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# ECONOMIC STRUCTURE OF DROUGHT PRONE REGIONS OF INDIA

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**ABSTRACT**

*Drought is a natural disaster that is often referred to as creeping phenomenon and its impact spreads over many sectors of economy and society. These impacts are extensive in spatial extent and are complex to estimate. Drought produces both direct and indirect impacts. The study has been carried out at two levels; first at regional level and second at micro- level (village). At regional level, sample areas consists of four different agro-climatic regions viz., arid, semi- arid, sub- humid and humid. Further, from each of these zones, one district each is selected from the four drought-prone regions of India. The selected districts are Jaisalmer, Sangli, Jalaun, and Puruliya. Two villages each from one district have been selected. The database comprises of relevant information collected from both primary and secondary data sources. The methodology of the study includes key informant interviews, structured questionnaire and informal discussions. Various statistical techniques have also been used in the study.*

*The paper broadly supports the hypothesis that the effects of drought on rural economy differ with different ecological settings. The paper outlines that occupational diversification has become part of the survival strategy of households in drought-prone areas of India. The different socio-economic groups are not equally vulnerable to drought so, their coping strategies also vary markedly. This study finds that gender inequality also has an important influence on rural economic structure, in particular to drought prone economies. The role of livestock in rural areas is also investigated. The paper also highlights the status of agricultural development in terms of technological development and alternative cropping methods. Credit structure forms an integral part of economic system, is also analysed in this paper.*

**Keywords**: Drought, Economic, Diversification, India

## INTRODUCTION:

Drought is a natural disaster that is often referred to as creeping phenomenon and its impact spreads over many sectors of economy and society. These impacts are extensive in spatial extent and are complex to estimate. Drought produces both direct and indirect impacts. Direct impacts are usually physical, e.g. depletion of water resource, loss in agriculture production, higher livestock and wildlife mortality and wild fires. When the direct impacts are multiplied over region and societies they are referred to as indirect impacts, for example loss of agriculture production further causes reduced income for farmers, malnutrition, unemployment, migration and poverty etc. The impacts of drought are more complex in contemporary scenario because more economic sectors (for example, agriculture, industry, energy, tourism, transportation etc.) are affected by it.

There is huge contrast in economic conditions, levels of development and poverty across regions and within societies. The variability in physical and ecological settings causes differences in socio- economic conditions and levels of development across drought prone regions of India. A developed society is the one in which all sections of population get sufficient opportunities to attain sources of income, production assets and have enough access to amenities such as education, information, health and nutrition. These factors play important role in making human beings to realize their development potential through individual and collective efforts (Rao, 1981). In this context, the drought prone regions are often characterised as developmental handicap, where the prevailing conditions restrict growth and development of economy in particular and of society as a whole.

Poverty with its impact on rural economy continues to be the major challenge in drought prone regions. The persistence of poverty in these areas has been attributed both to the failure of the various policy interventions and to the inability of local natural resource base to provide sufficient livelihood opportunities because of depletion and degradation (Shylendra and Rani, 2004). Although, there have been policy interventions but people have been largely adopting various coping strategies on their own to overcome from hardships caused by recurring droughts. The coping strategies are defined as responses of an individual, group or society to challenging situation taking place within existing structures such as production systems (Erikson et.al., 2005; Ikaria, 2007). The coping strategies are not equally important in all regions – some are principal ones that could be observed across all regions and others are unique to regional specificities, varying from tendency to overuse the already degraded common property resources (Jodha, 1990) to diversification of agriculture and diversification of occupations, including search of alternative source of income through migration.

Rural livelihood diversification is defined as the process by which rural households construct a diverse portfolio of activities and assets in order to survive and to improve their standard of living (Ellis, 2000). Diversification of occupation in rural economy has been the most dominant survival strategy for people residing in drought- prone areas. The process of diversification and changing rural occupational structure in the developing countries has been viewed in the literature broadly from two perspectives. First is the 'developmental perspective', which states that diversification is positive, with economic growth, modernisation of agriculture, infrastructural developments etc. There are alternatives available to people for work and it leads to diversification of occupations. The second view is the 'deterioration trajectory' that is caused by unfavourable growth and prosperity, for example, depletion of natural resources, agricultural stagnation and population growth (Koppel et. al., 1994; Unni, 1996). In drought-prone region, occupational diversification of household economy between agriculture and non- agricultural sources of income can spread the risk of drought to some extent, provided that different sources of income are not derived ultimately from same source i.e. agriculture.

The growth of non- agrarian sector in Indian rural economy is evident from macro - level studies (Chandrasekhar, 1993; Agarwal, 1990) which attempt to explain the prevailing differences at regional and inter-regional levels, but fail to explain the actual nature of economic structure. There is heterogeneity at every level even within villages. Diversification in itself is of two types i.e. diversification of weak or "Forced diversification" and diversification of strong. Forced diversification is a process representing people who neither get work into agriculture nor can move out of the village (Rao, 1980). An agricultural household, who is unable to secure a sufficient living from agricultural employment, may be forced to collect firewood or cow dung and sell to others. Whereas, a marginal farmer may be forced to hire out labour to earn his livelihood. This is a case of diversification of weaker section of society. On the other side, a large farmer who collects agricultural produce from others and sells or maintains dairy cattle as source of income is able to find salaried jobs for his relatives are examples of diversification of strong (Nadkarni, 1985). Therefore, there is need for region specific studies and the following section attempts to throw light on the economic structure of rural drought prone economies. This paper deals with economic structure and variation in growth performance of drought prone villages lying in different ecological settings of India.

