972 to March 31, 1973	$190,000.00

8. Estimated expenditures for next contract year:

April 1, 1973 to December 31, 1973	$164,018.00

B. Narrative Summary of Accomplishments and Utilization

The initial empirical research on this contract has confirmed the crucial importance of the relationships between technological change in agriculture on the one hand and the growth of employment and the distribution of income on the other hand. The analysis has also shown that the relationships between these variables are extremely complex. As a result of these latter findings a primary emphasis has been placed upon developing a mathematical model for tracing the complex relationships. The use

of this model has facilitated efficient development and administration of a simulation model and of the various empirically oriented studies on which the final conclusions must be based.

At the conceptual level, a major contribution has been made to analysis of employment growth by providing a model which distinguishes the food market from the labor market and thus facilitates examining the interaction of these two markets. The model then allows study of the effect of various assumptions with respect to the initial distributive bias of technological change in agriculture. This distinction places precisely the role of agriculture in an employment oriented strategy of economic growth. The mathematical model is now being transposed into a simulation model which accomodates the empirical data from the various micro studies and facilities detailed examination of the direct and indirect effects on employment and income distribution of various types of technological change in agriculture.

Three publications summarize the approach. "Jobs, Poverty and the Green Revolution" (Occasional Paper No. 42) is a popular statement of the total argument; "Technological Change and Distributive Bias in a Dual Economy" (Occasional Paper No. 43, see also Occasional Paper No. 58) presents the mathematical model; "Growth Linkages of the New Foodgrain Technologies" (Occasional Paper No. 50) presents empirical data to illustrate the nature of the growth linkages.

The empirical studies show: (1) that there is wide variation in the effect of agricultural technology on the functional and personal distribution of income according to the nature of new agricultural technologies and the environment within which they are applied (Occasional Papers No. 50 and 52). (2) That expenditure patterns vary considerably amongst income groups and hence that the varying distribution of income from particular new agricultural technologies importantly influences the secondary effects on employment (Occasional Paper No. 54). (3) That one of the most important effects of the new agricultural technologies is a substantial increase in rural incomes which, in turn, stimulate large increases in demand for nonfood grain commodities (Occasional Paper No. 50). Given the common tendency for the bulk of the direct increase in income to go to higher income rural people, it is these secondary effects which must provide the bulk of increased employment and breadth of participation in growth. Of particularly great importance in this respect are the various labor intensive agricultural commodities such as livestock products and fruits and vegetables. (4) Demand for products from small scale industries are likely to increase (Occasional Paper No. 56 and forthcoming). Such industries do have a large labor component but face complex problems in expansion which arise from the commercial orientation of small scale industrial entrepreneurs and their interaction with large scale industries (Occasional Paper 56 and forthcoming). These problems will require special public action if the small scale industries are to fulfill their

potential. (5) There are substantial opportunities for increasing employment and incomes on small farms but problems not only of credit, but of risk and uncertainty arise which require special programs if the potentials are to be met (Occasional Papers 47, 53 and 57). (6) There is substantial interaction between increasing incomes from the new technologies in agriculture, the ability to pay for education and the demand for educated people (forthcoming Occasional Paper). The potentials for rural public works to alleviate employment problems are substantial but still much smaller over the long run than changes in cropping patterns associated with changed technology and demand (forthcoming Occasional Paper). With respect to all of these major findings the analysis provides detailed information necessary for tailoring public policy to the precise requisite development needs.

These models and empirical findings are new; are being widely discussed in seminars and meetings in planning agencies and elsewhere of developing countries and in aid giving agencies; and or contributing towards more effective strategies to accelerate growth and broaden participation in the processes and benefits of growth.

ANNUAL RESEARCH REPORT

"THE IMPACT OF NEW TECHNOLOGY ON RURAL EMPLOYMENT AND INCOME DISTRIBUTION"

Contract No. AID/csd-2805 John W. Mellor, Director

January, 1973

A. General Background

The great and continuing problems of employment and income distribution in low income countries are highlighted and exacerbated by the current technological changes occurring in their food grain sectors. There is no more important problem in low income countries. The relationship between the new food grain technologies and employment and income distribution has complex direct and indirect effects. Fortunately, within these relationships is the basis for policies which may at once accelerate growth and broaden the distribution of income. If the complexities are to be understood and the opportunities grasped, careful, rigorous analysis is necessary which must include a statement of the interrelationships and a construct within which a large quantity of complex empirical data may be placed. Because so little work has been done on this problem in the past a large quantity of empirical data of many types must be gathered, not only to provide a basis for final policy recommendations, but to assist in refining analytical models for future use. New directions for employment oriented strategies of growth are emerging from both the theoretical and the empirical aspects of this study. The research is providing the necessary theoretical model, a simulation model and facts necessary for formulating an employment oriented strategy of economic growth.

B. Statement of Project Objectives as Stated in the Contract

The scope of work in the contract is stated as follows:

(a) To determine and quantify relevant means by which technologies affect farming welfare, employment opportunities and the incomes of rural people, and (b) to derive from the analysis policy recommendations which will help accelerate technological absorption, and rural growth by broadening the base of rural employment and investment opportunities and participation of rural people. In pursuing these objectives, Contractor shall consider the interaction of technological change in agriculture with employment and income distribution and shall build the research plan concurrently on a framework of analysis.

The plan of work for this project includes three parts: (1) a series of studies of the relationship between the infrastructure of agricultural development, the diffusion of new agricultural technologies and the growth and income distribution effects of agricultural development; (2) a series of micro level or farm level, descriptive studies of the effect of agricultural growth on the distribution of income, and (3) development of a theoretical model for analysis of relationships between economic growth and income distribution, with the testing of this model against micro and macro data.

C. Continued Relevance of Objectives

In the nearly three years since the commencement of this research contract there has been a substantial accumulation of experience with the "green revolution" and various attempts to increase employment and broaden the distribution of income. This experience continues to reinforce our original view of the interdependencies between technological

change in agriculture and the growth of employment and the broadening of income distribution. Thus, the basic thrust of this research effort is confirmed.

The initial results of the research have, however, caused some change in emphasis. First, as the complexity of the interactions have become more fully understood, we have placed greater emphasis on development of analytical models. This has been necessitated by the greater complexity than anticipated of the employment processes and encouraged by the necessity of understanding these complex relationships if sound planning is to occur. Second, the initial analysis has shown so clearly the importance to secondary employment of expenditure patterns from increased rural incomes that we have increased our emphasis on that aspect both in conceptualizing and in the empirical work. Third, initial work on the project and the evolution of policy have emphasized the importance of means of reducing capital-labor ratios in providing secondary employment. We have, therefore, increased our efforts in this direction. Fourth, the special policy concern of governments and international agencies with problems of small farmers caused us to give an added emphasis to that set of problems. Fifth, as means of more rapid growth in employment are applied, knowledge of the precise nature of the complex rural labor supply schedule becomes important -- we are, therefore, exploring the potentials for a study in this area. These points of increased emphasis allow the project to proceed towards a more fully integrated conclusion than if we had kept the originally planned emphases intact. One effect, however, has been somewhat less emphasis on description of the many types of innovations in agricultural technology and their wide ranging primary and secondary effects. We have nearly completed a comprehensive analytical framework for measuring these processes and are testing it in depth against

actual situations. The appropriate time is rapidly approaching for such a comprehensive wide ranging analysis which will allow more complete generalization with respect to the effects of technological change in agriculture on employment and income distribution.

D. Accomplishments to Date

1. Findings: The analysis of factor shares for new agricultural technologies confirms that even without mechanization only 5 to 15 percent of increased income is paid to low income laborers through increased employment. Thus, if low income rural people are to participate in the increased incomes, secondary increases in employment must be provided (Occasional Paper No. 50)

The analysis of expenditure patterns by income class show that for India, except for the lowest 10 percent and highest 5 percent of the income classes, a fairly constant 30 to 35 percent of increments to income are spent on nonfood grain agricultural commodities (Occasional Paper No. 54). Milk, fruits and vegetables are the most important items in this category and they are highly labor intensive. Thus, strategy for increasing employment subsequent to new technologies in food grains production should emphasize the production and marketing requisites for expanding this sector. This is an important finding and calls for important shifts in policy emphasis. Past policy in most LDC's has given little emphasis to the potential role of this sector. It is also clear from the same analysis that the proportion of increments to income spent on nonagricultural commodities is substantially higher with each successive income class. But, in the peasant dominated agricultural sector the potential for labor intensive production of these commodities is very great (Occasional Paper No. 50 and 54).

Small scale industries represent a primary means of providing goods to meet rural demand through labor intensive processes. Our study shows, however, that past strategies for developing small scale industry have been ineffective because they fail to recognize key characteristics of small scale industrialists, they, in practice, must be trade oriented because of their large turnover of purchased materiels and the major market imperfections they face. Government policy needs to emphasize (a) increasing the supply of short term credit to such firms and (b) reducing market imperfections through investment in infrastructure and replacement of restrictive regulations by facilitative and supportive programs. In the past, credit programs have emphasized fixed investment and government rules and regulations have tended to increase market imperfections.

Detailed analysis of the structure of industrial development confirm, counter to most other studies, that change in the structure alone of Indian industry has resulted in industrial employment in 1965 being nearly 50 percent less than the level that would have been attained if the structure of 1951 had prevailed (forthcoming Occasional Paper). This emphasizes the importance of structure to employment. That, in turn, emphasizes the importance of increased trade and increased agricultural production as a source of demand for goods of greater labor intensity. These are new findings, quite counter to much of the existing development theory and literature.

The changing structure of demand consequent to rising rural incomes has an important influence on the demand for educated rural people (forthcoming Occasional Paper). The data clearly show that the lower income

rural people do not send their children to school because of the very low net returns to such education under conditions of stagnant rural incomes. Rising rural incomes change that situation radically. Thus, policies for rural education must recognize the interaction among technological change in agriculture, the size and distribution of income, the expenditure patterns for that income, the consequent level and breadth of rural development and the demand for educated people. Rural social and educational policy have given insufficient attention to these questions. This research is generating specific policy suggestions for dealing with these problems. The data in our study show that in areas of vigorous agricultural advance, jobs for persons of primary and secondary school education are much more abundant than in areas of stagnant agriculture. These jobs are substantially in occupations servicing increased consumer expenditures, as well as in those servicing new production technologies.

Even though the potential is substantial for labor force absorption through the derived demand for nonagricultural commodities, there is need to reduce the outflow of labor from agriculture by more effective small farmer programs. Substantial potential exists for increasing incomes of small farmers through increased application of new technology and changing cropping patterns. The most important problem of small farmers is that of uncertainty. It is found in Surat District that the higher income crops are also the higher risk crops (forthcoming Occasional Paper). Likewise, there tends to be more risk with the new high yielding varieties. Thus, greater risk aversion by small farmers leads to widening income disparities between small farmers and large and may thereby drive increasing numbers of small farmers onto the labor market. Programs for small farmers must be designed to deal with this risk problem.

Preliminary analysis of data on rural employment potentials is shedding light on the problem of rural public works (forthcoming Occasional Paper). Rural public works tend to be emphasized in areas experiencing the least technological change in agriculture. This is because these tend to be the areas of greatest poverty and hence greatest need for rural employment programs. However, where agriculture is stagnant the rural works projects tend not to provide a basis for increased production or longer term employment potential. Thus, while helpful in the short run they may not solve the longer run employment and production problem.

The problems of achieving the rural income increase necessary to provide an integrated approach to raising employment and broadening income distribution is apparent from the present research in Thailand. For example, preliminary analysis shows that lack of water control is limiting the new varieties of rice to about 10 percent of the rice acreage (Occasional Paper No. 52). The result is slow spread of innovation, slow increase in rural incomes, small multiplier effects and slow increase in employment.

The studies together reinforce the initial view of the interdependence of technological change, employment and income distribution. Because of this interdependence a broad based study with many component micro studies must be the basis of approach to meaningful answers and policy.

Appendix 1 provides a list of Occasional Papers and Bulletins reporting the findings. The points above are selected from those publications. This list includes publications from this and the closely related preceding contract. Appendix 4 lists all papers issued from this past year's work.

2. Interpretation of Data and Supporting Evidence: The data that support the findings cited above are reported in the respective Occasional Papers. The data are from three sources, (a) secondary data from other published sources, and (b) primary data from our own micro studies, (c) primary data from micro studies administered by others. A schedule for our own micro studies is appended as Appendix 2. Appendix 3 (items a. through j.) includes brief reports on the progress of the various micro studies and outlines of new ones.

The simulation model uses data from all three sources. The analysis of factor shares uses data from micro studies done by others and our own study. The analysis of consumption patterns is based on data from NSS and NCAER studies and has led to our own micro study (Appendix 3.h.), which will fill key gaps in knowledge of this crucial area.

The analysis of capital intensity required our own intensive study of 240 small scale industries. The topic is of such importance to the overall objective that intensive analysis is being carried out of ASI data on capital intensity (see Appendix 3.c. and 3.i.).

The analysis of small farmers and of rural employment options is based on our own micro studies (see Appendix 3.f. and 3.g.).

Close association of our work with other institutions, particularly those in low income nations, has greatly facilitated our access to data sources to the mutual benefit of our work as well as the work of those institutions themselves.

3. Research Design: The research findings have suggested a much more sophisticated approach to study of capital intensity than we had planned. That change is now being incorporated (see Appendix 3.i.). The methodology of the other studies remains as planned.

E. Dissemination and Utilization of Research Results

The effort to see that the research results are effectively used has had three thrusts -- publication, speeches to meetings of groups of research people and administrators, small discussion groups with administrators.

The publication program for this research is active. Fourteen publications have been issued in this year. Appendix 4 lists this year's publications and includes abstracts of each of the publications. The publications are sent to a mailing list of over 500 persons, carefully selected to represent research and administrative audiences. A substantial number of key government officials in low income nations are on the mailing list. A file of several dozen letters confirms that the publications are widely read and influential. The publications are also sent to many persons in the international and bilateral aid agencies. Not only is policy influenced by these publications, but other research is influenced by our methodology and results. In particular, increasing emphasis on multiplier effects of increased rural incomes and analysis of the effects on consumption of changing income distribution can be traced to our work. The publications come out quickly after completion of analysis and so are considered timely.

Particularly during the past year a heavy speaking program has been followed to bring research results quickly to the attention of other researchers and policy makers. This aspect was emphasized this year, compared to other years, because we realized that the work had major implications to the basic questions of choice of an employment oriented strategy. Over 30 such meetings and speeches were given during the year. They are listed in Appendix 5. At these meetings numerous useful suggestions for

improving the research were received and later applied. Demand was also generated for the publications, thereby providing a double exposure.

Numerous meetings were held directly with government officials. These included key members of Planning Commissions in India, Bangladesh, Ethiopia and Nigeria; key members of the cabinet and administrative officials in Ministries of Agriculture in Taiwan, Philippines, India, Bangladesh, Nigeria and Ethiopia; also the members of the Agricultural Prices Commission in India; the President of the All-India Grain Dealers Association and other private sector leaders in India; a large number of division, department and bureau heads in national and international aid agencies. These contacts influenced the direction of the research as well as providing a channel for a direct flow of research results. It is unlikely that one person or research project changes the direction of development planning, but clearly this research is having an unusually large impact.

All projects performed in low income countries are joint projects with a host country institution. The institutions include Kasetsart University, Thailand; Indian Institute of Management, Ahmedabad, India; The Mysore University of Agricultural Science, Bangalore, India; and the G. P. Pant Agricultural University, Pantnagar, India. Arrangements were made at each institution for (a) one of their senior staff to participate in formulating the project and to provide partial supervision of the project; (b) a junior staff member to work in association with the project, particularly including participation in the field work; and (c) for joint publication of research results. The collaborative institution was carefully chosen because of its own capabilities in the area of research and resultant potential for genuine interaction and mutual benefit. In all cases preliminary discussions occurred with personnel at the institution,

followed by drafting of a statement of the sub-project, followed by further discussions or correspondence and final revision. In each case a senior person at the collaborating institution was named to direct the fieldwork with full authority to modify the effort as appropriate to the developing situation. In all cases a significant portion of the analysis was carried on in the field with a direct input from the collaborating agency. In all cases, draft of the manuscripts has been sent and joint publication is arranged whenever the collaborating institution feels it is appropriate.

F. Statement of Expenditures and Obligations and Contractor Resources.

Budget for the Period
April 1, 1972 to March 31, 1973

Category	Estimated Expenditures
Salaries & Wages	$97,000
Consultant Fees	8,000
Overhead	43,000
Travel & Transportation	15,000
Allowances	2,500
Other Direct Costs	20,500
Materials & Supplies	4,000
Grand Total	$190,000

The budgeting and staffing proceeded roughly as planned a year ago.

