PB-224 292

RURAL WORKS AND EMPLOYMENT: DESCRIPTION AND PRELIMINARY ANALYSIS OF A LAND ARMY PROJECT IN MYSORE STATE, INDIA

W. Graeme Donovan

Cornell University

Prepared for:

Agency for International Development

April 1973

	IN-331.763-D687	PB-224 292 44
"RURAL WORKS AND EMPLOYMENT: DESCRIPTION AND PRELIMINARY ANALYSIS OF A LAND ARMY PROJECT IN MYSORE STATE, INDIA"		Apr 73
W. Graeme Donovan.		
Cornell Univ. Dept. of Agricultural Economics.		Proj. 931-17-140-523 AID/csd-2805
12. Sponsoring Organization Name and Address Department of State Agency for International Development Washington, D.C. 20523		13. Type of Report & Period Covered 14.

15. Supplementary Notes

16. Abstracts

Under the Crash Scheme for Rural Employment, the most recent Central Government program of rural works in India, numerous projects have been set up throughout the country. This paper contains a description and analysis of one such project in Mysore State.

As unemployment in rural areas even in normal seasons has become increasingly acute and obvious, rural works are again being resorted to as employment-creating devices. The objectives of such works are to construct physical assets of an infrastructural nature by employing unskilled rural people in large working groups, in the general region of their home villages. Ideally, this has the dual effect of providing immediate participation in economic life for some of the most poverty-stricken persons of the society, and of increasing the productive capacity of the local economy. In the Introduction the author makes some further general remarks about these two effects. The succeeding section is taken up with a description of some aspects of rural works in India during the Third and Fourth Plans, providing a background for the analysis of a Land Army project in Mysore State which forms the main part of the essay. The essay concludes with a brief discussion of some implications for employment and development of the rural works approach outlined here.

17b. Identifiers/Open-Ended Terms

17c. COSATI Field/Group 331

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages 28
i	20. Security Class (This Page)	22. Price $3.00-145

April, 1973

RURAL WORKS AND EMPLOYMENT: DESCRIPTION AND PRELIMINARY ANALYSIS OF A LAND ARMY PROJECT IN MYSORE STATE, INDIA

by

W. Graeme Donovan

Occasional Paper No. 60
Employment and Income Distribution Project
Department of Agricultural Economics
Cornell University

Research supported by Contract No. AID/csd-2805
"The Impact of New Technology on Rural Employment and Income Distribution"
Cornell University and the United States Agency for International Development

ACKNOWLEDGEMENTS

Field work for this paper was done while the author was associated with the University of Agricultural Sciences, Bangalore. The author wishes to thank Professor R. Ramanna and other faculty members of the Department of Agricultural Economics for their help. Valuable assistance was received from the following persons in Mysore State: P. Padmanabha (Director of Census Operations), staff of the Public Works Department, village and Block officials in Gubbi Taluk. The openness and cooperation of staff of the Land Army, particularly Brigadier V. P. Naib, were greatly appreciated.

The author is grateful to John W. Mellor for numerous suggestions and helpful criticism, and to AID for continuing financial support under the Cornell University-USAID Employment and Income Distribution Project.

CONTENTS

APPENDICES

√

RURAL WORKS AND EMPLOYMENT: DESCRIPTION AND PRELIMINARY ANALYSIS OF A LAND ARMY PROJECT IN MYSORE STATE, INDIA

by

W. Graeme Donovan

I. INTRODUCTION

Under the Crash Scheme for Rural Employment (5), the most recent Central Government program of rural works in India, numerous projects have been set up throughout the country. This paper contains a description and analysis of one such project in Mysore State.[1/]

In India rural public works are often viewed as a method for bringing assistance and 'relief' to localities stricken by such natural disasters as drought and flood. The creation of employment opportunities has been an important element in works programs, since natural disasters usually reduce or destroy agricultural activity for a season, drastically lowering both the output of cultivators and the amount of work available for hired agricultural laborers. Employment in rural works then becomes the medium through which relief funds are channelled from the Central or State governments to the localities.

As unemployment in rural areas even in normal seasons has become increasingly acute and obvious, rural works are again being resorted to as employment-creating devices. The objectives of such works are to construct physical assets of an infrastructural nature by employing unskilled rural people in large working groups, in the general region of their home villages. Ideally, this has the dual effect of providing immediate participation in economic life for some of the most poverty-stricken persons of the society, and of increasing the productive capacity of the local economy. In this Introduction we shall make some further general remarks about these two effects. The succeeding section will be taken up with a description of some aspects of rural works in India during the Third and Fourth Plans, providing a background for the analysis of a Land Army project in Mysore State which forms the main part of the essay. The essay will conclude with a brief discussion of some implications for employment and development of the rural works approach outlined here.

The group employment of unskilled persons which characterizes rural works projects may have value beyond allowing a flow of income to these persons. In particular, the group work experience may have an important effect on attitudes

---

[1/] The State was renamed Karnataka during 1972, but we have used the former name in this paper.

which will carry over into future jobs outside the project. This will be the case in situations where there has been no tradition of cooperative endeavour, few incentives for regular and disciplined labor, or where manual work is regarded as socially demeaning. In addition, one of the important psychic values of employment is its engendering of a feeling of worth in the person which may be absent when they are unemployed. That is, because of meaningful participation in economic life the person may perceive themselves as being of value, and this may spill over into community attitudes towards self-help and development.

Moreover, there is the opportunity for education which is presented when persons are gathered in a task force. This is expanded if the workers are to stay at nights in a special camp, or if organized educational activities may take place in nearby villages in the evenings or at specially arranged hours. There are at least four levels at which we may see an educational program operating in this kind of setting:

(i) Development of general skills such as arise in experience of leadership, negotiation, problem articulation and solution, planning, cooperation, conflict resolution and so on. This kind of development will be fostered by planning for rural works whose importance to the local situation are clear and made clear to those who will benefit, by closely involving local beneficiaries at all stages of the planning and decision process, and by providing opportunities for local leadership to be exercised. This may not be easy to achieve in practice.

(ii) Development of specific skills such as carpentry, masonry, plumbing, blacksmithy, simple engineering, electrical repairs, metal work, surveying and accounting. If such skills were to be developed in special classes off the work site, instruction could be added in farm management, dairy husbandry, poultry raising, tailoring and so on. Of course this very quickly turns into a major job of rural adult education, a separate field in its own right. We merely wish to point out that for a rural works program closely integrated into the local scene, such possibilities for side effects do exist.

(iii) Development of awareness and knowledge about such subjects as family planning, nutrition, health, sanitation, community organization and local government.

(iv) Politicization and/or political indoctrination. These are closely related to (iii), and would also be possible in situations where a rural works task force was kept together after work hours.

With respect to increasing productive capacity of the local economy, it needs to be stressed that rural works must make possible or stimulate changes in local agriculture and/or industries if they are to have longer term value for creating employment. Projects which have no impact on underlying conditions of production in the locality, have at best a transient effect upon the welfare of the lower income persons they are generally designed to help. This calls attention to the need for careful project design, to ensure both that the assets contructed are durable (or that provision is made for their maintenance in working condition), and that they set in train employment-creating sequences of change in the local area.

II. RURAL WORKS IN INDIA DURING THE THIRD AND FOURTH PLANS

1. Background

In Appendix I are outlined expenditures proposed for the Third and revised Fourth Plans on Forests, Soil conservation, Flood control, Minor, medium and major irrigation, Rural market roads, Rural electrification and Rural water supply. These expenditures total Rs. 1134 crores for the Third Plan and Rs. 2207 crores for the revised Fourth Plan, representing 15.1 percent and 15.3 percent respectively of total public expenditures in the Plans.

Most projects of the type we are discussing -- involving construction of community assets by large groups of laborers recruited from rural areas -- will fall within these categories. It is difficult to discover, from the Plan documents themselves, what proportion of investment within these categories is for projects having a large employment component. Clearly there are elements of 'non-project' expenditure included in some categories, particularly allowances for research, survey and so on, and project expenditures themselves may not be labor-intensive in many cases. The figures are given here to provide a background against which to view outlays proposed for special rural works programs.

To obtain a perspective on employment generated by special programs, it is useful to note that there were approximately 162 million persons in the total rural work force in 1961 and an estimated 202 million in 1971.[2/] Of these approximately 31.5 million were agricultural laborers in 1961 and an estimated 39.3 million in 1971.

2. Rural Manpower Utilisation Programme

(a) Organization. During the Third Plan, a special organizational substructure was set up to deal with the newly introduced Rural Works Programme (sometimes called the Rural Manpower Utilisation Programme). This was initiated during the 1960/61 year and was apparently terminated as a formal program in April 1969 (20, p. iii). Each Community Development Block was urged, in preparing its own five year plan, to draw up a "comprehensive works programme" comprising five categories of works (8, pp. 1-2). Three of these categories were envisaged as part of normal Block plans, providing "some, though necessarily limited wage employment" (8, p. 2). The remaining two categories upon which most stress was laid for providing "wage employment on a large scale" were described as follows:

-- "Works projects included in the plans of States and local bodies which involve the use of unskilled and semi-skilled labour."

-- "Supplementary works programmes to be organized in areas in which there is high incidence of unemployment." (8, p. 2).

The Planning Commission report admitted that these two categories were similar in nature, but wished to emphasize the fact that the second category

---

[2/] Figures for 1961 are taken from the Census of India (4), and those for 1971 are estimated from total population figures given in (11), using proportions derived from the 1961 Census. This procedure will probably overstate the total rural work force in 1971, but may slightly understate the number of agricultural laborers, in the same year.

would supplement the first. It is these supplementary works which are singled out under the title of the Rural Works Programme. We may note some features of interest in the intentions of planners for the program:

(i) Wages were to be paid at local slack season rates, and the total wage bill was to be at least 60 percent of scheme costs.3/

(ii) As much as possible, work was to be contracted to labor-cooperatives and other voluntary organizations, and the Block Development Officers were to be given major supervisory responsibility.

(iii) Arrangements were to be made to ensure that maintenance was carried out, either by Panchayats and their Samitis, or by the government department executing the works.

(iv) All costs were to be met by the central government, though the mechanics of financing were to change from 1962-63 on, so that 50 percent of costs would be treated as a loan to the State government and 50 percent as a grant. From 1963-64 on, the central government set no prescribed limits on States relating to areas selected or timing of schemes, but merely provided the funding carte blanche.

(v) The Programme Evaluation Organisation (PEO) was charged with maintaining a close evaluative watch on progress, and its report up to 1964 (issued in 1967) covered 84 projects and included data from 2739 interviews with project laborers (9). No further published reports seem to have been issued to cover later years.

(b) Performance. Clearly it was intended that this program should create assets which would build up agricultural production to raise employment on a continuing basis. Areas were to be chosen with boosts to agricultural production in mind. Whether or not the program came to consist mainly of works of a 'relief' nature is difficult to ascertain. In any case, it seems that its achievements were rather modest, even relative to the moderate targets it set itself. During the period of the Third Plan it was thought that the following amount of employment would be generated by the special program (8, p. 3):

First year -- 100,000 persons for 100 days each

Second year -- 500,000 persons for 100 days each

Third year -- 1,000,000 persons for 100 days each

Last year -- 2,500,000 persons for 100 days each

An investment of Rs. 150 crores was set aside to cover the program, but as it transpired only Rs. 19 crores were made available (12.7 percent of the planned sum). The PEO study (9) estimated that on average about 53 mandays of employment were generated for the expenditure of every Rs. 100/-. If this is assumed to be a fair measure of overall achievement, then the investment of Rs. 19 crores must have provided employment for 100 days for an average of 201,000

3/ There is no indication of how the executing agency defined or estimated "slack season wage rate" nor whether field experience forced them to manipulate their rate until sufficient workers were forthcoming for the scheme. The labor supply response in the slack season may be complex, and has been little studied.

persons per year of the plan. Why was such a low proportion of planned investment actually taken up? Probably there were problems encountered in getting the organization established and working smoothly, and the kinds of delays in sanctioning release of funds which still today cause difficulty for rural works projects. Although mentioning the need for greatly improving the sanction system, the PEO report suggests that the poor performance was "due to the limitations of resources as a result of unexpected developments," doubtless an oblique reference to the outbreak of hostilities between India and China in 1962, and possibly those between India and Pakistan in 1965.