## LITERATURE REVIEW:

Rao (1980) work stresses on theme of 'place of village' in planning for development. He considered small size of villages and factors inhibiting contacts and links among neighbouring villages. He argues that effective planning for rural development needs grouping of villages into clusters capable of serving as "unit areas of development". In his view, programmes for rural development offer substantial scope for bringing neighbouring villages together. When villages are grouped they can share common amenities and can constitute large sized institutions like Panchayats and cooperatives. The effective coming together of neighbouring villages would improve the rural environment and make it more conducive to economic growth, rural diversification and will also promote emergence of viable rural institutions. Nadkarni, (1985) work on focuses on the impact of drought on socio-economic conditions of rural areas and its development. It's a regional study which looks into the role of irrigation, animal husbandry and rural industry in their development. He explained how the phenomenon of poverty and inequality undergoes qualitative changes in this process, and how even when absolute poverty is reduced, inequality increases. He also explained how commercialisation of agriculture played a progressive role but it does not solve problem of poverty and infact increased inequality. Rao (1987) argued that the economic investigation of rural programmes tends to be myopic remaining preoccupied with increase in employment, income, assets, etc. The work describe that viewing rural programmes from the broader perspective of change in relative positions of rural strata would provide deeper understanding of rural change and also bring the empirical studies closer to the emerging theoretical issues in development. Acharya (1992) work is based on the study of severe drought of 1987-88, when 27 districts of Rajasthan were affected. This work presents results of the study conducted to assess the effect of the drought. It was observed that there was decrease in net sown area, irrigated area, gross cropped area, yields of crops and fodder for livestock. The coping strategies adopted by the households to mitigate the effects of drought were in the form of curtailing expenditure, migration, etc. The result of this study implied that in spite of all the coping mechanisms used to mitigate the effect of drought, the sufferings of households were substantial. Public relief works were inadequate to provide employment to affected population and compensate for the eroded income. The study suggests that long- term measures like soil and water conservation, afforestation, development of pastures and grazing lands, diversification of economic activities needs to be systematically planned and implemented for drought proofing of these regions.

Nagarjan (2009) concluded that onset and offset of drought are difficult to calculate as it accumulates slowly over a period of time unlike other natural hazards. Bandyopadhyay and Saha (2014) analyses the meteorological and vegetative drought in Gujarat. They argued that impact of drought on vegetation can have significant consequences on livelihood and socio- economic development. They concluded that both Rainfall Anomaly Index and NDVI Anomaly Index can be used as an indicator for assessment of area affected by meteorological and vegetative drought. Bandyopadhyay et. al., (2015) analyse the adverse effects of heat waves and temperature extremes on agricultural droughts in Gujarat. They concluded that heat wave events were responsible for moisture-stress and thermal- stress in vegetation, leading to reduced crop yield and agricultural drought. The findings of their study revealed that in the semi- arid region, number of heat wave days have increased remarkably compared to the earlier decades. This leads to moisture deficit in different parts of semi- arid region. World Meteorological Organisation (2013) reported that 2001 – 2010 decade saw drought occurrences in all parts of the world, India was worst affected by drought in 2002 (also an El- Nino year), more than 300,000,000 people were affected.

## DATA BASE AND METHODOLOGY :

The database comprises of relevant information collected from both primary and secondary data sources. The present study has been carried out at two levels; first at regional level and second at micro- level (village). At regional level, sample areas consisting of four different agro- climatic zones of India have been classified. The regions are classified on the basis of rainfall they receive and intensity of drought. The regions are arid, semi- arid, sub- humid, and humid. Further, from each of these regions, one district each is randomly selected from the four drought-prone regions of India. The selected districts are Jaisalmer, Sangli, Jalaun, and Puruliya. These have been purposefully selected because they belong to different agro- climatic zones of India and the intensity of drought is different over these regions (Table 1)

Often, when the studies are at district level, the understanding of processes at village level tends to get averaged and is not prominently noticed. Therefore, the study incorporates major analysis at village level. Two villages each from one district i.e., one irrigated and other un-irrigated have been chosen by random sampling, purposively in consultation with district administration. The selected villages are Selat and Chandsar from Jaisalmer district (Arid), Kasegaon and Kalewadi from Sangli (Semi-arid), Harakka and Girthan from Jalaun (Sub-humid), and

Gurudi and Bahukakata from Puruliya district (Humid).
The data base for regional analysis is primarily based on secondary data collected from various sources. Census of India (2001 and 2011) provided important secondary information through - District Census Handbook and Village and Town Directory.
An investigative questionnaire and informal discussions were conducted in 2012-2015 to collect the primary information. The questionnaire requested information related to economic structure at household level, diversification of economic activities, water availability, agriculture, hardships during drought, coping mechanism, adaptations and strategies against drought. Primary data were collected through structured questionnaire with stratified random sampling. All households in the village were covered by household schedule if the villages were small in size i.e. less than 100 households. When the sample village size exceeded 100 substantially, the sample size was restricted to 100 and randomly selected from voter list. To provide proportionate representation to every socio-economic segment, the community households were stratified on the basis of size of land holding, income status, ethnicity and caste etc. reflecting social status. A representative sample of information was selected based on gender, age and education.