Budget for the 9 Month Period
April 1, 1973 to December 31, 1973

Category	Estimated Expenditures
Salaries & Wages	$80,000
Consultant Fees	16,500
Overhead	37,876
Travel & Transportation	7,892
Allowances	1,800
Other Direct Costs	16,350
Materials & Supplies	3,600
Grand Total	$164,018

Total A.I.D. Funding of Contract to date
June 30, 1970 to April 1, 1972 $200,643.74

Total expenditures and obligations through previous contract year:
April 1, 1971 to April 1, 1972 $102,825.17

Total expenditures and obligations for current year:
April 1, 1972 to March 31, 1973 $190,000.00

Estimated expenditures for next contract year (9 months):
April 1, 1973 to December 31, 1973 $164,018.00

G. Work Plan and Budget Forecast for Coming Year

The subject of this contract has proved even more important and rewarding than we had anticipated at its inception. The result has been an expansion of the work in most profitable directions and greater complexity in some aspects than had been anticipated. Due to these desirable features the contract work will not be completed on June 30, 1973. Extension to December 31, 1973 should see completion of the original contract work and the base prepared for application of the models, analytical techniques and discovered relationships to a wide range of immediate problems in less developed countries, particularly those of Asia.

The contract work is comprised of three parts. The following section comments on the status of each of those and the remaining work and schedule of activities is presented in Appendix 2.

1. Because of the complexity of the subject, considerable effort has gone into developing a formal mathematical analytical model. The original two-sector, two-market model has now been completely revised and is receiving a great deal of notice and attention. The extension of that model to include three markets -- labor, food and capital -- will require an extension of time but it is expected to be completed by December, 1973.

The mathematical models are being converted into a simulation model which allows us to look at the varying effects of technological changes in agricultures of quite different characteristics. The model developed was given a number of test runs and has now been completely rewritten. New runs are being made and on the basis of that we should be able to complete the model by December, 1973.

We plan a major conference of economic theoreticians and empirical model builders to take place in the fall of 1973, at which time the above

work will be subjected to substantial outside review and its relation with similar thought and work elsewhere noted. That effort should be most useful in completing the work and moving it into widespread and active use.

2. A series of micro empirical studies have been pursued to provide knowledge for formulating our conceptual framework and data for the simulation model. These studies are also providing directly useful information for policy determination in their respective areas.

The studies of small scale industries in India, of factor shares and diffusion problems of improved rice varieties in Thailand, and of the economics of rural education in India should all be completed within the time span of the initial contract. The studies of risk and uncertainty as they relate to incomes of small farmers in India and factor intensity with emphasis on employment in India are all well along and should be completed in the latter part of 1973. The analysis of capital intensity has been expanded and subjected to much more sophisticated analysis than originally intended. Final gathering of secondary data is proceeding and analysis should be completed by late in 1973. The study of rural expenditure patterns are sufficiently complete to allow us to proceed with the work which depends upon it. Because of the importance of this subject we are pursuing it with greater intensity and will expect to have considerably improved results by December of 1973. Obviously, the question of labor supply is important to our overall analysis. We had, however, not realized how little useful information was available on this subject. As a result, we have initiated additional work in this area which will be useful to us in writing the final report for this contract in December of 1973 but which we also hope to carry beyond that time.

3. A major objective of the research has been to provide a basic set of policy guides for an employment oriented strategy of economic development. Occasional Papers 42 and 50, as revised, reflect the first two year's work towards contribution of this objective. A substantial portion of the Project Director's time is devoted to developing this statement of strategy and integrating the total work into that statement to provide support of the positions taken and to indicate specific further research needs. That effort is proceeding and should be complete by the end of 1973.

4. I have carried on extensive discussions about our work with USAID and national officials in India, Bangladesh, Philippines, Thailand and Nepal in Asia and Ethiopia and Nigeria in Africa. It seems clear that the work as of December, 1973 will provide us with a firm basis for analyzing and prescribing with respect to a wide range of key problems arising from technological change in agriculture and its affects on levels of employment and the distribution of income. The research into direct and indirect effects of technological change also suggest the basis for a major further research thrust which will provide direct and continuing assistance to action programs. During the next several months these implications will be carefully drawn.

5. A budget follows for the 9 month period from March 31, 1973 to December 31, 1973. The rate of spending projected is based on our estimates of specific manpower and other requirements for that period. Our rate of spending at the present time is at a higher rate than what we project for that future nine month period. This necessitates holding a tight line on assistance for the final write-up phase of the work.

Proposed Budget

March 31, 1973 to January 1, 1974

Category	Amount
Salaries & Wages	$80,000
Consultant Fees	16,500
Overhead	37,876
Travel & Transportation	7,892
Allowances	1,800
Other Direct Costs	16,350
Materials & Supplies	3,600
GRAND TOTAL	$164,018

LIST OF APPENDICES

		Page
1.	List of Occasional Papers	22
2.	Schedule for Sub-project and Project Completion	29
3.	D.2. Supporting Evidence for Interpretation of Data (Included only in report to AID)	30
4.	E.1.(1) Bibliographic List and Abstracts	73
5.	E.1.(2) Statement Identifying Use of Materials (Included only in report to AID)	88
6.	E.2. Evidence of Findings of Research being used in LDC's and U.S. (Included only in report to AID)	91

Appendix 1. December, 1972.

PUBLICATIONS LIST

Cornell University - USAID

Prices, Employment and Income Distribution Research Project

Department of Agricultural Economics

Cornell University

PUBLICATIONS LIST

Cornell University - USAID

Prices, Employment and Income Distribution Research Projects.

Department of Agricultural Economics

Cornell University

Paper No.	Date	Title	Author
1.	Oct. 1967	"Change in Relative Prices of Agricultural Commodities, India, 1952-53 to 1964-65" (out of print).	John W. Mellor and Ashok Dar
2.	Oct. 1967	"Notes on Foodgrains Prices, India, 1967-68 to 1968-69"	John W. Mellor
3.	Dec. 1967	"Determinants and Development Implications of Foograins Prices, India, 1949-50 to 1963-64" (Published in The American Journal of Agricultural Economics, Vol. 50, No. 4, Nov. 1968) (out of print).	John W. Mellor and Ashok Dar
4.	Nov. 1967	"Domestic Terms of Trade and Economic Development in India, 1952-53 to 1964-65" (Cornell International Agricultural Development Bulletin No. 12)	Ashok Dar
5.	Jan. 1968	"Note on Agricultural Price Policy - 1968 Indian Wheat Price Support"	John W. Mellor
6.	Jan.-March 1968	"The Functions of Agricultural Prices in Economic Development" (Published in the Indian Journal of Agricultural Economics, Vol. XXIII, No. 1, Jan.-March, 1968)	John W. Mellor
7.	Jan.1968 Revised July1969	"Three Reviews of Indian Agriculture: a) agricultural production trends b) marketing c) village studies"	John W. Mellor
8.	Jan. 1968	"Farm Management Extension in a Modernizing Agriculture" (Published in Netherlands Journal of Agricultural Science, 16, No. 4, 1968)	John W. Mellor

Paper No.	Date	Title	Author
9.	Apr. 1968	"Opportunities and Problems Associated with Wheat Production, Marketing and Pricing in the Kathmandu Valley"	John W. Mellor
10.	Apr. 1968	"Wheat Production and Utilization as a Leading Edge for Development in the Kathmandu Valley"	John W. Mellor
11.	Sept. 1968	"Statistical Tables, Methodology, Data Sources and Conclusions regarding Intersectoral Capital Flows in the Economic Development of Taiwan, 1895-1960"	Teng-hui Lee
12.	Dec. 1968	"Working of Grain Markets in Selected States, India, 1955-56 to 1964-65" (Out of print).	Uma J. Lele
13.	June 1968	"A Study of Movement in Prices of Selected Items of Foodgrains and Industrial Raw Materials in India, 1939 to 1967-68" (Out of print).	M B. Mathur
14.	Jan. 1969	"Increasing Fertilizer Use in Indian Agriculture"	Gunvant M. Desai
15.	Jan. 1969	"A Note on the Distribution Effects of Chilean Agricultural Price Policies"	Roberto Echeverria
16.	Jan. 1969	"Economic Analysis of Well Irrigation, Aligarh District, India"	T. V. Moorti
17.	Apr. 1969	"The Modernization Decision in Indian Urban Fluid Milk Markets" (Cornell International Agricultural Development Bulletin No. 15).	Ray W. Nightingale
18. thru 23	Mar. 1969	Summary Tables for Study of Diffusion of Innovation, Central Plains, Thailand (Out of print see Paper No. 41).	Brook A. Greene & Jerachone Sriswasdilek
24.	July 1969	"Growth of Fertilizer Use in Indian Agriculture" Expanded and reissued as Cornell International Agricultural Development Bulletin No. 18.	Gunvant M. Desai
25.	Aug. 1969	"The Relationship Between Agricultural Production and Industrial Capital Formation in India, 1951-52 to 1964-65" (Cornell International Agricultural Development Bulletin No. 17).	U. S Bawa

Paper No.	Date	Title	Author
26.	Oct. 1969	"An Economic Analysis of Resource Use in Farming, Jabalpur District, Madhya Pradesh, India, 1967-68" (Cornell International Agricultural Bulletin No. 20)	V. P. Shukla
27.	Aug. 1969	"Agricultural Price Policy in the Context of Economic Development" (Published in The American Journal of Agricultural Economics, Proceedings Issue, Vol. 51, No. 5, December, 1969.	John W. Mellor
28.	Sept. 1969	"Stability for Primary Products: Means to What Ends?"	W. G. Tomek
29.	March 1970	"A Comparative Study of Well Irrigation in Aligarh District, India" (Cornell International Agricultural Bulletin No. 19)	T. V. Moorti
30.	June 1970	"The Effect of Agricultural Price Policies on Intersectoral Income Transfers" (out of print).	Roberto Echeverria
31.	June 1970	"The Structure and Performance of the Rice Marketing System in East Pakistan," Expanded and reissued as Cornell International Agricultural Bulletin No. 23.	M. O. Farruk
32.	June 1970	"The Impact of the Sonauli-Pokhara Highway on the Regional Income and Agricultural Production of Pokhara Valley, Nepal," Expanded and reissued as Cornell International Agricultural Bulletin No. 14.	Mark C. W. Schroeder & Daniel G. Sisler
33.	June 1970	"Agricultural Resource Transfers and Agricultural Development: A Brief Review of Experience in Japan, England, and France"	Uma J. Lele
34.	June 1970	"Technological Change in Agriculture and Intersectoral Resource Flows," Revised January, 1972 and reissued as: "Accelerated Growth in Agricultural Production and the Intersectoral Transfer of Resources"	John W. Mellor
35.	May 1970	"A Brief Bibliographical Sketch on Intersectoral Capital Transfers in Japan" (Out of print).	Shigemochi Hirashima
36.	June 1970	"Fertilizer Adoption and Use in Amphoe Manorom, Thailand, 1967-69"	Brook Greene
37.	June 1970	"An Analysis of Modernization of the Rice Milling Industry in India"	Uma J. Lele
38.	June 1970	"Elements of a Food Marketing Policy for Low Income Countries" (Published in The Marketing Challenge: Distributing Increased Production in Developing Nations, Foreign Economic Development Report 7, December, 1970)	John W. Mellor

Paper No.	Date	Title	Author
39.	June 1970	"Agricultural Prices in Economic Development - Their Role, Function and Operation" (Out of Print, for summarization of points in this paper, see No. 51)	John W. Mellor
40.	July 1970	"Modernization of the Rice Milling Industry" (Published in Economic & Political Weekly, Vol. V, No. 28, July 11, 1970)	Uma J. Lele
41.	Nov. 1970	"Rate of Adoption of New Farm Practices in the Central Plains, Thailand"	Brock Greene
42.	June 1971	"The Political Economy of Employment Oriented Development." Now available as a reprint entitled, "Jobs, Poverty and the "Green Revolution," (Published in International Affairs, Vol. 48, No. 1, January, 1972)	Uma J. Lele and John W. Mellor
43.	June 1971	"A Labor Supply Theory of Economic Development" (Out of print; to be replaced by revised "Technological Change and Distributive Bias in a Dual Economy," by Uma J. Lele and John W. Mellor).	John W. Mellor and Uma J. Lele
44.	Feb. 1971	"Capital-Labor Ratios, Capital-Output Ratios, and Rates of Profit in Indian Industry"	Grace Horowitz
45.	June 1971	"A Note on Dualistic Models"	Uma J. Lele
46.	June 1971	"Dilemma of State Tube Wells" (Published in Economic & Political Weekly, Vol. VI, No. 13, March 27, 1971)	John W. Mellor & T. V. Moorti
47.	Aug. 1971	"Differential Rates of Adoption of the New Seed Varieties in India: The Problem of the Small Farm"	Michael Schluter
48.	Sept. 1971	"The Green Revolution: Income Distribution and Nutrition" (Published in Philip L. White (Ed.), Proceedings - Western Hemisphere Nutrition Congress III, Mount Kisco, N.Y.: Futura Publishing Co., Inc. 1972)	Uma Lele
49.	Dec. 1971	"The Modern Rice Mill in India"	Uma Lele
50.	Dec. 1971	"Growth Linkages of the New Foodgrain Technologies"	John W. Mellor & Uma J. Lele
51.	Oct. 1970	"The Basis for Agricultural Price Policy" (Published in War on Hunger, Vol. IV, No. 10, Oct. 1970)	John W. Mellor

Paper No.	Date	Title	Author
52.	Feb. 1972	"Preliminary Observations on the Production of New High Yielding Rice Varieties and Traditional Rice Varieties in Suphan Buri, Thailand."	William R. Burton and Tongruay Chungtes
53.	Mar. 1972	"New Seed Varieties and the Small Farm" (Published in Economic & Political Weekly, Vol. VII, No. 13, March 25, 1972).	M. Schluter & John W. Mellor
54.	Aug. 1972	"Analysis of Consumption Expenditure Patterns in India."	B. M. Desai
55.	1973	"Nitrogen Use and Foodgrain Productions, India, 1973-74, 1978-79 and 1983-84" (forthcoming).	G. M. Desai
56.	July 1972	"Capital Intensity, Absolute Size and Growth Rate of the Small Industries Sector in India: A Critique of Official Estimates."	Jan H. van der Veen
57.	Oct. 1972	"Some Aspects of the Suitability of High Yielding Rice & Bajara Varieties for the Small Farm, Thanjavur and Mehsana Districts, India."	Michael G. G. Schluter and Richard W. Longhurst
58.	Dec. 1972	"Models of Economic Growth and Land Augmenting Technological Change in Foodgrain Production."	John W. Mellor

John W. Mellor
March, 1972.

BULLETINS REPORTING RESEARCH ON THE ECONOMICS OF ASIAN AGRICULTURE

Cornell International Agricultural Development Series

1. Uma J. Lele and John W. Mellor, "Estimates of Change and Causes of Change in Foodgrains Production, India, 1949-50 to 1960-61." Bulletin No. 2.

2. John W. Mellor and Bruno de Ponteves, "Estimates and Projections of Milk Production and Use of Concentrate Feeds: India, 1951-1976." Bulletin No. 6.

3. Thomas F. Weaver, "Irrigation Evaluation under Monsoon Rainfall Patterns -- A Case Study for Raipur District, Madhya Pradesh, India." Bulletin No. 10.

4. Ashok K. Dar, "Domestic Terms of Trade and Economic Development of India, 1952-53 to 1964-65." Bulletin No. 12.

5. Mark C. W. Schroeder and Daniel G. Sisler, "Impact of the Sonauli-Pokhara Highway on the Regional Income and Agricultural Production of Pokhara Valley, Nepal." Bulletin No. 14.

6. Ray W. Nightingale, "The Modernization Decision in Indian Urban Fluid Milk Markets." Bulletin No. 15.

7. Ujagar S. Bawa, "Agricultural Production and Industrial Capital Formation, India, 1951-52 to 1964-65." Bulletin No. 17.

8. Gunvant M. Desai, "Growth of Fertilizer Use in Indian Agriculture -- Past Trends and Future Demand." Bulletin No. 18.

9. T. V. Moorti, "A Comparative Study of Well Irrigation in Aligarh District, India." Bulletin No. 19.

10. V. P. Shukla, "Interaction of Technological Change and Irrigation in Determining Farm Resource Use, Jabalpur District, India, 1967-1968." Bulletin No. 20.