Some of the data obtained from the PEO survey of laborers are of interest because they provide characteristics of the persons being directly affected by the program. We have set these out in Appendix II. Unfortunately the PEO report does not provide details of villages and regions in which projects were operating so that we cannot say whether or not the works were drawing laborers evenly from throughout the work force of the region. Clearly a high proportion of agricultural laborers and members of Scheduled Castes were being attracted.[4/] At the same time it is quite surprising to find that the proportion of project work forces cultivating 5 acres or more of land was as high as one-fifth to one-quarter. If persons in this economic group could be attracted to rural works in such numbers there must have been a rather large pool of laborers who could have been drawn upon to execute 'off peak season' projects. Of course we cannot be sure that the PEO sample was representative of workers in all schemes.

(c) Termination. We have no information on performance of the program during the interim one-year plans which filled in the 1966-69 period, and the draft Fourth Plan for 1969-74 does not mention the program. Its termination appears to have been formally discussed, however, in some of the 'approach' documents to the Fourth Plan. An indirect reference is contained in the foreword to a study of the program as it operated in seven northern districts of Mysore State (21). There the abandonment was said to have been carried out by the "reconstituted Planning Commission" whose integrated district development program proposed for the Fourth Plan (1969-1974) was considered to have obviated the necessity for a separate rural works program. The Planning Commission which prepared the original Fourth Plan (1966-1971) had proposed to expand funds available for the Rural Works Programme.

(d) Criticisms. Whatever the official reason for the decision, later events have moved thinking back towards a separate works emphasis, and we now consider some specific criticisms which surfaced in the PEO report (9) and in a study of projects of the Rural Works Programme in northern areas of Mysore State, carried out by Nanjundappa (21).

(i) Sanction of schemes. Both reports complained about delays in releasing funds and permission to proceed with projects. Under the system used, money

---

[4/] From the 1961 Census the proportion of male agricultural laborers to total male rural work force was 16.2 percent, and the proportion of male members of Scheduled Castes to total males in the population was 14.6 percent, (4, pp. 86-87), while works projects were drawing between 30 percent and 60 percent of their laborers from among Scheduled Castes, and between 36 percent and 47 percent of their labor force from among landless families (see Appendix II).

was sanctioned for use in a particular financial year (which runs from April 1 to March 31). Frequently sanction was delayed until as little as one month before the end of the financial year, leaving local agencies the hopeless task of using funds in the limited period remaining. Further, since the period from February to May generally represented the 'slack' agricultural season, when labor was most available for works, the problem of release of funds was critical to effectiveness.

(ii) Use of local organizations. The PEO felt that Panchayats and labor cooperatives were not being closely enough associated with scheme planning and execution. Indeed, they expressed doubts about the validity of the labor cooperative concept, noting that these organizations had proved difficult to sustain in the face of irregularity in work schemes and lack of job guarantees. In practice, Panchayats were frequently to be found mobilizing and supervising labor, or at least nominating someone to do so. It can be argued that labor cooperatives have usefulness outside the sphere of rural works in the sense that they could be the forerunner of organizations which more effectively presented labor's case regarding work conditions and wage levels in rural areas, perhaps increasing labor's generally low share of the community's income. From this point of view it may be worthwhile to foster such organizations by dealing with the conditions said to be rendering them ineffective i.e. trying to arrange more continuous work and guarantees of jobs. The year-to-year sanction system, with its built-in delays and uncertainty, was again probably at fault here.

An important point with respect to project design relates to their phasing so that not all of the low-employment portions are executed in one year (21, pp. 102-103).

(iii) Repairs and maintenance. The PEO report did not deal with this specifically, but Nanjundappa stated that the subject was being passed over in projects in North Mysore. He maintained that Panchayats experienced political and funding problems, and difficulties over ownership of projects and payback therefrom, which implied that they were not in a position to be held responsible for maintenance. There may, however, have been a failure to involve local people in the sense of their seeing clearly that the asset was theirs to use productively or else to be wasted. In addition, the number of times the words 'improvement' and 'restoration' occur in the titles of rural works projects indicates that many of these were themselves repair and maintenance jobs. There is a continuum of definitions which may be given to the term 'maintenance', ranging from frequent small repairs through to infrequent, rather massive attention which amounts to re-building the asset. The level of maintenance seen as appropriate is bound up with the question of durability, and therefore of construction technique and its degree of labor intensity, as well as with the function of the asset and the level of 'working order' desired for its continuing effectiveness. In some circumstances it may be desirable to forego initial durability and plan for rather higher amounts of continuing employment in a maintenance role.

(iv) Area and project selection. The Planning Commission set out general guidelines for choosing areas, stating that they should be 'backward' in development, have high rates of unemployment and underemployment (at least in the slack season), but with scope for productive agricultural programs (8). They suggested that such factors should be considered as population density, proportion of agricultural labor to total population, employment in organized industries, cultivatable area per capita, value of output per acre, proportions of area irrigated and double cropped, local wage rates, migration patterns and capacity of administrative

and technical organizations to handle works. However, they were specific about neither the way these criteria should be interpreted nor about how data should be obtained to illuminate them. The PEO was equally non-specific in its report (9), recording merely that State selections were frequently not meeting the criteria because of insufficient time and data at their disposal. The need for detailed and continuing surveys of unemployment has been pointed out on several occasions. It can be argued that, given the state of information, it would be better to start rural works than to wait for improved data, and that broad guidelines about agricultural and employment benefits foreseen, derived from calculations similar to those we shall illustrate later, could be used to direct the flow of investment.

(v) Labor remuneration. Laborers interviewed by Nanjundappa (21) consistently expressed their preference for the piece-work approach being used by the Public Works Department, whereby a price was set for a specified physical achievement and the laborers were free to do it as quickly as they could. Obviously such an approach cannot be used for all parts of the construction without quality suffering, but the nature of the works is such that it can be quite widely adopted. The approach requires accurate observation and considerable experience if realistic estimates are to be made, and would usefully be followed by checks on the sums laborers were actually earning each day on various activities.

(vi) Inflation. The PEO report did not touch on the inflationary potential of the program, and Nanjundappa dismissed it by arguing that expenditure on the rural works was only 0.1 percent of total public expenditure in Mysore State over the period, so could be expected to have negligible effect on prices. When a greatly expanded works program is contemplated, however, with increases in the purchasing power of low-income people, the problem may become significant. Commodities which have a high income elasticity of demand for these persons, especially food and clothing, will be susceptible to the most price pressure, and upward movements in prices of these commodities will reduce the degree of improvement in real welfare which might otherwise have resulted. Payment to laborers in kind rather than cash (21, p. 120) protects their real incomes but does not solve the basic procurement problem. The use of food aid from outside countries to provide in-kind support for rural work projects (25, p. 18; 10, p. 30) is a possible approach where political considerations and the international supply situation permit. The most stable lasting solution is the increase in agricultural production which will (hopefully) be stimulated by the works themselves. Important factors in this solution are the time lags between project investment and project benefits, and a sufficient mobility of commodities to prevent local inflation.

3. The Crash Scheme for Rural Employment (CSRE)

This scheme was introduced at the beginning of the 1971/72 financial year viz. April 1, 1971, and seems to have been one attempt to put into effect the 'garibi hatao' slogan with which Mrs. Gandhi's New Congress Party swept to power throughout the country in early 1971. The Crash Scheme aims at providing employment for at least 1000 persons for ten months of the year in every district of the country (5). A wage rate of up to Rs. 100 per month is allowed. Funds are provided by the central government to the States, and the allocation is made in an arbitrary, though arithmetically straightforward fashion, as illustrated by that for 1972-73 (5, p. 13):

Wage cost per district per year:	1000 x 10 x Rs. 100 =	Rs. 1,000,000
Add 25 percent for equipment and materials		250,000
Total expenditure per district per year		Rs. 1,250,000
Total expenditure for whole country (355 districts)		Rs. 443,750,000

Now, the government had set aside Rs. 500 million for the scheme, so the balance remaining from the above arithmetic was then allocated to the seven most populous States in such a way that the allocation per head of population was equal in all seven States. Of course this does not equalize per capita allocations over all States in the country, and the exercise allots Rs. 9.38 per head in Nagaland, for example, compared with Rs. 3.91 per head in Himachal Pradesh, and 88 paise per head in the most populous States (Uttar Pradesh, Bihar etc.) (5, p. 15). It is conceivable that the final allocation achieved in practice may differ from that indicated in the guidelines.

We now briefly outline some other rules laid down in the CSRE guidelines (5):

(i) Projects may relate to road-building, drainage and land reclamation, water and soil conservation, flood control, minor irrigation, forests, extra classrooms for primary schools, and special repairs (not maintenance) to existing assets, to put them into operation.

(ii) No project can be taken up which is already included in the Fourth Plan of any of the States.

(iii) As far as possible, not more than one person should be employed from any one family, and preference should be given to persons least likely to find alternative employment.

(iv) Projects must not be executed by private contractors, but are to be administered by District Development Councils, Zila Parishads, District Collectors and the like.5/

(v) State governments must designate an agency to be responsible for maintenance.

(vi) Funds are to be released by the Centre to the States in four instalments per annum under a rather complex arrangement whereby States must report

---

5/ The reasons given for excluding private contractors are that they are likely to use laborers from outside local areas, especially those already on their payrolls, and that they "retain a substantial margin of profit for themselves" (5, p. 9). This viewpoint may place too little value on the entrepreneurial function performed by these labor contractors. Recruiting and supervising tasks may require a considerable amount of local knowledge, and the Crash Scheme opts for these tasks being performed by the administering agency. In some past schemes labor co-operatives have been encouraged to provide laborers.

when two-thirds of each instalment is spent in order to obtain the next release. This provision, along with the requirement that States furnish monthly, quarterly and half yearly achievement reports, may slow the appropriation of funds or give rise to discontinuities in their flow.

(vii) Projects are to be designed so that, in each district, the wage component in total expenditure for all projects is no lower than 70 percent of total expenditure. Allowance is made for proportionate expenditure on wages to differ among projects according to their nature, but there is a suggestion that 60 percent is as low as it is thought the wage component should be for any project.

An important issue raised by this latter provision is that choice of the proportion of expenditure going to wages is simultaneously a choice about income distribution, construction technique and durability of the asset constructed. Or at least it is a choice about "the range of choices" which will be considered in these three areas. The interactions involved here need to be weighed carefully, and perhaps spelled out as separate policy decisions, instead of being left as implications of what appears on the surface to be an arbitrary selection of a percentage wage component.