## ANALYSIS OF RURAL ECONOMIC STRUCTURE:

The comparative analysis of different village types in terms of indicators of structure of rural economy is a complex process because the rural households cannot demarcate an exclusive specialisation in one economic activity and they derive income from various sources. In drought affected regions, the economic base is dependent upon the contingencies of drought. Therefore, the occupation from which maximum income is earned is taken as main economic activity of the household. This section focuses on how village economy differs based on certain indicators i.e. occupational structure, agrarian structure, livestock composition and credit structure.

## OCCUPATIONAL STRUCTURE:

The occupational structure form integral part of socio-economic process of transformation in drought prone regions. In particular to rural areas, due to institutional rigidities and differential access to economic assets, it is not always uniform across rural groups (Saleth, 1997). For presenting occupational structure, five broad categories have been made i.e. cultivators, allied agricultural activities, agricultural labourers, household industry/business and other workers. It is important to note that the occupation of household is the largest source of income. The analysis of household data throw light on the occupational structure, which shows that cultivation predominates and agriculture continues to be a leading source of income and employment. Though, there are variations between different ecological settings (Table 2).
The arid region (Jaisalmer) has diversified rural economy witnessed by division of labour among households (Table 2). In both the sampled villages, the household members are primarily employed in cultivation i.e. 38% of total households. Cultivation is predominant economic activity and it is practiced on small scale basically for sustenance. The physical conditions and non-availability of water restrict the production even in non-drought conditions. Allied agricultural activity, mainly animal husbandry is also prominent economic activity in this region, employing 14% of households from both the villages (Table 2). The region has rich livestock wealth and it is an important alternative source of livelihood for a majority of the rural population. The workforce under agricultural labourers is less (about 2%) because the agricultural operations are not suitable, thus there is no demand for labourers. The persons involved in household industry/business are negligible. The region is considered to be one of the most backward and the natural conditions prevailing are least conducive to the growth of industries. There are neither raw material nor power and water to help any establishment. However, a few households are involved in petty shops, independent household work and small business of wool/cotton. The households with occupation as other workers are significant in number. The households earning their living from other works constitute 45% of households from both the villages. These include households as non-agriculture wage labourers, artisans, independent workers, salaried and persons living on income from rent, interest and pension. With no availability of resources, poor conditions and recurring drought this is the ultimate source of income for the deprived population.
The semi-arid region shows diverse occupational structure in comparison to arid region. The households have diversified sources of income viz., they are involved in cultivation, agriculture labour, household industry/ business and other works. It is noticeable fact that the allied agricultural activities is practiced by small number of households (about 4%), which is primarily because the households who own cattle, buffalo and poultry use the products for self- consumption. It also includes indigenous practice of pisciculture, where man-made small lakes

called "Pazar talav" are constructed. These are source of employment to the people and they also help the people technically and financially but due to drought conditions it is not practiced widely. Cultivators involves large number i.e. 66% of household, although agriculture has been the main source of livelihood of people but a large majority of people, however, have to pursue one of the subsidiary occupations to supplement income from land. The agricultural labourers also seek employment in other sectors as there is little scope for ensured employment in agriculture. Similar is the case with households employed in small business or petty shops; they constitute about 5% of households only. There is no diversification in the form of rural industry or any other opportunity for the population, so they are involved in either of these activities for sustenance. The category of other workers also takes in significant number of households i.e. 15%; whereby, other works include non-agricultural wage labourers and salaried employed in this region. The category of other workers make rural economic structure prone to vagaries of drought as it is generally believed that more dependence on agriculture leads to more impact of drought. In presence of recurring droughts combined with irregular rainfall and pest, an assured water supply through irrigation system is required along with other opportunities of diversification of rural economy.

The occupational structure in sub- humid region is not as diversified as that of arid and semi-arid regions. The households are mainly involved in cultivation and other works. The households employed in other three categories of occupation are less in number. Agriculture is not well developed because the region is precarious, owing to its extreme sensitivity to droughts. Apart from this, like other portion of Bundelkhand, it is liable to incursions of 'kans', which frequently throws large areas out of cultivation. Yet, cultivation fetches maximum number of households; where, 68% of households from both villages are employed in it. The households have to practice cultivation for sustenance as there are no alternative source of income available in the form of animal husbandry, rural industry etc. The category of other workers employs large number of households (24%) and they comprise of salaried employment, non- agricultural wage labourers, artisans and independent workers (Table 2).