11. M. O. Farruk, "The Structure and Performance of the Rice Marketing System in East Pakistan." Bulletin No. 23.

12. Brook A. Greene, "Rate of Adoption of New Farm Practices in the Central Plains, Thailand." (Forthcoming)

These studies are part of a continuing series being carried on in the Department of Agricultural Economics at Cornell University. See, also, list of Occasional Papers.

Appendix 2. Schedule for Sub-Project and Project Completion

Sub-Project Director	Project	Date work Started	Date field work ended	Date statistical analysis completed	Date of completion of report
1. John W. Mellor & C. Ranade with collaboration of U. Lele	The conceptualizing				
	Phase I	7/70			4/71
	Revised Phase I	10/71			2/72
	Phase II	5/71			6/73
2. John W. Mellor & Mohinder Mudahar	Simulation model				
	Preliminary report	9/71			3/72
	Final report	--			12/73
3. Jan van der Veen	Employment potential in small industries, Gujarat State	10/70	10/71	8/72	12/72
4. William R Burton	Comparative study of agricultural innovations with respect to productivity & distribution of economic returns	12/70	12/71	12/72	3/73
5. Richard Shortlidge	Cost benefit analysis of education of rural people in Uttar Pradesh	2/71	9/71	3/73	6/73
6 Michael G Schluter	Raising incomes on small farms - Bardoli Taluka, Surat District, India	8/71	1/73	5/73	8/73
7. W Graeme Donovan	Direct & indirect employment effects within agriculture of new agricultural technologies	8/71	9/72	6/73	10/73
8 Bhupendra Desai	Consumption pattern effects				
	Phase I - secondary data	2/71			10/72
	Phase II - field study	9/72	6/73	10/73	12/73
9. Uttam Dabholkar	Capital labor ratios as they relate to employment growth	6/71	3/73	8/73	12/73
10. Gillian Hart	Labor Supply Schedule	Preliminary and Exploratory			
11. John W. Mellor	Final overall report				12/73

TABLE OF CONTENTS

Appendix D 2.

INTERPRETATION OF DATA & SUPPORTING EVIDENCE

a.	The Conceptualization of the Model	C Ranade
b.	Simulation Model Project	M. S. Mudahar
c.	Abstract of, "Small Industries in India The Case of Gujarat State	Jan H van der Veen
d.	New Rice Technology and Rural Incomes in Suphan Buri, Thailand	William R Burton
e.	Determinants of Educational Investment Patterns for Five Income Categories in Rural Uttar Pradesh	R. L. Shortlidge, Jr.
f.	Comments and Observations after Field Trips, Surat District, India	Michael G Schluter
g.	Optimising Employment Generation in Two Areas of Mysore	W. Graeme Donovan
h.	Changes in Consumption and Investment Under the Old and New Food Grains Technologies, India	B. M Desai
i.	The Nature of Growth and the Evolving Composition of the Industrial Sector in India	Uttam Dabholkar
j.	Labor Supply Schedule, Preliminary and Exploratory, Bangladesh	Gillian P. Hart

THE CONCEPTUALIZATION OF THE MODEL

First Model

The first model (in the form of the paper entitled, "Technological Change and Distributive Bias in a Dual Economy") demonstrates the transfer of surplus labor from the food grain sector to the nonfood grain sector as marketable surplus of food grains increases due to land-augmenting technological change. The food grain production is assumed to be a function of land and labor. The nonfood grain output depends on capital and labor where the supply of capital is exogenous before the economy starts functioning and following the growth path. The model leaves an open end for incorporating intersectoral capital transfers.

Second Model

As a continuation of the first model, we analyze allocation of capital goods between food grain and nonfood grain as the food grain production shifts towards land-saving technologies. The food grain production depends on land, capital and labor where returns on land and capital go to the landlords. If rate of return on capital is held constant, land-augmenting technological change would increase savings of landlords and this, in turn, would generate net financial flows from the food grain sector to the nonfood grain sector. The land-saving technologies may thus serve as an alternative to a land tax in the developing countries. Additionally, with rise in the marketable surplus of food, as surplus labor moves towards the nonfood grain sector, less capital intensive techniques in nonfood grain would stimulate an increasing flow of physical capital goods to the food grain production. It is complementarities in the food grain production that makes the second model more complex and we are in the process of analyzing those interactions.

(D.2.b.) Mohinder S. Muhadar
January, 1973.

SIMULATION MODEL PROJECT

We are all aware of the technological breakthroughs which took place in the last decade within the agricultural sector of many Asian countries. Those breakthroughs led to significant changes in the economic performance and prospects of many of the less economically developed countries (LDC's). Some of the eminent development economists, who maintained that the agricultural sector can not provide stimulus to the overall economic growth in the LDC's, were taken by surprise. The fruits of this so-called "green revolution" have been and are being realized in many Asian countries, including India, which a few years ago were considered to be at the verge of the "Malthusian trap."

This agricultural revolution led to changes in the agricultural productivity, income distribution patterns, employment and migration patterns, consumption and demand patterns, intersectoral resource transfers, etc. Most of these problems seem to have important long-run implications to influence the overall environment (economic, social, political, etc.) suitable for the life and dignity of human beings all over the world, especially in the LDC's. Some of these problems need immediate attention and urgent solutions. This calls for developing new "theoretical frameworks" to analyze these problems and a new "set of priorities" to formulate agricultural policies.

We have developed a simple simultaneous equation system simulation model which focuses precisely on these questions. Specifically, it is designed to trace out the effects of technological change on the agricultural production, employment in the agricultural and the nonagricultural sectors, consumption behavior and its subsequent implication on the demand patterns, etc. The construction of the simulation model is complete. This macro-type simulation model is for the economy as a whole. However, the economy is divided into agricultural and nonagricultural sectors. The agricultural sector is further divided into food grains and nonfood grain sectors. The agricultural commodities are produced by using modern and traditional technologies. All these sectors are linked with each other through several simple "feedback functions."

Currently the model is being estimated by using a special computer package, MACRØ - SIM, developed by Professor Donald Hester at the University of Wisconsin. The data used to estimate the model are related to the Indian economy. The preliminary results have been obtained and are quite encouraging. We hope to obtain a complete set of empirical results within a matter of weeks. Furthermore, the simulation model is being tested under alternative model specificaions and policy parameters. This sensitivity analysis will help us to analyze the qualitative properties of the model and to trace out the implications of alternative policy regimes.

(D.2.c.) Jan H. van der Veen
September, 1972

SMALL INDUSTRIES IN INDIA
THE CASE OF GUJARAT STATE

The Government of India recently has shown considerable interest in promoting the development of the small industries subsector. It is widely presumed that small industrial units, in general, have a greater employment creation potential per rupee of capital investment than do large industrial units.

Data covering larger industrial units in India are quite comprehensive and are more than adequate to meet most research needs. Unfortunately, adequate data on small industrial units are not available. This project contributes to efforts currently being made to overcome this lacuna in the data.

A purposive random sample, stratified into twelve industry groups and by geographic districts, was drawn from a population of urban unregistered industrial units employing at least five persons and located in the state of Gujarat in western India. Recall data was obtained from two hundred six of two hundred fifty respondents for the accounting year ending in October 1970 (Diwali year). The interviews were designed to determine (1) whether the active promotion of the urban unregistered industrial subsector is consistent with the stated objectives of the government; (2) if so, what particular features of this subsector best lend themselves to manipulation by policy makers; and (3) what effects the active promotion of this subsector would have on the overall industrial structure of the state.

The findings of this study of small industrial units in Gujarat support the general presumption that small industries do offer substantially more employment creation potential than do large industrial units, whether measured against capital engaged or against value added. The findings also suggest that small industrial units, in general, are characterized by lower capital/value added ratios than are large industrial units. Thus, a policy which promotes the expansion of the small industries subsector would tend to improve employment opportunities for prospective industrial workers while encouraging more effective use of that capital which is available for purposes of industrial development.

One of the outstanding general characteristics of the small industries subsector is its marked "commercial orientation." Due to the remarkably heavy use of material inputs in the production process and the serious imperfections which characterize most of the materials markets in which small industrialists operate, returns to entrepreneurial activities which emphasize purchasing and marketing are relatively large. Correspondingly, returns to entrepreneurial activities which emphasize the production process itself, as reflected in a deep interest in full capacity operations or in technological improvements, are relatively small. Industrial policies which concentrate on manipulating this "commercial orientation" are likely to bear with particular force on the behavior of small industrialists.

The structural interdependence of small industries is explored by using an input-output model of Gujarat state, expanded explicitly to include the small industries subsector. The results suggest that urban unregistered units are strongly integrated into the state's industrial sector. Backward linkages from large and small units alike are considerable, as are forward linkage into other small units. Forward linkages into large industries are weak.

The small industrial units covered in this study are profit making units which form an integral part of the industrial structure of Gujarat state. Appropriate policies which focus on the marked "commercial orientation" of these units will increase industrial employment and will encourage more effective use of capital. While these policies must be sensitive to the marked degree of industrial interdependence which characterizes small industrial units, it is clear that active promotion of the small industries subsector is consistent with the stated objectives of the Government of India.

(D.2.d.) William R. Burton
November, 1972

NEW RICE TECHNOLOGY AND RURAL INCOMES IN SUPHAN BURI, THAILAND

From the great diversity of reports it has become clear that the economic impact of the new grain technology differs in each country, largely due to agronomic conditions and the unique political, economic and cultural climate found in each country. Therefore, important policy decisions regarding potential impact of the Green Revolution in Thailand cannot be based solely upon studies from other countries. The Green Revolution can, and is, taking many forms depending upon the local farming conditions and institutions.

During the 1960's rice technology in Thailand steadily modernized itself through increased use of tractors, chemical fertilizers, pesticides and weedicides. The key technology yet to be available was development of a high yielding variety of rice. Thailand, perennially one of the world's largest rice exporters, was especially concerned with maintaining a high quality of rice for international trade and did not accept the low quality, original "miracle rice" of the Philippines for domestic production. Instead, the Rice Department of Thailand crossed the Philippine variety with Thai varieties with the objective of combining the high yielding and other favorable attributes of the Philippine variety with the quality and local adaptability of the Thai varieties. In December, 1969 the Thai Rice Department approved and recommended the use of two high yielding rice varieties for the great central rice producing region of Thailand.

This study, begun in December, 1970 in cooperation with the Department of Agricultural Economics of Kasetsart University, had the following three objectives:

(1) To determine the conditions limiting and promoting the profitability of the new rice technology in a major rice producing province of Thailand.

(2) To determine the favorable and unfavorable aspects of accelerated innovation use from the point of view of growth in production and the distribution of benefits among regions and socio-economic groups.

(3) To diagnose the implications of direct and indirect policies with respect to the distribution effects of the new rice technology.

It was also felt that much information on factors affecting the rate of adoption was of sufficient importance to be included in order to more fully understand the pattern of acceptance, rejection and the discontinuities in adoption of the new techniques.

With respect to objective (1), the analysis attempts to determine why certain of the new technologies are not profitable under present

agro/economic conditions and thus identify areas where further biological research could develop profitable innovations, and/or where government policymakers could alter existing economic and institutional conditions toward the same end.

With respect to objective (2), for many rural households in Thailand employment opportunities as laborers on other farms is an important source of cash income. This is particularly true of landless laborers. The impact of the HYV on the demand for farm labor in Thailand was an unknown when this field study began, therefore, information was required on both the supply and demand of agricultural labor. The source of hired labor was considered especially important.

As credit needs increased with increasing adoption of the new technology the very important question of the economies of scale associated with use of the new technology required special attention.

Data on landlord/tenant arrangements was also gathered and analyzed as well as information on land values in areas where the HYV were grown.

The critical relationship between yield, variety and degree of water control is investigated. Even before introduction of the HYV, we saw in the Central Region of Thailand evidence of uneven water conditions leading to an uneven level of income.

With respect to objective (3), will increased rice production necessarily lead to higher incomes? It may in the short run, but if production and breeding research proceed faster than research in storage, marketing and utilization, the long run outlook may not be so promising. Existing input price policies, paddy price supports and the rice premium all must now be analyzed in view of these recent developments in Thai rice production. In addition, policies must be formulated to deal with the different agro/economic areas within Thailand. One policy for the nation may not suffice, as each area has its own unique problems.

Therefore while we have certain initial production and distribution effects on farm income and employment, we also may have significant national results with major social and political implications.

DETERMINANTS OF EDUCATIONAL INVESTMENT PATTERNS
FOR FIVE INCOME CATEGORIES IN RURAL UTTAR PRADESH

From June to December 1972 the household data was tabulated and analyzed from the standpoint of simple averages. The data included 248 households from Badaun district and 46 households from Nainital district. These households were taken from a sample of twelve villages in Badaun and two villages in Nainital.

The results of this stage of the analysis reveal: (1) The average size of land held in Badaun corresponded to the All-India average, whereas in Nainital the average was nearly double. (2) For households owning less than 7.5 acres of land, including the landless groups, little variation in the average per capita income for the year 1970-71 was observed. The marked difference in per capita income was noted for households owning more than 7.5 acres of land. (3) The labor force participation rates (includes both sexes) was 4.15 percent for the population under ten years of age, 28.44 percent for the population between 11 and 15 years of age, 59.40 percent for the population between 16 and 20 years of age, 58.10 percent for the population between 21 and 30 years of age, and 52.21 percent for the population over 31 years of age. Participation in the labor force was highest among the small landowners for the population under 15 years of age, for children generally and for adult women. As the size of land held by the household increased, the participation of children and women declined. (4) With rising income per working household member, child and adult female labor is withdrawn. The result for the households owning less than 7.5 acres of land was a fairly stable income per capita. (5) Participation in school parallels, but inversely, the labor force participation of children. The lowest participation of children in school was found for the small landholding groups and their participation was even lower than for the landless groups comprising agricultural laborers and traditional village artisans. (6) As expected, the population over twenty years of age has a lower level of formal education than the population under 20 years of age not attending school. The deviation between the two groups decreases as the size of the household's landholdings increase, the most dramatic differences being in the cases of the landless agricultural laborers and village artisans and the small landholding households. (7) Education below eighth or tenth grade does not enhance the prospects for employment outside the village under today's conditions in India and, therefore, the poorest members of rural society are denied employment beyond the village. Although free primary education and the rapid expansion of primary facilities has dramatically increased the participation of low income rural households in school, the fact that middle school and high school are not free means that these levels of education are effectively denied to the very poor in rural India. (8) The rapidly rising direct and indirect cost of schooling after primary grades coincides with a significant decline in the participation of the poorest rural households in school. The increase in cost is matched by a rather vague understanding of the employment possibilities for the

educated outside the village. Therefore, uncertainity may explain in part the decline in participation among the poor.

The analysis to be completed involves the use of regression analysis to explain the participation and nonparticipation of children in school. With participation or nonparticipation the dependent variable, the regression will explore the impact of a set of independent variables which will include household income, age, sex, caste labor force participation divided into quarters of the year, educational qualifications of adult household members, family size, etc. This analysis will be the foundation of the quantitative aspects of the study.

M. Schluter
May 29, 1972

Comments and Observations After Fieldtrips, Surat District, India

Some comments on Determinants of the Cropping Pattern

The most commonly accepted theory is that there are two types of farmers:

(1.) Subsistence farmers, who decide first to grow what they need for home consumption and then put surplus acreage under cash crops. This assumes farmers have a fixed food requirement, and they put sufficient acreage under food crops to meet this requirement.

(2.) Commercial farmers, who sell all they produce on the farm, and then buy their food from the market.

But this theory leaves too many questions unanswered, especially with respect to subsistence farming:

1. The food requirement of a farmer is not simply 'fixed.' He may consume more in a good year than in a bad year. Also, he may substitute one crop for another in his diet, if the yield of one crop is good and the yield of another is poor.

2. The acreage necessary to meet the 'fixed' requirement is not certain. If yields are good, a much smaller acreage is necessary to supply food for the family than if yields are 'normal' or poor. So we need to know if the farmer assumes good, normal or poor yields is assessing acreage to be put under foodcrops.

3. The theory assumes the farmer gives priority to meeting food requirements. Only then does he think about cash. But unless the farmer repays the moneylender or cooperative this year, he cannot get a loan for next year. Also the moneylender may refuse to lend to the farmer unless the farmer is growing a crop which he can use to repay the loan. If the farmer is giving priority to repaying his current debt in deciding which crops to grow, he is not giving first and only priority to meeting his food requirements.

In a broader context, the theory does not explain why one farmer is a subsistance farmer and another a commercial farmer, nor how a farmer can change from being one to being the other. Also, we cannot learn from this theory why a farmer decides to grow one cash crop rather than another.