4. Other Schemes

An interim report submitted in February 1972 by the Expert Committee on Unemployment (Chairman B. C. Bhagwati) advocated a Rs. 2000 crores plan for creating almost four million jobs during the succeeding two years, through a program of rural works (26). The program would add an outlay of about Rs. 740 crores to investment in rural works already included in the revised Fourth Plan. Some of the elements of this proposed additional investment were said to be as follows (26):

Minor irrigation (additional 1.24 million acres)	Rs. 100 crores
Rural electrification (additional 37,000 villages and 300,000 pumpsets)	Rs. 235 crores
Rural roads	Rs. 110 crores
Rural housing (additional 770,000 units)	Rs. 230 crores
Rural water supply (additional 21,000 villages)	Rs. 62 crores

It is not known what government action has been taken on this proposal.

Finally, no attempt is made here to trace employment effects of aid from various foreign sources, both public and private, though some proportion of this may be invested in projects whose construction has a high labor component.

III. RURAL WORKS IN MYSORE STATE

1. Background

The programs outlined above have also been implemented in Mysore State, and mention has already been made of the study by Nanjundappa (21) of the former Rural Works Programme in northern districts of the State.

During the Fourth Plan period (1969-1974), expenditures proposed for Forests, Soil conservation, Flood control, Minor, medium and major irrigation, Rural market roads, and Rural electrification in the State total Rs. 140 crores[6], or 40 percent of total public expenditure in the Plan (19). In addition, investment of Rs. 13 crores on land reclamation is proposed to be partially financed by a World Bank loan[7], and the Crash Scheme for Rural Employment (12 and 5) has allotted Rs. 2.37 crores to the State in 1971-1972 and Rs. 2.38 crores in 1972-1973.

Out of a total work force of 10.29 million persons in Mysore State in 1971, 2.65 million recorded their occupation as "Agricultural Labourer" and 4.09 million as "cultivator" (11).

Against this background we focus upon a new organization called the Land Army, unique to Mysore, which has been established on an experimental basis to handle about half of the State funds under the Crash Scheme for Rural Employment.

2. Organization of the Land Army

This new government body was constituted in February 1971, in readiness for the beginning of the CSRE, and submitted projects for consideration (18, p. 1). There was a series of delays in the sanctioning process, however, and the first works were not commenced until the August-October period, 1971. By September 1971 about 8 projects were operational and by March 1972 these had increased to 16, with some of the original schemes having become more ambitious in scope. At least 11 districts of the 19 in the State have Land Army projects.

The Land Army has a centralized structure. At the State level, overall control is vested in an Executive Committee, headed by a former army General, with representation at the Secretarial level from State departments of Development, Finance, Agriculture and Forestry, Public Works and Electricity, and

---

[6] These categories are similar to those used for the Third and Fourth Plans of the entire country -- see Appendix I. The Mysore government is investing heavily in irrigation schemes, in an attempt to bring the proportion of irrigated land up to levels achieved elsewhere in the country. It is proposed that approximately Rs. 89 crores should be spent on medium and major irrigation schemes, and Rs. 32 crores on minor irrigation schemes.

[7] A World Bank integrated 'project' totalling Rs. 60 crores was intended to be commenced in the State in February 1972, but was delayed when problems were encountered over payback conditions imposed upon farmers who were to obtain tube wells. It is not known whether or not the project has yet commenced (see 3 and 13).

Labour, together with several other senior officials from these departments (17). The organization itself is directed by a former army Brigadier with small headquarters staff in Bangalore consisting of an assistant director, project engineers and administrative assistants. In the field the group of workers on each project is termed a 'task force' made up of bhu-sainiks (literally, "land soldiers"). This is controlled by a Task Force Commander (TFC) who has one assistant TFC if there are less than 150 bhu-sainiks, two for between 150 and 200, and three if the task force numbers more than 200. (At least, these are the ideal ratios, not always attained in practice). The military flavor is continued by further dividing up the task forces into Platoons of 50 (with platoon commanders selected from among laborers) and Sections of 10. In this structure the key figures are proving to be the Director himself, and the Task Force Commanders, who carry a heavy load of work and responsibility.

(a) Selection and remuneration of personnel. While a few TFC's have been seconded from the regular army, most have been recruited from among unemployed engineering graduates, either diploma or degree holding. In the original screening 60 were selected out of some 400 applicants, and after a short but rigorous training, about 35-40 remained for appointment. TFC's earn the equivalent of about Rs. 450 per month (including the imputed value of food) and assistants about Rs. 300 per month.

For a particular project, workers are recruited from local villages by Land Army personnel, helped by local village leaders. Selection concentrates on the age group 18-25 years, though where large task forces have been required this age has been exceeded. The only formal requirement for selection is reasonable physical health. General guidelines of the CSRE apply, since the Land Army is using these funds. Laborers are paid Rs. 100 per month, though some variations have been tried. The Land Army has been strongly advocating the 'camp' concept i.e. the erection of temporary dwellings on a central site where the task force may be accommodated. It has not proved possible to implement this entirely, and usually a situation arises where some part of the task force lives in the camp, and the rest commute daily from nearby villages. To provide an incentive for the camp, workers who stay there are paid Rs. 4 per day, from which Rs. 1.30 is extracted to pay for meals provided by Land Army cooks. Commuting laborers receive Rs. 3 per day, and must provide their own food. Wherever the nature of work permits, piece work rates are introduced, which is having the effect of speeding up work and making laborers willing to work longer hours to finish jobs earlier. Usually a certain volume of work is assigned to a ten-person group, with a specified price, and group members keep one another working.

(b) The camp concept. The Land Army Director would like to have all of the bhu-sainiks living in camps in order that the following matters might be efficiently attended to:

(i) Feeding -- an improvement in the workers' nutritional standards is aimed for, and it is maintained that many bhu-sainiks have gained 8-15 kgs. in weight, even while doing hard manual work.

(ii) Health care -- the weight of workers in the camp is checked regularly, and any health problems which arise dealt with.

(iii) Drills -- camp workers lead a disciplined life, which includes parades, drills and physical exercises on a regular basis.

(iv) Instruction -- it is intended that evening classes be given in certain trade skills, but these have not begun yet. The Director would also like to follow up later with mobile trade instruction teams visiting the villages, but it remains to be seen whether or not funds will be available for this activity.

It is not yet clear, either, whether the government will eventually make provision for laborers to be signed up on a more permanent basis (up to three years, for example), a move which the Director sees as desirable.

(c) Nature of schemes. The works have consisted mainly of roads, afforestation and construction of village irrigation tanks.[8] Emphasis is placed upon durable construction (e.g. all-weather roads) as it is felt that this is where many Community Development works failed. Two of the projects are outside the usual type, namely a tree-planting task in conjunction with the University of Mysore, and a national park some ten miles south of Bangalore in which about 20 square miles of land are being developed as a game sanctuary, with internal roads, forests and reservoirs.

In Gubbi Taluk of Tumkur District, about 60 miles northwest of Bangalore, a project of the Land Army which includes roads, irrigation tanks and afforestation provides a useful example to illustrate in more detail the approach being adopted.

3. The Land Army Alilusrirama Project

(a) Background. The project centers upon the village of Alilaghatta (population 2400) which is about 14 miles from the town of Gubbi on a metalled road constructed 8 years ago. Project boundaries have expanded considerably since it was first sanctioned. The initial core of the project consisted of two inter-village roads (a total of 8 miles), a 400 acre forestry plantation, and work on three tanks, one of which was new. Since then a further 6 roads have been proposed, totalling 17.5 miles in length, and the expanded project will affect at least 18 villages within an area of approximately 45 square miles.

The Taluk which has this project almost at its center is a dry region characterized by single cropping agriculture with a sizable area of coconut and arecanut gardens. In 1970-71, for example, of a net area sown of 140,000 acres, only 525 acres (0.37 percent) were sown a second time. The cropping breakdown for the Taluk in this same year was broadly as follows:[9]

---

[8] A 'tank' is the name given to a small village reservoir or storage dam, impounding water to be used for irrigating crops, livestock drinking purposes, and so on.

[9] Information obtained from the District Statistical Officer, in Tumkur.

Crop	Area (acres)	Percent
Kharif Ragi	59,104	42.0
Paddy	11,389	8.1
Other cereals	12,831	9.1
Horsegram	25,630	18.2
Other pulses	7,541	5.4
Total foodgrains	116,495	82.8
Other food crops	5,164	3.7
Coconuts	8,808	6.3
Arecanuts	2,107	1.5
Groundnut	3,641	2.6
Other crops	4,373	3.1
Total	140,588	100.0

The dominance of Ragi, essentially a dryland crop, is obvious.

We now outline the scheme, particularly as it was submitted for sanction in its revised form in April 1972.10/

(b) Details of project. In Appendix III are set out the planned expenditures for the original core scheme, the additional road works proposed since the project began, and a new large irrigation tank at Hardagere, the village which is being linked to Alilaghatta by one of the all-weather roads. This Hardagere tank is being constructed under the auspices of the Public Works Department (PWD) but we include it here, because it should have a considerable productive impact upon agriculture by adding to irrigation potential, and it links in well with the Land Army works. In addition, a proposal is being investigated for diverting water from a stream some distance to the north of Alilaghatta so that it flows into tanks around the village. This will be a major diversion channel and up to Rs. 300,000 may be sought to cover its cost. That proposal is unlikely to be taken up before the 1973-74 year at the earliest. As a summary, then, the Land Army is seeking sanction for the following expenditures on the Alilusrirama project:

Original core scheme	Rs.	300,000
Additional six roads		300,000
Future diversion channel		300,000
Total	Rs.	900,000

To this is added here the estimate for the PWD tank at Hardagere, namely Rs. 464,000.

10/ Details are drawn from Land Army files.

The estimates suggested that approximately 72,500 days of employment would be generated on the first phase (October 1971 to March 1973), and 63,800 days on the second phase roads (April 1973 to March 1974). This employment is created by the first two expenditures of Rs. 300,000 each, noted above. These timings have been altered somewhat by the way funding has become available, and we shall discuss below the employment achievement up to August 1972.

(c) Characteristics of project workers. In Appendix IV data are presented to give an idea of the characteristics of laborers being drawn to the project. They are summarized from interviews with 23 workers taken on August 28 and 29, 1972. These workers were selected from two portions of the task force which were then employed on two different roads in the project. Selection was done randomly from the complete roll for the two portions of the task force involved. Unfortunately it was impossible to select from the entire task force, because further small portions were engaged on other jobs at the time.

On the two days in question, the numbers of workers present for employment in the entire task force were respectively 395 and 425. The sample of 23 therefore represented about 5.6 percent of the overall work force. Some of the summarized data call for brief comment:

(i) The work force has not been confined to those in the age group 18-25 years, as originally intended by the Land Army, although 61 percent of the sample were in that age group. Expansion of the Alilusrirama task force has clearly necessitated accepting older workers, who made up 34.7 percent of the sample interviewed.

(ii) A little more than 65 percent of the sample had received no education and were illiterate. The proportion of rural males aged 15-24 in Mysore State as a whole who were illiterate was 57.4 percent in 1961 (4) and is likely to have fallen to about 52 percent in 1971.[11] Just under 60 percent of all males in Tumkur district were recorded as illiterate in the 1971 Census (15 p. 163) but this figure includes infants, so that the illiteracy rate among adult males was likely to have been considerably less than 60 percent. There is an indication, therefore, that the project has drawn disproportionately from among workers with less education.

(iii) In the list of Castes, Vokkaligas and Lingayats are the major cultivating groups of Mysore State, which together also dominate State politics. Twenty-six percent of the respondents said they belonged to these groups. The Kurubar, A. K. and A. D. groups, from which 43 percent of the sample workers came, are generally regarded as Scheduled Castes. For Gubbi Taluk, in the 1961 Census, Scheduled Castes made up only 14.8 percent of the population (16), so that once again the project seemed to be drawing workers relatively heavily from groups generally regarded as among the least privileged in society.