The humid region is characterised by diversified rural economy structure and households are involved in different kinds of occupations, with major share (40%) in cultivation followed by marginal share in other activities like allied agricultural activities, agricultural labourers, household industry/ business. The region is characterised by erratic rainfall with drought in between the rains in the later part of August but because of better irrigation facilities, cultivation is the main occupation of the local communities and it employs 40% of the households in this region. Allied agricultural activities are practiced by only 10% households, which primarily include animal rearing. The households owning cattle and poultry use products for self- consumption, animal husbandry is not practiced on large scale. Agricultural labourers are also less in number (2%) because the agricultural operations are intensive and small land holdings exist with no demand for labourers. The households employed in household industry or businesses are only 10% in number and they are the ones who earn their livelihood from petty shop and sale and purchase of items on small scale. Also, there is no small scale or cottage industry present in the village. The households earning their livelihood from other activities are significant in number, i.e. 38% of households. They are employed as non-agricultural wage labourers, salaried employed and independent workers.

The occupational structure and economy of a region can be studied from two different perspectives. The above discussion explained the economic structure as indicated by household economy whereas the following section will take into consideration each individual in a household.

As mentioned earlier, the households cannot demarcate specification of their economic activity and depend on various sources to earn their livelihood. The diversification of economic activity is affected by various factors including size of family; more the number of earners, greater are the chances of diversification. This has been reflected in this study where households with greater number of earners are involved in different economic activities. This is important for drought prone areas and can also work as management strategy to reduce the vulnerability of drought. The data collected of individuals from sample villages clearly reflect that the economy at individual level is more diversified in comparison to household economy as a whole (Fig. 2).

## AGRARIAN STRUCTURE:

Agriculture is the major source of income in rural areas and many non-agricultural income generating activities are also depend on the level of agricultural production. It is important to evaluate that if there is any 'trickle down' mechanism at work, then an increase in the agricultural production per head must improve household incomes (Ahluwalia, 1978). The performance of agriculture depends on various factors like size of land holdings, agricultural assets, level of inputs used and mechanisation of farms etc. Thus, few of these factors have been selected to assess the role of agriculture in shaping rural economic structure.

## AGRICULTURAL LANDHOLDINGS:

The drought prone areas in India are mainly classified as backward in agriculture where the agents are mainly small and marginal farmers (Ffolliott et. al., 2002). Rain-fed farmers are economically weak with little ability to withstand risk. The holdings are unconsolidated and scattered (Sharma and Singh, 2006). Agricultural advancement and knowledge transfer is minimal in these regions, information regarding new production is limited to relatives and neighbours (Mahapatra, 1978). Thus, in small landholdings following traditional cultivation, and with limited scope for innovation, the income of the farmer is very low.

Agricultural land holding size differs with region to region, and in drought prone regions, it is largely affected by land and water problems. There are disparities in growth, especially rain-fed regions, which lead to long term results in decline of per capita land availability and shrinkage of farm size. These differences are evident from the study of sample villages (Fig. 3).

In arid region, all the respondent households come under marginal land holding size of cultivable land (Fig. 3). It is largely because that the land is associated with low productivity, low fertility and barren conditions. Semi-arid region is characterised by all three types of land holdings, but the households with medium size land holdings dominate in both the villages of this region. About 38% of households have medium sized land holdings; this is because of comparatively large average size of family that enables farmers to consolidated land holdings. The households with small and marginal size of agricultural landholdings are also significant in number (21% and 24%, respectively). The semi- arid conditions and recurring droughts are the major factors which attribute to unsuitability of agricultural practices on large scale. There are households (around 17%) with large land holding size which reflects consolidation and domination of land in few hands. Sub- humid region also has all type of land holdings, but households with small size land holdings are more in number (48%) due to fragmentation of land, owing to the pressure of population on land and customary laws of inheritance. There is significant number of households that own medium size of land holdings (19%), which is because of comparatively better irrigation system in this region. There are few households that own large size of land also. The villages of humid region present a different picture, on contrary to general perception.

The humid region is characterised by better availability of water in comparison to others. Technically, it should have better agricultural development but, marginal and small land holding size dominated the region. Majority of households (65%) have marginal land, followed by small size (30%). The households owning large land holdings are negligible in numbers; this is because of lack of agricultural developments in both the villages. As, already mentioned, the households are employed in other workers and cultivation practices are not fairly developed over the sampled region.

## AGRICULTURAL ASSETS:

The rain-fed lands suffer from a number of biophysical and socio-economic constraints which affect productivity of crops and livestock. These include low and erratic rainfall, land degradation and poor productivity (Abrol and Katyal, 1994), low level of input use and technology adoption, low draft power availability (Mayande and Katyal, 1996). This is also witnesses in the sampled drought prone regions. Among the important assets relating to agriculture are tractors owned by 26% of farming households (Table 3.2). Ownership of tractors is significantly more in the case of sub-humid and humid regions (34% and 52%). The utilization of tractors is less in arid and semi-arid regions, because of limitation in agricultural development due to drought conditions (Table 3).