The risk-income hypothesis provides an integrated approach to all the decisions a farmer makes with respect to his cropping pattern. Food and cash crops are not considered in isolation, but interact to reduce risk, as a food crop and a cash crop may be especially profitable in different years.

The tendency for small farmers to concentrate on foodcrops may be explained in terms of this risk hypothesis. To grow your own food is less 'risky' than growing commercial crops. This is partly because the latter have to be sold, so there are price as well as yield fluctuations, and partly because commercial crops are generally more prone to disease. Also, if you sell your crops and buy your food, there are the price fluctuations in the food you are buying which add to your uncertainty.

How risk aversion may influence the cropping pattern can be seen in the following case (actual figures)

A farmer has:

Area	Soil Type	Crops grown	Crops possible
1. V	Deep Black	1 V Paddy	Paddy, Cotton Jowar
2. V	Black	2 V Jowar 1 V Groundnut	Cotton, Groundnut, Paddy, Jowar
1. V	Mixed	1 V Cotton	Cotton, Groundnut Jowar

Total cultivated land was 4 vigas = 2.4 Acres

The main reason why he is growing all three crops seems to be to lower his 'risk.' One year cotton gives a high income and groundnuts a low-income, and the next year, vice versa. Although his average yearly cash income is not as high as it would have been if he had concentrated on cotton, the yearly fluctuations in his income are lower.

The risk hypothesis may also explain why it is mainly small farmers who lease out land. Leasing-out land is the least risky alternative, although being the lowest income alternative. Income, albeit a low income, is perfectly assured.

Dairying

Dairying competes with both food and cash crops in the following ways:

(1) For Land This is especially true of the rabi season. For example, farmers grow lucerne or val to provide animal fodder rather than wheat or vegetables. Also, the need to supply fodder may inhibit expansion of acreage under sugarcane. A paddy and val combination supplies a lot of fodder as subsidiary product, whereas sugarcane does not supply any.

In region 1, farmers have opted mainly for the sugarcane alternative, mainly owing to shortage of domestic labour to look after buffaloes.

In region 2, with mainly small farms, farmers have opted mainly for the buffaloes alternative, since this has three additional advantages for the small farmer:

(1) Paddy and rabi crops are of short duration, and less capital intensive than sugarcane, so less borrowing is necessary

(2) The risk of a paddy and rabi crop combination is less than for sugarcane.

(3) Buffaloes and crops are a less risky alternative than just sugarcane

In region 3, with no irrigation facility, the competition between foddercrops and cash crops is very clear cut. Additional buffaloes would require an increase in the acreage under jowar, and a consequent decrease in acreage under the competing cash crops cotton and groundnuts.

(2) For Labour In the area of my study, it is mainly the women who look after the buffaloes. Women also assist in peak periods of labour demand (i.e. paddy planting and harvesting). The number of buffaloes a farmer keeps is thus dependent on the number of women in the house, the number of children to be looked after, the number of children who can help, and the health of the women concerned. Education is very important as a factor reducing availability of labour to look after buffaloes. In the tribal area, where most small farmers and their wives supplement their income with agricultural labour, often nobody was left at home to look after the buffaloes during the day.

(3) For Working Capital Many small farmers emphasized the problems of keeping buffaloes when they were not in milk. Those with an external occupation had an obvious advantage in this respect, as also those who had a large enough herd always to have one buffalo (or cow) in milk.

In one village, none of the above acted as the critical constraint to dairying development, but simply the lack of marketing facilities. The selling of milk is of such difficulty that no farmer with less than five acres kept a buffalo.

Co-operative Credit

The small offtake of co-operative credit in region 3 (tribal and unirrigated) was due to a lack of demand for credit. This may be traced to several factors.

1. Lack of profitable investment opportunities Especially with no possibility of selling milk, there were very few opportunities for profitable use of additional cash.

2. Uncertainty Small farmers repeatedly expressed unwillingness to use additional credit available from any source owing to the possibility of crop failure, leading to an inability to repay. The most obvious possible use of a short-term loan was to purchase chemical fertiliser for use on paddy. Farmers were unwilling to do this because they felt it was 'risky.'

3. Competition from the moneylender The moneylender's agent bought all the cash crops in the village. He also provided loans as and when required. (Also a more permanent institution?)

4. Inefficiency of co-operative (a) Fear of not getting loan in time, (b) A fixed interest rate regardless of when loan repaid. Farmers had no advantage from repaying after the harvest in November than in the following April, as they paid 9% on the amount borrowed whenever they repaid. Between November and April, plenty of other uses arose for the money to be used for repaying the co-operative.

Note: If a farmer borrowed from a money lender year after year, and then this year borrowed from both a cooperative and the moneylender, the opportunity cost of failing to repay one or the other, from the point of view of the interest paid, would be about the same.

Miscellaneous Points on Use of Labour

(1) Opportunity Cost of Labour to Small Farmers: There was sometime less weeding on small farms. Since these farmers were also working as agricultural labourers, a high labour input on their own farm had an obvious opportunity cost since the weeding period is the same on all farms and therefore was the period when they could obtain employment.

(2) Vegetables are human labour intensive (for harvesting) and bullock labour intensive for transport. The bullok labour for transport is at a 'peak' period as there is demand for ploughing for jowar and cotton. Thus the 'surplus' human labour and bullock power make vegetables especially suitable for the small farm.

(3) Tractors 33 out of 80 farmers in the irrigated area used tractors for some operation. Two owned tractors. Those 31 hiring in tractor services did so almost exclusively for:

(a) Ploughing for sugarcane and other rabi crops

(b) Threshing for wheat

This suggests that demand for tractor services is highly crop specific and operation specific.

OPTIMISING EMPLOYMENT GENERATION IN TWO RURAL AREAS OF MYSORE

Interim Report by W. Graeme Donovan

March, 1972

Since arrival in India in January, most of my time has been taken up with discovering sources of information, and I have had a considerable number of discussions with officials in a range of government departments. The Bureau of Economics and Statistics has set up a benchmark survey of marginal farmers and agricultural laborers, and the results of this should be available to me in June. Some of my most interesting talks have been with the Director of the Land Army, an organization peculiar to this state. Rural works are being dealt with under four separate schemes. First, the normal Fourth Plan expenditure amounts to Rs. 145 crores on works affecting the rural sector. Second, there is a World Bank project, beginning this year, costing Rs. 60 crores, about half of which will be spent on rural works, mainly for constructing open wells and reclaiming land. (Incidentally, about Rs. 12 crores of the World Bank budget has been allocated for purchase of tractors and some other agricultural machinery.) Third, a series of Rural Works Projects have been taken up as employment generating measures to replace the older Rural Manpower Utilization Projects. These are confined to selected districts and the budget for 1970-74 is Rs. 14 crores. Finally, under the Crash Scheme for Rural Employment, expenditure is taking place on a small scale in every Taluk. The budget for the state for 1971-72 was about Rs. 2.5 crores. Part of this latter sum has gone to the Land Army, which has 15 special projects underway in particular problem areas of the state.

What interested me most about the Land Army was the highly disciplined attitude being adopted toward <u>organization</u> of their projects. Under this

approach labor contractors and middlemen have been eliminated. The Army rigorously selects and trains supervisors who become responsible for all details of their particular project, including recruitment of unemployed youths in the villages. Recruits remain in camps during working periods, where they are fed and housed by the army with a view to improving their level of nutrition. On average so far, recruits have actually gained weight while doing heavy manual labor. They are paid Rs. 100 per month, and the aim is to provide training during evening classes in various trades which will be of use when employment on the works project has ended. I was impressed by the recognition of the key role of supervision, by the careful way in which the projects are planned to fit in with local needs, and by the emphasis placed on constructing well the first time so that works would not have to be repeated. These laborers, and follow-up with mobile trade-instruction teams (planned), are particularly valuable features. It seems to me likely that the Land Army will be given responsibility for a greater proportion of expenditure under the Crash Scheme in future years, and the concept may spread to other states.

It has been difficult to select an area for survey, and I have been forced to modify the coverage obtainable, since areas where labor use could be studied under intensive cropping conditions are generally areas which have little scope for rural works programmes. I have also decided that groups of villages in two distinctly different areas would give too shallow a coverage with the resources available. My plan now is to interview 100 farmers and 100 landless laborers in four villages around Srirangapatna in Mandya District. This is an intensive rice and sugarcane area, under canal irrigation, where it should also be possible to analyze labor use under dairying and commercial vegetable production. I want to study relationships

involved with mechanization, with the help of information from an Indo-Japanese research farm about ten miles from my selected villages. They have done quite a lot of work with small-scale machines for planting, intercultivation, reaping and threshing (separately), and combining, as well as trying to spread Japanese methods of paddy growing in the surrounding area.

Apart from the village survey, I would like to select one project of the Land Army in a much less intensive agricultural area and evaluate its employment effects.

Arrangements have been made to begin interviewing in villages on April 3rd. Three B.S. graduates in agriculture will be performing most of this work. Two have recently been doing village interviewing for a German professor who is on sabbatical leave here. There is a good group of Masters degree students at the Mysore University of Agricultural Sciences this year and I would very much have liked to obtain assistance from some of them for interviewing. However, they are all taken up with course work at this time. Perhaps they may be able to help during a second round.

The villages selected are all within a four mile radius of Srirangapatna town, and I expect to be able to use public transport for access to all four. It will probably be necessary to stay overnight in the villages sometimes to catch farmers before work as they are still busy at this time of year, unlike those in rainfed areas of the state.

In February I spent two days in Dharwar District, 250 miles northwest of Bangalore, and found the contrast in agricultural scenery between there and here very marked and interesting. Farms there on the black soils are quite large, and there seemed to be big threshing floors everywhere, surrounded by stacks of harvested grains. A large part of the visual experience is simply that jowar takes up a lot more stack space than other crops,

but Dharwar District has 85 percent of its area sown, against Bangalore's just over 50 percent. I talked with a number of people there, including D. M. Hanjundappa, Head of the Department of Economics at Karnatak University, who several years ago wrote a lengthy analysis of the Rural Manpower Utilization Programme in northern districts of the state. He has a large number of research studies underway and seems a very dynamic individual.

Like most states in the country, Mysore now has a strong new Congress government, in our case following a year of President's rule, through the Governor. Although the latter was very active and maintained an ongoing government programme, it seems likely that development efforts will speed up with a regular state legislature back in operation. The newly announced cabinet has many young members and the Chief Minister has already made some firm policy commitments.

July 1, 1972

Two weeks of interviewing in the villages beginning July 4th should, hopefully, complete data collection there. There are some gaps to fill in in the first round data, which have now been tabulated, and also some new questions to be asked. I have been disappointed with some of the things discovered in the villages. For example, there was neither as much adoption of high yielding paddy varieties as hoped for, nor as much vegetable growing. There is, however, a good picture of sugarcane cultivation, and since three of my villages are situated at varying distances from the sugar factory, some analysis of the spatial factors involved should be possible. I spent two days at the factory and gathered quite a lot of information on labor conditions and remuneration. The factory employs 700 men directly in its

processing operations, and cane growing generates a very large quantity of employment, as about 10,000 acres are needed to keep the factory working at capacity. Such is the degree of control exercised by factory personnel over the cane growing operations, that the whole thing is almost a unified "industrial" process, from planting through to sale of sugar, and the farmers are almost factory employees. It wasn't my intention to choose villages where sugarcane played such a dominant role, but at least the fourth village, being on the very fringe of the supply area, gives some idea of a different agricultural structure.

In mid-May I went for a lengthy tour of several Land Army projects with the Director, Brigadier Naib. This proved particularly useful for getting a feeling for the kinds of logistical problems faced in these projects, and reinforced the observation that good supervision and administration are crucial for success. The burden of responsibility being thrust upon the "Task Force Commanders" is tremendous. These are frequently engineering graduates in their 20's, who are put through an intensive training course, and then given charge of between 100 to 500 rural youths who make up the task force for a particular project. The TFC's have to plan such engineering details as alignment of roads, arrange for supplies of raw materials (broken rock filling, seedling trees, and so on), and keep daily records of men working, money disbursed, stores of food and equipment. In addition, they plan and supervise provision of campsite amenities, meal arrangements for the task force, daily drill and recreation sessions, and sometimes evening classes on trade subjects. One of these graduates told me he was working long hours seven days a week and barely keeping up. I plan to try out an evaluation of one of these projects in an area about 70 miles north

of Bangalore. Already most of the cost and manpower information is available, but I will need to spend some time up there to study benefit aspects, concentrating especially on working out whether change effects of the scheme will themselves be the source of much employment later on.

My visit to the Indo-Japanese research farm was very interesting, as they have a large range of Japanese equipment on hand, most of which is ideally suited to medium scale paddy farming, including small combine harvesters which move on rubber tracks, and various kinds of transplanters, threshing machines and power tillers. Most of these machines are not available commercially in India, but those items which are, particularly power tillers, seem to be priced at over twice the level obtaining in Japan. The Mitsubishi power tiller is actually being manufactured in Bangalore now, with an import content which I was told was 30 percent at present and would drop over time. Unfortunately, there is no chance of my obtaining directly data from field use of these machines, but I am waiting to receive reports of machinery trials from the research farm itself, and have written to a commercial bank in South Kanara District which apparently carried out a survey among power tiller operators there.

I am hoping to complete data collection and leave India by the end of September. There is some secondary information which can be used, including data collected by Dr. Donald Taylor in the Tungabhadra Irrigation Project area, a dairying study being carried out in Bangalore District by workers from the Danish Institute for Development Research, and a survey of scheduled caste families performed by a faculty member of the Rural Sociology Department at the U.A.S. I am also hoping to obtain data from surveys by a German researcher, and a Master's student who is studying

well irrigation in the northeast of Bangalore District. Some of these data will be of limited use, however.

One of my main problems at the moment is to obtain a unifying view of the study and see in what direction it is going. I will try to visit some other universities when the forthcoming round of interviewing is over, and may get some new insights from this.

(D.2.h.) B. M. Desai
July, 1972

Title: Changes in Consumption and Investment Under the Old and New Food Grains Technologies, India

Location: Ithaca, New York and India

Leader: Bhupendra M Desai, leader of sub-project

Justification: Recent breakthroughs in foodgrains technology in India, it is believed, have widened the income disparities in rural areas. This has sparked both pessimism and optimism about the future growth. The pessimists argue that such disparities would eventually lead to concentration of economic opportunities in the hands of a few and also to social and political unrest. The optimists see the immediate widening of income disparities as a boon in disguise, although not as a natural force that is not to be interfered by the public policy. They base their judgement by analysing the implications of such distribution to marketed surplus of food grains so crucially needed to generate more employment and also to the new demand patterns that would emerge from the skewed distribution of incomes from food grains technology.

Mellor and Lele have analysed the implications for generating employment in a two sector general equilibrium model[1/] (1, 2). They have also analysed the changes in consumption pattern by assuming two different distributions of incomes from food grains (3). Four reasons guided us to undertake the present study. One, Mellor and Lele's empirical findings on changes in consumption pattern refer to the period prior to the new food grains technologies. Two, due to nonavailability of data, their consumption function did not consider the influence of prices, including relative prices, on changes in consumption pattern. Three, they did not analyse the changes in investment pattern. This is because they considered growth linkages of investment being weaker than that of consumption. While we do not propose to examine this hypothesis, we consider it important to analyse the changes in investment because of their influence on subsequent changes in production, income and its distribution, and also on the nature of future technologies. Four, they have not conceptualized the link between food grains incomes and other sources of income, although as we shall see later, their model will aid us considerably in this task. The link between food grains and non-food grains incomes is important because it is the total income of a household that determines its consumption and investment decisions. Thus, to fill these four gaps we propose to undertake this study.

The second justification stems from our belief that the knowledge regarding the changes in consumption and investment in rural areas is necessary to aid the public policy in directing the supply of goods whose demand is generated. The public policy is particularly required to mobilize the participation of the disadvantaged groups in the creation of the new supplies.

1/ Their model is a direct improvement over other dualistic models (which are the only growth models that recognize the need for technological change in agriculture for economic transformation) in establishing a mechanism of labor transfer as well as in incorporating nonneutral technological change in agriculture.

Questions and Objectives: The following questions will be studied for three different technical conditions in food grains.[2] These conditions are:

Technology I as characterized by land reclamation, land consolidation, soil conservation, and some increase in irrigation and fertilizaer use.

Technology II as embodied in high yielding seed varieties, fertilizers, irrigation and insecticides and pesticides.

Technology III as characterized by highly mechanized methods of production.

The questions we propose to research under each technology are:

(1) What is the size of increase in production and incomes?

(2) What is the share of (hired) labor, capital and land in increased production and incomes?

(3) What is the link between functional distribution of food grains incomes and other sources of incomes?

