

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; six monthly progress report, Jan.-July 1971

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

4. DOCUMENT DATE 1971	5. NUMBER OF PAGES 8p.	6. ARC NUMBER ARC
--------------------------	---------------------------	----------------------

7. REFERENCE ORGANIZATION NAME AND ADDRESS
 Cornell

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

9. ABSTRACT

10. CONTROL NUMBER PN-RAB-386	11. PRICE OF DOCUMENT
12. DESCRIPTORS Employment Technological change	13. PROJECT NUMBER
	14. CONTRACT NUMBER CSD-2805 Res.
	15. TYPE OF DOCUMENT

201.35
10.8.77

SECOND SIX MONTHLY PROGRESS REPORT - CONTRACT NO. AID-csd-2805

"The Impact of New Technology on Rural Employment and Income"

For the Period January 1, 1971 - July 1, 1971

John W. Mellor, Cornell University

TABLE OF CONTENTS

	<u>Page</u>
1. The Second Six Monthly Progress Report	
The Conceptual Model	1
The Simulation Model	2
Field Projects in Progress	3
Field Projects to be Initiated	4
Research Utilization	5
2. Appendix 1.	1
"Raising Incomes on Small Farms in India," an outline of proposed intensive study of small farms	
A revised project statement by Michael Schluter	
3. Appendix 2.	
"Optimising Employment Generation in Two Rural Areas of Mysore State, India"	
A revised project statement by W. Graeme Donovan	

SECOND SIX MONTHLY PROGRESS REPORT - CONTRACT NO. AID-csd-2805

"The Impact of New Technology on Rural Employment and Income"

For the Period January 1, 1971 - July 1, 1971

John W. Mellor, Cornell University

During the second six months of the contract, work was organized in four categories. First, further refinements of the conceptual model which was developed during the first six months of the contract. Second, formation from the conceptual model of a simulation model which is now in the process of being applied to India. Third, continuation of three field projects initiated during the first six months of the contract. Fourth, further development and refinement of two field projects to be initiated during the third six months period of the contract.

The Conceptual Model

During the first six months of the contract, Mellor and Lele developed a mathematical growth model which not only provides the conceptual basis for organization of the empirical research in this contract, but has also stirred a great deal of interest amongst researchers in this country and planners in low income countries. The formulation has been so promising that it merited more work than we had originally planned. The model as developed deals with the interrelationships between technological change in agriculture, increasing agricultural production, agricultural marketings, and the growth of employment in various sectors of the economy. The model contains two important omissions.

It does not include a capital market and thus cannot deal with the interaction of intersectoral capital flows with the labor and food markets. This is an extremely important omission. Arrangements were made for Dr. Lele to work on a consulting basis with the project in order to incorporate a capital market. The basic formulation of the capital market has now been completed and a number of computer runs are now in process with respect to various dynamic aspects of the model. The model even with two markets was quite complex. The introduction of the third market greatly increases the complexity. It appears, however, that despite this complexity the model will be useful in sorting out a number of different processes affecting employment and the distribution of income from the new technologies. This aspect of the model will be pursued further during the third six month period.

The other omission from the model is a treatment of household labor allocations. A number of people working with the model have made note of this. We have some question, however, as to whether the additional complexity which this will introduce will actually add to the analytic facility of the model. We are still taking this addition to the model under advisement.

The Simulation Model

The Mellor-Lele model is formulated in such a way as to lend itself to a simulation analysis. We have, over the past six months, been working out a large number of additional detailed equations necessary for a simulation. Concurrently, we have been collecting data representative of the Indian economy and the technological changes going on in the Indian economy so that we may simulate current status of the Indian economy with respect to these factors and then with various assumptions make simulations into the future. The model is sufficiently complex so that we have been delayed considerably in setting up the initial simulation. Not surprisingly, we are also having considerable difficulty in obtaining consistency in our initial conditions for the model. When we have consistency within the model and with the reality of the Indian economy we will then proceed with examination of a number of expectations for the future.