Following tractors, the next highest incidence of ownership is that of threshers. Threshers are used mainly in humid region; about 50% of households use threshers in agricultural operations. Sub-humid region and semi-arid has less number of threshers (4% and 10%) while arid region has absence of any other agricultural asset except tractors. The other agricultural assets like planter or tiller have negligible share (Table 3). Proper tillage and precise placement of seed and fertilizers in the moist zone are most critical for successful crop establishment in dry lands. Since the sowing of crops must be completed in a short span of time, use of appropriate implements is necessary to cover large area before the seed zone dries out. Suitable implements have been recommended for various locations to meet this requirement. These are designed to suit the soil type, crop and the drought power availability (Venkateswarlu, 1997). In many cases, the existing local implement used by the farmers have been improved to increase their working efficiency (Gupta and Sriram, 1987).

## AGRICULTURAL INPUTS:

Nutrient management and fertilizers is recommended in rain-fed crop production have been made primarily from NPK along with the chemical, organic and bio-fertilizer (Rao and Das, 1982). The use of high yielding varieties of

seeds, fertilizers, manure and pesticides by proportion of farming households is presented in Fig. 4. Similar to many other attributes discussed earlier, there is a marked increment in the proportion of farming households using agricultural inputs (HYV seeds, fertilizers, organic manures, pesticides) from arid through semi-arid, sub-humid and humid tracts. This is also indicative of increased cost of cultivation and thereby indicating crop failure in sub-humid and humid regions leading to higher losses also.

There are differences within different ecological regions in terms of use of agricultural inputs, which tend to increase from arid to humid region (Fig. 4). In arid region, the use of manures is almost non-existent, only 6% of households are using manures. Cattle waste is commonly put in the fields and it serves as manure. Artificial manuring, fertilizers and pesticides on a large scale cannot be found practicable until reliable arrangements for timely and sufficient watering of crops is assured. Although, about 30% of households are using HYV seeds and fertilizers to overcome unsuitability of soil conditions.

Semi-arid region witnesses larger usage of manures among all sampled households; about 90% of cultivating households use manures. The manure comprises of both traditional (organic) and modern (synthetic). Cultivating households in this region also uses fertilizers in large numbers. About 70% of cultivating households use fertilizers in their land to increase productivity. HYV seeds and pesticides were also used. Sub-humid region has maximum users of fertilizers (Fig. 4), because of the availability of water that ensures usage of fertilizers by 96% of households in this region. The district Jalaun is equipped with irrigation facilities due to chronic drought conditions, because it lies in Bundelkhand region therefore, use of HYV seeds is also possible along with high usage of fertilizers. Manures are also used by significant number of households (47%). Whereas, humid region is distinct from other regions, because majority (98%) of households use HYV seeds; it is reflective of need of better production and better availability of water in comparison to other regions. The households using fertilizers and manures are also significant in numbers which is implied with high use of HYV seeds. The region is also characterised by highest number (54%) of households using pesticides.

**LAND LEASE:**

Lease in and out of agricultural land benefits livelihood and it is valuable in case of drought prone regions. It includes productivity from land which otherwise be left unused and supplementary income to households, but this is not readily practiced in sampled regions (Table 4). Arid region has 13% of total households lease in land whereas only 6% lease out their land. The insignificant numbers are because of the fact that the land in arid regions is non-productive and leasing in-out would prove to be non-advantages from profit point of view. Those involved in lease of land are for sustenance purpose only. It is not practiced in semi-arid regions. In sub- humid region, small number of households (10%) were involved in lease-in land and insignificant number (3%) in lease-out; whereas, in humid region 13% lease-out with only 7% leasing in. The numbers are reflective of the fact that leasing practices are not much popular in the sampled villages, which exists due to non- productive nature of land, insecurity about land, non-experimental outlook of the cultivators and illiteracy with lack of knowledge.

**LIVESTOCK:**

Livestock rearing constitutes an important source of livelihood for the rural poor. Livestock serves as an asset to households in countryside. Livestock owners use their animals either as a means of production or as capital or both. Households with different levels of income keep livestock because of the wide spectrum of benefits, viz. cash income, food, manure, draft power and hauling services, savings and insurance and social status and social capital (Bebe et. al., 2003; Moll, 2005; Upton, 2004). At the bottom of the pyramid there are the poor farmers who, in the absence of formal insurance markets, tend to diversify (including into livestock) to achieve a balance between potential returns and the risks associated with climatic variability and market and institutional imperfections (Alderman and Paxson, 2002). In India, for instance, crop diversification is highest on small farms and lowest on the largest farms, both in irrigated and non-irrigated areas (FAO, 2002). Livestock is important in drought prone regions too and there is variability in type of livestock and its products within different agro-climatic zones (Table 5). There is clear regional demarcation of livestock in sampled regions.