(4) What is the size of aggregate marginal propensity to consume and invest?

(5) What is the marginal propensity to consume different commodities?

(6) What is the marginal propensity to invest in different goods and services?

(7) What are the determinants of various aspects in the above questions?

The objective is to test the following conceptual framework developed to analyse these questions.

Conceptual framework: Visualize a group of labor and farm households in a homogeneous region witnessing the earlier mentioned three technical conditions in food grains farming over a period of time. The effects of each of these technologies on the economy of these households are conceptualized as follows:

(1) Size of increase in production and incomes: The size of increase in production under each technology can be expressed as a function of (a) movement along, and (b) the upward shift in the production function.

2/ Hayami and Ruttan have recently classified these three technical conditions into two viz. land-saving (technology I and II in our terminology) and labor-saving (technology III) (4). We distinguish two techniques under the land-saving classification, because technology I augments land supply primarily through the increased extensive farming, whereas technology II augments supply of land through increased intensive farming. More detailed justification of our distinction would be clear from the conceptual framework developed for this research.

Both these effects would be progressively stronger as we move from technology I to III. This is because (i) under technology I, irrigation is the prime and only shifter.[3] Whereas, in the other two, besides irrigation, new seeds, fertilizers, and pesticides and insecticides also cause the shift in production function, and (ii) under technology II, unlike in the other two technologies, the increase in the use of land is soon arrested due to the physical limits to extensive farming, a rapid decline in marginal productivity of resources and also small size of marginal returns on investment.

The size of increase in gross food grains incomes of farm households is a function of changes in (a) physical quantum of production, (b) prices, and (c) the income elasticity of demand for food grains. Given the demand conditions, under the free play of market forces, one would expect factors (a) and (b) to work in opposite direction. This, in turn, may negatively affect subsequent increases in food grains production. However, such a result would be prevented at least in the short run because of (i) greater strength of production response due to nature of technological change, and (ii) high short-run income elasticity of demand for food grains. In the long run, when food grains prices decline, we would expect the change in production pattern from food grains to, say, commercial crops like cotton, etc. Thus, we hypothesize that the size of increase in incomes of farm households would rise as we move from one technology to the other.

So far, we have analysed the effects on average farmer's income. But the size of increase in production and incomes of farms of different sizes would vary on account of differential rates of adoption of new technologies and also the new cropping pattern. The differential rates of adoption are primarily caused by differences in access to new inputs and also in the ability of various farms to bear risk and uncertainty associated with the new techniques and the new high-value crops like cotton (5). Because of these factors, the increase in marginal productivity of land, capital, and labor on small farms would be smaller as compared to that on large farms, as we move from one technology to the other.

The size of increase in (absolute) incomes of (hired) labor households depends on increase in (i) farm employment, and (ii) farm wage rate. As we pass from technology I to II, the farm employment would increased. This is because of increased (a) harvest in a season, (b) multiple cropping, (c) use of such inputs as fertilizers, irrigation, etc., and (d) substitution of hired labor for family

---

3/ Fertilizer is not a strong shifter under technology I because of the extremely limited responsiveness of the traditional varieties. This is also true to an extent for irrigation.

labor. Against this, the farm wage rate (in monetary units) would also rise as we move from technology I through III because of such factors as (a) the rise in (absolute) marginal productivity of labor, (b) a relatively high food grains prices on account of high income elasticity of demand for them in the short run, (c) inelasticity of labor supply in seasonal peaks under technology II. Thus, the size of increase in (absolute money) (farm) incomes of labor households would also rise as we move along the three technologies.

(2) Shares of factors of production in increase in production and incomes: Although the absolute size of increase in incomes of both the labor and farm households would rise as we move along the three technologies, the relative size of increase in incomes of labor households would decline.[4/] This is because of the inherent bias of the technical change.[5/] And it can be explained using the neo-classical theory of production and distribution (6).

Within the framework of this theory, a relative decline in labor's share in increased production and incomes can be explained as follows:

As we move along the three technologies, the marginal product of land and capital relative to that of labor would increase.[6/] Given a factor-price ratio, this would cause substitution of land and capital for labor. It must, however, be noted that under technology II, land is being substituted by certain industrial inputs like fertilizers, pesticides and irrigation (equipment). Thus, under this technology, although the substitution of labor by these inputs would rise, this substitution being imperfect would be quite low relative to that under technology III. To that extent the relative decline in the increase in labor's marginal productivity will be smaller than that under technology III, but it would be greater than that under technology I. Thus, the relative changes in marginal productivity of land, labor and capital, and also the changes in elasticity of substitution between these factors would explain the decline in relative share of labor in increased incomes and production under three technologies.

4/ The skewness in the direct distribution of increased incomes from technological change between farms of various size was explained earlier in terms of inequality in increases in marginal productivity of land, labor and capital on these farms.

5/ Hicks defines the bias of technological change in terms of proportional change in the ratio of marginal products of the two factors of production (7).

6/ Land is distinguished from capital because under technology I and II the form of capital is very different from that under technology III Further, to the extent to which such capital is financed by the farmer himself a larger proportion of increase in productivity of capital accrues to him. This is yet another explanation for the increase in skewness in the direct distribution of increased incomes among frams of varied sizes

From the above, we may therefore hypothesize that the functional distribution of increased food grains incomes may worsen for both the labor and small farm households as we move from one technology to the other.

(3) Link between functional distribution of food grains income and other sources of income: At a given point in time, the extent to which the rural households earn income from sources other than food grains farming, it is necessary to determine the income from all sources. This is because consumption and investment decisions are governed by the total income and its distribution among households.

We anticipate that as we move along the three technologies, the size of increase in incomes from nonfood grains farming as well as non-farm industries would increase. This can be explained by such factors as (a) increase in demand for products of these industries as a result of technological change in food grains, (b) increase in employment in these industries has become possible due to the release of wages goods constraint, (c) the possibility of substituting nonfood grains farming for food grains farming on account of both the decline in food grains prices in the long run and the increased availability of such inputs as land, fertilizers and irrigation needed for commercial crops.

The functional distribution of increased nonfood grains income among different farmers and laborers can be explained as before by (i) relative changes in marginal product of various factors of production in this sector, and (ii) changes in elasticity of substitution between these factors. Both these are heavily dependent on the nature of technology in the nonfood grains sector. Considering the present technology in this sector in rural areas we formulate two hypotheses.

(a) That the distribution of increased incomes from non-food grain irrigated crop farming like cotton, tobacco, sugar cane, banana, etc., may worsen for small farms and labor households.[7]

---

[7] The existing technology in farming of commercial crops, particularly irrigated cash crops, is quite similar to the technology II under study. The only, but an important difference, is that the seeds of these crops are not as high-yielding, although a small beginning in this direction is already under way for crops like cotton. Against this, the present technology in nonirrigated commercial crops and dairying is relatively labor-intensive.

(b) That the distribution of increased income from unirrigated cash crops like ground nut, and from nonfarm enterprises like dairying may improve for small farm and labor households.

Thus, in a region where nonfood grain irrigated crop farming is the second major source of income of a household, the personal income distribution for small farmers and landless households may worsen. But in a region where dairying and unirrigated cash crop farming is the important supplementary source of income the personal income distribution for these households may improve.

So far we have discussed the effect of technological change in food grains on personal income distribution at a given point in time. However, the future changes in personal income distribution are also very important.

Given the inherited inequality in factor (including sophisticated human capital) ownership, the future changes in personal distribution of income are a function of (i) inequality in rate of returns on the factors owned and/or that may be acquired, and (ii) inequality in savings propensities. We hypothesize that the future changes in personal distribution of the above discussed two income sources may not be favourable to the small farm and labor households. This is because these households have lower saving propensities. Also, because they require much higher rate of return to induce themselves to acquire an asset. This is due to their inability to bear risk and also due to high opportunity cost for them to postpone consumption and/or to borrow for undertaking investment. Thus, unless policy measures are taken to influence the above two factors, the future personal income distribution may not improve for small farm and labor households.

Finally, thus far we have discussed the endogenously (i.e. by technology in food grains) determined changes in functional and personal distribution of income. However, since in reality there would exist a particular pattern of distribution of nonfood grains incomes due to certain exogenous factors, the empirical analysis of this phenomenon would have to be broad in perspective.

(4) Size of aggregate marginal propensity to consume and invest: An obvious hypothesis that would follow from the preceding discussion is that as we pass from one technology to the other the marinal propensity to consume (MPC) would decline and the marginal propensity to invest (MPI) would increase. This is because (i) the absolute levels of total income of different size farms and labor households would increase, (ii) the distribution of incomes from food grains and nonfood grain irrigated crop farming is more favorable to upper income groups, although the distribution of incomes from dairying and unirrigated cash crop farming would be more favorable to small farm and landless households, and (iii)

rates and size of return on investment rise as we move along the three technologies.

At this stage it would be appropriate to define consumption and investment. Consumption in this study is defined to include expenditure on nondurable consumer goods, durable consumer goods, and consumer services.[8] Investment is defined as that expenditure (including nondurable inputs) which postpones present consumption to future.

Although the earlier mentioned hypothesis concerning the size of MPC and MPI under the three technologies would hold for farmers in general, we further hypothesize that under technology II and III, there may exist short phases when MPI is even greater than MPC. To explain this, we conceptualize the consumption and investment behavior of farmers as follows:

The main feature of the farm households is the integration of two decision units into one, viz., a family acts both as an entrepreneur and as a consumer. This results in an interdependence of consumption and investment decisions. Consumption and investment decisions are interdependent because the former, through savings and marketable surplus, influence cash flows and determine the latter. And investment, through the expected rate of return, would influence the expected size of incomes and determine the consumption. In this context, consumption and investment behavior of farmers under three technologies can be conceptualized in terms of rate of time preference. Thus, the rate of time preference would decrease as we go from technology I through III. This is because (i) the expected rate of return on investment would progressively increase (due mainly to differences in the sources of increase in resource productivities), (ii) (Consequently) the expected size of the income stream would also rise (which in turn would enable higher level of future consumption), and (iii) the amount of investment required would also increase (which is primarily a function of nature of technology).

One major force that may increase the rate of time preference is the increasing degree and complexity of risks and uncertainty associated with the adoption of new technologies and also the cropping pattern. Even this force may not necessarily increase

---

8/ This definition of consumption is different from the one advocated by the modern consumption function theories (8). These theories consider, besides the expenditure on nondurable consumer goods and services, that expenditure on durable consumer goods that is required to use them as consumption.

the rate of time preference because of the dramatic rise in the rate and more important, the size of returns as we move along the three technologies. Neverthless, the complexity of risks and uncertainty would lower the rate of time preference for those whose ability to bear risk is extremely limited. This particularly holds for small farmers in whose case the expected rate of returns would have to be discounted for risks. Further, in the case of small farmers as well as landless laborers who would intend to invest in education, the existing level of consumption itself would also increase their rate of time preference. Thus, the differences in aggregate MPC and MPI of different income groups can be explained by the differences in the intensity with which the above discussed factors would influence their rate of time preference.

(5) Pattern of marginal propensity to consume: We hypothesize the behavior of marginal propensity to expend (MPE) on four major expenditure groups, viz., (i) food grains, (ii) nonfood grains agricultural, (iii) nondurable nonagricultural, and (iv) durable nonagricultural.[9] We expect that as we move from technology I to III the MPE with respect to income for food grains to be positive but declining. Against this, the corresponding MPE on the remaining three groups to be positive and increasing. This is because the absolute levels of incomes are rising and also because the personal distribution of income is skewed further as we go from one technology to the other.

Besides testing the above hypothesis, we also propose to analyse the behavior of MPE with respect to prices. The demand theory divides the price effects into income and substitution effects. The MPE with respect to own-prices would be negative for each of the four expenditure groups. The important qualification to this being that the income effects do no overwhelm pure substitution effects. The MPE with respect to the prices of related goods for each expenditure group would be either positive or negative, depending on the elasticity of substitution of different commodities that comprise an expenditure group.[10] It is also not possible to assess a priori, whether or not the two marginal propensities would increase or decrease as we pass from one technology to the other. This is because the change in the levels of own-price and the prices of related goods depends on a complex set of factors. For example, the change in the prices of related goods would depend also on the supply conditions of these goods. And the supply may be constrained by shortage of capital, institutional and other factors.

9/ The MPE for each group is defined as the sum of MPE on each commodity that comprise an expenditure group. The MPE on each commodity would be estimated from the consumption function for each commodity.

10/ The cross-elasticity of each expenditure group as a whole would be very low, and therefore MPE with respect to relative prices (for the group as a whole) may not present an interesting case of analysis.

So far we have used the classical theory of household behavior. To adapt this theory to analyse the behavior of rural households, some modifications are necessary. The most important one being the introduction of parity price index instead of retail price index (9). This modification is required because the rural households[11] act as both producer and consumer. The parity price index indicates the resource flows between various sectors and economic groups. Since prices received by a household directly affect its real income and since these prices refer to those commodities that the household consumes, this variable represents three effects, viz., income effect, own-price-gross-substitution effect and the effect of prices of substitutes and complements. Determining a priori, the direction of change in the level of expenditure on the four groups is not possible for the same reasons discussed earlier in connection with income and substitution effects of a price change.

(6) Pattern of marginal propensity to invest: Ideally, we would like to develop a conceptual framework such that takes into account the interdependence of investment in each good/item within as well as between the four broad investment expenditure groups viz., working capital, durable capital, human capital and financial capital. We would, however, for the present analyse the implications of three technologies to pattern of investment in farm working capital and durable capital. Determining the investment function for them involves finding out the demand functions for different investment goods.[12] This demand function is primarily governed by the nature of technology. And the nature of technology under study varies according to this rate of return and also the (relevant) factor-factor price ratios In addition, the demand for investment goods would depend on the financial conditions of a farmer (11).

Assuming that past saving of a household represents its financial conditions, we can write the demand function for investment goods as a function of rates and size of returns (R), (relevant) factor-factor price ratios (P), and past savings (S). The MPI with respect to R and S will be positive, whereas that with respect to P will be negative.

Using these variables we may hypothesize that as we move along the three technologies the MPI in such yield-increasing inputs as seeds,

---

11/ Including the landless labor households, because they receive kind wages which they often trade to obtain cash needed to buy other commodities.

12/ Since the demand for durable capital unlike that for a nondurable input, is a demand for stock, the investment function for such capital must be derived from the demand for the stock (10).

fertilizers and water would increase. Similarly, the MPI in irrigation equipments and other farm implements would also increase. This is because not only the returns on the use of these inputs would be higher, but also the price ratio between land and land-substituting inputs would be favorable to these industrial inputs. We finally hypothesize that under technology II and MPI in such capital as tractors would increase rapidly, particularly on large farms. This is because of improved returns on mechanization and/or favorable capital (tractor)-labor price ratio on account of possibility of inelastic labor supply at seasonal peaks.

Data Requirements

Ideal data for this study would be the time-series data for a group of different size farm and labor households who have witnessed the three technologies.

For each household we need the data on:

(1) use of inputs,
(2) production of crops and other products,
(3) input and output prices,
(4) details of income from nonfarm sources,
(5) details of inventory of farm, nonfarm and household assets
(6) consumption expenditure on various items (cash as well as home produced,
(7) details of investment expenditure on assets,
(8) past debt and current loans details, and
(9) socio-demographic characteristics like caste, age, sex, education, etc. of family members.

Data Availability:

Time-series data on the above aspects for the same group of households are not available. Also the data for technology III may not exist because such technology is not yet widely available in India. In these circumstances, we have to select one of the following three sources of data.

First, the two-point (in time) village surveys conducted by the Agro-Economic Research Centres (AERC) located in different States in India. Second, the two-point surveys of Senapur in eastern Uttar Pradesh, conducted by the Department of Agricultural Economics at Cornell. And third, the Consumption, Saving and Investment Surveys for a period of three years conducted by the AERC and National Council of Applied Economic Research in India.

The use of second source would require conducting a third point survey to take account of effects of technology II. Since we do not propose to undertake a fresh survey we exclude this possible source.

From the remaining two sources, we prefer to use the third source. The AERC's have collected the required data for three years, 1968-69 to 1971-72, for the same group of about 100 farm and 40 landless labor households. The use of three years data may be particularly required for sound empirical analysis of various aspects including simultaneity of consumption and investment decisions of farmers. However, these data represent only the technology II under study. Although it may be possible to approximately identify the cross-section of regions with the two technologies. Such an attempt would require us to modify the conceptual framework to account for differences in physical, infrastructural and other factors.

These data are available for about eleven districts located in different parts of India. We however, propose to select no more than four districts. The selection will be made after studying the results of these surveys which may be available (in published form) some time in the end of this year.

