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Coping Strategies of The Poor Facing Harsh Ecosystems

The Case of Andhra Pradesh

C. S. MURTY

RESEARCH UNIT FOR LIVELIHOODS AND NATURAL RESOURCES
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Foreword

The Centre for Economic and Social Studies (CESS) was established in 1980 to undertake research in the field of economic and social development in India. The Centre recognizes that a comprehensive study of economic and social development issues requires an interdisciplinary approach and tries to involve researchers from various disciplines. The Centre's focus has been on policy relevant research through empirical investigation with sound methodology. Being a Hyderabad based think tank, it has focused on, among other things, several distinctive features of the development process of Andhra Pradesh, though its sphere of research activities has expanded beyond the state, covering other states apart from issues at the nation level.

Dissemination of research findings to fellow researchers and policy thinkers is an important dimension of policy relevant research which directly or indirectly contributes to policy formulation and evaluation. CESS has published several books, journal articles, working papers and monographs over the years. The monographs provide an opportunity for CESS faculty, visiting scholars and students to disseminate their research findings in an elaborate form.

The CESS has established the Research Unit for Livelihoods and Natural Resources (RULNR) in the year 2008 with financial support of Jamsetji Tata Trust. The core objectives of the RULNR are to conduct theoretical and applied research on policy relevant issues on human livelihoods and natural resource management, especially in areas related to river basins, forest and dryland ecosystems and to provide an effective platform for debates on policy relevant aspects for academicians, policy makers, civil society organizations and development practitioners. RULNR intends to adopt a multi-disciplinary approach drawing on various disciplines such as ecology, economics, political science, and social anthropology.

The present monograph by Prof. Shamba Murty on the coping strategies of the poor in dry land agriculture is based on a large scale sample study conducted among 960 households spread over 16 villages of Andhra Pradesh. It argues that households in wet land areas will have income and liquid assets to mitigate the adverse affects of drought to some extent. But the poor in dry land areas are unlikely to possess adequate income to cushion the adverse impact of drought. Therefore, it is postulated that the coping mechanisms of the poor in wet and dry land areas will be different during drought years than in normal years.

The study brings out clearly that in dry land areas, where land productivity is low, the poor adopt several survival strategies for their sustenance. As a result, the cultural, institutional and economic subsystems of the poor differ between the dry land and wet land ecosystems. The poor in dry land areas seem to cope with the drought conditions by giving less priority to education, by making women to actively participate in the labour market and by consuming inferior cereals.

The reliance of non-institutional sources of credit is more in dry land areas. Farmers in dry land areas are found opting for a more diversified cropping pattern and occupation structure. The author argues that policy measures aimed at increasing the productivity of the non-food crops assume importance. Soil and moisture conservation, is, therefore, noted to be important. One way to effect this is by promoting education in these areas. Education makes people more mobile and enables them to acquire skills resulting in increased earnings of the workers. It is also essential that the institutional sources of credit become more responsive to the needs of the dry land areas.

It is hoped that this monograph will help in formulation of policy on dry land agriculture.

Manoj Panda
Director, CESS

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Executive Summary

The study works with the primary data, collected from 960 households in 16 villages spread over different agro-climatic regions of AP, in an attempt to comprehend the coping strategies adopted by the people confronting drought conditions in dry land agriculture. In attempting to contextualize the study, we first analyse the secondary data relating to 22 districts of the state and reach the conclusion that the significance of non-food crops increases with any decrease in the proportion of irrigated area. Concurrently the study also shows up the fact that farmers diversify their cropping pattern and undertake diverse occupations in trying to stabilize their incomes when they have to make do with, among other things, little or no irrigation facilities.

The study based on survey data refers to the drought year 2008-09. In this one point study, we seek to understand the coping mechanisms of the poor facing drought conditions not by comparing the behaviour of the poor in drought and normal years but by positioning the poor of the dry land areas against the poor in the wet land areas in a year of drought. In times of drought, the socio-cultural, institutional and economic aspects of the poor would no doubt be subject to change in both the wet land and dry land areas. Our understanding is that such changes may be less in wet land agriculture, compared to dry land areas. Therefore, coping mechanisms of the poor facing drought will be evident when we compare the conditions obtaining in the wet and dry land areas.

In line with the received theory, the poor in dry land areas seem to cope with the drought conditions (a) by giving less priority to education, (b) by making women to actively participate in the labour market, (c) by consuming inferior cereals, (d) by accessing non-institutional sources of credit, (e) by resorting to a diversified cropping pattern and occupational distribution and (f) by resorting to distress sale of assets to make both ends meet. Note, however, that migration as a coping strategy to mitigate the ill-effects of drought does not appear to be important. This should be attributed to the manual employment secured by the poor households in the works carried out under the MGNREGS.

It is argued that the policies aimed at improving the living conditions of the poor in dry land agriculture should aim at (a) increasing the productivity of the non-food crops they

specialise in, (b) improving minor irrigation facilities, (c) improving the educational facilities to make workers more productive and (d) integrating rural areas with towns and market centres to facilitate diversification of occupational structure of the dry land areas. Provision of credit through institutional sources also can help to mitigate the problems of the poor in conditions of drought.

SECTION I
Introduction, Objectives and Methodology

I.1. The Context:

About 60% of the country's arable land of 141 million hectares is dry. The modern farm technology has largely bypassed this land. The growth process in dry land areas is marked by a high degree of instability and increasing costs of cultivation. Yield instability is because the land is prone to frequent droughts. The minimum support prices offered for foodgrains do not include the capital subsidy on irrigation as well as subsidies for power and fertilisers. Farmers enjoying these subsidies are, therefore, in a position to offer their produce for sale at the procurement prices. The dry land farmers, who do not receive the benefit of either public investment or the subsidies, have to face high cost of cultivation, and therefore have to compete with farmers enjoying irrigation facilities in the supply of foodgrains (Rao and Singh, 1986). These are hurdles to realising sustained agricultural growth in the country (Ninan and Chandrashekar, 1993). Given that the growth of foodgrains output has almost reached a plateau in irrigated areas, much of the additional demand for the output has to be met by dry land areas in future (Dhawan, 1988; Selvaraj and Ramasamy, 2006). This calls for focussed attention on the growth of the output in these areas (Jodha, 1991).

In dry land areas, the poor in general, and as a necessity, adopt survival strategies of various hues for their sustenance. As a result, the cultural, institutional and economic subsystems of the poor differ (Bohle and Adhikari, 1998) (a) between the predominantly dry land ecosystems and the predominantly wet land ecosystems, and again within the dry land areas (b) between a normal year and a year of drought. These differences must be seen as a culmination of the coping mechanisms followed by the people as they try to integrate to the regional economy (Epstein, 1962, 1973).

I.2. Survival Strategies of the Poor in Dry Land Areas: A Review of Literature:

Cultural:

It is common knowledge that values shaping the behaviour of the poor during drought years depart significantly from the normal years. For example, consumption of cereals like jowar, ragi, bazra and even roots and tubers – the so called famine food (though nutritious) – may not be considered as demeaning during years of drought, unlike in

normal times, when superior cereals like rice and wheat are consumed (Purendra Prasad and Venkata Rao,1997; Rathore,2004; Swinton, 1988). Also, as is well known, while women and children from even poor households in general may be barred from working as wage labour in normal times, they may participate in the labour market in drought years (Bryceson, 1999). The period succeeding a year of drought may witness postponement of social functions, including marriages (Purendra Prasad and Venkata Rao, 1997).

It is highly likely that the education of children in general and female children in particular gets a low priority under drought conditions vis-à-vis normal times. It is noticed, however, that younger families combine farming with further schooling, anticipating the day they might need to rely more on education than farming (Sick, 1997). The village studies by Epstein in Karnataka separated by over a decade show that the interests of people in an irrigated Wangala village are continued to be vested in agriculture. In this village there are only minor changes in the traditional social system. By contrast, the unirrigated Dalena's social system has changed considerably during the same period. The absence of irrigation has spurred the Dalena villagers to efforts leading to their own economic progress. The villagers of Dalena supplemented their farming incomes from sources beyond the village boundaries and outside agriculture (Epstein, 1973).

Institutional:
Reference here may be made to the institutions of patron-client relationships, exchange labour, permanent farm servants, kinship ties, tenancy and credit. The poor may look upon the patron-client relationships, exchange labour and permanent farm service as providing a kind of buffer during the periods of drought even as they may like to enjoy the freedom that goes with casual wage labour (Purendra Prasad and Venkata Rao, 1997; Morduch, 1995; Jodha 1981). Kinship ties also act as facilitators in easing the pressure during crisis periods (Purendra Prasad and Venkata Rao, 1997; Ellis, 1998; Campbell, 1999) although the importance of reciprocal aid systems is on the decline as people find inclined to respond to market signals (Jodha, 1978; Swinton, 1988; Campbell, 1999; Rathore, 2004). As for the institution of tenancy, some people opine that sharecropping enables the poor tenant to share risk with his landlord (Shaban, 1987).

Also important are the credit institutions and the way they impact on the livelihoods of the poor. The non-institutional sources of credit play an important role in the economy of dry land agriculture. The institutional sources in the main may reschedule the repayment of the principal amount, defer land revenue, and waive the interest payable in periods of drought. But to smooth consumption the poor have to fall back largely on credit from the non-institutional lenders during such periods (Vyas, 1996; Shah, 2006;

Dawan, 2003). A strong institutional credit support is essential for dry land farmers to adapt improved technologies involving cash investment (Rao and Singh, 1986; Selvaraj and Ramasamy, 2006). The credit institutions with potential to meet this challenge are the Regional Rural Banks. It is desirable to have linkages between credit and input supply on the one hand, and marketing of produce and loan recovery on the other (Rao and Singh, 1986).

Economic:

Even as the savings may be low in dry land areas, they may take a nose dive in the years of drought. That is, there may be a preference of the present over the future in times of drought (Hayami, 2001, Campbell, 1999). Next, the capability to diversify income is critical for the survival capabilities of the rural poor. An age old practice to circumvent the likely adverse affects of drought in dry land areas is to grow mixed crops. Crops with different maturity periods are cultivated in rotation to cope with erratic rainfall (Purendra Prasad and Venkata Rao, 1997). The crop combinations are coarse cereals, mainly bajra, and different types of pulses, oilseeds, beans etc (Rathore, 2004). Poor households are observed to shift production into more conservative but less profitable crops (Morduch, 1995). Farmers are known to arrive at a product mix to get a steady flow of income over the year (Vyas, 1996). In contrast, farmers in wet land areas adopt, for their livelihood, mono-cropping (Scott, 1979; Mruthyunjaya and Kumar, 1989; Sujith Kumar, 2007).

The differences in cropping pattern and cropping intensity between the dry land and wet land ecosystems are such as to lead to differences in their occupational distribution (Epstein, 1962, 1973; Purendra Prasad and Venkata Rao, 1997). People in dry land areas take up diverse enterprises to safeguard themselves from drought. Thus, along with crop production, farmers take to animal husbandry, poultry and fishing (Ellis, 1998). Here again goats appear to be preferred to cattle. Being browsers, goats are particularly well adapted to survive drought conditions (Swinton, 1988). Compared to large animals, small ruminants are more convenient to rear as their number can be adjusted quickly by sale or purchase. Natural growth of small ruminants is also more rapid as their calving rate is higher (Rathore, 2004). Since cattle graze large amounts of forage and will not browse, they are the least adopted to drought among the livestock species (Swinton, 1988). It is seen, however, that there is a neglect of small ruminants and those who depend on them (Shah, 2006). Utilising the land for crop production and for horticulture is another way by which diversification takes place (Campbell, 1999).

It must be noted that the decision of the poor to diversify their activities as coping strategies need not be poverty-reducing. Diversification reduces agricultural productivity

because of the diversion of labour and capital from farming. Income diversification limits the gains from specialisation in favour of spreading risks over multiple income generating activities (Bryceson, 1999; Morduch, 1995). It is also found that the most vulnerable households are more likely to diversify plots, a common means of reducing the impact of weather shocks that vary with location. Another form of diversification involves off-farm activity (Morduch, 1995).

Routine short-term migration figures among the options available to the poor to offset shortages. Migration of this nature is regular and not something that is relied upon in the aftermath of a year of drought (Campbell, 1999; Morris, 1974; Falkenmark and Rockstrom, 1993). More workers and over a long period may migrate in times of drought. In any case, there are household-specific factors that impact on migration. These are: (1) Male headed families are more likely to migrate than female headed ones. (2) Ownership of land, livestock and other assets reduces the probability of migration. (3) Families with large number of dependents are more likely to migrate. (4) The probability of migrating is higher where there is no access to water source within the village (Rathore, 2004).

The coping strategies to drought also include the mortgaging and sale of land, sale of livestock, curtailing consumption and use of fertilisers and pesticides on the farm. The sale of assets leaves the poor in a double disadvantageous position. The sale price of assets will be low when the poor seek to sell them to smooth consumption. Contrarily, when the poor attempt to re-acquire them; during a post-drought year, their prices will be extremely high. In the case of farm products the situation is completely the opposite. The prices of foodgrains, fodder, milk etc are higher during the drought and lower during the post-drought year. Thus, the drought-affected farmer is faced with adverse terms of trade both as a seller and as a buyer (Jodha, 1978, 1975; Purendra Prasad and Venkata Rao, 1997). The attempt on the part of the households in the dry land ecosystem to survive under harsh conditions makes them to take up rural non-farm employment even of a residual variety.

Note that not all survival mechanisms are available to rural people to mitigate the ill-effects of drought. The availability of options varies depending upon one's age, gender, socio-economic status, topography of dry lands etc. Options available for safeguarding oneself from drought also alter overtime (Campbell, 1999; Scoones and Graham, 1994).

In sum, when we pit the dry land areas against wet land ones, we find that there are differences between them in respect of the composition of crop income, the size of wage income, income from migration, income from leased land, income from non-farm

employment, income from child labour, earnings from livestock, income from services, remittances, level of savings, income from steady salaried employment etc (Vyas, 1996, Ramdas and Ghotge, 2006). One expects that the poor in the dry land ecosystems are more integrated to the regional economy than those in the wet land ecosystems (Epstein, 1962, 1973).

I.3. Policies to Circumvent Drought in Dry Land Areas:

People in dry land areas are not passive, inflexible, ignorant victims of drought. They are highly active, adoptive and dynamic actors. The knowledge acquired during their seasonal migration may even help them in shifting from one variety to another variety of grains that gives them a higher yield in the local environmental conditions (Purendra Prasad and Venkata Rao, 1997). However, more often than not, the survival strategies to cope with drought that are within their reach are not by themselves sufficient to get out of poverty (Bohle and Adhikari, 1998). It is for this reason government should consider drought mitigation as the principal strategy of agricultural and rural development (Morris, 1974; Bokil, 2000). Government intervention as a palliative to drought is all the more important because millions of people depend upon farming in the dry land areas too (Bohle and Adhikari, 1998; Desai, 2003).

According to old thinking drought years are seen as separate from normal years. Therefore, government response to drought is often late and inadequate. This view has now given place to a new thinking which treats drought as part of normality and the relief measures are taken up accordingly (Scoones and Graham, 1994; Bokil, 2000). To the extent that rain failure must be expected and short-run relief must be provided, specific allocations for these statistically probable events should be explicitly assigned within the formal plans and budgets (Morris, 1974). The provision of drought relief is a question of political survival for the government in power (Khera, 2006). Those who require support in the period of drought include agricultural labourers as well. When the crop is struck by drought and starts to whither, farmers have no option but to cut it as soon as possible and sell it as feed for cattle. For agricultural labourers this means not only untimely work at a fraction of the normal wage rate, but also the disappearance of an entire chain of post-harvest operations that would have given them a daily cash flow throughout the period (Selvaraj and Ramasamy, 2006). Hence, some form of income transfer policies would be needed to improve their welfare (Davis, 1991).

It is important to quantify the contributions of different tactics employed by the people to household income. Without this information, it is difficult to evolve the policy measures likely to have the most beneficial impact on them (Swinton, 1988). Asset depletion is an important tactic adopted by farmers in coping with inadequate agricultural

production. Hence, government policy should seek to facilitate the accumulation of assets by farmers (Swinton, 1988). Assured water facility, rain water harvesting are sound remedies for arid agriculture. However, these alternatives are not available to most of the dry areas. Another strategy for dry areas is de-emphasizing crop farming and encouraging livestock farming (Jodha, 1972; Mehta, 2000; Scoones and Graham, 1994). Ideally pastoral development is left to local NGOs and government restricts itself to infrastructural provision (Scoones and Graham, 1994). Crop insurance programmes are also pushed through by the State to safeguard the interests of farmers in times of drought. But they have proven excessively costly when administered to small scale subsistence farmers (Swinton, 1988).

Ideas differ as to when a government should take up relief operations consequent upon a drought. One view is that while making relief decisions the State should be guided by phenomena like migration, sale of assets etc by the drought-hit people which are a part of the adjustment mechanism of people to recurrent droughts rather than true signals of distress requiring relief. Hence the State need not respond to signals indicating depletion of stock of assets or fall in incomes. Instead relief should be provided when consumption falls below some level of calorie intake which is the true signal of distress. Protection of consumption rather than income and assets should be the objective of relief policies (Morris, 1974).

It is useful to consider the alternative and more plausible view as well. For the drought hit people, the final phase of adjustment process consists of out-migration. This happens much later in the scarcity period. The sale or mortgage of assets and out-migration that occur at the late stage should be regarded as true indicators of distress in a given scarcity period. The reduced current consumption, which is the first recourse to drought, is not a true signal of distress. Reliance on this signal may mean initiation of relief much earlier than it is warranted by the degree of distress. If relief policies become operative only after the sale of assets has already occurred, they may prove self-defeating and contribute to the process of pauperisation initiated and increased by recurrent droughts (Jodha, 1975; Purendra Prasad and Venkata Rao, 1997).

To be beneficial to less resource farmers and agricultural labourers, government policies should address to their multi-dimensional goals. The policies and programmes should be designed to improve employable skills and increase family income through their participation in off-farm opportunities. In the dry regions where water is scarce, policies should aim at moisture and soil conservation and at encouraging income enhancing crops like fruit trees and economic activities that involve less water (Ninan and Chandrasekhar, 1993). If is often the case that every rupee spent in dry lands

benefits more than the same investment made in wet lands (Vijay Shankar, 2006; Braun, Gulati, Hazell, Rosegrant and Ruel, 2005; Majumder and Patra, 1993; Hanumantha Rao, 2000). Since water is the principal limiting resource in the tropical dry lands, livelihood security is a question of maximising production per unit of water (Falkenmark and Rockstrom, 1993). In the process there is a simultaneous need to increasing fertiliser use (Mruthunjaya and Kumar, 1989). Considering the limited prospects of irrigated regions in meeting the food needs of the country and equity considerations, there is a need for a shift in the development priorities in favour of dry land agriculture. The technology that suited the green revolution areas is unlikely to be replicable in the dry land areas (Ramanna, 1991). What is important is the reorientation of agricultural research strategies to suit the specific requirements of dry lands (Jodha, 1991).