Arid region of Jaisalmer district have rich livestock wealth. In the absence of suitable conditions for agricultural operations, cattle breeding provide the single most important alternative source of livelihood for a majority of the rural population of the region. The herds of cattle, camels, sheep and goats serve as the sole wealth of these people. These animals possess such traits that they can survive in-spite of the arid nature of the region. Cattle are extensively reared in both the villages; about 46% of households possess cattle (Table 5). Cow serves as a source of milk and bullocks are used for ploughing the land. It is a dual purpose breed, bullocks being good

drought animals and cows having a high milk- yielding capacity. It is because of this fact that about 84% of households extract milk as main livestock product. Camels are among the most useful domestic animal in this region. The Jaisalmer camels, forming a specific breed, are famous for their speed, hardiness, endurance, and easy pace. They can go long distances without food and water. Yet, only 3% of household possess this animal because they cannot bear the maintenance cost (Table 5). The other important livestock includes sheep that is extensively bred in the region chiefly because of their wool. A good average type of sheep has a fairly good hump and generally medium grade wool, though some flocks produce fine grade as well. The Jaisalmeri sheep also yield excellent mutton. Goats are also extensively reared in the region for milk and meat.

The type of livestock is different in semi- arid region of Sangli district, where buffalo is extensively reared in both the villages and acts as an important source of milk (48% households) and milk products (17% households), which are mainly curd and ghee. Buffaloes are chiefly reared by 63% of households (Table 5). The other livestock includes cattle, 25% of total population owns it and still retain its importance in the agrarian economy and agricultural operations like ploughing, harrowing, sowing, transporting of agricultural produce etc. and help in carrying out with the help of bullocks. Cows along with buffaloes are reared for purposes of breeding and milk production. The cattle breed in the region, however, lacks in milking quality and attempts are being made at governmental level to improve the quality of livestock under various schemes. Poultry is also significant in the region, about 16% of households are involved in poultry farming. Poultry keeping provides a source of subsidiary income to households as it provides them eggs and meat. The other category of livestock includes goat and sheep that is reared negligibly in the sampled villages of semi-arid region.

The livestock composition in villages of sub-humid region is divergent than that of other regions. The high percentage of households owning livestock is reflective of its importance as an alternative source of income in drought conditions. Cattle and buffaloes are widely reared (42 % and 76%) owing to their importance in agricultural operations and for products mainly milk (81% households) and milk products (12% households), which are ghee and curd in this region. Poultry rearing is also important with high number of households (38%) are involved in poultry keeping for its products. Only a few numbers (3%) of households are involved in rearing of other animals such as goat and sheep. The animals are generally of poor structure and weak in this region.

The humid region is characterised by different livestock composition as compared to all the other regions. Cattle are largely reared because these are helpful in agriculture and it serves the only source of milk and its products in this region to around 43% of total households. Buffalo rearing is completely absent, this is merely due to the fact that products from buffalo are not used in the region and households could not afford the bearing costs of buffaloes, which is comparatively higher than other animals. Poultry is reared by households in large numbers (45% of total households). The non-cultivating households also keep poultry because it provides them alternative source of income.

**CREDIT:**

Credit forms an integral part of structure of economy of rural society. The International Fund for Agricultural Development (IFAD) strategic framework 2011-2015, identifies that improving the access of the rural poor to relevant financial services is a vital tool in poverty alleviation and sustainable rural development. Along with economic importance the credit structure has impact on the social order of a rural society too. There are evidences of bondage of depressed communities or weaker sections and they undergo a change at different levels of development, which can also be explained by concept of interlocked markets (Bhardwaj, 1990). The concept states that certain classes in the society consolidate power through a hold over more than one means of production or market – labour, capital and output. And they are often seen exploiting other classes. Credit can be used as an instrument of dominance in rural society. It may be used to ensure timely availability of labour, to ensure that marketable surplus is routed through the creditor, and or to simply ensure political support. The provision of institutional finance i.e. banks, co-operatives and government organisations have the potential to break the dominance of rural landlords, but only if directed to the households who need credit. Otherwise, it may only replenish credit funds of the non-institutional sources and reinforce their dominance. It is therefore, needed to analyse sources of credit adopted by different categories of households in sample villages.

Data from different agro-climatic regions of India illustrates that the agrarian society still is in clutches of non-organised credit sources (Fig. 5). The households in arid region of Jaisalmer have money lenders and relatives as dominant source of borrowings of loan, about 85% of households borrow loan from money lenders. This is the traditional source of credit and households find it easy to approach them. In addition, majority of them are illiterate and are not aware of institutional sources of credit available. The villages of this region are not facilitated with any of the institutional credit societies.

The villages of Sangli district of semi-arid region have diversified credit structure where households take credit from NGO's, relatives, money lenders and institutions. But in this region also the dominant source is non-organised, i.e. credit from relatives (50%) and money lenders (45%) with exception of few households that take credit from institutional sources. The villages have availability of institutional credit societies in the form of agricultural credit societies and other credit societies. Credit from relatives and money lenders provide easy access and repayment rules are also adjustable, therefore, it is first priority of households in case of need.