The districts and the states for which the data are available from AERC are given below:

Districts	States
Ludhiana	Punjab
Karnal	Haryana
Meerut	Western Uttar Pradesh
Ahmednagar	Maharashtra
Bangalore	Mysore
Palghat	Kerala
West Godavari	Andhra Pradesh
Cuttack	Orissa
Tikamgarh	Madhya Pradesh
Surat	Gujarat
Kota	Rajasthan

References

1. Mellor, John W. and Uma J. Lele, "A Labor Supply Theory of Economic Development," Occasional Paper No. 43, Department of Agricultural Economics, Cornell University-USAID Employment and Income Distribution Project, June, 1971.

2. Lele, Uma J. and John W. Mellor, "Jobs, Poverty and the "Green Revolution," International Affairs, January 1972.

3. Mellor, John W. and Uma J. Lele, "Growth Linkages of the New Foodgrain Technologies,"Occasional Paper No. 50, Department of Agricultural Economics, Cornell University-USAID Employment and Income Distribution Project, May, 1972.

4. Hayami, Y. and V. W. Ruttan, Agricultural Development: An International Perspective, The Johns Hopkins Press, Baltimore and London, 1971.

5. Schluter, M. and J. W. Mellor, "New Seed Varieties and the Small Farm," Economic and Political Weekly, Vol. VII, No. 13, Review of Agriculture, March 25, 1972.

6. Bronfenbrennor, M., Income Distribution Theory, Aldine-Atherton, Chicago and New York, 1971.

7. Hicks, J R., Theory of Wages, Macmillan, London, 1932.

8. Friedman, M., A Theory of the Consumption Function, National Bureau, Princeton, Princeton University Press, 1957. For empirical analysis of Friedman's theory and for stock-adjustment and habit-formation ideas behind consumption function, see: Houthakker, H. S. and L. D. Taylor, Consumer Demand in the United States, 1929-70, Harvard University Press, Cambridge, 1970.

9. Tendulkar, Suresh D., "Econometric Study of Monthly Consumption Expenditure in Rural Uttar Pradesh," American Journal of Agricultural Economics, Vol. 51, No. 1, February 1969.

10. Griliches, Zvi, "The Demand for a Durable Input: Farm Tractors in the United States, 1921-57," in A. C. Harberger (ed.), The Demand for Durable Goods, The University of Chicago Press, 1960.

11. Duesenberry, James S., Business Cycles and Economic Growth, McGraw-Hill Book Company, Inc., New York, Toronot, London, 1958, Chapters 4 and 5.

(D.2.i.) Uttam Dabholkar
December, 1972.

The Nature of Growth and the Evolving Composition of the Industrial Sector in India

1. Consolidation of time series data, for each three-digit industry group in Indian manufacturing: 1951, 1957, 1961 and 1965; in particular, with reference to:

   (a) Productive capital
   (b) Fixed capital
   (c) Total employment
   (d) Employment: production workers
   (e) Growth output
   (f) Value added

2. Generation of time series data for nineteen two-digit industry groups comprising (i) all "large scale" Indian manufacturing, and (ii) intermediate Indian manufacturing: 1951, 1957, 1961 and 1965. In particular, with reference to:

   (a) Productive capital
   (b) Fixed capital
   (c) Total employment
   (d) Employment: production workers
   (e) Gross output
   (f) Value added

3. Generation of aggregate time series data for ninetten two-digit industry groups comprising "large" and "intermediate" scale production for the entire industrial sector in India: 1951, 1957, 1961 and 1965.

4. The evolving composition of the industrial sector with regard to the share of each two-digit industry group in:

   (a) Productive capital
   (b) Fixed capital
   (c) Total employment
   (d) Employment: production workers
   (e) Gross output
   (f) Value added

5. A separate analysis of the evolving pattern of growth of the large scale and the intermediate scale production in Indian manufacturing.

6. The (compound) rates of growth of important variables in Indian manufacturing for 1951-57, 1957-61, 1961-65 and 1951-65 for:

   (a) Productive capital
   (b) Fixed capital
   (c) Total employment
   (d) Employment: production workers
   (e) Gross output
   (f) Value added

7. Sectoral movements of capital-labor ratios in Indian manufacturing: 1951, 1957, 1961 and 1965: (i) large scale production, (ii) intermediate scale production.

8. Employment and output in Indian manufacturing: a simple test of the compositional hypothesis: analysis under alternative conditions:

   (i) Balanced growth and no technical change
   (ii) Balanced growth and technical change
   (iii) Unbalanced growth and no technical change
   (iv) Unbalanced growth and technical change

Labor Supply Schedule, Preliminary & Exploratory, Bangladesh

I.

(D.P.j.) Gillian P. Hart
November, 1972

OUTLINE AND OBJECTIVES

Bangladesh represents a classic example of a "labor surplus" economy:

(a) a very large proportion (85%) of the population in the agricultural sector;

(b) high rates of growth in the labor force. It has been estimated that from 1970-75 average annual additions to the labor force will be of the order of between 770,000 and 1 million, increasing to between 840,000 and 1.15 million from 1975-80.

A commonly held view in much of the literature is that there is considerable "disguised unemployment" in the agricultural sector of economics such as that of Bangladesh. It is assumed that the marginal productivity of labor in agriculture approximates zero, and that a large proportion of the "disguisedly unemployed" population can be withdrawn without affecting agricultural output. The existence of a costless, easily removable labor surplus at a wage determined by subsistence implies that solutions to problems of poverty and stagnation lie almost solely in the sphere of creating employment opportunities.

For a long time these highly simplistic assumptions about labor supply have not been tested. To a large extent this is probably a function of the capital-intensive growth paths followed by a number of low income countries. The corollary of this was a relative lack of concern with employment *per se*. More recently, attention has been focused sharply on the need for improving employment and income distribution, and it is within this context that the validity of the conventional theories about labor supply assumes crucial importance.

A major contention of this study is that the conventional approach is a dangerous oversimplication. It will be argued that factors determining the elasticity of the labor supply are likely to be extremely complex, and that even in a country with as densely populated an agricultural sector as Bangladesh there might not be an easily removable labor surplus. On the other hand, it would appear from the relatively few situations of rapid growth that labor supply is not likely to be limiting to growth, provided correct policies are carried out. However, in order to identify these policies it is necessary to gain a deeper understanding of the forces influencing labor supply.

Although a number of theoretical and empirical studies have cast considerable doubt on the concept of "disguised unemployment", very little effort has been expended on comprehensive analyses of labor supply schedules. This lack of knowledge relating to labor supply is likely to constitute an important obstacle in the formulation of programs designed to generate employment.[1/]

In this study an attempt will be made

(1) To formulate a conceptual framework, the aim being to identify some of the major determinants of labor supply and examine their interrelationships in such a way as to be able to predict the effects of changes in these determinants on the slope and position of labor supply schedules;

---

1 The extent of the problems currently being encountered in this area have been highlighted recently at two seminars at Cornell University: (a) Dr. John Duloy (Sen. Ec. Advisor, IBRD) in a seminar on a programming model of Mexican agriculture (which is part of a macro-model of the Mexican economy being formulated by the World Bank) elaborated in some detail on the need for more comprehensive knowledge of labor supply schedules in the formulation of planning models. ("The Agricultural Sector" in L. Goreux and A. Manne (eds.) Multi-Level Planning: Case Studies in Mexico - (forthcoming). (b) Dr. J. P. Bhattacharjee (Deputy Director Joint FAO/IBRD Investment Center) emphasized that lack of research into labor supply was severely hampering the construction of employment programs.

(2) To subject these hypotheses to empirical testing and review the theoretical framework in the light of empirical findings;

(3) To analyze some of the policy implications arising from this analysis which might be relevant to the formulation of employment policy in Bangladesh.

II.

METHOD OF APPROACH

In contrast to the conventional approach, the basic hypothesis upon which this study is based is that wages, and hence the supply of price of labor, are determined by marginal rather than average productivity. This, in turn, focuses attention on the operation of labor markets within the rural sector and between the rural and urban sectors. Within this framework, three considerations appear to merit particular attention:

(a) the existence of extensive seasonality in the rural sector with its implications of regular shifts in labor market equilibria;

(b) possible differences in the slope and position of labor supply schedules according to the amount of land owned;

(c) the need to take cognizance of a differentiated labor force with respect to woman and child labor as well as skill acquisition.

(A) Seasonality

One of the most important factors overlooked by the conventional approach is the extensive seasonality in labor demand and productivity in the agricultural sector. Several studies have indicated that, even in densely populated regions, not only is a removable surplus of labor non-existent, but there may be fairly

severe labor shortages during seasonal peaks. One of the most notable of these studies was conducted by Habibullah[2] in East Pakistan. He found that in Sabilpur village - which had a population density of 3354 per square mile compared with 777 for the country as a whole - unemployment shrank to nil during July, December and March to early June. In the latter period, particularly critical labor shortages necessitated the return of family members from urban areas, as well as children and elderly people being drawn into the labor force.

The importance of estimating labor supply elasticity is highlighted by the existence of unemployment during seasonal troughs. The provision of counter-seasonal employment (for example rural public works) seems to offer a reasonable solution to the problem. It is necessary, however, to establish the wage rate at which substantial quantities of labor would be offered for this type of employment. Two possible sources of information are: (i) direct questionning and (ii) analysis of secondary data on the relationship between wages in public works and quantities of labor forthcoming. At relatively low wage-rates, the labor supply elasticity might be rather low if the physical costs of exertion are considered to outweigh small additions to income. The lower the degree of elasticity of labor supply, the greater the need to increase productivity and wages in counter-seasonal employment. This may prove difficult to achieve by means of programs such as rural public works, and suggests that solutions to problems of low off-season productivity must be sought in the direction of releasing labor requirements at seasonal peaks by means of mechanization in order to provide adequately productive non-agricultural

---

2 M. Habibullah, The Pattern of Agricultural Unemployment (Bureau of Economic Research, Dacca University, 1962).

employment on a stable, year-round basis. Thus it is possible that fairly low cost mechanization could serve to create a relatively elastic labor supply. The implications of mechanization are, however, complex and far-reaching and necessitate an enquiry into possible differences between the supply schedules of landless laborers, small farmers and larger landowners.

(B) The influence of farm size on labor supply schedules.

It has been well-established empirically that labor inputs and yields per acre tend to be inversely related to farm size, and that even some small farmers hire labor during seasonal peaks. The theoretical interpretation of this phenomenon suggests that given their production possibilities, smaller farmers will tend to value additions to income relatively highly, and will therefore apply labor relatively intensively at the margin. The supply price of family labor is higher on larger farms and hired laborers will be employed to the point where marginal product is equated with the wage rate. Given the fact that in Bangladesh about 20 percent of rural families are on holdings of over 5 acres which constitute nearly 60 percent of cultivated land, the adaptations made by this group of farmers to mechanization is likely to be crucial. Mechanization would tend to increase labor productivity and wages, and thus reduce the volume of hired labor. It is possible, moreover, that a change in the nature of work brought about by mechanization would induce larger farmers to increase their labor input. Thus aggregate labor budget data which show constant labor requirements with increased intensity and mechanization may mask a displacement of lower income hired laborers by higher income peasant operators. This would create a particularly serious situation if employment availability was inadequate, and must be taken cognizance of in any program designed to increase simultaneously the supply of and demand for labor. Hence it is crucial to obtain a more

comprehensive understanding of the labor supply responses of larger farmers under changing conditions. This would require a detailed micro-analysis of changes in the composition of the labor force in areas which have experienced differing degrees and types of mechanization.

(C) Changes in the Structure and Composition of the labor force.

Although this study will be primarily concerned with the supply of relatively unskilled laborers, it would appear dangerously misleading to proceed on the assumption of an undifferentiated labor force. More specifically, an attempt will be made in this study to examine in some detail the differences between male, female and child labor, the distribution of jobs according to age and sex at different income levels and changes in the structure and composition of the labor force which might be induced by the type of policy measures outlined above.

III.

SUMMARY

On the basis of the foregoing arguments, an attempt will now be made to summarize briefly the major areas of enquiry with which this study will be concerned:

1. The operation of labor markets. This will involve an examination of the relationships between wage rates and productivity. Should significant discrepancies arise, indicating imperfections in the labor market, an attempt will be made to identify the nature and source of these imperfections.

2. An estimation of the elasticity of labor supply for a range of alternative occupations by means of secondary data analysis and direct interrogation.

3. The manner in which different types and degrees of mechanization affect the labor supply - and hence employment - responses of larger farmers. This would involve examination of existing data in addition to direct observations.

4. The effect of increasing levels of productivity on the structure and composition of the labor force.

Thus the two main methods of approach which will be used in this study are:

(a) A review of existing secondary data, particularly material which has been collected for related studies and which is only available in Bangladesh,

(b) Field surveys to collect original data on specific aspects of current use and seasonal returns to labor, and to obtain information on the extent to which more labor would be offered at higher wages and in different occupations.

TABLE OF CONTENTS

Appendix E.1.(1)

BIBLIOGRAPHIC LIST AND ABSTRACTS

Contract Period -- January 1, 1972 to December 31, 1972

a. Burton, William R. & Tongruay Chungtes, "Preliminary Observations on the Production of New High Yielding Rice Varieties and Traditional Rice Varieties in Suphan Buri, Thailand," Occ. Paper No. 52, Dept. of Agr. Econ., Cornell Univ.-USAID Employment and Income Distribution Project, February, 1972.

b. _____, "Summary Tables of Agricultural Research on the Economics of Producing High Yielding Rice Varieties in Suphan Buri, Thailand," Dept. of Agr. Econ., Faculty of Economics and Business Administration, Kasetsart University, February, 1972.

c. Chungtes, Tongruay & William R. Burton, "Costs of Producing High Yielding Rice Varieties and Traditional Rice Varieties in Suphan Buri, Wet Season, 1970, and Dry Season, 1971," Technical Report No. 4, Dept. of Agr. Econ. Faculty of Economics and Business Administration, Kasetsart University, May, 1972.

d. Desai, B. M., "Analysis of Consumption Expenditure Patterns in India," Occ. Paper No. 54, Dept. of Agr. Econ., Cornell Univ.-USAID Employment and Income Distribution Project, August, 1972.

e. Lele, Uma J. and J. W. Mellor, "Jobs, Poverty and the 'Green Revolution," International Affairs, Vol. 48, No. 1, January, 1972. pp. 20-32.

f. _____, "Technological Change and Distributive Bias in a Dual Economy," Revised Occ. Paper No. 43, Dept. of Agr. Econ., Cornell Univ.-USAID Employment and Income Distribution Project, October, 1972.

g. Mellor, John W., "Accelerated Growth in Agricultural Production and the Intersectoral Transfer of Resources," Revised Occ. Paper No. 34, Dept. of Agr. Econ., Cornell Univ.-USAID Employment and Income Distribution Project, January, 1972.

h. _____, "Models of Economic Growth and Land Augmenting Technological Change in Foodgrain Production," Occ. Paper No. 58, Dept. of Agr. Econ., Cornell Univ.-USAID Employment and Income Distribution Project, December, 1972.

i. _____, Review of Mahesh T. Pathak & Arun S. Patel, Agricultural Taxation in Gujarat, New York: Asia Publishing House, Inc., 1970; R. N. Tewari, Agricultural Development and Population Growth, Delhi: Sulton Chand and Sons, 1970; Dorris D. Brown, Agricultural Development in India's Districts, Cambridge, Mass. Harvard University Press, 1971, in Pacific Affairs, Vol. 45, No. 2, Summer 1972. pp. 300-303.

App. 4

j. Mellor, John W. and Uma J Lele, "Growth Linkages of the New Foodgrain Technologies," Occ. Paper No. 50, Dept. of Agr. Econ., Cornell Univ.-USAID Employment and Income Distribution Project, May, 1972.

k. Schluter, M. and John W. Mellor, "New Seed Varieties and the Small Farm," Economic and Political Weekly, Vol. VII, No. 13, Review of Agriculture, March 25, 1972.

l. Schluter, Michael G. G. and Richard W. Longhurst, "Some Aspects of the Suitability of High Yielding Rice and Bajra Varieties for the Small Farm, Thanjavur and Mehsana Districts, India," Occ. Paper No. 57, Dept. of Agr. Econ., Cornell Univ.-USAID Employment and Income Distribution Project, October, 1972.

m. Shortlidge, Richard, Jr., "U.P. Agricultural University and Agricultural Graduates in India," (Mimeo issued for limited circulation for purposes of research in India and United States), May, 1972.

n. van der Veen, Jan H., "Capital Intensity, Absolute Size and Growth Rate of the Small Industries Sector in India: A Critique of Official Estimates," Occ. Paper No. 56, Dept. of Agr. Econ., Cornell Univ.-USAID Employment and Income Distribution Project, July, 1972.