We will deal in the model with labor allocations between four sectors, a foodgrains sector, a nonfoodgrains agricultural sector, a nonagricultural sector, and a residual sector which we describe as a rural public works sector. We are designing the simulation so that the employment potential generated will provide an assumed level of per capita income and then this will determine demand not only for the foodgrains sector but also for the nonfoodgrains agricultural sector. We expect, under some fairly reasonable assumptions, to show a rapid growth in that sector. This will demonstrate the potentials not only for generating income, but also for generating employment through diversification in the agricultural sector. In so far, as these results are realized, they will be extremely useful in alerting policy makers to needs for facilitating development of the nonfoodgrains sector of agriculture. We expect to be able to test the direct and indirect effects of a number of expansion paths for the foodgrains and other agriculture sectors.

A substantial amount of time has been spent on data collection for the simulation. We continue to expand substantially on the work initiated in the first six monthly period with respect to capital labor ratios. We are also pulling together a substantial amount of information on demand patterns for different income groups. Both of these bodies of

work will undoubtedly be continued and perhaps expanded in the third six monthly period. In order to make our simulation useful and reasonable we will need to get fairly precise data with respect to expectations for new agricultural technologies and their applications in Indian agriculture. We will probably have to turn to some consulting services in India for some help on this.

The simulation approach looks extremely promising. If it continues to be as promising, we will probably expand our work in this direction. In any case, during the third six monthly period we will be putting considerable input into the simulation model.

Field Projects in Progress

Three field projects continued during the second six monthly period. The first is being conducted in Thailand and deals with the direct effects of the new technologies on net yields and hence on returns to the land-owning classes, and on employment and hence returns to lower income people in agriculture. The second field project is in India and deals with education in rural areas as it relates to employment and employability. The third field project is also in India and deals with potentials for increasing absorption of labor in small scale industry.

Field collection of data has been completed and preliminary tabulation of the data is well underway with respect to the study of education and employment in rural areas. Mr. Shortlidge, who is in charge of this sub-project will be returning to Ithaca in September and will proceed with intensive analysis of the data and write-up of the results. It is already clear that we will be able to shed a great deal of light on the reasons for the very high drop-out rates of rural people from primary and secondary school education. We will be able to show sharp contrast in attitudes towards education in areas making rapid progress in agriculture and those which are not making rapid progress in agriculture. These differences in attitudes will probably be closely related to differences in opportunities for people with education. We will also be able to show sharp contrast in both costs and returns to education between people in lower and higher socio economic groups. We will also have a substantial analysis of the returns to education at a first-rate agricultural university, the kinds of jobs which are obtained, the rates of unemployment, and changes in these over a few years of time.

Data collection from the small scale industries project is nearly completed. It is expected that it will be completed within the next few months and that Mr. van der Veen, who is in charge of this sub-project will return to Ithaca sometime during the fall to proceed with intensive analysis of the data and write-up. It is clear that we will

find a great deal of variability in capital labor ratios amongst various small scale industries. It is also apparent that the nature of the problems facing small scale industries will vary considerably among industries and that simplistic programs are not likely to be very successful. The interactions between small scale and large scale industries are turning out to be very complex, again warning us from simplistic judgments about the potentials for small scale industries considered in isolation.

Data collection on the effect of the new technologies in Thailand on yields and employment is proceeding as planned. In order to have a full year's data and an overlap of data from the irrigation season, we will probably continue data collection until Spring of 1972. Therefore, Mr. Burton, who is in charge of this sub-project probably will not return to Ithaca until April or May of 1972 at which time intensive analysis and write-up will take place.

Field Projects to be Initiated

Two field projects will be initiated within the next month. Both will take place in India and have been discussed in our previous six monthly report, with various AID officials in India and Washington and with various people in the government of India and various educational institutions.