Most of the improved dry land technologies are found to be financially viable in field testing. But the pace of adoption of the improved dry land technologies has been found to be rather slow. The poor resource base of the dry land farmers and lack of investment capacity appear to be the main bottlenecks in quick transfer of technology (Rao and Singh, 1986). The technologies that can take care of dry lands and generate employment and reduce poverty are of two types: one addressed to soil and water conservation, water harvesting, erosion control, soil enrichment, and the other addressed to dry land cropping pattern involving both annual arable crops and perennial crops including agro-forestry (Nadkarni, 1999; PM address, 2006). It is imperative that the crop varieties meant for water limiting environment should ensure minimal level of yield during the stress period and this could induce the farmers to go for a higher level of adoption (Selvaraj and Ramasamy, 2006). Government must give up the one-size-fits-all approach and focus on fine tuning and matching its interventions to the subtle variations in local contexts (Vijay Shankar, 2006; Scoones and Graham, 1994; Hanumantha Rao, 2000).

Dry lands are poor in terms of their banking networks. Informal credit markets with high interest rates dominate here. Organisation of SHGs and linking them with banks is an effective means of credit delivery to poor households (Shah, 2006).

I.4. Objectives of the Study:

The study seeks:

(1) To examine if the nature of crops grown in a district is systematically related to the proportion of area irrigated in it.

(2) To probe whether cropping pattern in dry land areas is more diversified than that in wet land areas.

(3) To identify the factors that lead to diversification of cropping pattern.

(4) To isolate the factors that impact on the occupational status of the households.

(5) To identify the respect in which the cultural values, institutional rules and economic factors vary between the harsh ecosystem of the dry land areas and the wet land areas.

I.5. Data and Methodology:

Objectives (1) through (4) are sought to be accomplished employing the district level data of AP available in the secondary sources, namely, Statistical Abstracts, decennial Census, etc. The simple and multiple regression techniques are used in the process. The data aggregated at the district level does not however through clear light on the objectives of the study. For instance, the differences between the wet and dry areas and between a drought and a non-drought seasons with respect to cropping pattern, migration, terms of lease of land, levels of education, occupational distribution with focus on the importance of rural non-agricultural employment can be better assessed when we work with data at the level of villages. Therefore, we collected primary data from 16 villages of AP to assess the differences between the dry and wet areas.

We may now make it clear as to why we need to study the conditions in wet areas in a study that is essentially meant to understand the conditions in dry lands. A one point study of this nature, as it requires one to work without any benchmark, cannot directly make explicit the coping mechanisms adopted by the poor of the dry land areas in periods of drought, unless the respondents' memory is taxed to elicit details on past events. This methodological issue entails that we compare the poor of the dry lands with those of the wet lands to gain an understanding of the survival strategies of the former in the periods of drought or famine.

The conditions presently obtaining in the study areas are a culmination of the developments that have been taking place in the areas over the years. Therefore, if dry land areas exhibit characteristics that are different from wet land areas, it should be seen, at least in part, as resulting from the lack of irrigation facilities there. In times of severe drought, socio-cultural, institutional and economic aspects of the poor would, no doubt, be subject to change in both wet and dry land areas. However, such changes may be less in wet land areas, compared to dry land areas, because the households in the former areas will have income and liquid assets to mitigate the adverse affects of drought to some extent. Such a possibility will be relatively less in dry land areas, as they are unlikely to possess income to cushion the adverse impact of drought. Therefore, coping mechanisms of the poor in wet and dry land areas will be particularly different during drought than in normal years.

Data for the study were collected from the four important regions of the state viz., north coastal Andhra, south coastal Andhra, Rayalaseema and Telangana. We selected the districts in the four regions purposively and chose the most irrigated and most un-irrigated district from each region. Once the districts were chosen, the highly irrigated mandal of the most irrigated district and the highly un-irrigated mandal of the most un-irrigated district were identified. Where more than one mandal qualifies for inclusion in the sample based on the percentage of irrigated area, we selected such of those mandals where the percentage of cultivated area to geographical area is the highest.

As a next step, two villages were selected at random from each of the irrigated and the un-irrigated mandals. Since the selected villages are spread over the entire state and are chosen giving due importance to different agro-climatic zones, the conditions in the villages are most likely to represent the conditions in the state. The details relating to the selected districts, mandals and villages are given in Table I.1. Further details on the selected villages are given in Appendix Tables I.1 and I.2. The Census data of 2001 shows that the occupational distribution of the main workers is largely uniform between the wet and dry districts. (Appendix Table I.2).

The primary data were, therefore, collected from 16 villages of the state (Table I.1). Since it is only the (1) small farmers, (2) marginal farmers and (3) landless agricultural labourers that would be particularly subject to the harsh realities of life during drought, our sample from each of the selected villages was drawn from among them. We defined them as constituting the poor. These households may be treated as having limited resources in the sense that they are not endowed with adequate factors, skills and organisational support to move into the mainstream of economic activity in the farm sector. In the context, we defined a marginal farmer as one who possesses 2.50 acres or less of land and the small farmer as the one possessing 2.51 to 5.00 acres of land. The poor landless agricultural labourers of the sample are those who own no land whatever. They derive their income by working as agricultural labour in the main.

A total of 20 households each from the three categories spread over the 16 villages of AP were chosen randomly for the study. As noted, the district, mandal, village and household selection adopted here is expected to make the study representative of the Universe, that is, Andhra Pradesh. A total of 960 households (= 16 villages * 3 categories of the poor * 20 sample households) figured in the study (Table I.2).

Our study in AP pertains to the crop year 2008-09. This was the year in which the actual rainfall fell short of the normal in 17 of the 22 districts (excluding Hyderabad). Widespread drought conditions prevailed in the state. This was particularly so in the kharif 2008 season. In the preceding year 2007-08 rainfall was short of the normal in

Table I.1: Names of selected districts/mandals/villages

Region/district	Mandals	% of irrigated area to GCA in mandals*	Villages
North Coastal Andhra			
Srikakulam (Wet)	Polaki	84.26	Dandulaxmipuram, Polaki
Visakhapuram (Dry)	Anandapuram	15.89	Kusuluvada, Gidijala
South Coastal Andhra			
West Godavari (Wet)	Ganapavaram	100.00	Pippara, Kasipadu
Prakasam (Dry)	Korisapadu	5.77	Bodduvanipalem Paidipadu
Rayalaseema			
Chittoor (Wet)	Nagari	64.45	Oranthangal Golla Kuppam Mudipalle
Ananthapur (Dry)	Rayadurg	4.40	Mallapuram, Vemparalla
Telangana			
Karimnagar (Wet)	Manakondur	68.88	Veldi, Manakondur
Adilabad (Dry)	Jainad	0.23	Kowtha, Jainad

* Source: Census 2001

See Appendix Tables I.1 and I.2 for details on the selected villages.

Table I.2: Sample details

Type of land area	Number of villages	Category of selected households			Total
		Landless agri. Labour (LLAL)	Marginal farmers (MF)	Small farmers (SF)	
Wet land area*	8	160	160	160	480
Dry land area**	8	160	160	160	480
Total	16	320	320	320	960

* Sample is drawn from the districts of Karimnagar, Chittoor, West Godavari, and Srikakulam

** Sample is drawn from the districts of Adilabad, Ananthapur, Prakasam, and Visakhapatnam

only 4 of the 22 districts (Appendix Table I.2). Thus, the year 2008-09 was notified in the official circles as a drought year. To classify a district into a dry land area, the annual rainfall needs to be less than 750 mm per annum. Therefore, all districts of AP, barring one exception (in Medak) are not dry land areas. They may be termed as rain-fed areas. In our analysis below the term dry land areas is used as synonymous with rain-fed areas.

SECTION II
Impact of Drought on Cropping Pattern and Occupational Distribution A District Level Analysis

II.1. Irrigation as Influencing the Crops Grown:

Here we have employed the district level secondary data available from *Statistical Abstracts* and the decennial *Census 2001* to examine whether the cropping pattern diverges systematically with variations in the percentage of gross irrigated area to gross cropped area in the state. To begin with we have examined whether area under rice, food grains, food crops and non-food crops is changing with increase in the gross irrigated area. It is hypothesised that with every increase in the percentage of gross irrigated area, the percentage of area under rice, food grains and food crops increases and the percentage of non-food crops decreases.

For purposes of testing the hypothesis, we have divided the percentage of gross irrigated area to gross cropped area of the districts into five size-classes, viz., 0-20, 21-40, 41-60, 61-80, 81-100. In the data pertaining to the year 2007-08, the number of districts in the five size-classes was 2, 7, 7, 5, and 1 respectively. Having grouped the districts so, we have arrived at the average percentage area under rice, food grains, food crops and non-food crops in the five size-classes. The exercise shows that the hypothesis is valid. Thus, the percentage of rice area to gross cropped area witnesses a noticeable increase from 5.63% to 62.99% with increase in the size-class of gross irrigated area to gross cropped area from 0-20% to 81-100%. In the case of food grains the increase in the area is from 24.16% to 69.99% with increase in the size-class of irrigation. The corresponding increase in the percentage of food crops is from 27.85 to 90.10. Simultaneously, the percentage of non-food crops to gross cropped area decreases systematically from 72.15 to 9.90 with increase in the size-class of irrigated area (Table II.1). From the above it follows that non-food crops are grown in the dry land areas in the main.

To reflect on the influence of irrigation on the crops grown in the districts, we also have employed simple regression equations. To begin with, the proportion of gross irrigated area in gross cropped area is used as an independent variable to explain variations in the dependent variable, the proportion of rice area in gross cropped area, Table II.1: Summary table on the distribution of area under crops classified by the size-class of irrigated area in the districts employing the data corresponding to the 22 districts of the state. The

data used in the regression relate to the agricultural year 2007-08. The regression results presented in table II.2 show that the coefficient of the independent variable is positive and significant at less than 1 per cent level. The value of R^2, indicating the goodness of fit of the regression equation, is very high at 0.7609 and, as evident from the F-value, it is statistically significant at less than 1 per cent level. Thus, it is amply clear that rice is the prominent crop grown in the predominantly irrigated areas. As the proportion of irrigated area increases, the proportion of the area devoted to rice also increases.

Table II.1: Summary table on the distribution of area under crops classified by the size-class of irrigated area in the districts

Size-class of irrigated area in the districts (%) (2007-08)	% Area under different crops in the districts				Total area
	Rice	Food grains	Food crops	Non-food crops	
0 – 20	5.63	24.16	27.85	72.15	100.00
21 – 40	15.98	53.81	65.63	34.37	100.00
41 – 60	37.87	57.27	73.46	26.54	100.00
61 – 80	42.61	65.53	77.99	22.01	100.00
81 – 100	62.99	69.99	90.10	9.90	100.00
All classes	29.36	54.45	67.11	32.89	100.00

Source: Statistical Abstract of AP

The table is based on the latest available data. See Appendix Table II.1 for details.

Next, the proportion of irrigated area is related to the proportion of area under foodgrains in the regression model. The regression results exhibit a positive and significant relationship between the independent variable and the dependent variable. It may be noted that the coefficient of the irrigation variable is positive and significant at less than 1 per cent level. The corresponding R^2, at 0.3630, too is significant at less than 1 per cent level. When the dependent variable in our regression model is defined as the proportion of area under food crops and is regressed on the proportion of irrigated area, we again find that the regression coefficient is positive and significant at 1 per cent level. The regression equation also provides a good fit to the data (Table II.2).

We also employed our simple regression model to study the relationship between the proportion of irrigated area and the proportion of non-food crops in total cropped area. The regression coefficient now turns out significant with a negative sign. Thus, it is clear that with increase in the proportion of irrigated area, the proportion of area under non-food crops decreases systematically (Table II.2).

Table II.2: Percentage of gross irrigated area as the factor influencing cropping pattern: Simple linear regression coefficients 2007-08

Dependent variable	Intercept	Regression coefficients (with t-values)	R^2 [with F-values]
% of area under rice	-5.9168	0.7542* (7.9774)	0.7609* [63.6381]
% of area under food grains	32.5343	0.4816* (3.3762)	0.3630* [11.3986]
% of area under food crops	42.8149	0.5645* (3.7988)	0.4191* [14.4312]
% of area under non-food crops	57.2030	-0.5644* (-3.8000)	0.4193* [14.4393]
H-Index	0.2440	0.0004 (0.3529)	0.0062 [0.1245]

* Significant at 1% level
Independent variable used in the regressions is GIA/GCA
Number of observations = 22

Another hypothesis that follows from the review of literature is that the farmers in the drought prone dry land areas opt for a diversified cropping pattern so that even if one crop fails another will yield reasonable level of income and therefore they secure a minimum level of income to eke out a living.

To test the proposition, we have calculated the Herfindahl index (or the crop diversification index) taking the crops grown in each of the 22 districts. Note that the higher the value of the index, the more will be concentration, that is, fewer will be the crops grown. The data employed in the process relate to the year 2007-08. The index arrived at is regressed on the independent variable, the proportion of gross irrigated area in the gross cropped area. The regression results show that the regression coefficient is not significant statistically (Table II.2). Thus, our hypothesis that the cropping pattern gets more and more diversified, with decrease in the proportion of irrigated area in gross cropped area stands rejected. This is to be expected for some of the dry land areas specialise in the production of only a few crops like coarse cereals, pulses, or oil seeds.

II.2. Factors Influencing Crop Diversification:

In the above, we have employed a simple regression model to examine the relationship between the Herfindahl index of crop diversification and the proportion of area under irrigation. The relationship is found to be not significant. It is, however, possible that the index sowing the crop diversification is influenced by several factors, instead of just one. We have, therefore, employed a multiple regression model to identify the factors influencing the crop diversification index. In the model the independent variables are (1) literacy rate (2001), (2) rainfall (2007-08), (3) GIA/GCA (2007-08), (4) average

size of holding (2005-06), (5) roads per 100 km of geographic area (2006-07), (6) bank credit per hectare of cropped area in lakhs (2006-07) and (7) fertilizer consumption per hectare in tonnes (2006-07).

The causal relationships between the dependent variable indicating the degree of diversification and the independent variables may be stated thus: (1) With increase in the percentage of irrigated area to cropped area, the Herfindahl index is expected to increase, indicating that the cropping pattern is highly specialised. (2) With increase in the rainfall too the cropping pattern is likely to be highly specialised. (3) With increase in the average size of holding the Herfindahl index may turn out to be low, suggesting that the large farmers cultivate many crops on their farms. (4) With increase in rural connectivity farmers may choose to diversify the cropping pattern because they face few hurdles in taking their produce to distant places for sale. In the absence of proper transport network, farmers prefer to specialise in a few crops and sell the output to local traders. (5) Where availability of institutional credit is not a big problem, farmers may be inclined to grow capital intensive crops that require use of fertilisers and pesticides in large doses.

Of the variables chosen to explain the variations in the Herfindahl index of crop diversification, literacy rate, the proportion of gross irrigated area, average size of holding, and fertilizer consumption turned out to be statistically significant. With increase in literacy rate, crop diversification index appears to increase. The proportion of irrigated area also appears with a positive and significant coefficient, though at 10 per cent level. An increase in the proportion of irrigated area appears to lead to an increase in the value of crop diversification index. That is, cropping pattern gets more concentrated with increase in the proportion of irrigated area. Interestingly, an increase in the average size of holding is resulting in an increase in the value of the index of crop diversification. Fertilizer consumption is seen to be negatively related to the crop diversification index. Where crop diversification index has a small value, that is where crop concentration is low, fertilizer use is more. The value of R^2 corresponding to this multiple regression equation is 0.5449 and the value is significant at 10 per cent level (Table II.3).

Table II.3: Linear regression coefficients of the factors influencing crop diversification as indicated by H-index 2007-08

Independent variable name	Regression coefficients	t-values
Intercept	-0.4718	-1.5134
Literacy rate 2001	0.0149**	2.5253
Rainfall 2007-08	-0.0001	-0.8034
GIA/GCA	0.0034***	2.0101
Average size of holding 2005-06	0.1555**	2.0709
Roads 2006-07	-0.0016	-0.8238
Credit 2006-07	-0.6816	-1.4375
Fertiliser 2006-07	-0.0006**	-2.54507
R square [with F-value]	0.5449***	[2.3946]

** Significant at 5% level. *** Significant at 10% level.
Dependent variable is the H-index of crop diversification. Number of observations = 22

II.3. Factors Influencing the Occupational Status of Households:

Workers in dry land areas are likely to be engaged in diverse occupations. This is due to the fact that agriculture in the areas may not provide them with employment sufficient enough to eke out a living. We may state the proposition thus: proportion of agricultural workers – cultivators and agricultural labourers (main plus marginal) – will increase with increase in the ratio of GIA to GCA. Data pertaining to the year 2001 does not support this contention. Thus, the proportion of agricultural workers in total workers formed 77.04%, 75.42%, 77.09%, 70.60% and 77.59% in the five size-classes of irrigated area respectively (Table II.4).

However, the independent variables that are likely to impact on the Herfindahl index for cropping pattern may also impact on the percentage of agricultural workers (cultivators and agricultural labourers) to total workers. (1) With increase in literacy rate, the proportion of agricultural workers may decrease. (2) An increase in rainfall may impact positively on the proportion of agricultural workers. (3) Any increase in the proportion of irrigated area may result in an increase in the percentage of agricultural workers. (4) Also, an increase in the average size of holding may impact positively on the proportion of agricultural workers. (5) An increase in the road network may facilitate movement of agricultural workers and results in an increase in their proportion. (6) An increase in credit facilities may lead to occupational diversification and, therefore, to a decrease in the proportion of agricultural workers. (7) More fertilisers may be needed in a diversified cropping pattern that may be associated with a high intensity of labour use and an increase in the proportion of agricultural workers.

Table II.4: Summary table on the distribution of agricultural workers and total workers in 2001 by the size-class of irrigated area in the districts

Size-class of irrigated area in the districts (%) (2001)	% of agricultural workers (main + marginal) in the districts (rural)			Total workers (rural)
	Cultivators	Agri labourers	Total	
0 – 20	36.06	40.98	77.04	100.00
21 – 40	31.17	44.24	75.41	100.00
41 – 60	28.12	48.97	77.09	100.00
61 – 80	21.14	49.46	70.60	100.00
81 – 100	14.36	63.23	77.59	100.00
All classes	27.53	47.51	75.04	100.00

Source: Census 2001. See Appendix Table II.2 for further details.