---

[11] The figure for 1961 is from the national Census (4). That for 1971 is an estimate made by reducing the 1961 figure by the same proportion as the illiteracy figure for all males had fallen between 1961 and 1971 (the latter being quoted in the 1971 Mysore Census (11)).

(iv) Respondents in the sample were each asked how much land was farmed by their immediate family, and the following pattern emerged:

	Percent of Respondents
Zero land	8.7
Up to 1 acre	17.4
1.01 to 2 acres	43.5
2.01 to 5 acres	21.7
5.01 to 10 acres	8.7
10.01 acres and above	-
Total	100.0

It is difficult to make meaningful statements about the appeal of the works to absolutely landless families, because it is difficult to define this group in the community at large. For example, the 1971 Census for 17 villages affected by the Alilusrirama project records 14 percent of the work force giving "Agricultural Labour" as their main occupation, but it is likely that many persons in this category cultivated small holdings as well. Statements about "Landless Labourers" frequently include workers with holdings below two acres, and this loose definition is reasonable where agricultural conditions are such that this land provides a low proportion of total income.

That a large proportion of the task force workers came from lower-income families, however, seems to be indicated by

-- the proportion farming 2 acres of land or less (69.6 percent)

-- the proportion having no education (65.2 percent)

-- the proportion giving house value of Rs. 500 or less (82.6 percent)

-- the estimated family income per capita of working members of families from which bhu-sainiks came (Rs. 273 per capita)

(d) Fluctuations in work force. In Appendix V are graphs showing the strength of the Alilusrirama task force from December 1971 to August 1972. The expansion of the labor force is clearly seen, reaching a peak of 561 on August 14, and being above 500 on 13 days during July and August. The daily graph from April to August shows the kind of fluctuations which can occur with absenteeism for one reasons or another -- ill health, work on the family farm, festivals, marriages and so on. There are seasonal fluctuations relating to farm operations, but these are obscured by daily changes for other reasons, and also by deliberate expansion of recruitment as the project 'found its feet' and became able to sustain more laborers. When data are available to contruct corresponding graphs for the complete farm year from June 1972 to June 1973, a much more clear pattern of seasonal fluctuations should be revealed.

4. Effects of the Alilusrirama Project

(a) Effects on laborers. During the period December 1971 to August 1972, the works program has provided approximately 47,600 days of employment for local laborers, and seems likely to generate at least another 133.000 days (i.e. about 53,000 days per year) during the next two and a half years if continued as planned.

The Task Force Commander was able to provide estimates of seven villages of origin of some 490 of the enrolled workers. The total work force of these seven villages is recorded by the 1971 Census as 2,687. That is, at least 18 percent of the workers in these villages have obtained some employment from the project, and the proportion may be higher if persons are included who have been employed temporarily and have dropped out, to be replaced by others (at least 560 laborers had received some employment).

Data from the sample interviewed indicate that for them the average quantum of work provided by the Land Army during the past year has been 101.4 days, or 38.8 percent of their average total work (of 262.3 days) obtained for the year (Appendix IV). We do not know what amount of work these persons would have found in the absence of the Land Army project. Reports of Land Army field staff about daily attendance with the task force seem to indicate, however, that many workers freely return to agricultural activities when the need arises and there is a 'pull' from their own farms. This suggests that had alternative agricultural employment been available it might have been taken up by the Land Army laborers, and that therefore all Land Army employment represents a net addition to normal employment for these workers. However, we must concede the possibility that some Land Army laborers have been unwilling to return for agricultural work which they did previously, and that their unavailability has forced other persons out of idleness, such as family members on larger farms, for example. To the extent this has occurred, additions from Land Army work must be discounted to arrive at net figures, but we do not have sufficient data to measure this 'replacement' effect. If all Land Army employment is regarded as a net addition, it has increased employment of task force members by about 63 percent.

Sample laborers who were engaged with the Land Army had contributed, on average, 53.9 percent of their family's cash income during the past year, and 53 percent of this contribution had come from the Land Army work itself. If we assume that all Land Army employment is additional to that which otherwise would have been obtained, Land Army work had increased the family incomes of sample workers by 40 percent. If we look at the individual workers concerned, this work had increased their cash incomes by 108.3 percent, which is clearly significant for low income persons. In addition, those workers being fed by the Land Army were probably on a more highly nutritive diet than before, they had all been exposed to the discipline of regular and co-operative effort, and there is the possibility that instruction may be given in trade skills.

The Alilaghatta Panchayat chairman remarked that one of the important effects of the project had been a significant drop in the crime level of the locality. A number of community members had been driven, by lack of employment and attendant poverty, to surviving by petty thefts of food, crops and so on. Such incidents had virtually ceased since a large group of workers had been receiving regular incomes. This observation provides circumstantial evidence that effects of the project are reaching to poorer persons in the community.

It is very important, however, to ask what will happen to the workers when the Land Army project has been completed. In order to maintain the currently heightened levels of expectation, the days of employment from the Land Army will have to be replaced by a considerable quantum of additional employment, most of which will have to come from the immediate locality, and particularly from

agricultural activities there. This means that the works should stimulate agricultural employment opportunities, and in the next section we consider the possibilities for this occurring. Furthermore, the timing of this employment boost could be crucial. Ideally an expansion in the agricultural sector should be already under way before the project works end, so that there is no major break in the employment continuum. It is not difficult to foresee a return of the crime mentioned above, and other social unrest, in the event of a major drop in employment opportunities when the works end.

(b) Irrigation effects. If the Land Army project is considered by itself (without the PWD tank at Hardagere) the irrigation effect will not be large. Work being performed on the three tanks is mainly in the nature of restoration and deferred maintenance which would otherwise have to be carried out by cultivators themselves. Two of the tanks are intended for use mainly for livestock drinking water rather than for increasing crop production. If the diversion proposed for the 1973-74 year is carried out, water supply in the Alilaghatta tank will be improved in the sense that the summer supply will be assured. Currently about 90 acres are watered by this tank, 60 acres of which are in arecanut gardens and the balance in wetland crops taken in summer if the tank is full. When the water situation is adequate at the beginning of summer, it means that the areca gardens can be watered once a month to a depth of six inches, and also that water is available for the other crops, notably paddy, for four months. If the tank level is low at the beginning of summer, the arecanut trees receive priority, and no other irrigated crops are sown. It was maintained that under present conditions it is possible to grow the full supply of irrigated crops only once in eight years, although this probably exaggerates the lack of water. A supply of water via the diversion would presumably assure such cropping every year, though apparently there would still be no scope for double cropping.

Another aspect which should be mentioned is that arecanut trees are susceptible to drought during the summer, and will apparently die if deprived of water (either from rainfall or irrigation) for more than three months. The village Patel reported that during 1971, about 6 - 8,000 trees were lost, the accumulated result of bad years since the drought of 1966. Since the opportunity cost of replacing each tree is considered to be around Rs. 50 (including production lost during the years the new tree takes to mature and begin bearing fruit), this represented a significant loss to the villagers. An assured water supply would prevent such a loss from recurring.[12]

If investment in the new PWD tank at Hardagere is included in the analysis, agricultural effects of the works program should increase considerably. The tank is expected to allow irrigation of about 600 acres of 'semi-dry' crops, and in good years double cropping will be possible, if a careful system of rationing is adopted to spread the water evenly over the entire area. About one-third of this area will be in Hardagere and two-thirds in neighboring villages.[13]

---

[12] It should be noted, however, that this 1971 arecanut loss was probably the worst in living memory, and there was a suggestion that it may have been the only major loss the Patel could recall during his more than 40 years in the village.

[13] Information obtained from the Public Works Department, Tumkur.

In Appendix VI is given the 1970-71 cropping pattern for Alilaghatta and Hardagere villages. It will be noticed that Alilaghatta has grown coconuts and arecanuts more heavily than Hardagere, possibly because of a better water supply and access to markets. We have calculated the proportions of total area taken up by various crops, and have also presented the percentages of 'non-tree' crops to total area in 'non-tree' crops. That is, for this second calculation, the areas in Coconut, Arecanut, Betel, Mangoes and Banana have been set aside. The reason for doing this is to show that apart from the 'tree' crops the two villages have a rather similar cropping pattern.

To estimate the effects of the improved irrigation upon agriculture, and thus upon employment, we postulate three different patterns of cropping which might appear on the 630 acres being considered. It is assumed that all of this area represents completely new cropping, and that one-third of the area commanded by the Hardagere tank can be double cropped. The three crop patterns adopted are as follows:[14]

Acres of Crops in Alilaghatta (A) and Hardagere (H)

		I		II		III	
		A	H	A	H	A	H
Kharif	Ragi	-	270	-	100	-	150
	Paddy	-	240	-	410	-	240
	Other foodgrains and oilseeds	-	90	-	90	-	60
	Arecanuts	-	-	-	-	-	150
	Total	-	600	-	600	-	600
Rabi	Ragi	15	90	-	-	15	23
	Paddy	9	80	24	170	9	20
	Other foodgrains and oilseeds	6	30	6	30	6	7
	Arecanuts	-	-	-	-	-	150
	Total	30	200	30	200	30	200

[14] The three crop patterns postulated arise as follows:

I. These figures are based on the proportions of 'non-tree' crops currently grown in Alilaghatta and Hardagere. It has been assumed that the proportion in paddy will include those proportions currently allocated to Horsegram, Haraka (a coarse millet) and Jowar, which are grown now mainly because of dry conditions which will then be alleviated.

II. This second crop pattern is rather arbitrary, and assumes a considerable shift from ragi to rice, the latter usually being preferred where it can be grown. It is assumed that all the Alilaghatta land in ragi for alternative I switches to rice, and that 80 percent of the total ragi/rice area in Hardagere is in rice. The area of "other foodgrains and oilseeds" is the same in I and II.

III. For this alternative, Alilaghatta land use is the same as in I, but Arecanuts are grown on one quarter of the 600 acres, at the expense of ragi and "other foodgrains and oilseeds". This is about the same proportion as is currently devoted to Arecanuts on total land area in Alilaghatta. These 150 acres, of course, are in Arecanuts throughout the year, and in the Rabi season the remaining 50 acres have been split among the other three crop categories in the same proportions as in I.

In order to estimate the amount of employment implied by the above three crop patterns, we multiply the areas of different crops by standard labor coefficients, which represent quantity of human labor used per acre to produce each crop. The coefficients used were chosen after considering labor data from several sources as set out in Appendix VII. Following are these coefficients (mandays per acre):

	Kharif Season	Rabi Season
Ragi	60	70
Paddy	67	75
Other foodgrains and oilseeds	35	35
Arecanut	90 for whole year	

Then by calculation it can be seen that the three cropping patterns may generate the following employment each year:

Alternative I	50,715 mandays
Alternative II	52,430 mandays
Alternative III	45,970 mandays

(A more detailed table is set out in Appendix VIII.)

Several comments must be made about these figures:

(i) It is important to note the time difference between alternative III and the other two. While the first two cropping patterns could come into being in the first year following completion of the irrigation works, the arecanuts would take 7-8 years to reach maturity and produce their full yield. The employment estimates for alternative III therefore represents the 'going concern' state. In addition arecanuts, while needing quite a lot of labor, do not generate as much employment as two cereal crops in a year, which is why the third alternative falls short of the other two in this respect.