(A folder of these publications for AID only will be included, any of these publications will be given to others upon request.)

William R. Burton
October 1, 1972

ABSTRACT

Burton, William R. and Tongruay Chungtes, "Preliminary Observations on the Production of New High Yielding Rice Varieties and Traditional Rice Varieties in Suphan Buri, Thailand," Occasional Paper No. 52, USAID-Employment and Income Distribution Project, Department of Agricultural Economics, Cornell University, February, 1972.

_____ _____, "Summary Tables of Agricultural Research on the Economics of Producing High Yielding Rice Varieties in Suphan Buri, Thailand. Part I. Wet Season 1970, Dry Season 1971." Department of Agricultural Economics, Faculty of Economics and Business Administration, Kasetsart University, February, 1972.

Chungtes, Tongruay and William R Burton, "Costs of Producing High Yielding Rice Varieties and Traditional Rice Varieties in Suphan Buri, Wet Season, 1970 and Dry Season, 1971," Technical Report No. 4, Department of Agricultural Economics, Faculty of Economics and Business Administration, Kasetsart University, May, 1972.

From January, 1971 through March, 1972 a field survey was conducted in Suphan Buri, Thailand to determine the economic impact of new rice technology. Six villages and 150 households participated in the study. Both broadcasted and transplanted rice farms were studied and water conditions ranged from very good to deep-water areas with uncontrolled flooding.

Adoption of new high yielding rice varieties has been very rapid but only in areas of good water control where water depths can be held to under one-half meter. Yields for the high yielding varieties were about twenty-five percent higher than for the traditional rice varieties. Yields in the dry season, 1971 averaged about ten percent higher than in the 1970 wet season.

Cash costs per hectare were higher for the high yielding varieties, but were lower on a per ton basis.

Occasional Paper No. 52 presents preliminary data on the study. The Summary Tables give a detailed listing of input use, land ownership and other discriptive information. Technical Report No. 4 presents the cost of production picture.

B. M. Desai
August, 1972

ABSTRACT

"Analysis of Consumption Expenditure Patterns in India"

The study examines whether or not both the marginal rate of consumption and elasticity, with respect to income for various commodities differ between income groups and corresponding land holding groups. This objective is analyzed by using two data sources viz., National Sample Survey (NSS), 1963-64 and National Council of Applied Economic Research (NCAER), 1964-65.

Per capita monthly consumption expenditure on a particular commodity and per capita monthly total consumer expenses were, respectively, used as dependent and independent variables. Log-log-inverse function was selected because it facilitates a test of three functions at a time viz., log-inverse, log-log-inverse.

Three principal findings are: (1) The expenditure elasticity for 14 out of 18 commodities varied from one income class to the other. These 14 commodities are food grains, milk and milk-products, meat eggs and fish, other foods, vanaspati, other oils, sweeteners, cotton textiles, woolen textiles, other textiles, foot wear, durables, fuel and light, and house rent. The remaining four commodity categories are tobacco, education, transportation, and consumer services. (2) The marginal propensity to expend on all the items did not vary continuously among different income classes. (3) Quite ironically, the bottom three deciles in income distribution who are landless and small farm households would support through their demand for food grains the green revolution! The remaining deciles would provide the maximum market for nonfood grain agricultural goods. But the additional demand for nontraditional non-agricultural items would mainly come from the top decile in rural India.

Uma J. Lele
John W. Mellor
January, 1972
(Originally June, 1970)

ABSTRACT

"Jobs, Poverty and the Green Revolution"
(A revision of the paper formerly entitled,
The Political Economy of Employment Oriented
Development)

Precisely because the development policies of the past two decades have been consistent with the old reality of stagnant agriculture, so the new reality of technological breakthrough in agriculture requires a new strategy. Accelerated growth in food production provides striking opportunities for a reversal of the low-employment, "basic indust" approach. Such a change has far-reaching implications not only for the industrial structure, but for the choice of production technique, the domestic savings rate, the scale of industrial organization and the level and composition of trade.

Uma J Lele
John W. Mellor
October, 1972

ABSTRACT

"Technological Change and Distributive
Bias in a Dual Economy"

The two distinguishing features of the dual economy model presented below are: (1) incorporation of biased technological change in the traditional food sector, and (2) separation of food and labor markets into two independent but interacting markets. Through food and labor market equilibria the model analyzes the effect of biased technological change in the food-grain sector on employment, income distribution and terms of trade between sectors. It points out how and why the results obtained from the two special features of our model differ from those of the earlier dual models.

John W. Mellor
October 3, 1972

ABSTRACT

"Accelerated Growth in Agricultural Production and the Intersectoral Transfer of Resources"

Accelerated growth in the agricultural production of low-income countries may sharply increase the transfer of resources between agriculture and other sectors of the economy. Such changes affect relative rates of capital formation and income growth in various sectors, the structure of growth, and overall rates of growth. The current technological breakthroughs in the agricultural sector in India and other Asian countries have brought the whole question of problems of tapping agricultural incomes and food resources for the overall development process to the fore. This paper is an attempt to review the substantial amount of empirical data which we have developed in the research program being carried out under my direction and dealing with the question of intersectoral resource flows.

In many areas the current technological breakthroughs in agriculture offer large increases in output at incremental capital-output ratios of less than one. This facilitates immediate and greatly accelerated net resource transfers. Japan and Taiwan exemplify success along these lines. It is concluded that both in concept and in practice it is possible for the agricultural sector to make large net transfers of resources to other sectors. If these transferred resources are used productively the rate of economic growth can be accelerated.

John W. Mellor
December, 1972.

ABSTRACT

"Models of Economic Growth and Land Augmenting Technological Change in Foodgrain Production"

Technological change in foodgrain production as epitomized by the "Green Revolution" holds potential for substantial acceleration of overall rates of economic growth and change to a pattern of growth favorable to the low income laboring classes. Large additions to agricultural production increase the supply of wages goods and have the potential for increased employment. Net additions to national income expand the demand for goods and services and increased employment in the nonfoodgrains sector. The nature and extent of these influences depends significantly on the initial distribution of income from the increased foodgrain production, which is in turn importantly influenced by the nature of the underlying technological change. Growth theory and growth models would appear highly relevant to these aspects of economic development in low income countries. However, despite the apparent relevance, growth models tend to be oriented towards the regimes of high income nations.

The mainstream of economic growth models offer no basis for incorporating these major elements of actual growth into analytical formulations. Similarly, dualistic models, although they offer some potential for analysis of these forces have been largely a deadend of analysis. This paper reviews various types of growth and dualistic models from the point of view of their relevance to technological change in agriculture; states the theoretical conditions of a major contribution of agriculture to economic growth and suggests lines along which further development of models of economic growth might usefully proceed.

John W. Mellor
Summer, 1972

ABSTRACT

Review of: Mahesh T. Pathak & Arun S. Patel, Agricultural Taxation in Gujarat, New York: Asia Publishing House, Inc., 1970; R. N. Tewari, Agricultural Development and Population Growth, Delhi: Sultan Chand and Sons, 1970; Dorris D. Brown, Agricultural Development in India's Districts, Cambridge, Mass.: Harvard University Press, 1971, in Pacific Affairs, Vol. 45, No. 2, Summer 1972, Pp. 300-303.

Growing self-confidence in India, increasing potential for change in the pace and structure of Indian economic development, and the key role which agriculture is playing in these processes all add to the significance of these three books. The key issues in Indian rural development are how to accelerate growth in agricultural production and income; how to command increased rural income for reaching the social objectives of accelerated growth and broadened participation in the benefits of growth; and how to adapt rural development programs to the varying conditions of different regions. Each of these books deals, with varying effectiveness, with an aspect of one of these problems.

John W. Mellor
Uma J. Lele
May, 1972

ABSTRACT

"Growth Linkages of the New Foodgrain Technologies"

Successful introduction of the new high-yielding foodgrain varieties makes a substantial net addition to national income and distributes that income largely to upper-income rural people. Since upper-income rural people have a low marginal propensity to consume food grains, an initial imbalance is created between increased foodgrain supply and demand. The very forces which lie behind this imbalance provide potential for growth and employment stimulating linkages with other sectors of the economy. Through these linkages, supply and demand for food grains may be balanced with only a small change in relative prices. Failure to develop these linkages may result in large changes in relative foodgrains prices which could prejudice continued growth of the foodgrains sector itself.

In this paper we explore several of the empirical relationships suggested in the dualistic model reported in our paper No. 43. We present data with respect to the initial distribution of income from the new foodgrain technologies and the expenditure pattern of that income. These data indicate the effect of different distribution of benefits from new technologies on the marketings of food grains and on the structure of demand for other commodities. In general the distribution of income is weighted heavily to higher income rural people. We also examine the capital-labor ratios in various manufacturing industries as

an indicator of the employment implications of various expenditure patterns. In a peasant agriculture there is a consistently high proportion of increased expenditure on livestock products and fruits and vegetables. Other items of rural expenditure also are quite labor intensive.

M. Schluter
John W. Mellor
March, 1972

ABSTRACT

"New Seed Varieties and the Small Farm"

That there is a relationship between adoption of the new varieties and size of farm, is generally accepted. In this article, the variability that existed within this relationship by crops, seasons, regions and years, in the period 1966-67 to 1968-69 is examined. Also examined are a number of factors which may underlie the relationship.

The authors conclude that, although credit appears to be important, uncertainty may be the critical constraint to adoption among small farmers. Credit availability and uncertainty are interrelated factors, but depending on which is taken to be the crux of the problem, policies undertaken to facilitate adoption among small farmers are bound to be different.

It is also noted that, for some crops, small farmers who adopt the new varieties plant a higher proportion of acreage with them than do large farmers. This may be due to a labor restraint on the larger farms. That possibility, and its policy implications are examined.

Michael G. Schluter
Richard W. Longhurst
October, 1972

ABSTRACT

Some Aspects of the Suitability of High Yielding Rice and Bajra Varieties for the Small Farm, Thanjavur and Mehsana Districts, India

In order to evaluate farmers' response to the new rice and bajra varieties, the Indian Institute of Management at Ahmedabad undertook an intensive study of two districts -- Mehsana District in Gujarat for a study of hybrid bajra, and Thanjavur District in Tamil Nadu for a study of ADT-27, a new high-yielding rice variety. In each district, use of inputs, yields and prices were collected from approximately 60 farmers who had adopted the new varieties of seed on some part of their acreage, and approximately 40 who had grown only the traditional varieties. The Institute has kindly made the data from these surveys available for additional analysis.

The available data are used in this paper for three purposes. In section II a regression framework is used to examine factors affecting the extent of adoption of ADT-27 in Thanjavur. This is supplemented in section III by comparative production function analysis of ADT-27 and traditional rice varieties. In section IV, hybrid and local bajra are compared, again with production function analysis. In the final section, ADT-27 and hybrid bajra are assessed as to their suitability for the small farmer. It is concluded that large farmers plant a smaller proportion of acreage to new varieties than small farmers if the innovation is labor intensive; but, small farmers compared to large are reluctant to take up innovation if there is risk.

ABSTRACT

"U.P. Agricultural University and Agricultural Graduates in India"

This memorandum presents the preliminary findings of the analysis of graduates from U.P. Agricultural University (now G. B. Pant College of Agriculture and Technology). It examines the efficiency of investments by the individual and the society in the various degree programs of the University. The primary test criterion is the internal rate of return.

Data for the analysis were collected from the University's official records and a mailed questionnaire to graduates from the University who obtained their degrees between 1963 and 1971. Of the 1,868 degrees awarded by the University during this period, 666 were ultimately represented in the sample. The sample was well distributed (1) among the various degree programs and (2) by year of graduation.

The major results of the preliminary analysis were:

(1) The only significant period of unemployment for graduates was experienced immediately after leaving the University. This period averaged less than one-half the estimated rate for an average college graduate in India.

(2) The two major sources of employment for the B.Sc.Ag. have been university research and extension and private business.

(3) The state government holds a monopoly on the employment of B.Vet. Sc. graduates.

(4) State government, private business, and university research, extension and teaching have been the major sources of employment for graduates with a B. Tech.

(5) For the M.Sc.Ag., the three sources of employment have been university research, extension, and teaching, private business, and Government of India sponsored corporations.

(6) The two sources of employment for M.Vet.Sc. have been university reseach, extension and teaching, and Government of India sponsored research institutions.

(7) Both the social and the private rates of return for graduates from the University are above the average for undergraduate and post-graduate degrees in India. The two exceptions were the Village Level Worker special two year degree program in agriculture and the B.Vet.Sc. The low return for the V.L.W. was primarily caused by the slow rate of promotion after completing the degree and the extremely low rate of pay received by these civil servants even after promotion. It is hypothesized that their pay may not reflect their true social marginal value product. The low return for the B.Vet.Sc. indicates the dominance of state government employment for these graduates.

Jan H. van der Veen
July, 1972

"Capital Intensity, Absolute Size and Growth Rate of the Small Industries Sector in India A Critique of Official Estimates"

This paper discusses some official estimates relating to small industries in India. It is intended to serve as a detailed background paper to studies being conducted by the author on small industrial units in Gujarat State.

Estimates by the Central Statistical Organization show that "unregistered" industrial units have contributed over 35 percent of the industrial share of India's gross product. "Small Scale" industrial units, which are defined more generously, have contributed in the neighborhood of 52 percent of the industrial share of India's gross product. The aggregate capital/labor ratios of both the "unregistered" and "small scale" industrial subsectors are relatively low. As a result, the potential employment creation capacity of small industrial units, no matter which definition is applied, is great.

The current revival of interest in small industries in India has its origin in the changed conditions which are following in the wake of the "green revolution." That revival of interest focuses on the employment creation capacity of the small industries subsector. Unfortunately, uniform and reliable data on small industries in India are not yet available. Interest in the data that are available has prompted this study. The study provides a basis for interpretation of existing data.

Appendix E.1.(2)

STATEMENT IDENTIFYING USE OF MATERIAL

Burton, William R. & Tongruay Chungtes

a. February 1-4, 1972. Paper entitled, "Preliminary Observations on the Production of New High Yielding Rice Varieties and Traditional Rice Varieties in Suphan Buri, Thailand," presented at the Eleventh Conference on Agricultural Science: Agricultural Economics and Economic Development, Kasetsart University, Bangkok, Thailand.

Mellor, John W.

b. January 14, 1972. Review of "The Impact of New Technology on Rural Employment and Income," Agency for International Development, Department of State, Washington, D. C. (With Jan H. van der Veen, Richard Shortlidge and Bhupendra Desai.)

c. January 28, 1972. Discussion of U.S. policy toward Bangladesh, organized by the American Friends Service Committee for a group of Senators and Congressmen, Washington, D. C.

d. March 3 & 6, 1972. Two seminars to the World Bank Group, Washington, D. C.

e. March 20, 1972. Panel Discussion on China Policy, Cornell Alumni Association, Rochester, N. Y.

f. April 5, 1972. Seminar: "Using New Agriculture Technologies to Increase Employment and Broaden the Distribution of Income," University of Rhode Island.

g. April 10, 1972. Seminar: "Jobs, Poverty and the Green Revolution," Purdue University.

h. June 15 & 16, 1972. Seminars on "The Role of Agriculture in the Development Process and the Importance of Means for Obtaining Employment Oriented Employment." Foreign Service Institute, Department of State, Washington, D. C.

i. July 15-25, 1972. Trip to Bangladesh to negotiate with the Government of Bangladesh for a volunteer program for International Voluntary Services.

j. August 28, 1972. Paper entitled, "Models of Economic Growth and Land Augmenting Technological Change in Foodgrain Production," presented to the International Economics Association Conference on, "Agriculture in the Development of Low Income Countries," Gad Godesberg, Germany.

k. September 18-20, 1972. Participate in Seminar, "The Commodity Approach to Sectoral Planning for Rural Development," SEADAG Rural Development Seminar, Singapore.

l. October 12, 1972. Present seminar, "Jobs, Poverty and the Green Revolution," North Carolina Agricultural and Technical State University, Greensboro, N. C.

m. October 14-15, 1972. Present seminar, "Generating Employment in Bangladesh. Some Special Problems and their Possible Solutions," Midwest Asian Conference, University of Illinois, Urbana, Ill.

n. October 19-20, 1972. Present a discussion to the Agricultural Development Workshop on "Domestic Markets and Agricultural Development," University of Minnesota, St. Paul, Minn.

o. October 27, 1972. Present seminar, "Growth Linkages of Technological Change in Agriculture," Massachusetts Institute of Technology, Cambridge, Mass.

p. November 1-3, 1972. Discussant at the A/D/C seminar on, "The Application of Recursive Decision Systems to Agricultural Sector Analysis."

q. November 8, 1972. Lecture: "Growth Models and Rural Development," Department of Economics and Institute of Development Research, Addis Ababa, Ethiopia.

r. November 9, 1972. Lecture: "Aid, Trade and Growth of Employment," sponsored by Society for International Development, Africa Hall, Addis Ababa, Ethiop.

s. November 10, 1972. Lecture: "Employment and Growth Linkages of Technological Change," Haile Sellassie I University, Addis Ababa, Ethiopia.

t. November 13, 1972. Seminar, Department of Economics, University of Ibadan, Nigeria on growth models and rural development.

u. " Lecture at Nigerian Institute of Social and Economic Research, "Aid, Trade and Growth of Employment."

v. November 15, 1972. Lecture to Economic Society of Amadu Bellu University, Zaria, Nigeria, on, "Growth Models and Rural Development."

w. " Address weekly seminar of faculty of Social Science, ABU on current development in International Development Economics.

x. " Lecture to staff of IAR, "Employment and Growth Linkages of Technological Change in Agriculture."

y. November 18, 1972. Morning seminar with economic planners from Kano, NE and possibly NW States, Nigeria.

z. November 20, 1972. Seminar with federal economic planners and agricultural development specialists, Lagos, Nigeria.

aa. " Public lecture at Institute of International Affairs, Lagos, Nigeria

bb. December 1, 1972. Speak at Workshop on Cornell-KAIS Collaborative Activities, Cornell University, Ithaca, N. Y.

cc. December 7 & 8, 1972. Seminars at the Foreign Service Institute, Department of State, Washington, D. C.

dd. December 12, 1972. Lectures on employment, AID retreat, Columbia, Md.