We employed a multiple regression model with these 7 factors as independent variables. The dependent variable in the model is the proportion of agricultural workers in total workers (2001). The data pertaining to the 22 districts of the state are used in estimating the regression equation. The regression coefficients that turned out to be significant are the proportion of gross irrigated area, average size of holding, and fertilizer consumption. Of these three variables, the first two yielded positive coefficients, whereas the last one turned out with a negative coefficient (Table II.5). With increase in the proportion of irrigated area, the significance of agricultural workers seems to increase. Likewise, with increase in the average size of holding, the significance of agricultural workers appears to increase. Contrarily, an increase in fertilizer use is likely to decrease the proportion of agricultural workers.

Table II.5: Linear regression coefficients of the factors influencing % of agricultural workers 2001

Variable name	Regression coefficients	t-values
Intercept	32.1575	1.3450
Literacy rate 2001[a]	-0.0608	-0.2251
Rainfall 2007-08[b]	0.0019	0.1828
GIA/GCA 2007-08 [b]	0.3407**	2.6000
Average size of holding 2005-06 [b]	14.6122**	2.3623
Roads 2006-07 [b]	0.2473	1.7062
Credit 2006-07 [b]	-13.9526	-0.1550
Fertiliser 2006-07 [b]	-92.2624*	-3.6153
R square [with F-value]	0.5683**	[2.6323]

* Significant at 1% level. ** Significant at 5% level., Number of observations = 22,
Sources: a: Census 2001, b: Statistical Abstract of AP

SECTION III
Coping Strategies of the Poor in Dry Land Agriculture
An Analysis of Village Survey Data

III.1. Landholding Details of the Sample Farmers:

The analysis (and tables) in this section is based on the village survey data. As could be expected from the way we chose the sample villages, 81.43% of the land possessed (land owned + land leased-in – land leased-out + land mortgaged-in – land mortgaged-out) by the marginal farmers in the wet region was irrigated. In the dry land region, on the other hand, the irrigated land formed only 13.39% of the total land possessed by the farmers (Table III.1). The same pattern could be observed in respect of small farmers also. In the wet land area, the irrigated land formed 75.24% of the total land possessed. The corresponding proportion in the dry land area was 14.59% (Table III.2).

The lease market was not very active (Table III.3) in the survey villages in the case of marginal farmers. Whatever land that was under lease was largely governed by fixed kind leases in the kharif season and fixed cash leases in the rabi season in their case. Sharecropping tenancy was rarely practiced by the farmers (Table III.4). In respect of small farmers too, the lease market was not very active (Table III.3) and all three forms of tenancy, viz., sharecropping, fixed kind rent and fixed cash rent were important in the wet land area. In the dry land area, most of the leases were contracted on fixed cash rent basis (Table III.5).

As noted in the literature, the poor adopt survival strategies of various hues for their sustenance. As a result, the cultural, institutional and economic subsystems of the poor differ between the predominantly dry land ecosystems and the predominantly wet land ecosystems. These differences must be seen as a culmination of the coping mechanisms followed by the people as they try to integrate to the regional economy.

III.2. Socio-Cultural Variables:

Caste status of the sample households:

Three features of the caste status of the respondent households need mention. One, backward caste (BC) households predominate among all three categories of the poor, viz., the landless agricultural labourers (LLALs), marginal farmers (MFs) and small farmers (SFs), both in wet and dry land areas. Second, the scheduled caste (SC) households

form a larger proportion of households in dry land areas compared to their proportion in wet land areas. Third, other caste (OC) households are found to form a larger proportion among all categories of the poor in wet land areas than in dry land areas (Table III.6). Therefore, caste status as such can, to some extent, be a factor in causing deviant behaviour between the poor in wet land and dry land areas.

Table III.1: Landholding details of MFs by type of land area

(percentages)

Type of land Area	No. reporting	Total land	Total Irrigated land	Total Un-irrigated	Barren land
Wet land area					
1. Owned land	151	100.00 (223.76)	78.70	20.63	0.67
2. Leased-in Land	31	100.00 (33.40)	100.00	0	0
3. Leased-out land	1	100.00 (0.50)	100.00	0	0
4. Mortgaged in	0	0	0	0	0
5. Mortgaged out	0	0	0	0	0
6. Land possessed	183	100.00 (256.66)	81.43	17.98	0.59
Dry land area					
1. Owned land	153	100.00 (246.17)	11.51	88.49	0
2. Leased-in Land	26	100.00 (28.90)	29.41	70.59	0
3. Leased-out land	1	100.00 (1.00)	100.00	0	0
4. Mortgaged in	1	100.00 (1.00)	100.00	0	0
5. Mortgaged out	0	0	0	0	0
6. Land Possessed	181	100.00 (275.07)	13.39	86.61	0

Figures in ( ) are absolutes in acres.

Notes: Land possessed = land owned + land leased-in – land leased-out + land mortgaged-in – land mortgaged-out. Land possessed includes un-irrigated land as well.

Table III.2: Landholding details of SFs by type of land area

(percentages)

Type of land Area	No. reporting	Total land	Total Irrigated land	Total Un-irrigated	Barren land
Wet land area					
1. Owned land	149	100.00 (524.40)	72.01	24.37	3.62
2. Leased-in Land	29	100.00 (81.00)	92.59	7.41	0
3. Leased-out land	9	100.00 (22.50)	62.22	37.78	0
4. Mortgaged in	0	0	0	0	0
5. Mortgaged out	0	0	0	0	0
6. Land possessed	187	100.00 (582.90)	75.24	21.50	3.26
Dry land area					
1. Owned land	158	100.00 (600.88)	14.01	84.66	1.33
2. Leased-in Land	27	100.00 (46.30)	21.38	78.62	0
3. Leased-out land	3	100.00 (3.20)	21.88	78.12	0
4. Mortgaged in	1	100.00 (0.50)	100.00	0	0
5. Mortgaged out	1	100.00 (1.00)	0	100.00	0
6. Land possessed	190	100.00 (643.48)	14.59	84.17	1.24

Figures in ( ) are absolutes in acres
See notes to Table III.1

Table III.3: Land leased-in as a percentage of land possessed

Type of land area	MFs	SFs
Wet land 13.01	13.90	
Dry land 10.51	7.20	

Table III.4: Form of tenancy of MFs classified by type of land area

(percentages)

Type of land area	No. reporting	Extent Leased-in
Wet land area		
Fixed kind rent	67.74	70.06
Fixed cash rent	29.03	23.95
Sharecropping	3.23	5.99
Total	100.00 (31)	100.00 (33.40)
Dry land area		
Fixed kind rent	0	0
Fixed cash rent	76.92	79.24
Sharecropping	23.08	20.76
Total	100.00 (26)	100.00 (28.90)

Figures in ( ) are absolutes.

Table III.5: Form of tenancy of SFs classified by type of land area

(percentages)

Type of land area	No. reporting	Extent Leased-in
Wet land area		
Fixed kind rent	32.76	38.27
Fixed cash rent	17.24	11.73
Sharecropping	50.00	50.00
Total	100.00 (58)	100.00 (162.00)
Dry land area		
Fixed kind rent	0	0
Fixed cash rent	88.46	85.96
Sharecropping	11.54	14.04
Total	100.00 (26)	100.00 (46.30)

Figures in ( ) are absolutes.

Family size and the worker-dependent ratio:
The family size of households in wet land areas is marginally less than in dry land areas. This is true of all the three categories of households. The differences in the size being small, they are unlikely to reflect in the coping strategies of the poor households. The same conclusion may be drawn even in respect of the worker-dependent ratio as the ratio does not differ much between the wet and dry land areas (Table III.7) (Charts 1 and 2).

Educational status of family members aged above 5 years:
The level of education of the poor in dry land areas is much less than that of the poor in wet land areas in respect of all three categories of households. For instance, the proportion of illiterates in wet land areas was 27.38%. The corresponding proportion in dry land areas was higher at 39.79%. On the other extreme, family members with intermediate education and above in wet land areas was higher at 15.86% compared to 12.19% in case of dry land areas (Table III.8) (Charts 3 and 4). Having to make do with low incomes, the poor in dry land areas must have given low priority to education. This is one way in which the poor in dry land areas cope with the harsh realities of life.

Participation of women in the workforce:
Women workers among the poor are expected to constitute a larger proportion of total workers in dry land areas than in wet land areas in periods of drought in particular. This is so because the cultural values are unlikely to prevent them from participating in the labour market during such times. These are the times when women will be more compelled to work to earn some income to make both ends meet in their families. This expectation became true in the year of our study in respect of all three categories of households. To specify, women workers in the aggregate formed 44.37% of the total workers in wet land areas in the reference year. The corresponding figure in dry land areas was higher at 47.41%. It is also true that women workers constituted a larger proportion in dry land areas than in wet land areas separately in respect of LLALs, MFs and SFs (Table III.9). Thus, the participation of women in the workforce is a coping strategy of the poor in periods of drought.

Expenditure on social functions:
The poor in dry land areas much more than the poor in wet land areas may postpone or totally abandon social functions during drought. Aggregate data seem to support this notion. It shows that 63.12% of households in dry land areas did not spend any money on social functions. The corresponding figure for wet land areas was 60.62%. This hypothesis does not quite hold if we separately consider the spending by the LLALs and MFs. In respect of these two categories of the households, those not spending on social

Table III.6: Caste status of selected households by type of land area and by category of the households

(percentages)

Type of land area/ Category of households	Caste status				Total
	SC	ST	BC	OC	
Wet land area					
LLAL	36.87	6.25	41.25	15.63	100.00 (160)
MF	20.00	0.62	53.75	25.63	100.00 (160)
SF	10.63	0.62	56.88	31.87	100.00 (160)
Total	22.50	2.50	50.63	24.37	100.00 (480)
Dry land area					
LLAL	36.88	3.12	51.88	8.12	100.00 (160)
MF	27.50	2.50	56.25	13.75	100.00 (160)
SF	24.38	0.62	50.62	24.38	100.00 (160)
Total	29.58	2.08	52.29	15.42	100.00 (480)

Figures in ( ) are total no. of households.

Table III.7: Summary table on some aspects of selected households

Description	LLAL	MF	SF	Total
Wet Land				
Number of households	160	160	160	480
Average family size	4.00	4.29	4.25	4.18
Worker-dependent ratio	0.63	0.59	0.57	0.60
Dry Land				
Number of households	160	160	160	480
Average family size	4.02	4.50	4.99	4.50
Worker-dependent ratio	0.62	0.64	0.62	0.63

See Appendix Table III.1 for details

functions formed a slightly smaller proportion in dry land areas than in wet land areas. In the case of SFs, however, those not spending on social functions formed a larger proportion in dry land areas than in wet land areas (Table III.10). The reason for the lack of consistency in the data is not far to seek. The LLALs and MFs engaged themselves

Table III.8: Educational status of family members aged above 5 years by type of land area and by category of households

(percentages)

Type of land area/ Category of households	No. of family members above 5 years whose educational status is				Total
	Illiterate	5th class or less	6th to 10th class	Intermediate or more	
Wet land area					
LLAL	31.63	30.31	28.50	9.56	100.00 (607)
MF	28.79	24.66	30.32	16.23	100.00 (653)
SF	22.00	18.93	27.69	21.38	100.00 (650)
Total	27.38	27.91	28.85	15.86	100.00 (1910)
Dry land area					
LLAL	47.63	23.05	22.54	6.78	100.00(590)
MF	39.59	20.52	27.52	12.37	100.00 (687)
SF	33.74	23.62	26.32	16.33	100.00 (741)
Total	39.79	22.40	25.62	12.19	100.00 (2018)

Figures in ( ) are number of family members above 5 years.

Table III.9: Summary table on the distribution of workers by sex (percentages)

Main Occupation	LL	MF	SF	Total workers
Wet land				
Males	52.22	53.22	61.70	55.63
Females	47.78	46.78	38.30	44.37
Total	100.00 (406)	100.00 (404)	100.00 (389)	100.00 (1199)
Dry land				
Males	50.12	51.74	55.40	52.59
Females	49.88	48.26	44.60	47.41
Total	100.00 (401)	100.00 (460)	100.00 (491)	100.00 (1352)

See Appendix Tables III.2A and 2B for details

in the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGA) during the period of drought and, thereby, were able to earn enough wage income to overcome, to some extent, the adverse repercussions of drought. The SFs, being relatively

better endowed, appeared to have stayed away from manual employment available under MGNREGA. The self-targeting nature of the Scheme worked to the disadvantage of the SFs. They, therefore, refrained themselves from social functions in dry land areas.

Consumption pattern of the households:

Consumption pattern of the poor in dry land areas may differ from that of the poor in wet land areas particularly in drought conditions. Two possibilities exist: (a) Households in dry land areas may exhibit consumption of inferior cereals at least to some degree. Households in wet land areas on the other hand will not have to be so inclined. (b) Number of times food is consumed by the households may also differ between the wet and dry land areas, with the former consuming food more times than the latter. We examined whether the patterns observed in the field correspond to the patterns stated above.

Table III.10: Households reporting and not reporting expenditure on social functions classified by type of land area and by category of households

Category of household	Wet land area		Dry land area		Total	
	Yes	No	Yes	No	Yes	No
1. LLAL						
Number reporting (%)	33.75	66.25	37.50	62.50	35.63	64.37
Amount (Rs)	479660		1385300		1864960	
2. MFs						
Number reporting (%)	41.87	58.13	43.75	56.25	42.81	57.19
Amount (Rs)	1214000		2306200		3520200	
3. SFs						
Number reporting (%)	42.50	57.50	29.38	70.62	35.94	64.06
Amount (Rs)	1384900		622800		2007700	
4. Total						
Number reporting (%)	39.38	60.62	36.88	63.12	38.12	61.88
Amount (Rs)	3078560		4314300		7392860	

As to the pattern (a), we found that a much smaller proportion of the households consumed rice in dry land areas than in wet land areas. For instance, 57.71% of households in dry land areas consumed rice on an exclusive basis compared to 91.26% of households in wet land areas (Table III. 11). Considerable proportion of households in dry land areas reported that they consumed inferior cereals such as jowar, ragi and maize. This is true of all the three categories of households.

Table III.11: Households reporting consumption of rice and other inferior cereals in the drought of 2009 classified by type of land area and by category of households

(percentages)

Staple food	LLAL	MF	SF	Total
Wet land area				
1.Rice	85.63	88.75	99.37	91.26
2.Other than rice	5.62	6.88	0.63	4.37
3.Both	8.75	4.37	0	4.37
Total	100.00 (160)	100.00 (160)	100.00 (160)	100.00 (480)
Dry land area				
1.Rice	51.88	54.38	66.88	57.71
2.Other than rice	25.62	23.75	21.87	23.75
3.Both	22.50	21.87	11.25	18.54
Total	100.00 (160)	100.00 (160)	100.00 (160)	100.00 (480)

Figures in ( ) are total no. of households

Table III.12: Households classified by the no. of times they consumed food in the drought of 2009 by type of land area and by category of households

(percentages)

Type of land area/ Category of households	Takes food only once	Takes food twice	Takes food	Total thrice
Wet land area				
LLAL	0	11.88	88.12	100.00 (160)
MF	0	14.38	85.62	100.00 (160)
SF	0	13.13	86.87	100.00 (160)
Total	0	13.13	86.87	100.00 (480)
Dry land area				
LLAL	0	16.88	83.12	100.00 (160)
MF	0.62	13.13	86.25	100.00 (160)
SF	0	11.88	88.12	100.00 (160)
Total	0.21	13.96	85.83	100.00 (480)

Figures in ( ) are total no. of households.

Considering the pattern (b), it is noticed that the households taking food thrice constituted about an equal percentage among the households in dry and wet land areas (Table III.12).

What should not go unnoticed, however, is that even though the households in dry land areas took food thrice, they consumed inferior cereals on one or more occasions in a day.

III.3. Institutional variables:

Exchange labour:

Labour requirement of agricultural operations being less in drought conditions, exchange labour may be less prevalent in dry land agriculture than in wet land agriculture. Our data support this contention and show that exchange labour is prevalent only rarely in the year of survey especially in dry land agriculture (Table III.13).

Table III.13: Households who work in others' fields for wages or for exchange of labour classified by type of land area and by category of households

(percentages)

Type of land area/ Category of households	Total no. of households	Those who work in others' fields for wages	Those who work in others' fields for exchange of labour
Wet land area			
LLAL	100.00 (160)	100.00	0
MF	100.00 (132)	95.45	4.55
SF	100.00 (48)	83.33	16.67
Total	100.00(340)	95.88	4.12
Dry land area			
LLAL	100.00 (160)	100.00	0
MF	100.00 (145)	100.00	0
SF	100.00 (101)	92.08	7.92
Total	100.00 (406)	98.03	1.97

Figures in ( ) are no. of households who work in others' fields.

Permanent farm servants:

The poor may like to be attached to landlords as PFSs under conditions of drought because this vocation serves as a safety net against fall in employment. This may particularly be the case in dry land agriculture. True to this expectation, we found that the proportion of PFSs in dry land areas is more than in wet land areas, albeit marginally (Table III.14).

Agricultural tenancy:

Drought conditions as such do not in particular shape the institution of tenancy for the reason that the decision to lease-in land is taken before the onset of the monsoon; before

the commencement of the agricultural season. Notwithstanding this fact, the extent of tenancy may be more in wet land agriculture than in dry land agriculture. The tenants in general being poor peasants, they would like to enter the lease market in conditions that are less risk prone. From this argument it follows that tenancy may be more in wet land agriculture than in dry land areas. Our survey data is in line with this view and

Table III.14: Distribution of household workers by main occupation by category of households and by type of land area (including heads)

Occupation	LLAL	MF	SF	Total
Wet Land				
Agricultural labour	80.05	11.14	4.63	32.36
Permanent Farm Servant	1.48	0	0	0.50
Non-agricultural labour	12.81	9.16	3.34	8.51
Cultivation	0	71.03	76.61	48.79
Tending Livestock	0.74	2.23	3.86	2.25
Regular Employment	1.97	3.96	7.20	4.34
Business	0.74	0.5	2.06	1.08
Household Industry	0	0.25	0.24	0.17
Services	2.21	1.73	2.06	2.00
Total workers	100.00	100.00	100.00	100.00
	(406)	(404)	(389)	(1199)
Herfindahl index	0.6584	0.5277	0.5977	0.3529
Dry Land				
Agricultural labour	77.31	23.91	11.41	35.21
Permanent Farm Servant	2.74	0.87	1.02	1.48
Non-agricultural labour	15.71	11.52	5.50	10.43
Cultivation	0	57.39	74.34	46.67
Tending Livestock	0.75	1.52	0.81	1.03
Regular Employment	2.49	3.26	5.70	3.85
Business	0.25	0.87	0.61	0.59
Household Industry	0	0	0	0
Services	0.75	0.65	0.61	0.74
Total workers	100	100.00	100.00	100.00
	(401)	(460)	(491)	(1352)
Herfindahl index	0.6239	0.4013	0.5722	0.3546

shows that the proportion of tenants and the extent leased-in are more in wet land areas than in dry land areas. This is true both in respect of both MFs and SFs (Table III.3).