(ii) It is possible that the new agricultural employment opportunities may be sufficiently great at the peak time of the year to run right up against available labor supplies. We do not have data for employment patterns in the current agriculture which would allow this to be checked. It may be observed, however, that the third cropping pattern is likely to contribute least to employment peak problems since it contains a mixture of ragi, paddy and arecanuts whose peak labor requirements will arise at different times. The second alternative, by contrast, could exhibit 'peakiness' in its labor requirements because it is so heavily oriented towards the one crop, paddy. If labor peak problems do arise, it is likely that these will be at the beginning and end of the kharif season when planting and harvesting operations are under way. Most cropping is done in this season because of reliance upon the monsoon rains.

(iii) This new employment which may be generated in agriculture, especially with the first two alternative cropping patterns, compares favorably with estimates of additional employment generated by total Land Army work during the construction phase of the Alilusrirama project[15], approximately 55,500 mandays per year (see

---

[15] We have ignored labor used in constructing the PWD tank, partly because the information was not directly available, and partly because the work was being supervised by labor contractors who had possibly brought in their own employees from outside the local area.

page 16 above). It must be noted, however, that we cannot predict accurately who will obtain this additional employment generated in agriculture. It is unlikely that it will all be taken by casual hired laborers, as some of the cultivating families would have 'labor slack' which could become available once work opportunities present themselves. The crop operation most likely to be performed by either family or permanently hired labor is irrigation, because it requires only an hour or two on each irrigation day. If this operation alone were handled by family labor, the remaining employment open to casual laborers would be:

Alternative I	44,253 mandays per year
Alternative II	42,798 mandays per year
Alternative III	41,336 mandays per year

(iv) The estimates of employment generation are most sensitive to changes in the labor coefficients for Paddy. A 20 percent variation either way in the Paddy coefficients would alter the estimates for alternative I by 9 percent, for alternative II by 16 percent and for alternative III by 7.9 percent. Varying the Ragi labor coefficients by 20 percent would change the three alternatives by 9.3 percent, 2.3 percent and 5 percent respectively. Only the third alternative would be affected by varying the arecanut coefficient, a 20 percent change in the coefficient giving a 5.9 percent change in the total estimate.

(c) Effects of roads. It is very difficult to quantify the impact of new roads on the village economies, and we have not been able to do the more extensive survey work needed to obtain data for such a quantification. In addition, analysis which concentrated on adding up the quantities of inputs and outputs which might flow over new roads could lead to a serious underestimation of the impact of the roads. The effects on village attitudes of daily passenger buses, or of more frequent visits by carrier trucks, government officials whose enthusiasm previously stopped short at using overland vehicles, selling and buying agents from private firms and so on, may be profound.

The direct production effects of the roads arise from the fact that they lower the costs of transporting inputs and outputs, or make physically possible the use of new inputs and appearance of new products not possible before. All-weather roads are essential for the marketing and distribution of certain perishable commodities such as milk, fruits and vegetables, and they make easier[16/] the larger scale spread of such bulky inputs as fertilizer.

In Appendix IX we outline the pattern of agriculture in the villages which will be served by the 25.5 miles of road either under construction or planned. The 18 villages involved have been grouped into three 'clusters', two of which are

---

16/ A more precise formulation of this in economic terms is that mechanized transport, on improved roads, reduces the amount of time required by a farmer to take his produce to market. The problem with this formulation, with respect to ascribing benefits to the road, is that the farmer's time may not have any apparent opportunity cost. For example, the village Patel in Alilaghatta spoke wistfully of the days when large numbers of bullock carts 'in convoy' would spend a whole night carrying goods to Tumkur (25 miles away), with the drivers singing or sleeping. This is no longer possible because of increased heavy truck traffic on the improved main roads, with its attendant danger to slow, unlighted bullock carts!

associated with key villages which seem likely to become 'market centers' in the region. The major crops whose transport will be facilitated by the new roads, Coconuts and Arecanuts, take up almost 22 percent of the total cropped area.

An enquiry at the two main co-operative societies of the four currently operating in the Alilusrirama project area revealed that their volume of transactions in agricultural inputs was very small. Initiation of new irrigated cropping on land served by the Hardagere tank will increase the use of inputs, particularly fertilizer,[17] which will be transported over the new road between Alilaghatta and Hardagere. It is to be expected also that there will be increasing movement of items related to small-scale commercial establishments in the various villages, such as shops and facilities for processing agricultural commodities -- rice hullers and so on.

Data on dairying in these villages were not available, but there is scope for dairying development, and the roads may give rise to some movement of dairy produce between adjacent villages. It is unlikely that more widespread milk collection will develop in the near future, because the milk needs of the two nearest towns -- Gubbi (population 9,500) 14 miles away, and Tumkur (population 71,000) 25 miles away -- can probably be satisfied from within a relatively small radius of their centers. Nevertheless, the increase in crop production (and in incomes of beneficiary cultivators) from irrigation could result in a demand-led expansion in dairying output which would generate additional employment opportunities particularly in the first cluster of villages whose agriculture is outlined in Appendix IX. Up to 12 percent of the total wages of Rs. 555,000 which will be paid out over three years for Land Army work may be spent on dairy products (see calculation in section (e) below).

The most significant effect of the roads, however, is likely to arise from the movement of people over them. Where buses already ply in this area they appear always to be crowded. The small network of Land Army roads will make possible an extension of the bus service and the transportation of people among villages, and into towns such as Gubbi and Tumkur. The exposure which these people have to new ideas and to different ways of doing things must be regarded as of the utmost importance in bringing about change in the villages. It is in this context of spreading ideas that a major value of the increased mobility offered by the roads must be seen. The Land Army roads will thus 'open up' a number of villages which have previously remained isolated.

(d) The forest plantation. The main aims of this part of the Land Army project are said to be to prevent soil erosion and to increase soil moisture retention.

There will, however, be commercial benefits from the forest, accruing from some of the species being planted. It is not clear to whom these benefits will accrue, but it seems that the village Panchayat will arrange for commercial exploitation for the benefit of the village as a whole. The make-up of the forest is approximately as follows:

---

[17] Using fertilizer application data from an intensively cropped region in Mandya District, we estimate that up to 100 tonnes of fertilizer of all kinds may eventually be used each year on land irrigated from the Hardagere tank.

Species	Area (acres)	Use(s)	Years to Maturity
Glyricedia	225	Green manure (leaves)	3
Honge	50	Oil (seeds), Animal fodder (leaves), Fuel (branches)	6
Eucalyptus	40	Oil	6
Sandal	25	Oil or timber	10 or more
Coconuts	50	Nuts	10
Tamarind	10	Fruit	10
	400		

Source: Information from Land Army Task Force Commander.

It seems probable that only the Coconuts and Tamarind will be commercially exploited, and local estimates place gross profit levels of these two species at Rs. 2000 and Rs. 6000 per acre, respectively. Employment generation would be mainly from harvesting, and would not be forthcoming until maturity had been reached in about 10 years, again too far into the future to help with alleviating immediate unemployment, especially since the project works themselves may last only another two years.

(e) Expenditure effects. We noted above that in the seven villages from which most of the laborers were drawn to the Land Army project, it is possible to say that the project "construction effect" has been to give additional employment to about 18 percent of the work force, increasing their employment by a maximum of 63 percent and their incomes by 108 percent. This represents an increase in the overall spending power in the locality of less than 18 percent, since Land Army income is generally accruing to lower income members of the community. The additional income will be spent in a way which reflects demand patterns of the income groups to whom it accrues. To give some idea of the possible expenditure pattern, we have taken the total Land Army expenditure on wages, split it up among various income groups, and calculated the way in which this additional income might be allocated to various commodities, using data on consumption patterns developed at an all-India level (2).

Of the total projected Land Army expenditure of Rs. 900,000, we estimate approximately Rs. 555,000[18] will be spent on wages. If the sample of laborers interviewed was representative of the total work force, about Rs. 48,000 of these wages would be going to landless laborers, Rs. 97,000 to laborers with less than 1 acre of land, Rs. 362,000 to those with between 1 and 5 acres and Rs. 48,000 to those with more than 5 acres (see Appendix IV for proportions of sample laborers in these categories). From all-India data for 1964-65, Desai (2) has computed the allocation of additional expenditure among a variety of commodities by various income groups. Using the proportions reported in his analysis we estimate that an additional Rs. 555,000 in expenditure might be allocated as follows:

---

[18] Including wages budgetted for expenditure on the initial 'core' project, and assuming 60 percent of the remaining Rs. 600,000 will be spent on wages.

Commodity Group	Additional Expenditure[19] (Rupees)	Percentage
A. Agricultural commodities	342,400	61.7
Foodgrains	155,400	28.0
Milk and milk products	67,700	12.2
Meat, eggs and fish	16,100	2.9
Other foods (incl. fruits and vegetables)	39,900	7.2
Tobacco	7,800	1.4
Oils and sweeteners	55,500	10.0
B. Nonagricultural commodities	212,600	38.3
Textiles	49,400	8.9
Education	10,000	1.8
Fuel and light	38,900	7.0
Other expenditures	116,500	21.0
TOTAL	555,000	100.0

A calculation such as this can be of some assistance in working out balances of commodities in an area into which investment funds are to move. For example, if foodgrain prices average Rs. 750 per tonne, then an additional 207 tonnes of foodgrains would be needed during the period of time over which the above expenditure was to be made, if prices were to be kept stable. The average output of foodgrains for Tumkur District in 1970-71 was estimated to be 362 kgs. per acre (14, pp. 25 and 28). If we use this figure for the 18 villages of the project region for which crop areas are reported in Appendix IX, the total foodgrains production of the villages in 1970-71 must have been about 1899 tonnes (5246 acres of foodgrains at 362 kgs. per acre). The expenditure outlined above is likely to take place over a three year period, so that stability of prices (at the level assumed above) would require an additional quantity of foodgrains over that period equal to almost 11 percent of annual production. Using the same yield figure, total output of the new land assumed to be in foodgrains in the Hardagere tank area would vary from 192 tonnes to 300 tonnes depending upon the cropping alternative adopted. These figures must be regarded only as illustrative, as data more applicable to the exact region being considered could be used by policy makers.

---

[19] In Desai's analysis (2) expenditure elasticities were computed for a wide variety of commodities for various deciles of the income distribution. He postulated that his two bottom deciles corresponded approximately to landless laborers, the third decile to cultivators with up to one acre of land, the fourth and fifth to cultivators with between one and five acres, and the sixth and seventh and eighth deciles to cultivators with between five and ten acres. We split the total sum for wages among these groups according to the proportions of our sample of laborers which fell into each category. Then Desai's expenditure elasticities were used to allocate the wage sum within each decile, for various commodities (we have grouped the commodities somewhat). There is a small totalling problem within each major subgroup (A and B) because proportions in the original work by Desai did not quite total for reasons to do with rounding of small percentages.

These types of calculations could indicate how much agricultural production should increase if a locality is to remain self-sufficient without inflationary price movements, or alternatively what levels of importation may be required to achieve balance. Similar calculations could usefully be done at a national level for an aggregate works program.