Credit structure is different in sub-humid region. Money lenders who are dominant source of credit in arid and semi-arid regions are completely absent. Households rely heavily (84%) on relatives for help during need and drought conditions. The main reasons behind this are easy availability, low interest and adjustable repayment with no clauses of mortgaging. The other source of credit is through institutional means, although there were no credit societies available in sample villages yet 34% of total household record to use it as a source for credit (Fig. 5). This may be due to the fact that there has been progress in government initiatives in this area.

The villages of Puruliya district of humid region also show the traditional type of credit structure, which is controlled by money lenders (36%) and relatives (62%). There are no other sources of credit opted by households; Institutional and NGO's are absent. This may be due to lack of governmental initiatives; also there was not even a single credit society available in sample villages. It is quite possible that there has been some under reporting of loans taken by the weaker sections, particularly credit purchases from traders (grocers etc.) and kind of loans and advance wages received from farmers. The credit structure is also influenced by the occupational structure; in particular to drought prone regions, the sources of credit vary with different occupations (Table 6).

The non-organised sources of credit, i.e. relatives and money lenders dominate, whereby large percentages of households borrow from them during distress conditions. It is reflected from the data that all the occupational groups borrow or take credit; yet there are differences on the sources of credit. Marginal and small farmers largely take credit from relatives because the amount is less and it is affordable for relatives to help in time of need. Also, credit from relatives is at low interest and repayment is adjustable. The other source of financial help to them is money lenders; they also serve easy and reliable help to marginal and small farmers. And only 8% of households from this category approach institutions for financial help, mainly because to avoid the formalities lay down by institutions and organised credit societies. Similarly, medium and large farmers also rely on relatives and money lenders for financial help. It is important to note that the source of credit to agricultural labourers and other workers differs in comparison to previously mentioned occupational groups. Agricultural labourers and other workers largely depend on money lenders for financial help, which is because of lack of awareness and illiteracy. Money lenders are traditional source of credit and households find it easy to approach them and lack of collateral assets required to access institutional loans.

## CONCLUSION:

Analysis of this paper broadly supports the hypothesis that the effects of drought on rural economy differ with the ecological settings of the village. The occupational diversification has become part of the survival strategy of rural households in drought-prone areas. Although, agricultural dependence prevails but there is co-existence of diversification of household economy into different other activities viz., non-agricultural wage labourers, artisans, independent work etc. and livelihood diversification has become serious long term issue for policies concerned with reducing poverty in drought prone regions. Yet, there is a need for initiatives to be developed for diversification to overcome vulnerability of drought in the form of rural industry, long term development goals, alternative sources of income generation, employment generation schemes etc. The different socio-economic groups are not equally vulnerable to drought so, their coping strategies also vary markedly. There are occupational differences in coping with vulnerability caused due to recurring droughts. The rich or large farmers neither migrate outside nor diversify their occupation in any of the sample villages. However, marginal or small farmers, agriculture labourer and other workers are found to respond with these to survive. They either migrate outside or diversify their occupation to earn livelihood during drought conditions. Gender inequality also has an important influence on rural economic structure, in particular to drought prone economies. Men find more regular and reliable source of income in comparison to women. Men form greater work force and get more skilled work. However, women bear burden of many tasks, including household chores, collection of water from distant places, agricultural tasks etc. which, is reflective of constrained time of women. Livestock also serves as an asset in rural areas, and sampled villages show diversification in the form of animal husbandry but serious initiatives are lacking in this context. Livestock rearing is taken as source of supplementary income only, whereas it can serve as complete alternative source of income, especially in agriculturally poor regions. In context of agricultural development, with awareness and technological development, alternative crops and methods are needed to be

developed. Credit structure also forms an integral part of economic system, which is traditional in all the sampled villages; where money lenders and relatives are main source of financial help during distress conditions. Institutional or organised credit structure is needed to be strengthened through awareness. Thus, it is the conventional economic system, which is prevalent in sampled villages with poor quality of living. Thus, it can be concluded that production oriented rural development will not improve quality of living there is more to be done as suggested by Mahbub-ul-Haq (1995), that 'everything cannot quantified in process of development, intangibility of quality of living should also be taken into consideration'.