Table III.15: Loans outstanding classified by type of land area and by agency advancing loans for the three categories of households

(percentages)

Type of land area/ Agency advancing loans	Households with outstanding loans	Amount outstanding
LLAL: Wet land		
Institutional loans	42.78	35.60
Non-institutional loans	57.22	64.40
Total	100.00 (180)	100.00 (3187500)
LLAL: Dry land		
Institutional loans	40.91	31.00
Non-institutional loans	59.09	69.00
Total	100.00 (176)	100.00 (2214200)
MF: Wet land		
Institutional loans	61.04	52.64
Non-institutional loans	38.96	47.36
Total	100.00 (231)	100.00 (5450100)
MF: Dry land		
Institutional loans	61.97	48.86
Non-institutional loans	38.03	51.14
Total	100.00 (234)	100.00 (5309300)
SF: Wet land		
Institutional loans	70.65	63.98
Non-institutional loans	29.35	36.02
Total	100.00 (259)	100.00 (9990670)
SF: Dry land		
Institutional loans	63.02 60.65	
Non-institutional loans	36.98 39.35	
Total	100.00 (265)	100.00 (9325000)

Figures in ( ) are absolutes.

Sources of credit:
Of the non-institutional and the institutional sources of credit, the reliance on the former sources is likely to be more in dry land areas. This is so for two reasons. One, farmers will be able to raise more credit per unit of land from non-institutional sources than from institutional sources in dry land agriculture. Second, in years of drought farmers need for consumption loans increases and such loans are more likely to be advanced by

III.4. Economic variables:
Cropping pattern and cropping intensity:
In trying to stabilise their incomes, the poor cultivators in dry land areas may adopt a cropping pattern that is more diversified than that in wet land areas, even if it means settling with a lower income. The farmers in wet land may opt for cultivating a single crop like paddy in their land area. In contrast, the peasants in dry land areas may grow more than one crop in the hope that even if one crop fails the other crops yield reasonable returns (Charts 11 to 16). To test the validity of the proposition, we arrived at the Herfindahl index for cropping pattern separately for wet and dry land areas. The index clearly shows that the cropping pattern is highly concentrated in the wet land areas and diversified in the dry land areas. This is true for MFs and also for SFs. The index calculated for the two groups of cultivators together is 0.5656 in the wet land areas and 0.1466 in the dry land areas (Table III.16). It may be noted in the passing that the cropping intensity is 169% and 100% respectively in the wet and dry land agriculture for marginal farmers and 161% and 103% in the wet and dry land agriculture for the small farmers.

Distress sale of assets:
It is possible that the poor may sell off their assets out of distress, to meet dire financial needs when exposed to severe drought. We have arrived at the net sales (amount realised through sale of assets minus amount spent on purchase of assets) of the three categories of the households. In case of LLALs and SFs, sales far exceeded purchases in dry land areas compared to wet land areas. In respect of MFs, however, net sales are only marginally higher in dry land area than in wet land area (Tables III.17A, 17B, 17C).

The data on the reasons for the sale of assets is revealing. Among all three categories of households, the sale of assets was resorted to mainly for the purpose of repayment of loans and for meeting family expenditure (Table III.18). Returns from cultivation and agriculture labour being low, these households have taken to selling their assets to meet the pressing demand for money. In respect of marginal farmers, the actual output in kharif (2009) was 67.91% of the normal output in respect of the most important crop rice, in the wet land area. In the dry land area, the corresponding figure for rice was

merely 35.28%. In case of small farmers too, the actual rice output in kharif was 71.17% of the normal output in wet land area. In respect of the dry land area, the relevant figure was 48.80% (Tables III.19A and 19B). These data signify the severity of drought in the dry land areas. It is, therefore, possible that distress sale of assets was opted to by the households under consideration.

Table III.16: Gross cropped area under different crops of MFs and SFs classified by type of land area

Type of land area/Crops	MFs	SFs	MFs + SFs
Wet land			
Paddy	313.11	642.85	955.96
Maize	11.75	51.65	63.40
Groundnut	20.00	55.65	75.65
Pulses	26.50	40.55	67.05
Sugarcane	22.45	60.66	83.11
Chillies	13.90	26.80	40.70
Vegetables	0.80	0.25	1.05
GCA	408.51	878.41	1286.92
Herfindahl index	0.5991	0.5509	0.5656
Dry land			
Paddy	46.73	102.80	149.53
Maize	6.50	1.70	8.20
Oil seeds	36.73	100.88	137.61
Pulses	15.15	60.25	75.40
Soya	21.50	52.50	74.00
Cotton	49.81	98.25	148.06
Vegetables	11.55	16.45	28.00
Jowar	5.90	23.74	29.64
Chillies	13.05	9.50	22.55
Korra	2.00	0	2.00
Tobacco	46.55	113.50	160.05
GCA	255.47	579.57	835.04
Herfindahl index	0.1418	0.1506	0.1466

Table III.17A: Items sold and purchased by LLAL classified by type of land area

(percentages)

Items sold/ bought	No. reporting sale	Amount realized through sale	No. reporting purchase	Amount spent on purchases	Net sales
Wet Land area					
1. Land	0	0	0	0	
2. House	0	0	0	0	
3. Bullocks	0	0	0	0	
4. Buffalos	7	49.22	10	66.54	
5. Cows	1	8.23	6	33.46	
6. Sheep/goat	7	42.55	0	0	
Total	15	100.00 (121500)	16	100.00 (128500)	-7000
Dry land area					
1. Land	6	92.00	0	0	
2. House	1	1.44	0	0	
3. Bullocks		0	2	24.64	
4. Buffalos	6	5.27	5	39.13	
5. Cows	2	0.86	4	27.54	
6. Sheep/goat	2	0.43	3	8.69	
Total	17	100.00 (1043500)	14 (138000)	100.00 905500	

Figures in ( ) are absolute amount in rupees

Crop income:

It is possible that crop income per acre in dry land areas may be associated with smaller mean and smaller standard deviation. The farmers here may choose such crops to stabilize their crop incomes even if it means settling for a lower level of income. Data seem to support this contention. The mean income per acre in wet land agriculture was Rs. 13,069 and its standard deviation was 7,178. In dry land agriculture both the mean and standard deviation were lower. The mean income level was Rs. 6,306 with a standard deviation of 4,395.

Migration:

One of the important alternatives that are open for those facing drought conditions is to migrate for work. Data collected from the sample respondents show that the proportion

Table III.17B: Items sold and purchased by MFs classified by type of land area

(percentages)

Items sold/ bought	No. reporting sale	Amount realized through sale	No. reporting purchase	Amount spent on purchases	Net sales (Rs)
Wet Land area					
1. Land	5	72.65	1	17.06	
2. House	0	0	2	26.25	
3. Bullocks	3	5.34	3	13.39	
4. Buffalos	15	20.22	9	39.11	
5. Cows	5	1.10	2	3.67	
6. Sheep/goat	4	0.69	1	0.52	
Total	32	100.00 (729500)	18	100.00 (381000) 348500	
Dry land area					
1. Land	6	43.76	0	0	
2. House	0	0	0	0	
3. Bullocks	5	17.21	6	63.76	
4. Buffalos	15	28.15	2	15.10	
5. Cows	6	10.36	6	20.13	
6. Sheep/goat	1	0.52	2	1.01	
Total	33	100.00 (685500)	16	100.00 (298000) 387500	

Figures in ( ) are absolute amount in rupees

of households migrating for work was more in dry land area compared to the wet land area. Thus, considering all the three categories of households, the percentage of households indulging in migration was 30% in respect of dry land area and 25% in case of wet land area. The number of days of migration was also higher, at 3860 days, in dry land area as against 2135 days in wet land area (Table III.20). Data show that migration is the most among the landless agricultural labourers, in both the wet land area and the dry land area (Charts 17 and 18). From this, one gets the impression that the decision to migrate depends a great deal on whether or not a household holds land.

As noted in the literature, there are factors other than access to irrigation and size of holding that may impact on the number of days of migration. To account for all the plausible factors influencing the number of days of migration and to provide greater

Table III.17C: Items sold and purchased by SFs classified by type of land area

(percentages)

Items sold/ bought	No. reporting sale	Amount realized through sale	No. reporting purchase	Amount spent on purchases	Net sales (Rs)
Wet Land area					
1. Land	11	83.37	3	75.39	
2. House	0	0	0	0	
3. Bullocks	7	4.49	7	8.27	
4. Buffalos	17	10.74	17	13.70	
5. Cows	3	1.24	4	2.64	
6. Sheep/goat	1	0.16	0	0	
Total	39	100.00 (2495000)	31 (1777500)	100.00 717500	
Dry land area					
1. Land	11	65.47	1	10.27	
2. House	1	7.07	0	0	
3. Bullocks	18	18.09	13	49.28	
4. Buffalos	10	6.45	8	23.41	
5. Cows	2	1.13	6	16.02	
6. Sheep/goat	3	1.79	1	1.02	
Total	45	100.00 (2123000)	29 (487000)	100.00 1636000	

Figures in ( ) are absolute amount in rupees

authenticity to our results, we have employed a multiple regression model. The independent variables in the regression are (1) percentage of workers in the household, (2) education of the head of the household, (3) size of the land possessed, (4) percentage of irrigated land in the total land possessed and (5) income from animal husbandry. The independent variable is the number of days of migration. Separate regressions are run for (A) wet land area, and (B) dry land area. A combined regression is also run to see if the results for the wet and dry land areas differ. In this case, we have a sixth independent variable. It is a dummy variable that takes value 1 if the observation belongs to wet land area, and 0 if it belongs to dry land area. The results of the regression exercises pertaining to wet land area show that none of the independent variables is statistically significant. Also, the regression equation does not provide a good fit to the data. The value of R^2 is extremely low and is not statistically significant (Table III.21).

Table III.18: Reasons for sale of assets classified by type of land area and by the category of households

Reasons for sale	No. reporting among LLAL	No. reporting among MFs	No. reporting Among SFs	Total
Wet land area				
1. Social functions	1	4	3	8
2. To repay Loans	7	12	17	36
3. To meet family expen.	7	15	10	32
4. Children's education		2		2
5. To develop land		3	12	15
Total	15	36	42	93
Dry land area				
1. Social functions	2	4	4	10
2. To repay Loans	10	12	16	38
3. To meet family expen.	5	15	18	38
4. Children's education	1		2	3
5. To develop land		2	7	9
Total	18	33	47	98

Some households have reported more than one reason

The regression employed with data corresponding to the dry land area yielded a negative and significant coefficient for the variable, the size of land possessed. The coefficient is statistically significant at 5 per cent level. The value of R^2 is very low but is statistically significant at 10 per cent level (Table III.21).

The regression run combining the observations of the wet and dry land areas also yielded a negative coefficient for the size of land variable. However, the coefficient is statistically significant at 10 per cent level. The value of R^2 is also significant at 10 per cent level (Table III.21).

The explanatory power of the regression equations being very low (Tables III.21), we need not give importance to the regression coefficients, even if their values are statistically significant. Thus, in the year of study, migration of labour force is, by and large, independent of the chosen variables. For that matter, the average number of days of migration per household is very low in the survey villages (Table III.20). This could be because of the implementation of the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) in the chosen villages. The Scheme must have helped to reduce distress migration.

Table III.19A: Cropping pattern and output of MFs classified by type of land area

Crops grown	Total area under Crop (%)	Normal output	Actual output	Difference	Actual output As % of Normal output
Wet land area					
1. Kharif					
Paddy	79.76	5330	3619.50	1710.5	67.91
Maize	2.59	89	31	58	34.83
Groundnut	4.14	181	103	78	56.91
Pulses	3.19	75.50	46	29.6	60.93
Sugarcane	9.29	824.00	391	433	47.45
Chillies	0.21	10.00	8	2	80.00
Sesamum	0.82	6	2.50	3.50	41.67
Total	100.00				
	(241.66)				
2. Rabi					
Paddy	72.13	3764	2843.50	920.50	75.54
Maize	3.30	119	78	41	65.55
Groundnut	2.40	65	40	25	61.54
Pulses	11.26	162	125	37	77.16
Vegetables	0.48	17	14	3	82.35
Chillies	8.03	240	191	69	79.58
Seasamum	1.80	32	23	9	71.88
Sunflower	0.60	20	15	5	75.00
Total	100.00 (166.85)				
Dry land area					
Paddy	18.29	1165	411	754	35028
Maize	2.54	116	59	57	50.89
Groundnut	14.26	498	178	320	35.74
Pulses	5.93	121	63	58	52.07
Soya	8.42	241	161	80	66.80
Cotton	19.50	612	387	225	63.23
Vegetables	4.52	6470	4827	1643	74.60
Jowar	2.31	60	36	24	60.00
Chillies	5.11	113	76	37	67.26
Sesamum	0.12	3	1	2	33.33
Korras	078	18	12	6	66.67
Tobacco	18.22	475	351	124	73.89
Total	100.00 (255.47)				

Table III.19B: Cropping pattern and output of SFs classified by type of land area

Crops grown	Total area under Crop (%)	Normal output	Actual output	Difference	Actual output As % of Normal output
Wet land area					
1. Kharif					
Paddy	70.15	10819	7700	3119	71.17
Maize	7.29	686	393	293	57.29
Groundnut	5.10	390	171	219	43.85
Pulses	4.61	197	153	44	77.66
Vegtables	0.04	5	3	2	60.00
Sugarcane	11.15	2225	1172	1081	52.67
Chillies	0.74	38	22	16	57.89
Sesamum	0.37	2	1	1	50.00
Sunflower	0.55	20	15	5	75.00
Total	100.00 (543.97)				
2. Rabi					
Paddy	78.11	8734	6880	1854	78.77
Maize	3.59	306	192	114	62.74
Groundnut	3.44	200	146	54	73.00
Pulses	4.63	152	117	35	76.97
Chillies	6.82	368	294	74	79.89
Sesamum	2.36	77	57	20	74.03
Sunflower	1.05	63	52	11	82.54
Total	100.00 (334.44)				
Dry land area					
1. Kharif					
Paddy	15.84	2211	1079	1132	48.80
Maize	0.21	45	20	25	44.44
Groundnut	17.83	1029	360	669	34.99
Pulses	9.18	346	189	157	54.62
Soya	9.36	589	333	256	56.54

Cotton	17.51	1190	710	480	59.66
Vegetables	2.57	10450	7420	3030	71.00
Jowar	4.05	239	107	132	44.77
Chillies	1.69	95	54	41	56.84
sesamum	.14	8	5	3	62.50
Horsegram	1.38	80	24	56	30.00
Tobacco	20.24	1135	637	498	56.12
Total	100.00 (561.17)				
2.Rabi					
Paddy	75.54	260	190	70	73.08
Maize	2.72	20	0	20	0.00
Vegetables	10.88	1400	1100	300	78.57
Jowar	5.43	5	3	2	60.00
Horsegram	5.43	4	2	2	50.00
Total	100.00 (18.40)				

Occupational and income diversification:

The uncertainty as to the income from agriculture (viz., agricultural labour and cultivation) may make the poor in dry land agriculture to choose a more diversified occupational structure than in wet land agriculture. Apart from cultivation and agricultural labour, the poor may engage themselves as PFSs, and in animal husbandry and other non-agricultural occupations. The Herfindahl index for occupational structure is less, though in a small way, in dry land agriculture compared to wet land agriculture. This is true in respect of all the three categories of households (Table III.14). Unlike what is noticed in the primary data of 2008-09 pertaining to the poor households, the occupational distribution of the main workers as per 2001 Census does not differ between the wet land villages and the dry land villages (Appendix Table I.2). Thus, these two sets of data throw up different conclusions. This may be because the reference year of the two sets is different, and because the Census data cover the non-poor also.

Table III.20: Households who migrate for work and no. of days of migration classified by type of land area and by category of households

Type of land area/ Category of households	Total no. of households	% of households who migrate for work	No. of days of migration	No. of days of migration per household
Wet land area				
LLAL	100.00 (160)	12.50	965	6.03
MF	100.00 (160)	10.00	575	3.59
SF	100.00 (160)	2.50	595	3.72
Total	100.00 (480)	25.00	2135	4.45
Dry land area				
LLAL	100.00 (160)	15.00	2080	13.00
MF	100.00 (160)	8.13	990	6.19
SF	100.00 (160)	6.88	790	4.94
Total	100.00 (480)	30.00	3860	8.04

Figures in ( ) are total no. of households.

Table III.21: Linear regression coefficients (with t values) of the factors influencing number of days of migration

Independent variable name	Regression coefficients (with t values)		
	Wet land	Dry land	Wet + Dry
Intercept	4.4548	11.0974	8.6864
% of total workers in the family	0.0107 (0.2531)	0.0193 (0.3211)	0.0229 (0.6285)
Head of household's education	0.6603 (0.3386)	-4.7252 (-1.3777)	-1.4183 (-0.7697)
Size of land possessed	0.4616 (0.5814)	-1.6042** (-2.0605)	-0.9709*** (-1.7562)
% of irrigated land in total land possessed	-0.0415 (-1.5837)	0.0306 (0.5772)	-0.0002 (-0.0091)
Income from animal husbandry	0.0002 (1.0034)	-0.0006 (-1.3048)	0.0000 (0.0021)
Type of land (dummy)	n. a.	n. a.	-3.5854*** (-1.8242)
R^2 [with F value]	0.0081 [0.7754]	0.0209*** [2.0276]	0.0111*** [1.7808]

** Significant at 5% level. *** Significant at 10% level. Number of observations = 960

Examining the household income of the three categories of households, we find that, for landless agricultural labourers, income per household is more in dry land area than in wet land area, but only marginally, during 2008-09 (Table III.22). In case of marginal farmers and small farmers it is the other way round – per capita income is more in the wet land area than in dry land area (Tables III.22). This pattern is to be expected. The landless agricultural labourers engage themselves in one activity or the other even during a drought period and attempt to maintain their income level both in the wet land and dry land areas with considerable success. It is no doubt true that even the small and marginal farmers strive to do the same, but without success. The fall in the crop income during drought being significant in dry land area, they cannot attain the income level reached by their counterparts in wet land area.