IV. FINAL DISCUSSION

The Land Army approach discussed above shows considerable promise for handling rural works programs. It has already demonstrated a capacity to recruit laborers on a sizable scale, and to supervise effectively the construction of such assets as roads, dams and forests, handling well the difficult coordination and administration problems involved. As has been seen, the Land Army has a centralized structure, at least at the State level. As such, it is a step away from the concept of close involvement of local bodies at all stages of projects. This has disadvantages from the point of view of engendering a spirit of cooperation and development experience in local areas, but it may be the best way of handling projects so long as most of the funds for these come from the central government. It may be that the decentralized method is the most valuable one overall, if carried right through to local fund raising.[20] The way in which workers are organized in the Land Army may go some distance towards restoring valuable local effects lost by overall centralization. This refers particularly to recruiting directly in the area of the project, providing opportunities for local workers to fill intermediate-level supervisory positions in the task forces, and to the possibility for explicit, after-hours instruction and development of trade skills. In addition, a general philosophy of moving projects towards communities whose enthusiasm is sufficiently great to induce them to commit workers for construction, aids in keeping projects close to 'felt needs'.

To date, the Land Army Director has managed to keep a relatively close administrative familiarity with all aspects of projects, by spending a lot of time in the field, checking on engineering and logistical details, ensuring accounts and records are maintained, trying to become aware of problems in the early stages of their appearance, and so on. This personal approach has been an important factor in maintaining morale among task force commanders, and spurring them to high performance. Whether or not this degree of centralization is capable of being sustained as the Land Army expands in scope remains to be seen. Its success depends on considerable administrative skill, particularly at the Directorial and Task Force Commander levels. The fact that the internal supervisory structure is quite 'lean' has placed a heavy burden of work on these key positions, but has also produced a rapid flow of 'direction' within the organization.

At least in the first year of operation, the Land Army had not solved the problem of delays in project sanction. Some improvement may result from moves to bring the function of technical sanction within the Land Army itself (18, p. 6), although the additional staff necessary to support this function will add to the overall administrative burden.

Nor is it clear that the problem of repairs and maintenance which has bothered past rural works programs has yet been dealt with adequately. It seems likely that assets constructed by the Land Army will last longer than some which have been

---

[20] Experience at Comilla in Bangladesh supports the case for vigorous local input at all levels in increasing the effectiveness of rural works programs (22 and 25).

constructed in the past. However, no funds are being explicitly planned for maintenance under the CSRE. Of course the ultimate incentive to ensure works are maintained is to make them so productive and beneficial that their falling into disrepair hurts the incomes of people in the villages. It still may be necessary, though, to set up specific compulsory levies at the local level to provide adequate maintenance funds, and a small work force, administered at the Block level, which would be permanently employed on maintenance work, moving from village to village throughout the Block.

The final aspect which needs closer attention is the selection of areas and design of projects for these areas. There does seem to be scope for greater analytic input in dealing with this. This essay has tried to emphasize that the stimulation of post-project employment is a key concept in this process. The calculations made above, of possible effects of the Alilusrirama project on its locality, are approximate and limited, but they are intended to indicate the direction in which analytical work should proceed. The data upon which they are based would be readily obtainable by an analytical section within the Land Army. It is suggested that projects selected should, at least initially, maintain additional employment generated during the construction period, by building assets which will induce the necessary employment-inducing changes in agriculture. Furthermore, such changes need to be set in motion quite rapidly, to avoid a break in the continuity of greater employment opportunities which have begun with project construction.

It is not sufficient, however, to calculate additional labor requirements which will arise in agriculture, and compare them with those of project construction in such a way that a ratio of 1:1 between them becomes the criterion of success. This is so for at least five reasons:

(i) A static criterion such as this is not adequate to deal with the dynamic situation of a steadily growing labor force seeking employment, nor with longer term employment effects.

(ii) It may be argued that any gain in post-construction employment should be regarded as valuable, whether or not it reaches the level attained during construction. In this view, the 1:1 ratio would be rather arbitrary. However, it may not be arbitrary from a political point of view, as the rising expectations of persons who find additional employment for three years and are then left out in the cold, may turn to frustration and social unrest.

(iii) No account is taken of additional employment arising in local agriculture and industries as a result of development efforts quite outside the rural works project. The locality must be viewed in its totality in order that rural works may successfully mesh with other efforts. In the longer term, employment must be found in local agriculture and industries, but rural works may be a good way to set in train employment-creating sequences of change in local areas. This raises the question of whether there are better ways to stimulate these changes. That is, in some measure rural works must be compared with alternative ways of investing for employment, a subject which needs more extensive treatment than can be given here.

(iv) Calculation of overall employment does not deal with the important question of who gets the additional post-construction employment. A more sophisticated level of analytical work would be needed to search out these effects. If many cultivators have a considerable amount of idle family labor available, the creation of more employment opportunities in agriculture may lead to this slack being taken up,

without much increase in hired employment of the kind attracted to the project construction itself. The result could still be a dissaffected group of landless laborers or part-time cultivators of small holdings, with suddenly reduced employment opportunities when works end. The analysis would then focus on what agricultural activities need to be stimulated in order to boost jobs for hired workers. Also, it may be discovered that explicit extension input tied in with the project is needed to release potential changes which would not be released by the project alone. An example might be leaving behind newly organized dairying projects to take advantage of new roads, rather than just providing the roads. These could be useful in taking up slack family labor as mentioned previously.

(v) Focusing attention on employment may obscure the real issues, which are raising rural real incomes and distributing these more equally.

One further aspect of project design relates to the choice of technique in the construction phase itself. It may be possible to complete projects faster if mechanical equipment is used in construction. Some benefits of employment during construction will thus be foregone, but the benefits of post-construction employment will be realized more quickly. Some argue that these latter effects will be similar no matter what construction method is used, but this may not be true. A slower, more employment-oriented construction may bring about important changes in social structurings which may not be realized by machine-oriented construction, and these implications should be taken into account. Certain operations, of course, must be carried out by machines. It may be impossible, for example, to obtain the degree of compaction on a road required by good design standards, using manual labor alone. Sometimes the difficulties which accompany the management of large groups of workers have led to opting for a more mechanized approach. Joan Robinson has commented that "machines are more docile than men" (23). It is often not seen that specialized training may be necessary to develop supervision skills. Perhaps management of laborers is a neglected subject in research compared with development of machines. Outside of these constraints employment guidelines are frequently set in a rather arbitrary fashion. It was noted earlier that specifying the proportion of total project expenditure which should go to wages has important implications for construction technique, asset durability and income distribution which should be the subject of careful and explicit decisions.

The above analysis looks at a rural works project in midstream, and judges that its construction is already having a significant effect on the economic and social life of its community. Whether this can become a platform for further advance will depend upon the response of the community to their new assets. There is a suggestion in the analysis that explicit attention to longer term effects on agriculture might have differently shaped the project so that it would have stimulated more long term employment. A larger irrigation component may have been valuable in this respect.

It would be very useful if further research could trace what happens to project workers as the construction period draws to a close, and study how increased agricultural output is distributed among cultivators, and the increased employment among hired workers. If training in trade skills eventuates for members of the task force, it would be useful to see whether or not they can find post-construction occupations which will use their newly acquired skills. It would be interesting to discover whether those who gained leadership experience in the task force were helped by this to become leaders in the wider community.

Clearly the Government of India intends to invest a considerable amount in rural works projects in the next few years, hopefully with significant effects upon employment generation. If these funds are to be used effectively, a careful tailoring of projects to areas is called for so that the different employment-creating sequences appropriate to each region are recognized and realized.

APPENDIX I

THIRD AND FOURTH PLAN EXPENDITURES IN CATEGORIES WHERE PROJECTS WITH A HIGH EMPLOYMENT COMPONENT MAY BE POSSIBLE

Category	Third Plan (1961-1966)	Fourth Plan (1969-1974)
	(crores of Rupees)	
Forests	51.4	92.3
Soil conservation	72.7	151.1
Flood control	61.0	106.8
Minor irrigation	176.8	475.7
Major and medium irrigation	600.0	814.8
Rural market roads	n.a.	103.0
Rural electrification	105.0	363.0
Rural water supply	67.0	100.0
TOTAL	1133.9	2206.7
Proportion of total public expenditure:	15.1%	15.3%

Sources: Indian Third and Fourth Plan documents (6 and 7).

Notes:

(i) The Fourth Plan stated that more than half of the proposed expenditure for Minor irrigation was expected to be spent on community works (7, p. 190).

(ii) In the Fourth Plan it was possible to locate expenditures proposed for rural market roads, but in the Third Plan these could not be separated from a larger category which included national highways.

(iii) Other items of investment in the Plans, such as those relating to national trunk roads and hydro-electricity generating schemes, could also involve large working groups of laborers, but we have omitted them because such groups seem likely to be more specialized and 'permanent' in nature, drawing laborers some considerable distances from their home regions.

APPENDIX II

SURVEY OF LABORERS ON RURAL WORKS PROJECTS (1962-1964)

	Round 1 (1962)	Round 2 (1963)	Round 3 (1964)
Number of laborers questioned	623	999	1,117
Proportion from agricultural labor families	35.6%	44.0%	31.4%
Proportion from Scheduled Castes or Tribes	60.2%	46.8%	31.2%
Proportion 15-24 years old	28.7%	27.6%	28.3%
Proportion 25-44 years old	55.5%	56.2%	58.9%
Proportion 45 years and older	15.7%	16.1%	12.4%
Proportion reporting some land holding	54.7%	63.5%	52.6%
Of those holding land:			
Proportion 5 acres and above	41.1%	30.6%	47.1%
Proportion 1-5 acres	51.6%	56.0%	47.5%
Proportion less than 1 acre	7.3%	13.4%	5.4%
Proportion living less than 2 miles from work site	73.4%	63.9%	64.3%
Average number of days seeking employment	254	242	238
Average number of days reporting unemployment	92	76	44
Average days in wage employment on project	33	17	32
Average days employed outside project	129	149	162

Source: India, Government of, Planning Commission, Programme Evaluation Organisation. Report on Evaluation of Rural Manpower Projects. Publ. No. 58. New Delhi, 1967.

Notes:

The surveys from which these data are taken were performed between 1962 and 1964 on projects throughout India under the Rural Manpower Utilisation Programme. A total of 84 projects were included, and interviews obtained with 2,739 laborers.

APPENDIX III

DETAILS OF ALILUSRIRAMA PROJECT

1. Original 'core' project

	Road 1 (3.5 miles)	Road 2 (4.5 miles)	Forest (400 acres)	Tank 1 (8 acres)	Tank 2 (10 acres)	Tank 3 (10 acres)
Number employed	200	200	200	200	200	200
Duration (months)	2.5	4.0	3.0	0.5	0.5	0.5
Mandays	14,000	30,000	20,000	2,500	3,000	3,000
Wages (Rupees)	42,000	67,500	60,000	7,500	9,000	9,000
Materials (Rs.)	28,000	45,000	15,000	5,000	6,000	6,000
Total (Rs.)	70,000	112,500	75,000	12,500	15,000	15,000

Total outlay Rs. 300,000; Total mandays 52,500

2. Road proposals added since April 1973

	Road 3	Road 4	Road 5	Road 6	Road 7	Road 8
Length (miles)	2.0	2.5	3.0	2.0	3.0	5.0
Total cost (Rs.)	37,500	37,500	37,500	No estimate yet	45,000	75,000
Mandays	8,495	12,186	8,725	8,550	10,850	15,000

Total outlay Rs. 232,500; Total mandays 63,806

3. Proposed irrigation diversion channel

Total outlay Rs. 300,000

Details of Hardagere Tank (PWD)

Area of tank:	approx. 76 acres
Catchment area:	6.5 square miles
Gross storage capacity:	146.62 units* (38.6 million cubic feet)
Live storage capacity:	132.66 units
Useable water:	115.77 units (allowing for 10 percent percolation and evaporation losses)
Area to be irrigated:	approx. 600 acres
Total cost:	Rs. 464,000

*One unit is the volume of water which will cover one acre of land to a depth of 6 feet. For standard purposes, 1 unit = 0.261 MCF (million cubic feet).