Mudahar, Mohinder, S.

ee. November 1-3, 1972. Present paper entitled, "A Dynamic Model of Agricultural Development with Demand Linkages," at the A/D/C seminar on "The Application of Recursive Decision Systems to Agricultural Sector Analysis."

Shortlidge, Richard L.

ff. April 11, 1972. Guest Lecturer, Syracuse University, Syracuse, N. Y. for course in Research Methodology, Center for Development Education.

APPENDIX E.2.

Evidence of Findings of Research being used in LDCs and U.S.

(A brief sample follows
of the extensive cor-
respondence with respect
to this research.)

UNIVERSITY OF NEW HAMPS
DURHAM, NEW HAMP

COLLEGE OF LIFE SCIENCES
AND AGRICULTURE
Institute of
Natural and Environmental
Resources

STANFORD UNIVERSITY
STANFORD, CALIFORNIA 94305

TECHNICAL ASSISTANCE CONTRACT
WITH
UNIVERSIDADE DE SAO PAULO
LETTERS,
LED IN U.S.A.
YORK 09676

DEPARTMENT OF ECONOMICS

THE OHIO STATE UNIVERSITY

SEND TO AMERICAN CONS. GEN./SAO PAULO

ESCOLA SUPERIOR DE AGRICULTURA "LUIZ DE QUEIROZ"
PIRACICABA - ESTADO DE SAO PAULO, BRAZIL

MICHIGAN STATE UNIVERSITY EAST LANSI

DEPARTMENT OF AGRICULTURAL ECONOMICS · AG

January 23, 19

TO: Dept. of Agricultural Economics,
Cornell University,
Ithaca, New York 14850.

Date: February 16th, 1973.

Order No: EDL/PR/21673

Number of copies: ONE (unless otherwise noted)

SHIP TO: ECONOMIC DEVELOPMENT LIBRARY,
Harvard University,
1737 Cambridge Street, Room G.18,
Cambridge, Mass. 02138, U.S.A.

RAA:lb

CPC International

Best Foods / A Division of CPC International Inc. / P.O. Box 1534, 1120 Commerce Ave., Union, N.J. 07083
(201) 688-9000

Res[illegible]h Center

January 23, 1973

Dr. Mellor
Cornell University Prices Research Project
Ithaca, New York

Dear Dr. Mellor:

May we please have a copy of ELEMENTS OF A FOOD MARKETING

EMBASSY OF ISRAEL

WASHINGTON D.C.20008

[illegible] Economics. Occasional paper.

- 17838 -

[illegible] cultural resource [illegible] ment: a brief [illegible]

DOANE AGRICULTURAL SERVICE, INC. 8900 MANCHESTER ROAD • ST. LOUIS, MISSOURI 63144
TELEPHONE (314) 968-1000

January 29, 1973

Cornell University
Agricultural Exp. Station
Dept. of Agricultural Economics
Ithaca, New York 14850

[illegible] listed below if there are no charges. [illegible] the material, but advise us of

RICHARD ABEL AND COMPANY, INC.
SCHOLARLY BOOKS IN THE ARTS AND SCIENCES
1003 FRIES MILL ROAD — BLACKWOOD, NEW JERSEY 08012

Page_____of_____

PURCHASE ORDER

PLEASE REFER TO THIS NUMBER ON ALL INVOICES, PACKING SLIPS, REPORTS AND OTHER CORRESPONDENCE PERTAINING TO THIS ORDER.
PURCHASE ORDER NO. NJ [illegible]72

CORNELL UNIV.
N.Y. STATE COLLEGE OF AGRICULTURE
205 WARREN HALL
ITHACA, NEW YORK 14850

DATE 12-04-72 [illegible]
SHIP VIA CHEAPEST

UNITED STATES OF AMERICA
A.I.D. MISSION TO GHANA

Ghana Commercial Bank Building
6th & 7th Floors
P. O. Box 1630,
ACCRA, GHANA.
TELEPHONE 64914-17

September 20, 1972

Professor John W. Mellor
Department of Agricultural Economics
Cornell University
Cornell, New York

Dear Professor Mellor:

/Ghana Agriculture Division have received inquiries from the
of Agriculture about acquiring copies of your occasional
ist of publications
colleagues beli
program issues
ricing
able, we wo

AL DEVELOPMENT
SION TO ETHIOPIA

York 09319

ure

ecember 1972

DEC 2 1972

Addis Ababa, Ethiopia

EMBASSY
OF THE
UNITED STATES OF AMERICA

U.S. AID MISSION TO VIETNAM
85 Le Van Duyet, Saigon

July 14, 1972

John W. Mellor
New York State College of Agr
and Life Sciences
A Statutory College of the
Cornell University
Ithaca, New York 14850

Dear Mr. Mellor:

I received your l
the publications list
nient, please send us

Cable: USAIDPAK

UNITED STATES AGENCY FOR INTERNATIO
MISSION TO PAKISTAN

HEA
ISLAMA

July 31,

Memorandur

Office of Agricultu
Bureau of Technical Assis
AID/Washington D. C. 20523

Dr. John W. Mellor
Department of Agricultural Economics

AUG 11 1972

Frank W. Sheppard, Jr., Assistant Director
for Agricultural Development, USAID/Manila

Request for Publications

Request that following occasional papers

ms: "UNIVAGRIS"

Telephones: 3610, 28984, 28985, 71556

THE UNIVERSITY OF AGRICULTURAL SCIENCES

Department of Agricultural
Economics & Rural Sociology
Agricultural College, Hebbal,
Bangalore-24, India

Post Bag No. 1
XI Main, 16th Cross, Malleswaram
BANGALORE-3

February 15, 1972

Mr.W.Graeme Donovan, a Ph.D. student working with Dr. John W.Mellor, Professor of Agricultural Economics, Cornell University, Ithaca, New York, is presently in this University in the Department of Agricultural Economics to work [illegible] Research Project, "Optimising Employment Gener[illegible] Rural Areas of Mysore". Mr.Donovan is e[illegible] University for about nine months ti[illegible] is here, the following Graduat[illegible] advising Mr.Donovan. I re[illegible] Committee and give [illegible] research by Mr[illegible]

COLLEGE OF AGRICULTURE
U.P. AGRICULTURAL UNIVERSITY
PANTNAGAR
Distt. Nainital, India

No.CA/ ABC/Lit. IAU/2770
Dated 13-5-72

N.K. Anant Rao, M.Sc., Ph.D.
DEAN

MAY 17 1972

Dear Dr.Meller :

I am sending enclosed two copies of the paper, " Population Increase and Economic Growth and How the University Addresses Itself to this Problem," that was prepared for the Second Asian Agricultural College and University Seminar. I thank you very much for the suggestions you had given me. They were very helpful.

With kind regards,

Yours Sincerely,

(N.K.Anant Rao)

[illegible]ren Hall,
[illegible], Cornell Uni-
[illegible]versity.

[illegible]fessor, with a request to
[illegible] on February 21, 1972.

INDIAN Institute of Management
Vastrapur
Ahmedabad, INDIA

1 April 1971

Mr. J.P. Naik
Adviser
Ministry of Education & Y.S.
Shastri Bhavan
NEW DELHI

My dear JP:

We have in various ways been collaborating with Cornell
in relation to our work in Agriculture. As a
action wehave one of their doctoral
supervision of our faculty
research staff is at
fellowship

Himachal Pradesh University,
Summer Hill.

Simla-5, the 11th March, 1971.

.K. Singh,
Vice-Chancellor.

Dear Nelle

As the Vice-Chancellor of this University, I have to deal with a complex problem. The Himachal Pradesh University is described as a Multi-faculty university. Practically all the Universities in India are multi-faculty. Himachal Pradesh is so in a slightly different sense. Two Indo-American teams which have helped in the preparation of a blue-print for agricultural education recommended that there be an agricultural university in each State. When Himachal Pradesh came into being it began to aspire for a university, it was suggested that, for a population of about 30,000,00, it should have two universities, one for Agriculture patterned on the Land Grant University model and another of the conventional type for non-agricultural subjects. After a good deal of discussion, a decision was taken to bring both under one university with two different wings - the agricultural wing with a semi-autonomous Board of Management and the non-agricultural wing under the Executive Council of the University. Some of the decisions of the Board of Management are placed before the Executive Council.

As a Vice-Chancellor, concerned with both the wings, I have to reconcile the rigid demands of the two wings. One of

Ravi J. Matthai
Director

TELEGRAMS:
"TLX-618-TATAKEM"
TELEX:
618-TATIND-BY.

TATA CHEMICALS LIMITED

REGISTERED OFFICE:
BOMBAY HOUSE
BRUCE STREET, FORT
BOMBAY, 1.

AIR MAIL

SEP 1 ... 1972

PHONE: 259131

REF. NO. DO/G-1142/72

31 August 1972

Dear Prof. Mellor :

3. I shall be obliged if you wou... on your mailing list to rece... Papers, bulletin... obtai...

HINDUSTAN LEVER LIMITED

HINDUSTAN LEVER HOUSE · BACKBAY RECLAMATION · BOMBAY-1 BR

P.O.BOX 409 · TELEPHONE: 296400 · TELEX : BOMBAY 2323

CABLES & TELEGRAMS : 'HINDLEVER' BOMBAY

1st September, 1972

Mr. John W. Mellor,
New York State College of Agriculture and Life Sciences,
Cornell University,
Ithaca,
NEW YORK, 14850,
U.S.A.

Dear Sir,

Thank you for your circular ... the printed Bulletins, the interesting informa...

Hest. : 44-8183
Gram : VISHANT

12/A NETAJI SUBHAS ROAD
2ND FLOOR
CALCUTTA-1

29th June, 1972.

Modern Machineries Corporation

SCA/5457

The Director,
Department of Agricultural Economics,
Cornell University,
Ithaca,
NEW YORK-14850 (U.S.A.)

Dear Sir,

We understand that you have published Occasional Paper No.31, "The ...ketting And The Performance of the Rice Marketing System In East

FEDERATION OF INDIAN CHAMBERS OF COMMERCE & INDUSTRY

Telegrams : "UNICOMIND"
Telephones : 44281
Telex : 546

FEDERATION HOUSE
NEW DELHI-1

AUG 1972

Ref. No. F 6492/Misc/26

August 11,1972

Mr. John W. Mellor,
Department of Agricultural Economics
Cornell University,
Ithaca, New York.

Dear Sir,

...owledge with many thanks your letter dated
...ved by us on 10th August. We have
... 12,14,15,17,18,19 and 20
... we find, would be
... being

The Times of India
BOMBAY. (INDIA)
23rd August, 1972

Dear Mr. Mellor,

This is a brief note to
sending us your bu...
of the following i

AUG ... 1972

NATIONAL DAIRY DEVELOPMENT BOARD

PHONES: 601 to 606

ANAND, GUJARAT STATE, INDIA.

CABLE: DAIRYBOARD
TLX 012/2 8

BY AIR MAIL

MMD/Gen-24/10124

September 12, 1972

Mr. John W. Mellor
Dear Sir,

We have seen with great interest the following Cornell International Agricultural Development Bulletins.

1. ESTIMATES AND PROJECTIONS OF MILK PRODUCTION AND

KRISHI BHAVAN
DIRECTORATE OF AGRICULTURE
MADHYA PRADESH

No. INF/LIB./1/72-73/ Bhopal, Dt. Nov.'72.

To

Shri Jhon W.Mellor,
New York State College of Agriculture,
and Life Scienced,
A Statutory College of the State University,
Cornell University,
Ithaca, NEW YORK- 14850.

Sub : Supply of the Bulletins.

Ref : Your letter dated April,10,1972 addressed to M.P.Govt. Bhopal.

-oo-

of the following Bulletins

Section) M.P. Bhopal

JAWAHARLAL NEHRU KRISHI VISHWA VIDYALAYA
JABALPUR

Dr. D.P. Motiramani
Director of Research Services

D.O. No. DRS/Eii/

August 17, 1972

Dr. John W. Mellor
Department of Agricultural Economics
Warren Hall
Cornell University
Ithaca, New York 14850

Dear Dr. Meller:

AUG 0 1972

I thank you for your letter dated March 24, 1972 and the Cornell International Agricultural Development Bulletins 2, 6, 10 and 12 and earlier ones Nos. 14, 15, 17, 18, 19 and 20. I did not receive the list of occasional papers. I request you to keep the names of following on the mailing list and send the above

5. 26 Oct.1969 An Eding in Farming.

6. One.

AUG 1972

TELEPHONE : 3171/248-Off.
265-Res.

PUNJAB AGRICULTURAL UNIVERSITY
LUDHIANA

Dr A. S. Kahlon
DEAN
College of Basic Sciences & Humanities

D. O. No. 12324/M-24
Dated August 7, 1972

My dear Mellor

I am extremely grateful to you for remember
and expeditiously providing us with your
They are certainly very use
look at your
two

GOVERNMENT OF TAMIL NADU
TRUTH ALONE TRIUMPHS

FOOD DEPARTMENT
Letter No.83100/OP/72-1, dated 14th November 1972.

From
Thiru Ramchander, I.A.S.,
Secretary to Government.

To
Mr. John W. Mellor.

Sir,

Sub: List of occassional papers - Requested.

Ref: Your letter dated 10.4.72.

.....

I am to request that the following papers may kindly be supplied if they are available.

COLLEGE OF AGRICULTURE
XAVIER UNIVERSITY
CAGAYAN DE ORO CITY, PHILIPPINES

EXTENSION SERVICE
CATTLE RESEARCH STATION
INSTITUTE OF MARKET ANALYSIS
INSTITUTE OF SOCIAL ORDER
SOUTHEAST ASIA RURAL SOCIAL LEADERSHIP INSTITUTE

November 20, 1972.

ment of Agricultural Economics,
ity,

NOV

INSTITUTE OF DEVELOPING ECO.
(FORMERLY: THE INSTITUTE

ter papers
ill

INTERNATIONAL INSTITUTE OF TROPICAL AGRICULTURE
OYO ROAD, P.M.B. 5320, IBADAN, NIGERIA

Telephones:
Administration: Ibadan 23741
Library & Hostel) 23570
Bodija Estate) 24639

Cables: TROPFOUND, IKEJA

Lagos Office:
89, SOBO AROBIODU AVE.
P.O. BOX 145 IKEJA
Telephone: Lagos 33931

18 December, 1972

Please address the publications to the library to ensure that they become library property; we at the library will bring them to the attention of the appropriate people including Dr. Jellema.

CABLE: FORDFOUND
TEL: 282945

THE FORD FOUNDATION
P. O. BOX 98, RAMNA
DACCA - 2, BANGLADESH

31, DHANMANDI R. A.
ROAD NO. - 3

18th August, 1972

Professor John W. Mellor
New York State College of Agriculture and Life Sciences
Cornell University