More than the diversification in occupational distribution, the diversification in income is more glaring between the two areas. The Herfindahl index for household income is systematically higher (major part of the income accrues from a fewer occupations) in respect of LLALs, MFs and SFs in the wet land agriculture than in dry land agriculture. The indices for LLALs, MFs and SFs in wet land areas are respectively 0.3020, 0.3021 and 0.5328. The respective indices in dry land areas are 0.2960, 0.2287 and 0.3500 (Table III.22) (Charts 19 to 24).

Table III.22: Distribution of household income from different sources classified by type of land area and by category of households

(percentages)

Source of income	Income of LLAL	Income of MFs	Income of SFs
Wet land area			
1. Cultivation	0	49.77	71.71
2. Agri. labour	45.01	11.07	2.29
3. PFS	0.74	0	0.03
4. Non-agri. lab.	29.61	17.08	4.20
5. Services	4.31	2.08	1.19
6. Animal husbandry	2.54	5.99	5.44
7. Business	5.51	1.42	2.60
8. Salaries	6.85	8.99	11.12
9. Income from migration	2.98	1.42	0.18
10. Remittances	2.45	2.18	1.24
Total	100.00 (4319140)	100.00 (5990629)	100.00 (11048110)
Income per hh	26995	37441	69051
Herfindahl index	0.3020	0.3021	0.5328
Dry land area			
1. Cultivation	0	34.68	54.88
2. Agri. Labour	40.23	20.01	8.79
3. PFS	8.16	2.02	0.73
4. Non-agri. Lab.	34.47	23.63	10.25
5. Services	0.58	1.27	1.00
6. Animal husbandry	2.03	4.60	3.13
7. Business	0.69	0.93	1.96
8. Salaries	4.15	9.65	16.96
9. Income from migration	7.81	1.63	0.92
10. Remittances	1.87	1.58	1.38
Total	100.00 (4424350)	100.00 (4853710)	100.00 (7910300)
Income per hh	27652	30336	49439
Herfindahl index	0.2960	0.2287	0.3500

SECTION IV
The Summing Up

IV.1. Objectives and Methodology:

At the outset, the present study analyses the secondary data in order to identify the factors that shape the cropping pattern and crop diversification in the districts of Andhra Pradesh (AP). It also seeks to isolate the factors that impact on the occupational distribution of the rural workforce employing again the secondary data of the districts of the state. The basic premise here is that irrigation, or the lack of it, is the key determinant of the cropping pattern, crop diversification and occupational status.

Additionally, based on a survey conducted among 960 households in 16 villages spread over different agro-climatic regions of AP covering the year 2008-09, the study looks at the coping strategies adopted by the poor agricultural households, during a period of drought. A one point study of this nature, as it requires one to work without any benchmark, cannot bring out the coping mechanisms adopted by the poor of the dry land areas in periods of drought, unless the respondents' memory is taxed to elicit details on past events when normal conditions prevailed. This methodological issue requires that we compare the poor of the dry lands with those of the wet lands to gain an understanding of the survival strategies of the former during drought.

In times of drought, socio-cultural, institutional and economic aspects of the poor would, no doubt, be subject to change in both wet and dry land areas. However, such changes may be less in wet land areas, compared to dry land areas, because the households in the former areas will be endowed enough to mitigate the adverse affects of drought to some extent. Such a possibility will be relatively less in dry land areas, as they are unlikely to possess income and assets to cushion the adverse impact of drought. Therefore, coping mechanisms of the poor facing drought will be particularly evident when we compare the conditions obtaining in the wet and dry land areas.

IV.2. Factors Influencing Cropping Pattern and Crop Diversification:

To the question whether the area under rice, food grains and food crops increases with increase in the percentage of gross irrigated area, we get an affirmative answer. Thus, our regression exercises, with secondary data of the districts of AP, show that as the proportion of irrigated area increases, the proportion of area devoted to rice, food grains and food crops increases and the proportion of non-food crops decreases.

Another hypothesis studied with the secondary data of the districts of the state is that the farmers opt for a more and more diversified cropping pattern as the percentage of area under irrigation decreases. The understanding is that even if one crop fails because of poor irrigation facilities and an erratic monsoon, another will yield reasonable return and therefore they secure a minimum level of income to eke out a living. This hypothesis is tested regressing the Herfindahl index of crop diversification of the districts of AP on the independent variable, the proportion of gross irrigated area in the gross cropped area. The results of the simple regression exercise show that the hypothesis is not valid.

We have also worked with a multiple regression model to identify the factors impacting on the crop diversification index. The independent variables employed to explain the variations in the dependent variable are (1) literacy rate, (2) rainfall, (3) GIA/GCA, (4) average size of holding, (5) roads per 100 km of geographic area, (6) bank credit per hectare of cropped area in lakhs and (7) fertilizer consumption per hectare in tonnes. Of these variables, the coefficients of literacy, proportion of gross irrigated area, average size of holding and fertilizer consumption are found to be statistically significant. With increase in literacy rate, crop diversification index appears to increase. The proportion of irrigated area also appears with a positive and significant coefficient. An increase in the proportion of irrigated area appears to lead to an increase in the value of crop diversification index. That is, cropping pattern gets more concentrated with increase in the proportion of irrigated area. An increase in the average size of holding is resulting in an increase in the value of the index of crop diversification. Where crop diversification index has a small value, that is where crop concentration is low, fertilizer use is more.

IV.3. Factors Influencing the Occupational Status of Households:

Workers in dry land areas are likely to be engaged in diverse occupations. This is due to the fact that agriculture in the areas may not provide them with employment sufficient enough to eke out a living. We may state the proposition thus: proportion of agricultural workers – cultivators and agricultural labourers (main plus marginal) – will increase with increase in the ratio of GIA to GCA.

The independent variables that are likely to impact on the Herfindahl index for crop diversification may also impact on the percentage of agricultural workers (cultivators and agricultural labourers) to total workers. We employed a multiple regression model with the above mentioned 7 factors as independent variables. The dependent variable in the model is the proportion of agricultural workers in total workers. The regression coefficients that turned out to be significant are the proportion of gross irrigated area, average size of holding, and fertilizer consumption. Of these three variables, the first two yielded positive coefficients, whereas the last one turned out with a negative

coefficient. With increase in the proportion of irrigated area, the significance of agricultural workers seems to increase. Likewise, with increase in the average size of holding, the significance of agricultural workers appears to increase. Contrarily, an increase in fertilizer use is likely to decrease the proportion of agricultural workers.

Thus, the district level secondary data show that people try to overcome the ill-effects of dry conditions (1) by shifting to non-food crops, (2) by opting for a more diversified cropping pattern and (3) by choosing to diversify their occupational structure.

IV.4. Survival Strategies of the Poor Facing Harsh Ecosystems:

To study the impact of drought conditions on socio-cultural, institutional and economic aspects, we fall back on the primary data collected from diverse agro-climatic regions of the state.

Impact on socio-cultural variables:

The poor in dry land areas seem to cope with the drought conditions (a) by giving less priority to education, (b) by making women to actively participate in the labour market, (c) by keeping away from social functions to some extent, and (d) by consuming inferior cereals. These observations are in line with the received theory. What is of import is that we arrived at these conclusions not by comparing the behaviour of the poor in drought and normal years but by positioning the poor of the dry land areas against the poor in wet land areas in a year of drought.

Impact on institutional variables:

The drought conditions, in contrast to what is hypothesised, do not seem to impact on the significance of exchange labour and PFSs. However, as expected, the significance of (a) tenancy and (b) institutional sources of credit is less in dry land areas compared to wet land areas.

Impact on economic variables:

We may recount here the differences between the wet land area and the dry land area in respect of economic conditions in the year of drought. The differences reflect upon the coping strategies adopted by the poor. Thus, (a) the farmers in dry land agriculture are found opting for a more diversified cropping pattern and occupational distribution than the farmers in wet land agriculture, with a view to reduce variability in household income and (b) there is indication that the LLALs and SFs are resorting to distress sale of assets in dry land areas in order to repay loans and to meet family expenditure. Note, however, that migration as a coping strategy to mitigate the ill effects of drought does not appear to be important. In fact, the average number of days of migration per

household is very low in the survey villages. This should be attributed to the manual employment secured by the poor households in the works carried out under the MGNREGS in the villages under study.

IV.5. Policy Implications of the Study:

People are seen to overcome the ill-effects of dry conditions (1) by shifting to non-food crops, (2) by opting for a more diversified cropping pattern and (3) by choosing to diversify their occupational structure. Policy measures taken to mitigate the problems of dry land areas should, therefore, facilitate these processes.

The policies aimed at improving the living conditions of the poor in the dry land areas should aim at increasing the productivity of the non-food crops they specialise in. Increasing the productivity of the crops is one sure way of improving the living conditions of the people in dry land areas. This calls for technological inventions. The technology that increases the productivity of dry land crops in general and the non-food crops in particular, is the need of the hour. But such inventions are hard to come by.

It is as much important to increase the productivity of non-food crops as it is important to increase the productivity of workers in dry land areas. One way to effect this is by promoting education in these areas. As of now people in dry land areas assign low priority to education. This condition should change. Education makes people more mobile and enables them to acquire skills easily. These attributes increase the earnings of the workers. Infrastructure development in the form of minor irrigation facilities and soil and moisture conservation can contribute to the growth in productivity of the agricultural sector. And infrastructure development in the form of rural roads, by integrating rural areas with towns and market centres, can facilitate the diversification of occupational structure and increase the incomes of the people in dry areas. Since these activities constitute the core of the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), it should be promoted in all seriousness, particularly during the periods of drought.

There are many apprehensions about the MGNREGS. One of them is regarding the sustainability of the Scheme. The financial commitments involved in continuing the Scheme are enormous. However, the financial requirements, when seen as a proportion of the GNP are extremely low. A modicum of increase in tax rates can bring the revenue necessary to continue the Scheme. People are also doubtful whether this Scheme can be implemented with few leakages. But this is no reason for not implementing it. The Right to Information Act should be of great help in reducing the corrupt practices associated with the Scheme.

Provision of guaranteed employment provided for in MGNREGS can also help to see that the poor in drought conditions do not (1) undermine the importance of education, (2) make do with inferior cereals (3) have to resort to distress sale of assets and (4) have to endure fall in incomes. To ensure that the poor do not have to turn to non-institutional sources of credit in times of drought, formal sources of credit should be made to reschedule credit, and waive interest charges. There is also a need to rejuvenate the credit facilities in dry land areas. Linking institutional credit with crop insurance can go a long way in mitigating the shortages in drought years. It is essential that the institutional sources of credit become more responsive to the needs of the dry land areas. The micro-finance institutions can no doubt be of great help in pumping credit to the areas. But in recent times their operations received the wrath of the borrowers and the general public following the high rates of interest they charge and the questionable practices they adopt in recovering loans. It is, therefore, important that the nationalised banks take lead. If banks could be made to pump in more credit, the distress sale of assets indulged in by the poor in these areas could be reduced.

APPENDIX TABLES

Appendix Table I.1: Details relating to the villages selected for the study

District/Village	No. of Households	total population	total literates	irrigated area (ha)	unirrigated area (ha)	irrigated+ unirrigated (ha)	% of irrigated area
Srikakulam (wet)							
Dandulaxmipuram	791	3661	1032	979.35	203.24	1182.59	82.81
Polaki	1439	6193	2598	614.58	9.71	624.29	98.44
Visakhapatnam (dry)							
Kusuluvada	477	2275	262	166	1032.83	1198.83	13.85
Gidijala	653	3168	395	108	913.15	1021.15	10.58
West Godavari (wet)							
Pippara	2044	8472	3774	884.23	0	884.23	100.00
Kasipadu	669	2626	1083	489.67	0	489.67	100.00
Prakasam (dry)							
Bodduvanipalem	2858	12352	5312	61.52	2725.14	2786.66	2.21
Paidipadu	1569	6749	2921	30.35	1726.39	1756.74	1.73
Chittoor (wet)							
O. G. Kuppam	618	2519	834	321.1	34.28	355.38	90.35
Mudipalle	529	2498	895	128.9	17.4	146.3	88.11
Ananthapur (dry)							
Mallapuram	494	2664	772	89.4	1588.47	1677.87	5.33
Vemparalla	697	3803	1408	133.14	2008.38	2141.52	6.22
Karimnagar (wet)							
Veldi	1104	5413	1511	1009	418	1427	70.71
Manakondur	1989	10476	3991	1475	222	1697	86.92
Adilabad (dry)							
Kowtha	228	1283	360	0	672.52	672.52	0.00
Jainad	753	3651	1344	31.27	2274.75	2306.02	1.36

Source: Census 2001

Appendix Table I.2: Percentage distribution of main workers by occupation in the selected villages

District/Village	Percentage of										Total percent workers	Total main
	cultiva-tors	agri. labourers	Livestock & forestry	mining & quarrying	manufac. in HHI	manufac. in other than HHI	construc-tion	trade & commerce	transport, storage & commn	other services		
Srikakulam (wet)												
Dandulaxmipuram	25.85	43.23	17.71	0.46	0.26	1.82	0.13	3.19	0.65	6.71	100.00	1536
Polaki	20.04	60.11	0.71	0.00	0.96	1.45	0.89	4.34	0.93	10.58	100.00	2695
Visakhapatnam (dry)												
Kusuluvada	55.42	36.94	1.60	0.00	1.69	0.00	0.18	0.36	1.60	2.22	100.00	1126
Gidijala	69.63	13.20	2.36	0.00	0.54	0.13	0.20	6.06	2.63	5.25	100.00	1485
West Godavari (wet)												
Pippara	20.51	52.50	0.98	0.00	0.57	3.07	0.36	8.20	1.76	12.05	100.00	3354
Kasipadu	11.67	75.42	0.14	0.00	0.28	1.11	0.42	3.89	0.83	6.25	100.00	1440
Prakasam (dry)												
Bodduvanipalem	19.25	60.05	1.48	0.03	0.71	4.04	0.25	5.70	2.15	6.33	100.00	5943
Paidipadu	30.84	59.51	0.73	0.03	0.14	0.76	0.22	1.36	0.57	5.85	100.00	3690
Chittoor (wet)												
O. G. Kuppam	36.16	51.71	2.57	0.54	0.62	2.02	0.23	2.10	0.31	3.73	100.00	1286
Mudipalle	30.41	52.06	2.66	0.09	2.58	3.61	0.52	2.84	0.60	4.64	100.00	1164

Appendix Table I.2:contdd..

District/Village	Percentage of										Total percent workers	Total main
	cultiva-tors	agri. labourers	Livestock & forestry	mining & quarrying	manufac. in HHI	manufac. in other than HHI	construc-tion	trade & commerce	transport, storage & commn	other services		
Ananthapur (dry)												
Mallapuram	60.16	34.63	0.14	0.00	1.23	0.27	0.14	0.96	0.07	2.40	100.00	1461
Vemparalla	34.23	58.23	1.25	0.05	0.25	0.50	1.00	1.70	0.25	2.54	100.00	2004
Karimnagar (wet)												
Veldi	35.31	47.09	0.57	0.50	1.87	2.54	5.35	1.41	0.30	5.05	100.00	2988
Manakondur	16.15	53.30	2.05	1.49	3.03	4.53	2.26	4.62	1.97	10.59	100.00	4154
Adilabad (dry)												
Kowtha	43.41	49.71	0.57	0.00	0.29	1.29	0.14	0.86	0.14	3.58	100.00	698
Jainad	23.83	60.32	0.00	0.00	0.18	0.00	0.65	6.03	1.36	7.63	100.00	1691
All 8 wet villages	34.80	53.01	0.93	0.02	0.49	1.24	0.38	3.06	1.04	5.03	100.00	27642
All 8 dry villages	35.09	52.54	0.94	0.02	0.51	1.28	0.39	3.18	1.07	4.97	100.00	51594

Source: Census 2001

Appendix Table I.3: District-wise annual average rainfall (millimeters)

Dist	2007-08			2008-09		
	Actual	Normal	% Deviation	Actual	Normal	% Deviation
SKL	1335.9	1161.6	15	825.2	1161.6	-29
VZM	1304.7	1130.7	15	906.6	1130.7	-20
VSP	1420.1	1202.3	18	837.9	1202.3	-30
EG	1404.6	1217.7	15	1035.1	1217.7	-15
WG	1191.6	1153.0	3	1140.4	1153.0	-1
KRN	1141.8	1033.5	10	1187.7	1033.5	15
GNT	1103.8	853.0	29	883.3	853.0	4
PSM	1021.1	871.5	17	763.3	871.5	-12
NLR	1371.4	1080.4	27	959.4	1080.4	-11
CTR	1130.4	933.9	21	876.4	933.9	-6
KDP	1032.0	699.6	48	654.4	699.6	-6
ATP	816.0	552.3	48	680.6	552.3	23
KNL	1081.3	670.5	61	582.3	670.5	-13
MHB	844.9	603.9	40	457.6	603.9	-24
RR	913.8	781.1	17	762.9	781.1	-2
MDK	807.3	873.0	-8	708.4	873.0	-19
NMB	962.5	1035.5	-7	840.5	1035.5	-19
ADB	909.6	1157.4	-21	886.7	1157.4	-23
KRM	892.9	968.4	-8	784.5	968.4	-19
WGL	1107.7	993.6	11	1031.4	993.6	4
KMM	1271.2	1124.0	13	1326.9	1124.0	18
NLG	817.4	752.6	9	868.1	752.6	-9
AP	1079.8	940.4	15	847.3	940.4	-10

Source: Statistical Abstract of AP

Appendix Table II.1: Distribution of area under crops classified by the size-class of irrigated area

Size-class of irrigated area (%) (2007-08)	Area under different crops				Total area
	Rice	Food grains	Food crops	Non-food crops	
0 – 20					
Anantapur	44492	191543	233911	953817	1187728
Adilabad	52154	223370	244362	285285	529647
Total	96646	414913	478273	1239102	1717375
Percentage to total area	5.63	24.16	27.85	72.15	100.00
21 – 40					
Visakhapatnam	99251	186640	316259	68171	384430
Prakasam	127688	388438	450021	243295	693316
Kadapa	62557	155876	217687	254566	472253
Kurnool	108647	506746	582523	452281	1034804
Mahabubnagar	147839	479283	514241	313599	827840
Rangareddy	30397	154986	194597	43294	237891
Medak	92817	380699	472268	63656	535924
Total	669196	2252668	2747596	1438862	4186458
Percentage to total area	15.98	53.81	65.63	34.37	100.00
41 – 60					
Srikakulam	203370	310375	373073	87087	460160
Vizianagaram	126373	202630	300428	129154	429582
Krishna	354978	516259	634044	103724	737768
Guntur	307271	518810	614908	216741	831649
Chittoor	52290	83359	215993	192519	408512
Khammam	176277	265458	353278	156085	509363
Nalgonda	310735	418754	478475	187661	666136
Total	1531294	2315645	2970199	1072971	4043170
Percentage to total area	37.87	57.27	73.46	26.54	100.00
61 – 80					
East Godavari	410781	539454	688517	101285	789802
Nellore	234440	283269	340546	69973	410519
Nizamabad	127453	284641	335956	94008	429964

Appendix Table II.1:Contd..