Sources: Land Army files.
Public Works Department files.
Interviews with government officers.

APPENDIX IV

CHARACTERISTICS OF LAND ARMY WORKERS

1. Number interviewed: 23
   Proportion of task force at time of interview: 5.6 percent

2. Average age: 25.8 years
   Age ranges:

	Percent
17 and below	4.4
18 to 25	60.9
26 to 30	13.0
31 to 40	21.7
41 to 50	--
51 and above	--
	100.0

3. Number literate: 8 (34.8 percent)
   Education ranges:

	Percent
Zero	65.2
1 to 5 years	21.7
6 to 10 years	8.7
11 years and over	4.4
	100.0

4. Caste:

	Percent	
Vokkaliga	17.4	
Lingayat	8.7	
Valmiki	4.3	
Nayak	26.1	
Kurubar	4.3	
Adi Karnataka	34.8	] Scheduled: 43.5 percent
Adi Dravida	4.4	
	100.0	

5. Area of land farmed by family:

	Percent
Zero	8.7
Up to 1 acre	17.4
1.01 to 2 acres	43.5
2.01 to 5 acres	21.7
5.01 to 10 acres	8.7
10.01 acres and above	--
	100.0

6. None was a member of a Panchayat, Cooperative or other association

7. Number of persons working on family farm:

	Percent
Zero	8.7
1	--
2	52.2
3	13.1
4	4.3
5	13.1
6	--
7	4.3
8	4.3
	100.0

8. Valuations of houses, all of which were owned by the families:

	Percent
Rs. 1 to Rs. 100	8.7
101 to 200	17.4
201 to 300	26.1
301 to 400	8.7
401 to 500	21.7
501 to 1000	17.4
1001 and over	--
	100.0

9. Distance of home village from Alilaghatta (center of project):

	Percent
Zero	26.1
1.5 km.	39.1
2.0 km.	8.7
5.0 km.	13.1
8.0 km.	13.0
	100.0

10. Number of farmers worked for:

	Percent
Zero	34.8
1 to 5	43.5
6 to 10	13.0
11 to 15	8.7
	100.0

11. Average amount of work obtained of various kinds (days in past year):

	Days
Cultivation	22.83
Planting	17.30
Ridging	28.70

Harvest	15.22	
Threshing	2.26	
Other farm work	16.96	
Public Works Dept.	57.39	
Land Army	101.70	(38.8 percent)
Total	262.36 days	

12. Numbers obtaining work of various kinds for various lengths of time:

	Zero	1-30 days	31-60 days	61-90 days	91-180 days	181-270 days	271-360 days	Totals
Cultivation	11	7	4	-	1	-	-	23
Planting	11	8	4	-	-	-	-	23
Ridging	12	4	4	2	1	-	-	23
Harvest	13	7	3	-	-	-	-	23
Threshing	19	4	-	-	-	-	-	23
Other farm	19	1	1	1	-	1	-	23
P.W.D.	18	-	-	-	1	2	2	23
Land Army	-	8	1	6	4	4	-	23
Total Work	-	-	-	2	4	6	11	23

13. Income:

	23 respondents	21 respondents**
Average cash income	Rs. 585.48	Rs. 554.38
Average Land Army income	304.43	295.14
Average total family income	n.a.	1028.43
Average family income per capita*	n.a.	273.38

*Total family cash income divided by number working on farm plus Land Army worker. I.e., income per adult working family member.

**Total family income was obtained for only 21 of the 23 respondents.

14. Ranges of income (numbers earning various sums):

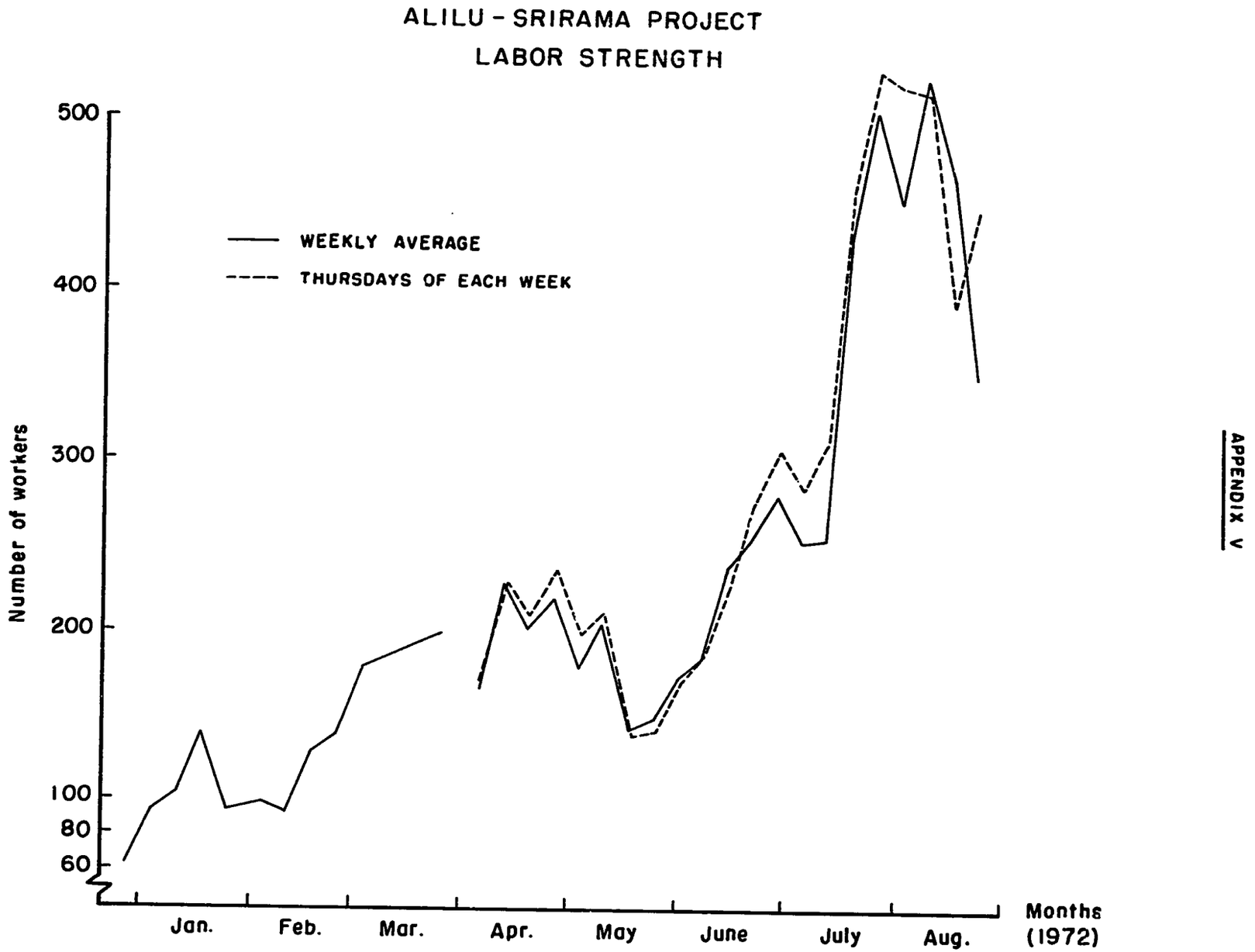
	Respondent alone		Respondent's family*	
		Percent		Percent
Rs. 1-100	1	4.4	-	-
101-200	1	4.4	-	-
201-300	3	13.0	-	-
301-400	1	4.4	1	4.4
401-500	5	21.7	3	13.0
501-1000	11	47.8	9	39.1
1001-2000	1	4.3	6	26.1
2001-3000	-	-	2	8.7
3001 and above	-	-	-	-
	23	100.0	21	91.3

*Family income was obtained for only 21 of the 23 respondents.

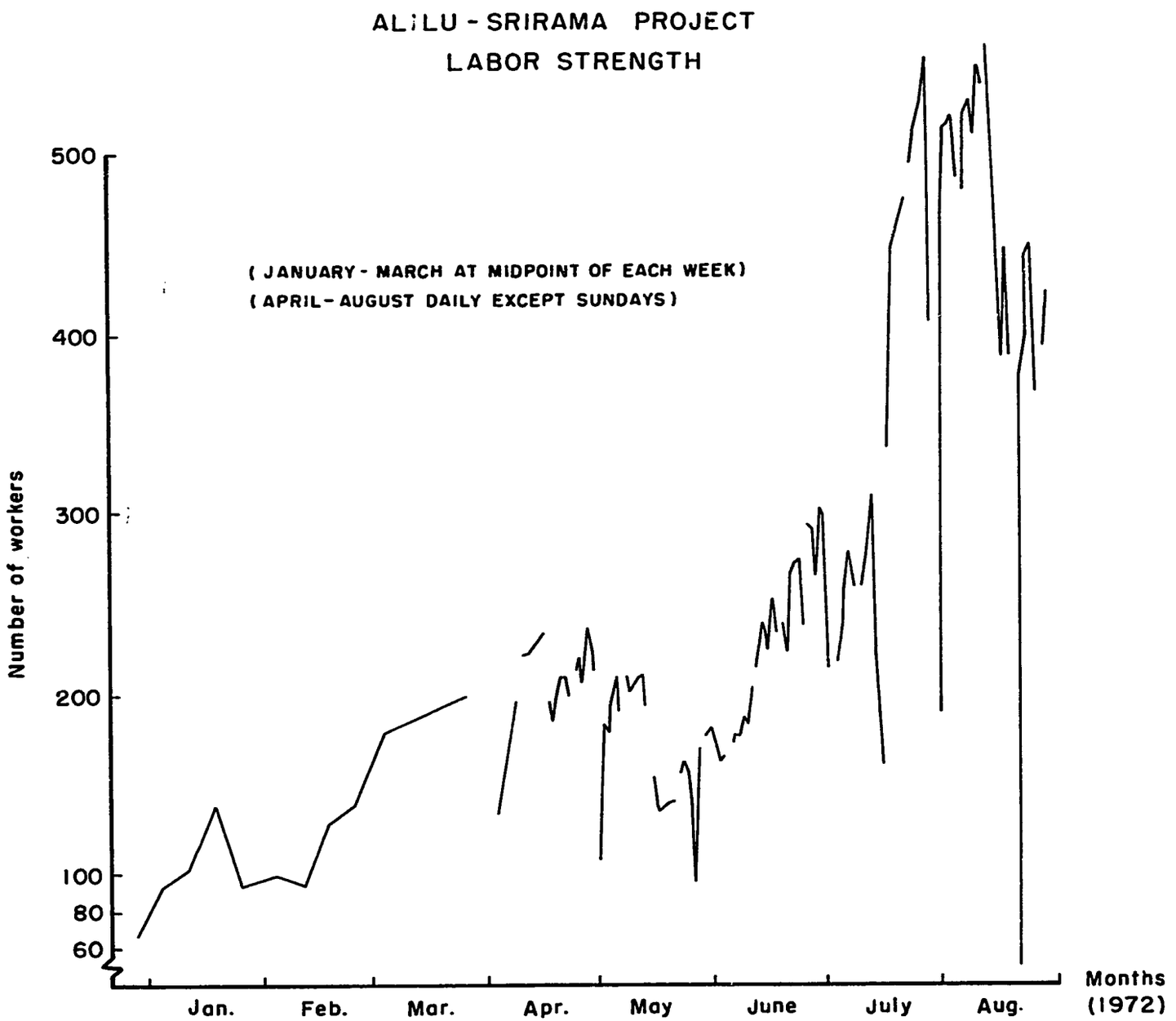
15. Breakdown of expenditure* (average per family for 22 respondents):

Item	Expenditure	Percent
	(Rupees)	
Food	703.86	50.7
Clothing	281.82	20.3
Utensils	66.36	4.8
Education	15.00	1.1
Marriage	150.00	10.8
Festivals	170.45	12.3
Total	1387.49	100.0

*It will be noted that average family expenditure as given exceeds average family income given in paragraph 13 above. This could be indicative of borrowing in order to support living standards in the short run, or it could be mis-statements by respondents of the sums involved in either case.