The work initiated by Michael Schluter on special problems of raising incomes on small farms will be pursued with an intensive field project. This first stage of his analysis has been completed and Occasional Paper #47 entitled "Differential Rates of Adoption of the New Seed Varieties in India; The Problem of the Small Farm" has been issued. It is clear from that analysis that there is considerable lag in acceptance of new yield increasing cost per unit of output reducing technologies of the small farms. This is a significant factor in the widening income disparities between small farmers and large farmers. It is clear from the initial analysis that interaction of risk aversion and poor access to credit are important factors in the lag in adoption by small cultivators. The intensive study plan, an outline of which is appended to this report will attempt to diagnose the precise nature of these problems as a means of developing policies for mitigating them. Arrangements have been made with the Indian Institute of Management for Mr. Schluter to perform his work there under the joint direction of Dr. D. K. Desai, who is Director of the AgCo Group at the Indian Institute of Management, and myself.

The second new field project will be under the direction of Mr. Graeme Donovan who is expected to proceed to India in early September and to initiate the project outlined in our last six monthly report

dealing with choice of means for increasing employment within a rural area. This project was not only discussed in our last six monthly report and with personnel in Washington but lengthy discussions were held with AID personnel in New Delhi and with various Indian officials including the Mysore Agricultural University, the Planning Commission and various Agro-Economic Research Centres. The project is a substantial one in many respects. What we basically will do is to look at various potentials for increasing employment through changes in enterprise combinations on farms within an income maximization objective. We then wish to look at the ancillary potentials for creating further employment in public works in rural areas in view of the limitations which might arise from the availability of capital, administration and the supporting consumer goods for the labor force. We particularly wish to look at interactions between these various elements. The study is to deal with a small area in Mysore State. Mr. Donovan will be working at the Mysore Agricultural University under the direction of Dr. Ramanna, Head of the Department of Agricultural Economics at the Agricultural University. The most recent draft of the project statement for that sub-project is appended. We are now proceeding with setting up the analytical framework and will attempt to give it a preliminary testing here before Mr. Donovan proceeds to the field. One of our most substantial concerns with respect to this project is with respect to data on alternative choices of technology for various types of rural public works. We are now pursuing various potentials for obtaining the rather detailed and complex data which we need in that respect. We have some good leads which we hope to pursue further.

Research Utilization

We are now just completing the first year of this project and relatively little of the research has moved to the point at which it can be widely utilized. We have issued four Occasional Papers as part of this particular project. Since we have built up a large clientele from the Occasional Papers issued from the previous USAID Prices Research Contract, we have simply continued the papers in this contract in that same series. The papers are as follows:

1. Occasional Paper #42, "The Political Economy of Employment Oriented Development" by Uma J. Lele and John W. Mellor June, 1971.
2. Occasional Paper #43, "A Labor Supply Theory of Economic Development" by John W. Mellor and Uma J. Lele, June, 1971.
3. Occasional Paper #45, "A Note on Dualistic Models" by Uma J. Lele, June, 1971.
4. Occasional Paper #47, "Differential Rates of Adoption of the New Seed Varieties in India; The Problem of the Small Farm" by Michael Schluter, August, 1971.

Occasional Papers #42 and 43 are bringing forth a very substantial response. They have been discussed at length with members of the Indian Planning Commission and a great deal of interest has been shown. There is a particular relevance here because what we are talking about is at considerable variance with the underlying concepts of the previous Indian plans. It seems likely that the impact of what we are doing will be very substantial. The Occasional Paper dealing with small farms is just being issued. There is a small farmer agency in India and we are sending copies there and will have discussions with officials of that agency this fall. In our next six monthly report, we should be able to report substantial impact from these and related studies. It is perhaps worth noting here that we are having very substantial requests for some of the reports done from our Prices Research Contract. Most recently, we had a request to air mail 15 copies of our rice milling study to Madras to be used by the relevant secretaries in the Madras State Government in formulating plans for the financing and developing of rice milling facilities. The impact of this report is clearly going to be very substantial.

The Appendices are not included in this copy of the report.