Size-class of irrigated area (%) (2007-08)	Area under different crops				Total area
	Rice	Food grains	Food crops	Non-food crops	
Karimnagar	281882	473001	529877	158792	688669
Warangal	186778	328602	376862	217239	594101
Total	1241334	1908967	2271758	641297	2913055
Percentage to total area	42.61	65.53	77.99	22.01	100.00
81 – 100					
West Godavari	445324	494816	636947	69993	706940
Percentage to total area	62.99	69.99	90.10	9.90	100.00
Andhra Pradesh	3983794	7387009	9104773	4462225	13566998
Percentage to total area	29.36	54.45	67.11	32.89	100.00

Source: Statistical Abstract of AP

Notes: The table is based on the data pertaining to the year 2007-08, the latest available.

Appendix Table II.2: Distribution of agricultural workers and total workers in 2001 by the size-class of irrigated area

Size-class of irrigated area (%) (2001)	Total agricultural workers (main + marginal) (rural)			Total workers (rural)
	Cultivators	Agri labourers	Total	
0 – 20				
Anantapur	522141	643660	1165801	1457202
Adilabad	338849	334797	673646	930584
Total	860990	978457	1839447	2387786
Percentage to total area	36.06	40.98	77.04	100.00
21 – 40				
Visakhapatnam	429187	413454	842641	1136671
Vizianagaram	327729	457263	784992	1030651
Prakasam	373933	652852	1026785	1366952
Kadapa	278843	439577	718420	968520
Kurnool	382023	773352	1155375	1458253
Mahabubnagar	551825	767304	1319129	1702478
Rangareddy	273470	283470	556940	803304
Medak	387795	477291	865086	1171753
Total	3004805	4264563	7269368	9638582
Percentage to total area	31.17	44.24	75.41	100.00
41 – 60				
Srikakulam	263295	546242	809537	1106480
Warangal	457301	598409	1055710	1366562
Guntur	382709	1010020	1392729	1727886
Chittoor	524834	616532	1141366	1489459
Khammam	283116	599434	882550	1085106
Nalgonda	403630	661447	1065077	1457963
Total	2314885	4032084	6346969	8233456
Percentage to total area	28.12	48.97	77.09	100.00
61 – 80				
East Godavari	213682	943401	1157083	1572675
Nellore	210027	527436	737463	1012336
Nizamabad	313935	333938	647873	1016756
Karimnagar	429560	562278	991838	1489104
Krishna	205144	843125	1048269	1399747
Total	1372348	3210178	4582526	6490618
Percentage to total area	21.14	49.46	70.60	100.00
81 – 100				
West Godavari	204309	899389	1103698	1422446
Percentage to total area	14.36	63.23	77.59	100.00
Andhra Pradesh	7757337	13384671	21142008	28172888
Percentage to total area	27.53	47.51	75.04	100.00

Source: Census 2001

Appendix Table III.1: Demographic features of selected households

Description	LLAL	MF	SF	Total
Wet Land				
Number of households	160	160	160	480
Total number of persons:				
(a) children (< 5 years)	33	34	30	97
(b) students	161	193	169	523
(c) workers	406	404	389	1199
Male workers	212	215	240	667
Female workers	194	189	149	532
(d) non-workers	27	41	80	148
(e) pensioners	11	8	7	26
Total family members	640	687	680	2007
Average family size	4.00	4.29	4.25	4.18
Worker-dependent ratio	0.63	0.59	0.57	0.60
Illiterates	192	188	143	523
Literates	415	465	507	1387
Total adult family members	607	653	650	1910
Dry Land				
Number of households	160	160	160	480
Total number of persons:				
(a) children (< 5 years)	53	33	57	143
(b) students	163	199	205	567
(c) workers	401	460	491	1352
Male workers	201	238	272	711
Female workers	200	222	219	641
(d) non-workers	8	14	27	49
(e) pensioners	18	14	18	50
Total family members	643	720	798	2161
Average family size	4.02	4.50	4.99	4.50
Worker-dependent ratio	0.62	0.64	0.62	0.63
Illiterates	281	272	250	803
Literates	309	415	491	1215
Total adult family members	590	687	741	2018

Appendix Table III.2A: Distribution of workers by sex: Wet land

Main Occupation	LL	MF	SF	Total workers
Agricultural labour				
Males	161	10	3	174
Females	164	35	15	214
Total	325	45	18	388
Permanent farm servant				
Males	6	0	0	6
Females	0	0	0	
Total	6	0	0	6
Non-agricultural labour				
Males	28	20	8	56
Females	24	17	5	46
Total	52	37	13	102
Cultivation				
Males	0	164	191	355
Females	0	123	107	230
Total	0	287	298	585
Tending livestock				
Males	1	2	2	5
Females	2	7	13	22
Total	3	9	15	27
Regular employment				
Males	8	10	27	45
Females	0	6	1	7
Total	8	16	28	52
Business				
Males	3	2	5	10
Females	0	0	3	3
Total	3	2	8	13
Household industry				
Males	0	1	1	2
Females	0			
Total	0	1	1	2
Services				
Males	5	6	3	14
Females	4	1	5	10
Total	9	7	8	24
Grand total				
Males	212 (52.22)	215 (53.22)	240 (61.70)	667 (55.63)
Females	194 (47.78)	189 (46.78)	149 (38.30)	532 (44.37)
Total	406 (100.00)	404 (100.00)	389 (100.00)	1199 (100.00)

Figures in ( ) are percentages.

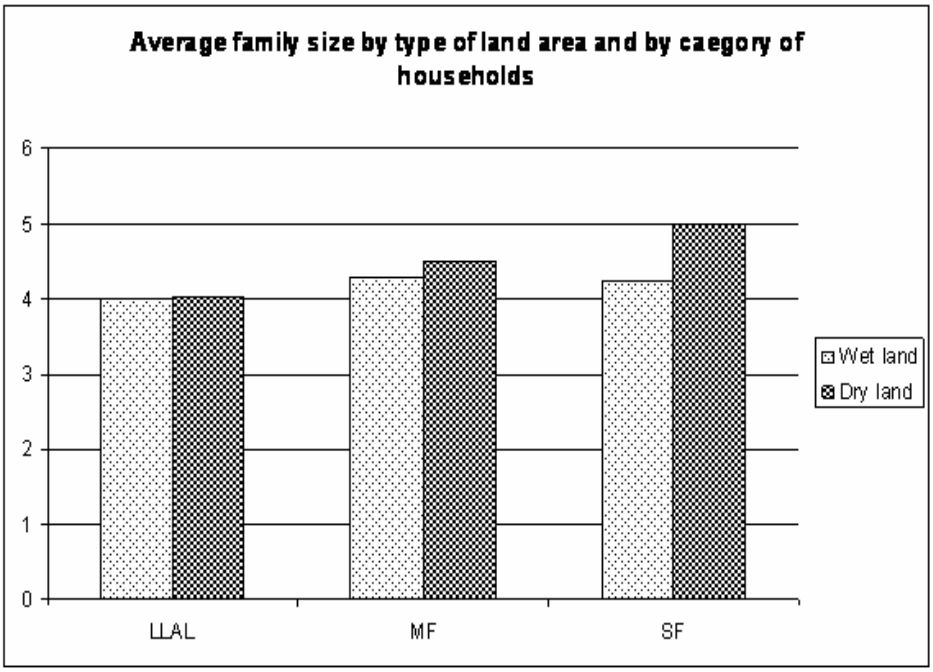
Appendix Table III.2B: Distribution of workers by sex: Dry land

Main Occupation	LL	MF	SF	Total workers
Agricultural labour				
Males	146	42	19	207
Females	164	68	37	269
Total	310	110	56	476
Permanent farm servant				
Males	11	4	5	20
Females	0	0	0	0
Total	11	4	5	20
Non-agricultural labour				
Males	34	38	18	90
Females	27	15	9	51
Total	61	53	27	141
Cultivation				
Males	1	137	202	340
Females	1	127	163	291
Total	2	264	365	631
Tending livestock				
Males	2	2	1	5
Females	1	5	3	9
Total	3	7	4	14
Regular employment				
Males	7	12	22	41
Females	3	3	6	12
Total	10	15	28	53
Business				
Males	0	3	2	5
Females	1	1	1	3
Total	1	4	3	8
Household industry				
Males	0	0	0	0
Females	0	0	0	0
Total	0	0	0	0
Services				
Males	0	0	3	3
Females	3	3	0	6
Total	3	3	3	9
Grand total				
Males	201 (50.12)	238 (51.74)	272 (55.40)	711 (52.59)
Females	200 (49.88)	222 (48.26)	219 (44.60)	641 (47.41)
Total	401 (100.00)	460 (100.00)	491 (100.00)	1352 (100.00)

Figures in ( ) are percentages.

CHARTS

CHART 1



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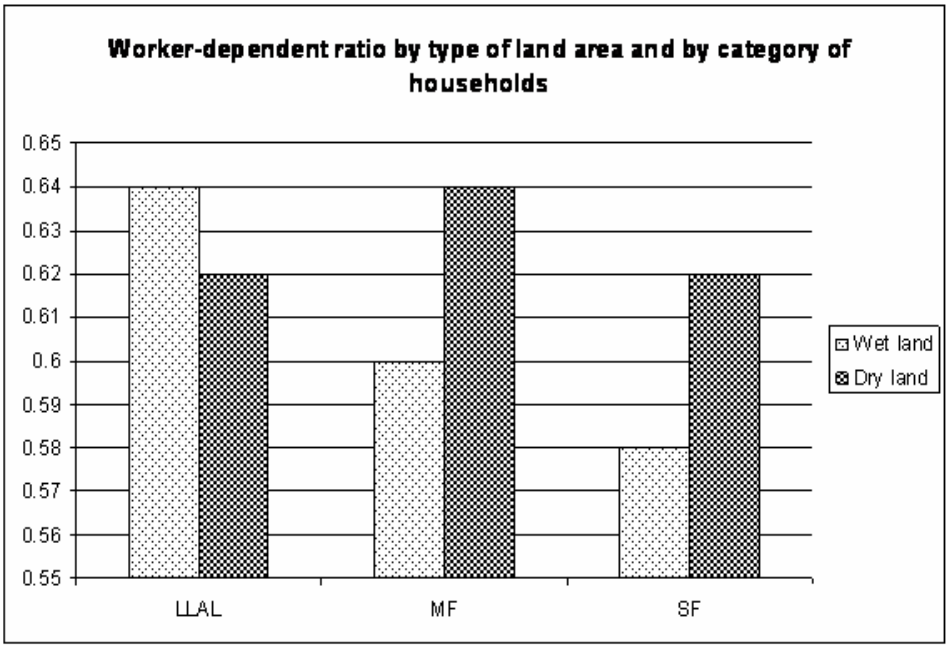

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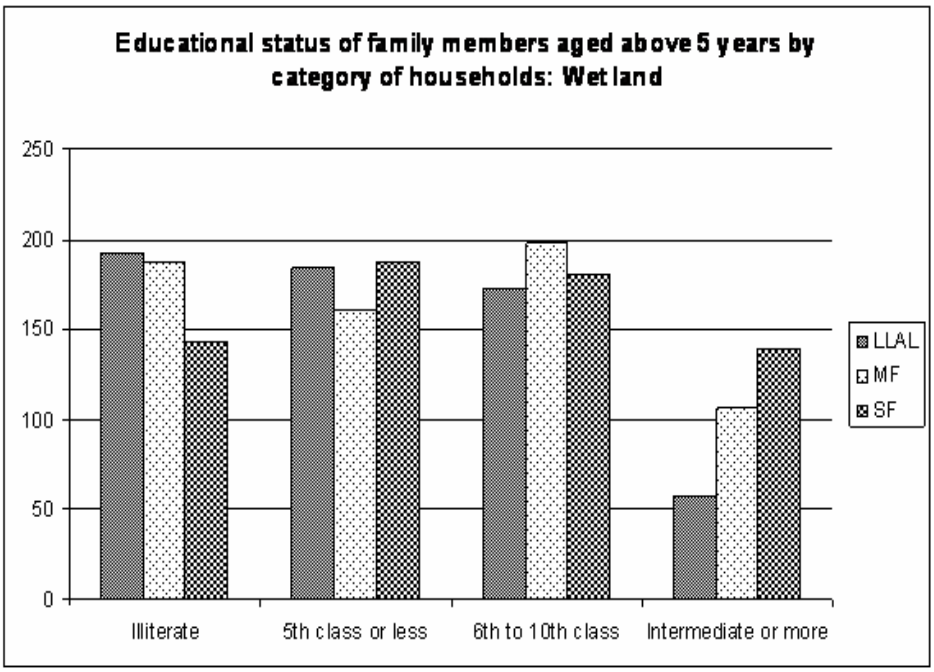

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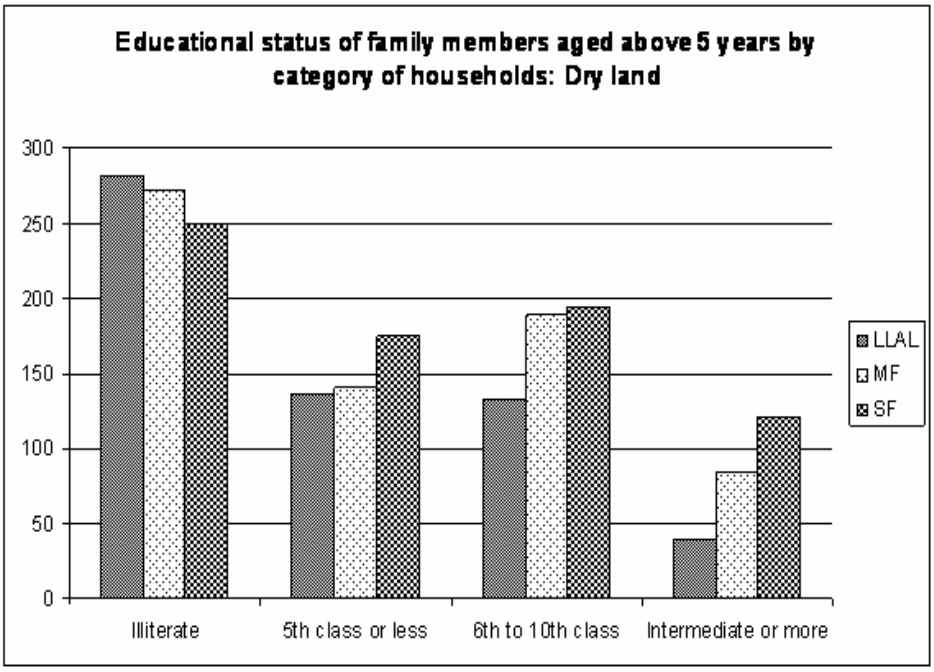

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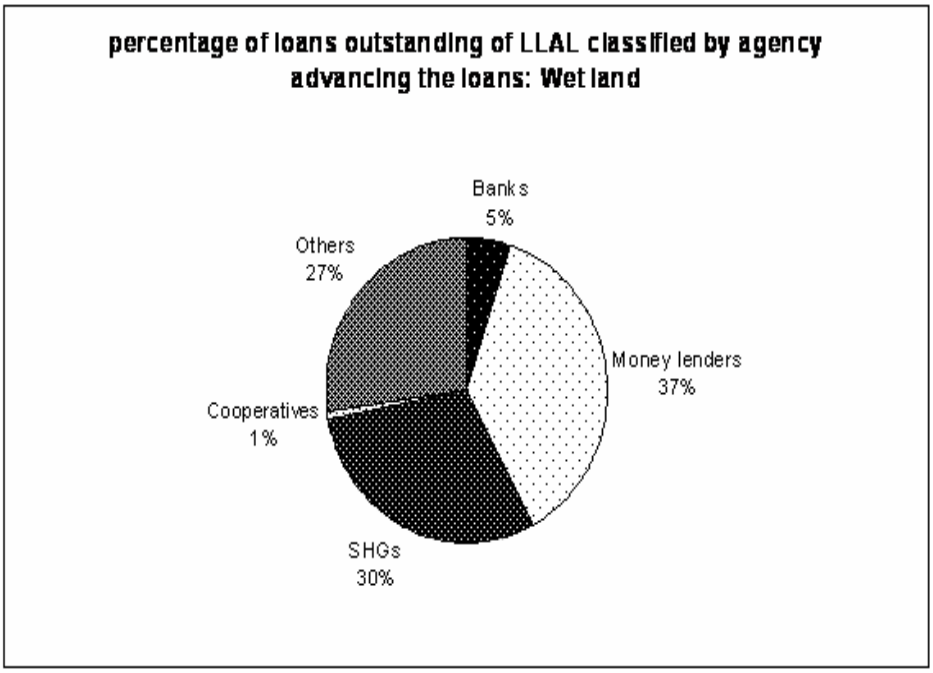

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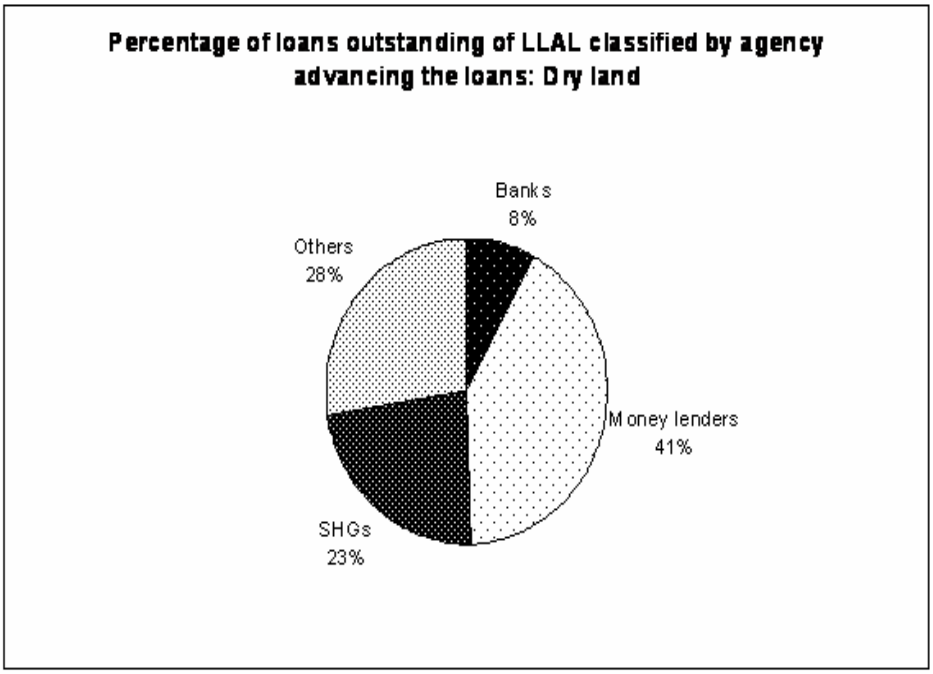