ALILU - SRIRAMA PROJECT
LABOR STRENGTH
WEEKLY AVERAGE
THURSDAYS OF EACH WEEK
Number of workers
500
400
300
200
100
80
60
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Months
(1972)

APPENDIX V


ALILU - SRIRAMA PROJECT
LABOR STRENGTH
(JANUARY - MARCH AT MIDPOINT OF EACH WEEK)
(APRIL - AUGUST DAILY EXCEPT SUNDAYS)
Number of workers
500
400
300
200
100
80
60
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Months
(1972)

APPENDIX VI

CROPPING PATTERN FOR TWO VILLAGES, 1970-71

Crop	Alilaghatta (acres)	Percent	Percent of 'non-tree' crops	Hardagere (acres)	Percent	Percent of 'non-tree' crops
Coconut	184.25	19.6		25.2	3.6	
Arecanut	222.25	23.6		5.1	0.7	
Betel	5.10	0.5		-	-	
Mangoes	8.50	0.9		-	-	
Bananas	10.30	1.1		1.2	0.2	
Maize	45.50	4.8	8.9	-	-	-
Horsegram	84.10	8.9	16.4	70.0	10.0	10.5
Ragi	268.25	28.5	52.5	305.1	43.7	45.7
Paddy	10.00	1.1	2.0	35.0	5.0	5.3
Lablab	14.25	1.5	2.8	20.0	2.9	3.0
Tur	8.25	0.9	1.6	20.0	2.9	3.0
Haraka	62.25	6.6	12.2	120.3	17.2	18.0
Mustard	7.25	0.8	1.4	30.0	4.3	4.5
Castor	9.25	1.0	1.8		-	-
Nizar	2.25	0.2	0.4		-	-
Jowar				24.0	3.4	3.6
Chillies				5.0	0.7	0.8
Groundnut				15.0	2.1	2.3
Waste				22.0	3.2	3.3
Totals	941.75	100.0	100.0	697.9	100.0	100.0

Source: Panchayat Secretaries for Alilaghatta and Hardagere.

APPENDIX VII

DATA ON LABOR USE FOR CROPS

1. Bellary and Raichur Districts of Mysore State

Data for high yielding varieties of Paddy (mandays per acre):

Kharif (165 farms)	Averages range from 58.89 to 72.03 (excluding irrigation)
	Averages range from 6.75 to 13.00 (irrigation only)
	Averages range from 67.39 to 80.60 (total labor)
Summer (57 farms)	Averages range from 64.38 to 75.82 (excluding irrigation)
	Averages range from 8.38 to 12.38 (irrigation only)
	Averages range from 72.77 to 85.07 (total labor)

Source: S. Bisaliah and D. C. Taylor (1).

Note:
Data expressed in the original source in hours per acre have been changed here into days per acre by dividing original figures by 8 (for a standard 8 hour workday). In addition, data for some operations originally expressed in terms of a contract cost have here been translated into days, by assuming Rs. 2.50 per manday for Transplanting and Rs. 3.00 per day for Harvesting.

2. Mandya District of Mysore State

Crop	Number of Farms	Irrigation Labor	Other Labor	Total Labor
		(mandays per acre)		
Kharif Paddy -- local	56	12.26	52.54	64.80
-- HYV	15	19.47	54.88	74.35
Rabi Paddy -- local	28	17.44	53.90	71.34
-- HYV	11	20.92	72.18	93.10
Rabi Ragi	27	3.84	64.34	68.18

Source: Survey of 68 farms performed by author, April and July, 1972.

3. Bangalore District of Mysore State

Dryland Ragi (30 farms) 34.36 mandays per acre

Irrigated Ragi (28 farms) 109.60 mandays per acre (including irrigation)

Source: B. L. Shankarappa (24).

4. Mandya District of Mysore State (number of farms in parentheses)

	1962-63	1963-64	1964-65	Three Year Average
Dry Ragi	47.28 (106)	46.15 (58)	60.26 (40)	49.41
Kar Ragi	48.90 (14)	51.68 (29)	61.02 (27)	54.71
Monsoon Paddy	58.79 (118)	68.23 (112)	86.63 (115)	72.68 (including irrigation)
Kar Paddy		81.81 (28)	87.31 (23)	84.24 (including irrigation)

Source: Government of Mysore, Department of Agriculture (15).

5. Tumkur District of Mysore State

		Mandays Per Acre
Arecanuts	Cultivation	4
	Harvest	4
	Cutting up	60
	Boiling and Drying	9
	Sorting	16
	Total	93

Source: Estimates made by village Patel, Alilaghatta.

APPENDIX VIII

EMPLOYMENT GENERATED BY THREE CROPPING PATTERNS ASSUMED FOR ALILUSRIRAMA PROJECT AREA

(in mandays per year)

		Ragi	Paddy	Other Foodgrains	Arecanuts	All Crops
I.	Kharif	16,200	16,080	3,150	-	35,430
	Rabi	7,350	6,675	1,260	-	15,285
	Total	23,550	22,755	4,410	-	50,715
II.	Kharif	6,000	27,470	3,150	-	36,620
	Rabi	-	14,550	1,260	-	15,810
	Total	6,000	42,020	4,410	-	52,430
III.	Kharif	9,000	16,080	2,100	-	27,180
	Rabi	2,660	2,175	455	-	5,290
	Total	11,660	18,255	2,555	13,500	45,970*

*Note:

The employment generated by Arecanuts is here inserted merely as a total because it cannot be allocated readily to Kharif and Rabi seasons. Thus Kharif and Rabi figures added together for other crops fall short of the total for all crops by the amount estimated for Arecanuts.

APPENDIX IX

1971 AGRICULTURAL PATTERN IN VILLAGES BEING LINKED BY LAND ARMY ROADS, ALILUSRIRAMA PROJECT, MYSORE STATE

Crop	Cluster 1 (5 villages)		Cluster 2 (8 villages)		Cluster 3 (5 villages)	
	Area (acres)	Percent	Area (acres)	Percent	Area (acres)	Percent
Coconut	314	11.5	356	13.3	316	18.9
Arecanuts	250	9.1	302	11.3	11	0.7
Betel	5	0.2	12	0.4	2	0.1
Other tree crops	20	0.7	-	-	-	-
Ragi	993	36.4	1242	46.3	848	50.6
Paddy	120	4.4	124	4.6	120	7.2
Haraka	263	9.6	49	1.9	59	3.5
Jowar	114	4.2	42	1.6	7	0.4
Maize	46	1.7	84	3.1	neg.	neg.
Bajra	4	0.2	-	-	1	0.1
Horsegram	299	10.9	239	8.9	221	13.2
Other pulses	146	5.3	151	5.6	74	4.4
Chillies	15	0.6	33	1.2	6	0.4
Groundnut	62	2.3	29	1.1	3	0.2
Oilseeds	79	2.9	18	0.7	5	0.3
	2730	100.0	2681	100.0	1673	100.0

Source: District Statistical Officer, Tumkur.

Notes:

(i) Villages have been grouped around a likely central market village to which they are being linked by the new roads.

(ii) Haraka is a coarse millet.

REFERENCES

1. Bisaliah, S. and D. C. Taylor. "An Economic Analysis of Major Irrigated Crops in the Tungabhadra Irrigation Project", University of Agricultural Sciences, Bangalore. (Mimeo), June 12, 1971.

2. Desai, B. M. "Analysis of Consumption Expenditure Patterns in India", Occasional Paper No. 54, Department of Agricultural Economics, Cornell University--USAID Employment and Income Distribution Project. August, 1972.

3. "Rupees 60 Crore Project for Boosting Agricultural Production," The Hindu. January 1, 1972.

4. India, Government of. Census of India, 1961. General Economic Tables, Vol. I, Part II-B(i); and Social and Cultural Tables, Vol. I, Part II-C(i).

5. _____. Ministry of Agriculture, Department of Community Development. Crash Scheme for Rural Employment. Guidelines for 1972-73. New Delhi. March, 1972.

6. _____. Planning Commission. Third Five-Year Plan. New Delhi. 1961.

7. _____. Planning Commission. Fourth Five-Year Plan. New Delhi. 1969.

8. _____. Planning Commission. Rural Works Programme. New Delhi. 1964.

9. _____. Planning Commission. Programme Evaluation Organisation. Report on Evaluation of Rural Manpower Projects. Publication No. 58. New Delhi. 1967.

10. Lele, Uma J. and John W. Mellor. "Jobs, Poverty and the Green Revolution", International Affairs. Vol. 48 (January, 1972). pp. 20-32.

11. Mysore, Government of. Census of India, 1971. Provisional Population Totals, Paper 1 and Paper 1 (Supplement). Bangalore. April and May, 1971.

12. _____. "Crash Scheme for Rural Employment 1971-72". (Mimeo, undated). Bangalore.

13. _____. World Bank Finance for Agricultural Development in Mysore State. A Revised Project Report. Bangalore. July, 1970.

14. _____. Bureau of Economics and Statistics. Statistical Abstract of Mysore, 1970-71. Bangalore. November, 1971.

15. _____. Department of Agriculture. Studies Into the Economics of Farm Management in Mandya District, Mysore State. Report for the Years 1962-65. Bangalore. October, 1969.

16. _____. Directorate of Economics and Statistics. Tumkur District at a Glance. 1971. Bangalore. October, 1971.

17. _____. Directorate of the Land Army. Land Army. (Publicity Brochure). Bangalore. February, 1972.

18. _____. Directorate of the Land Army. "Annual Report, 1971-72". (Mimeo). March, 1972.

19. _____. Planning Department. Fourth Five-Year Plan, 1969-74. Policy and Programme. Bangalore. October, 1970.

20. _____. Planning Department. Rural Works Project, 1970-74. Project Report. Belgaum. Bangalore. March, 1971. (Also similar reports for Bijapur, Chitradurga, Dharwar and Kolar).

21. Nanjundappa, D. M. Surplus Rural Manpower and Economic Development in Mysore. Department of Economics, Karnatak University. Dharwar. September, 1968.

22. Raper, Arthur F. Rural Development in Action. The Comprehensive Experiment at Comilla. Cornell University Press, Ithaca, New York. 1970.

23. Robinson, Joan. "The Choice of Technique", Economic Weekly. June 23, 1956. pp. 715-718.

24. Shankarappa, B. L. "Impact of Investment in Well Irrigation on Farm Employment Opportunities". Unpublished M.S. Thesis, University of Agricultural Sciences. Bangalore. (forthcoming) 1973.

25. Stevens, Robert D. Rural Development Programs for Adaptation from Comilla, Bangladesh. Report No. 215, Department of Agricultural Economics, Michigan State University. East Lansing. June, 1972.

26. "Panel Plan for Jobs in Villages". The Sunday Standard. February 13, 1972. pp. 1, 7.