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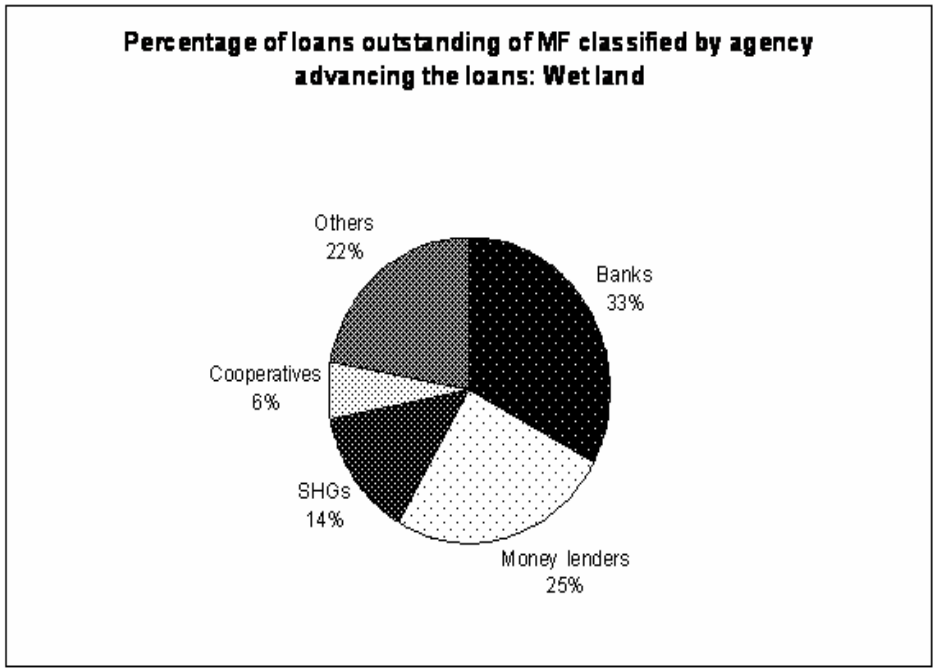

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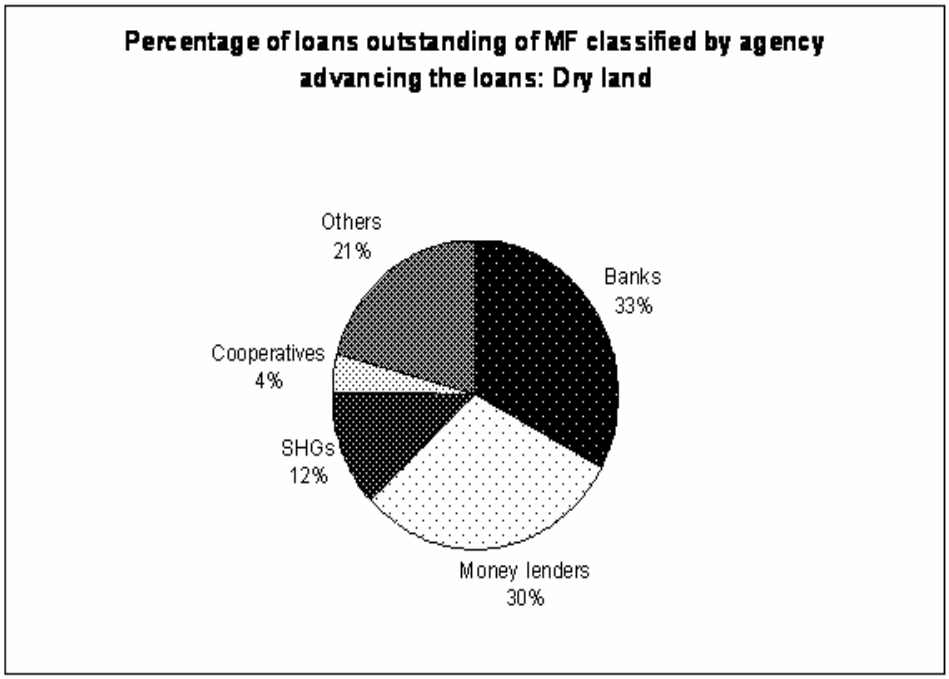

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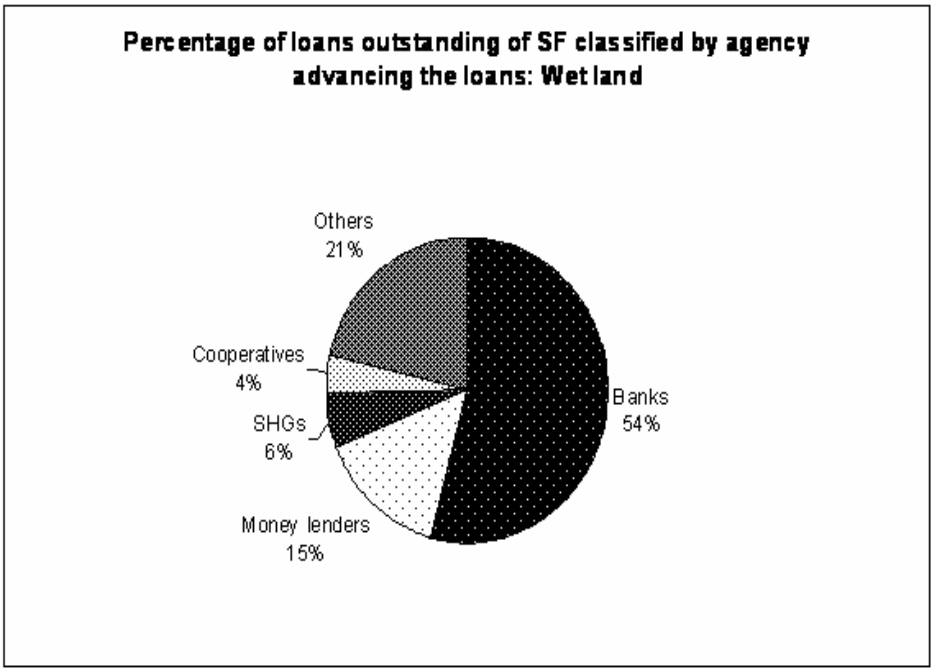

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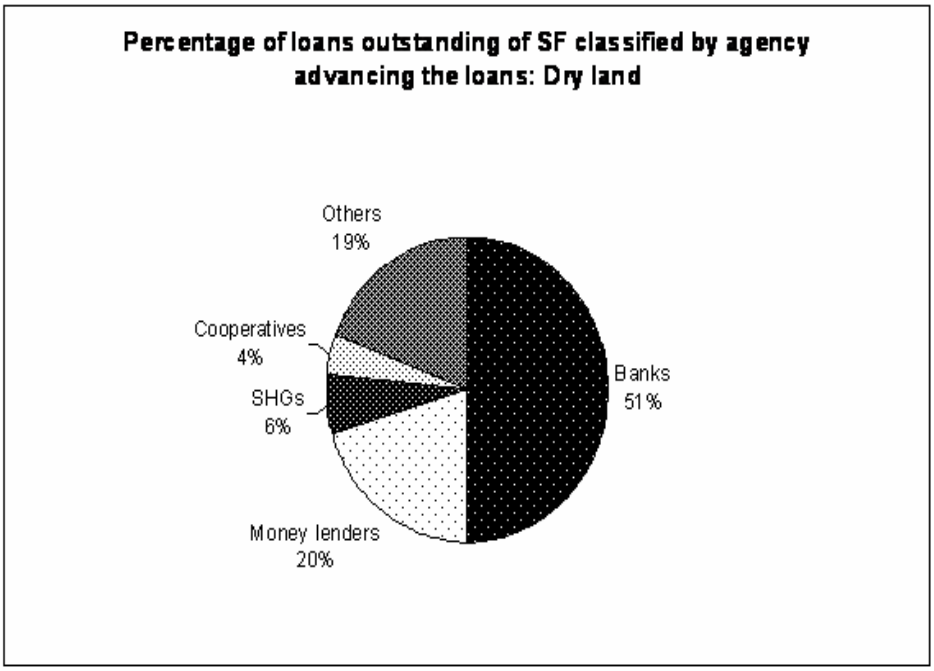

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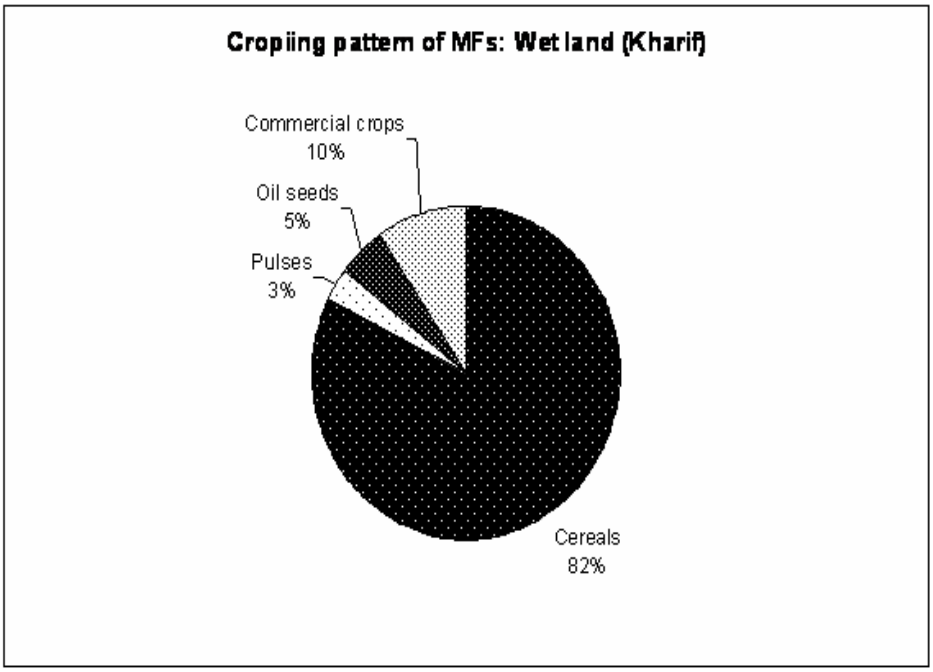

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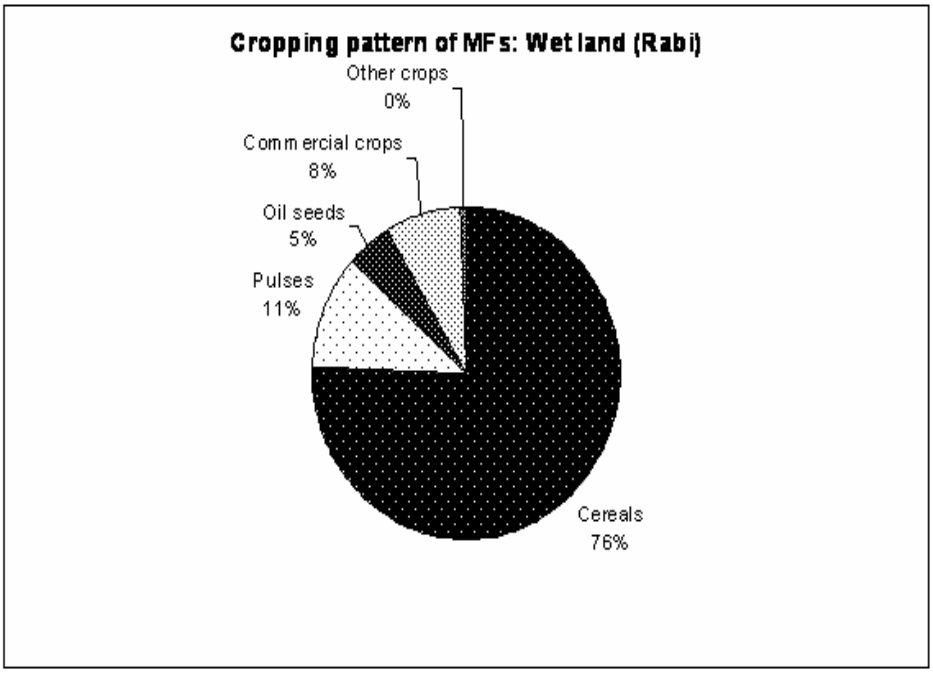

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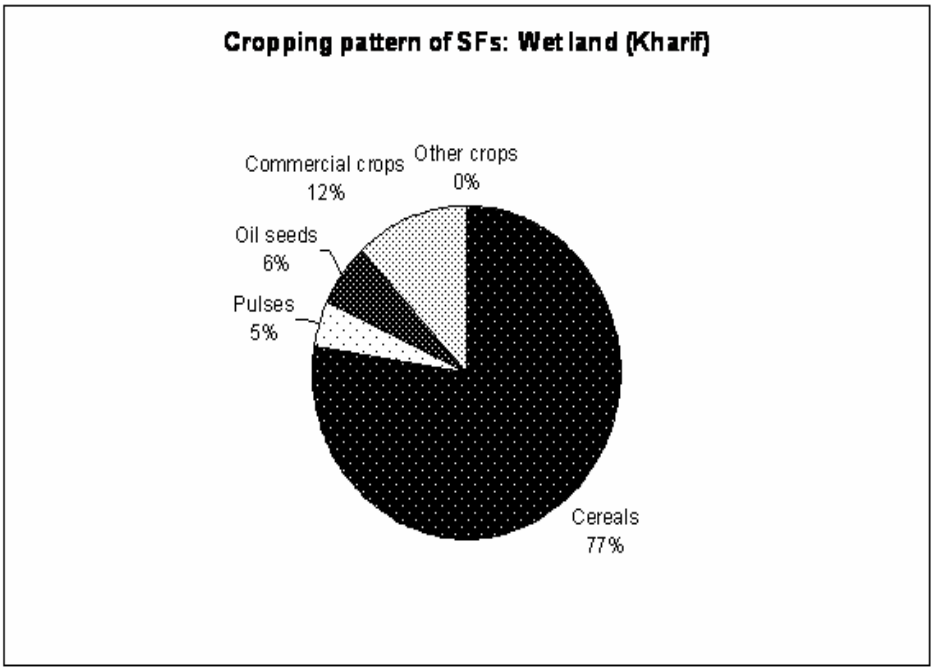

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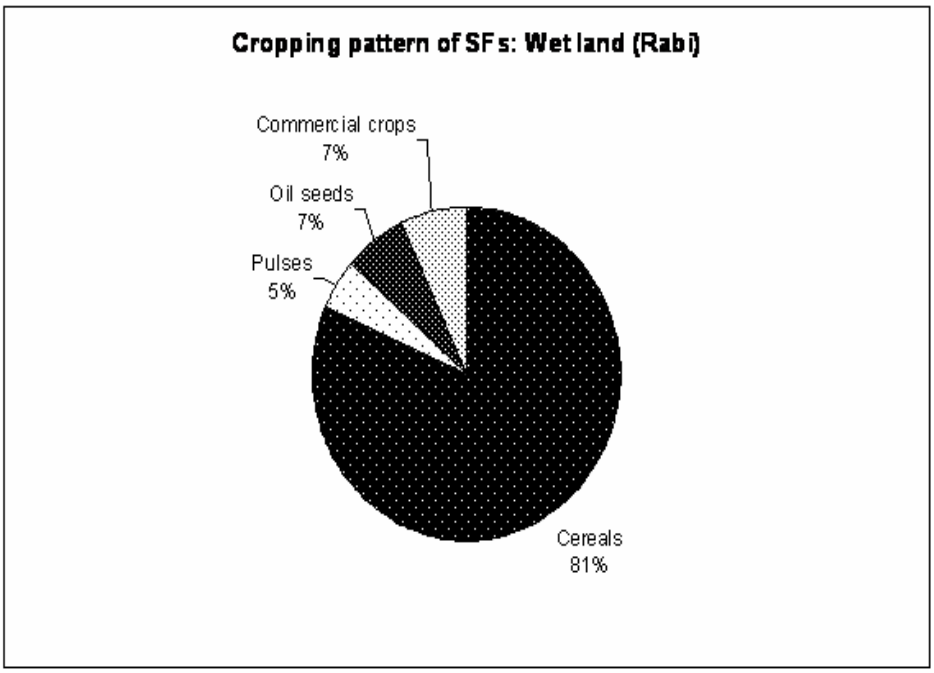

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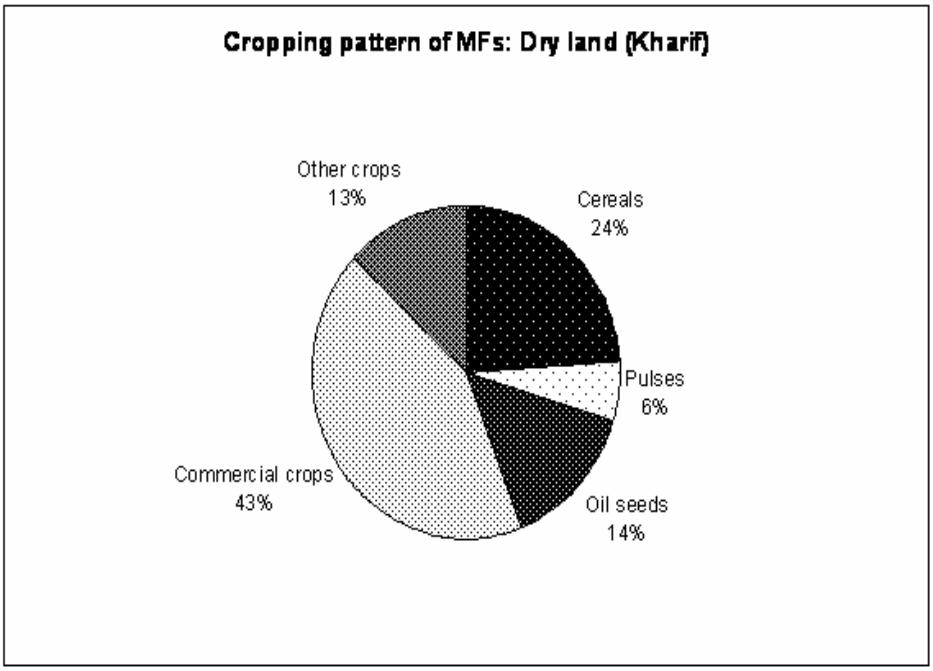

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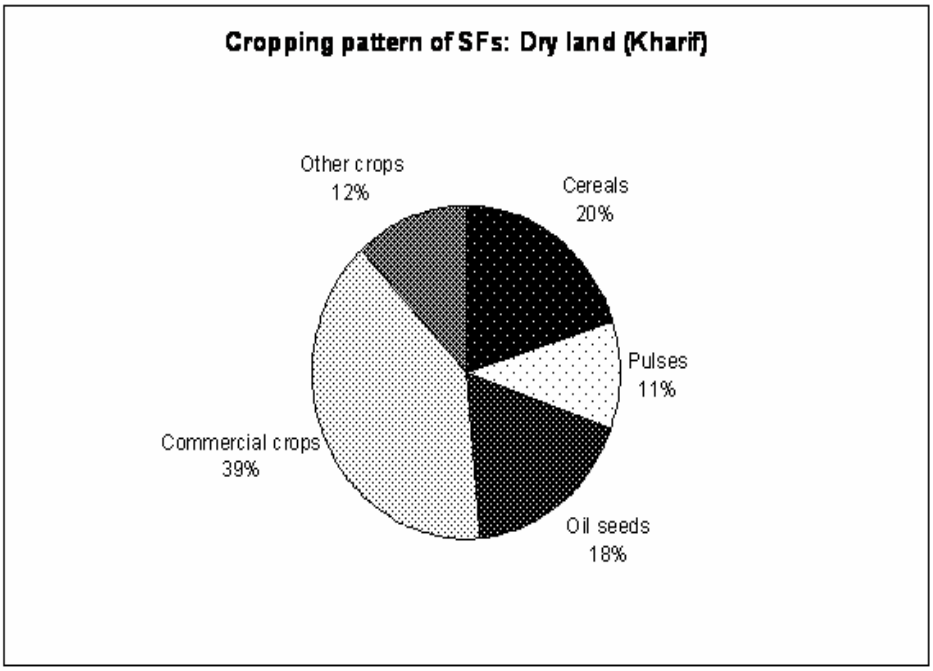

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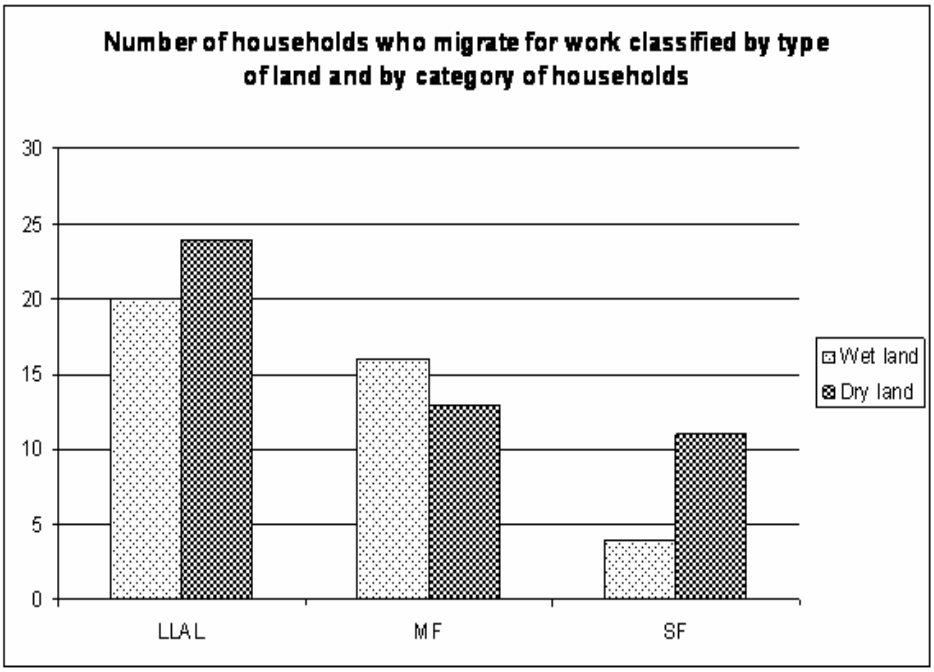

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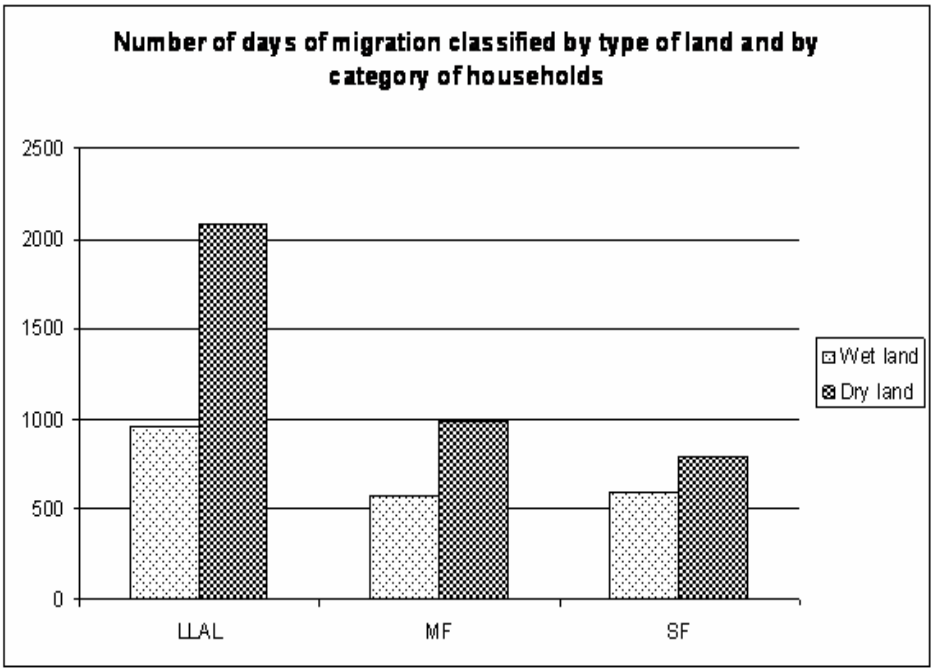

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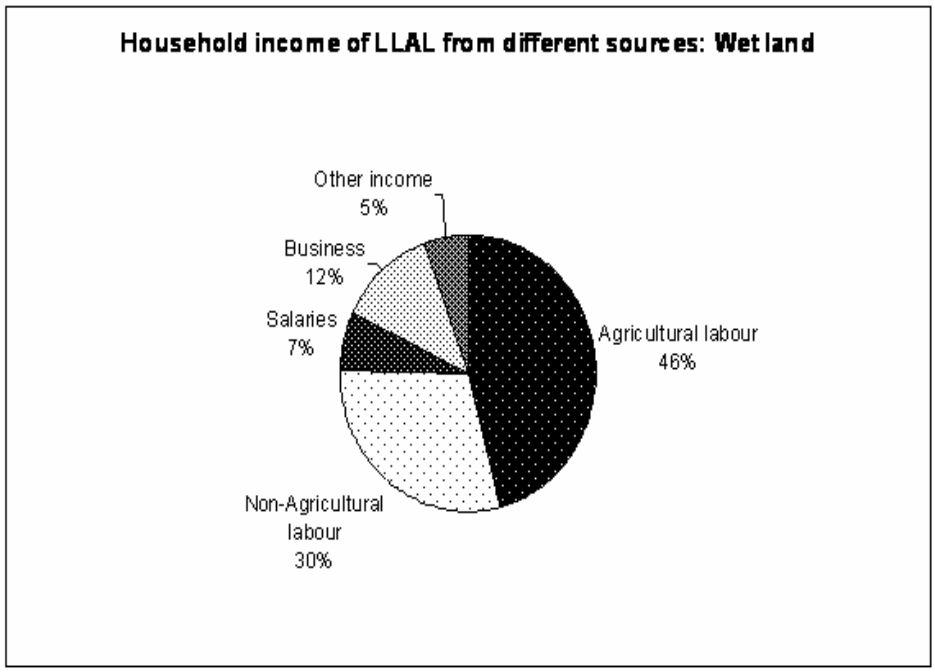

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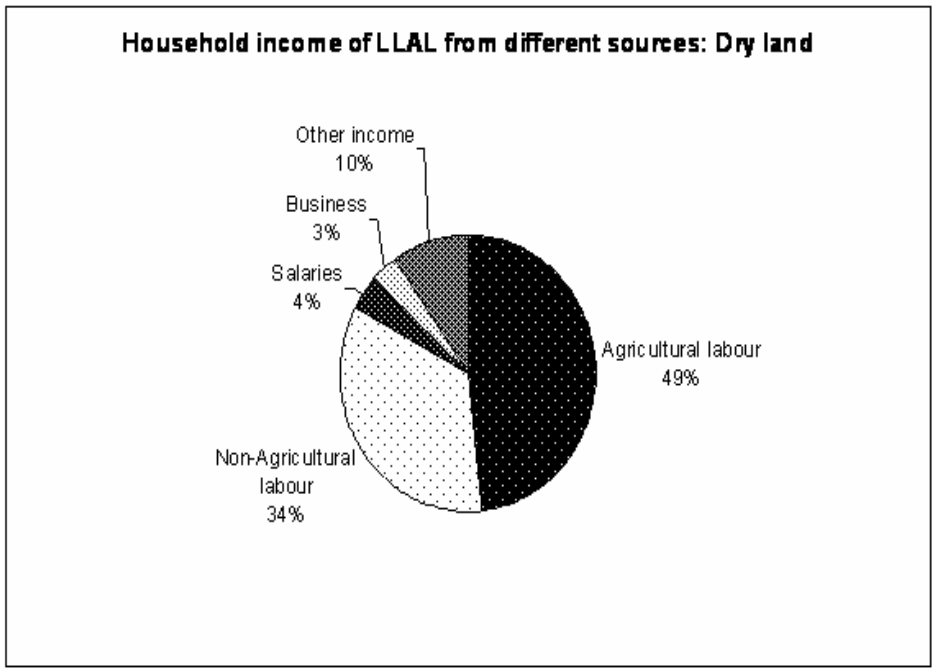

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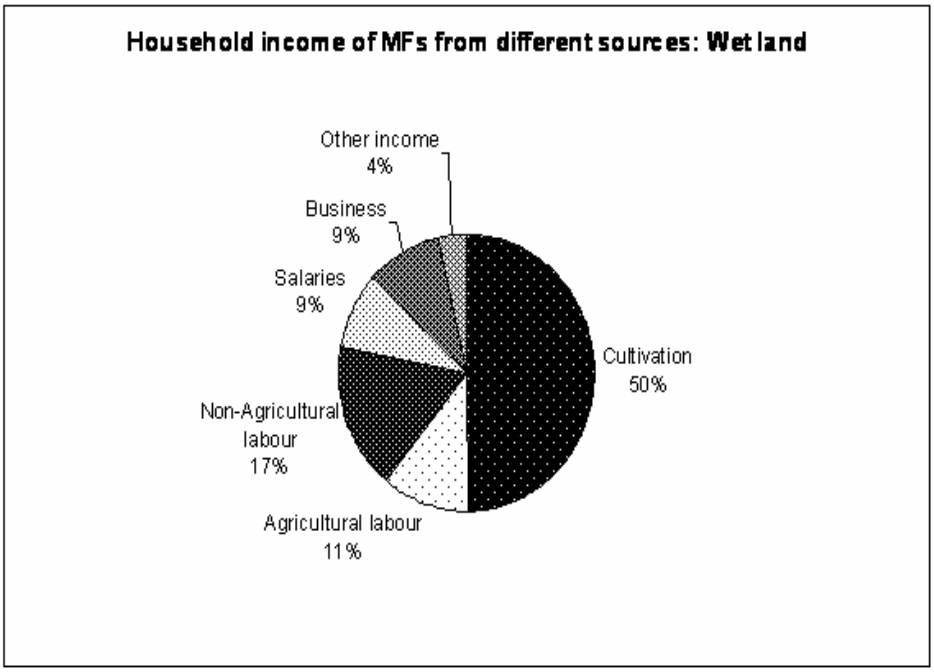

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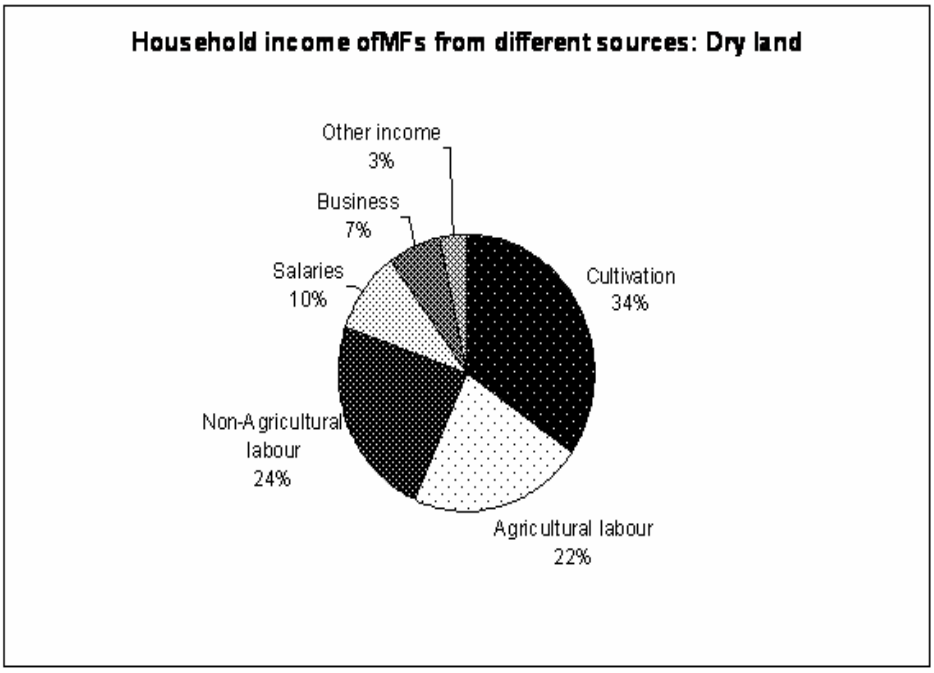

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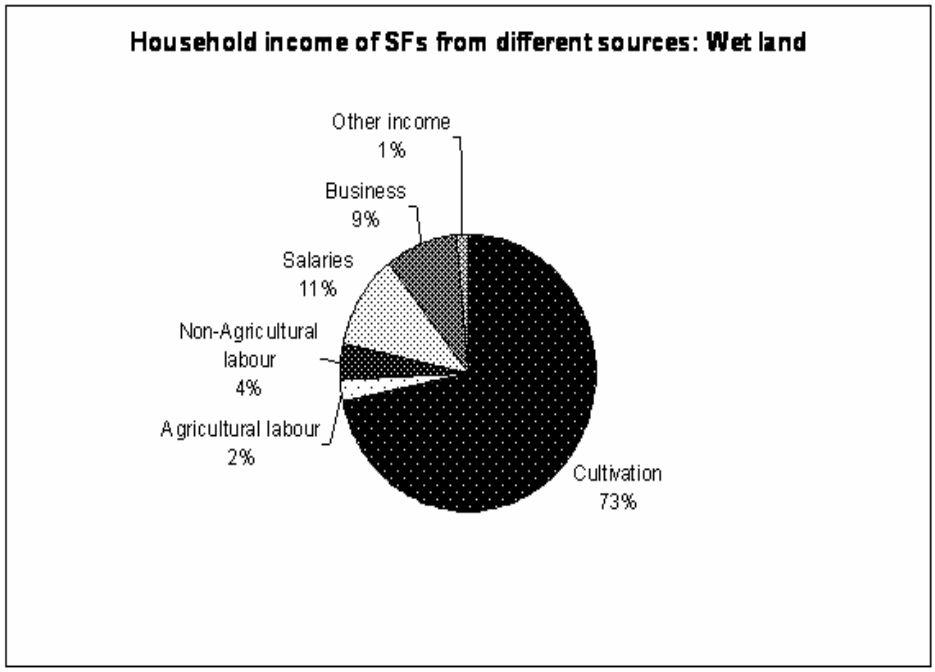

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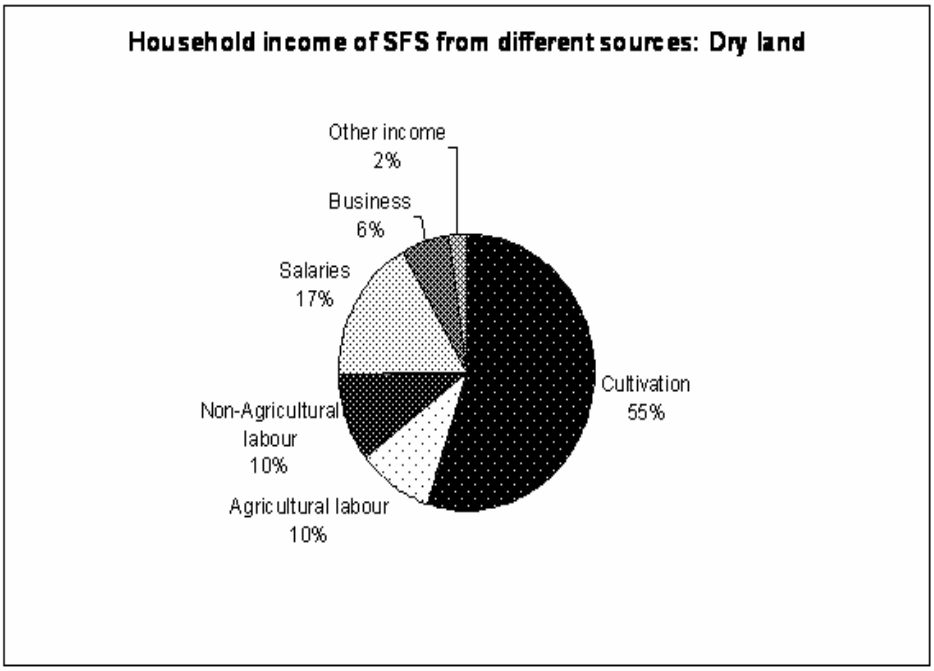

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