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## FIGURES

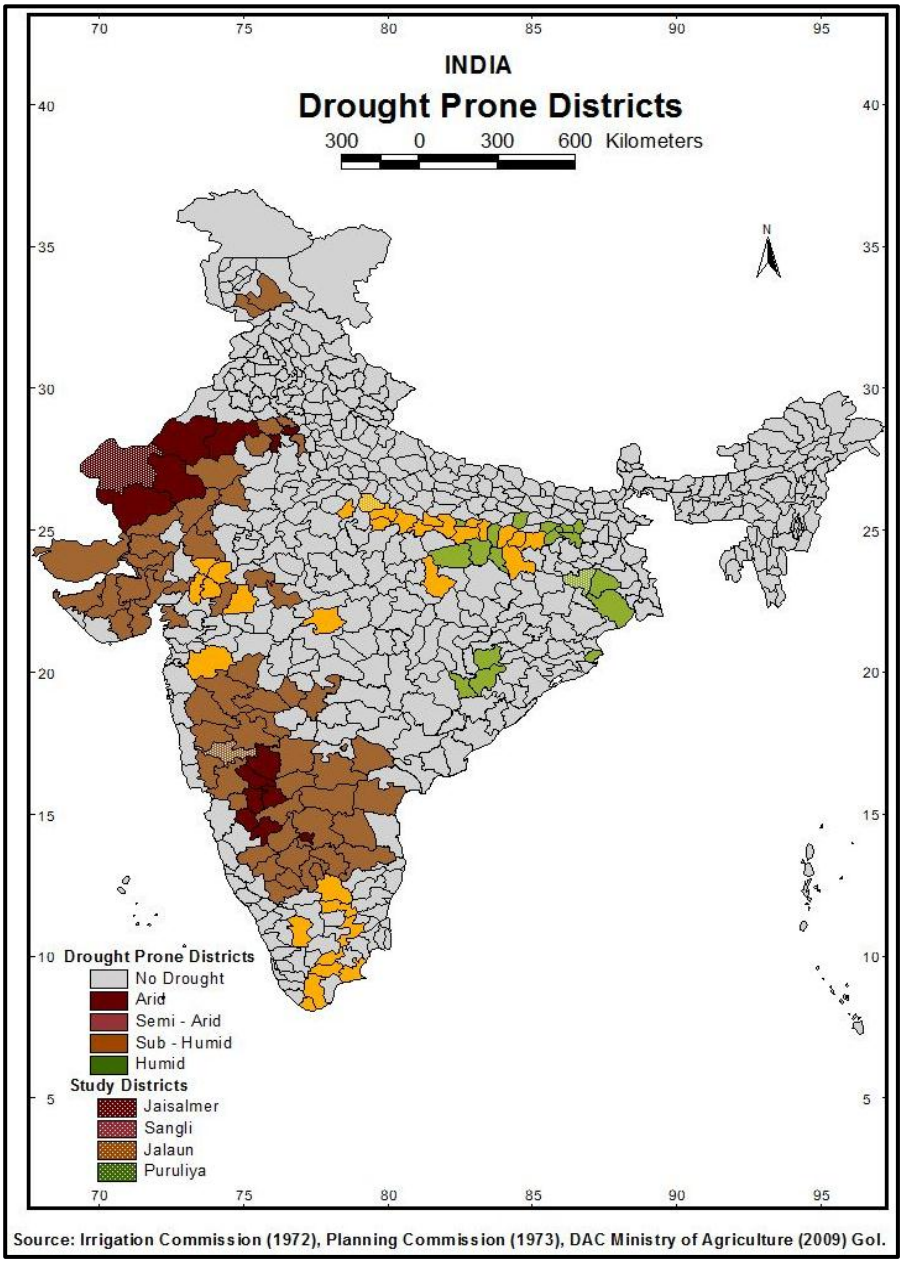



**Fig. 1: Drought Prone Districts of India**

**Fig. 2: Occupational structure of working individuals from sampled households in different agro-climatic zones**

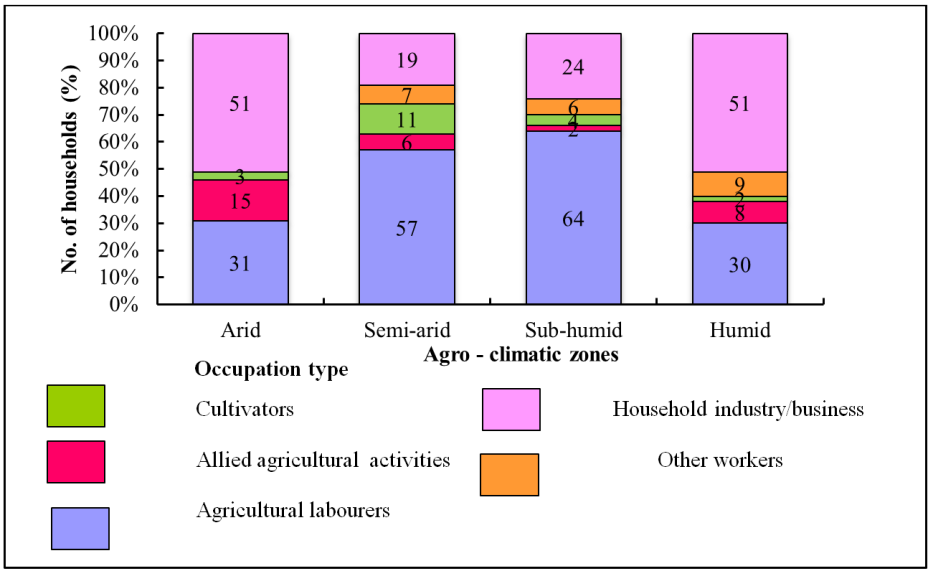



**Fig. 3: Agricultural land holding size of sampled households (%) in different agro-climatic zones**

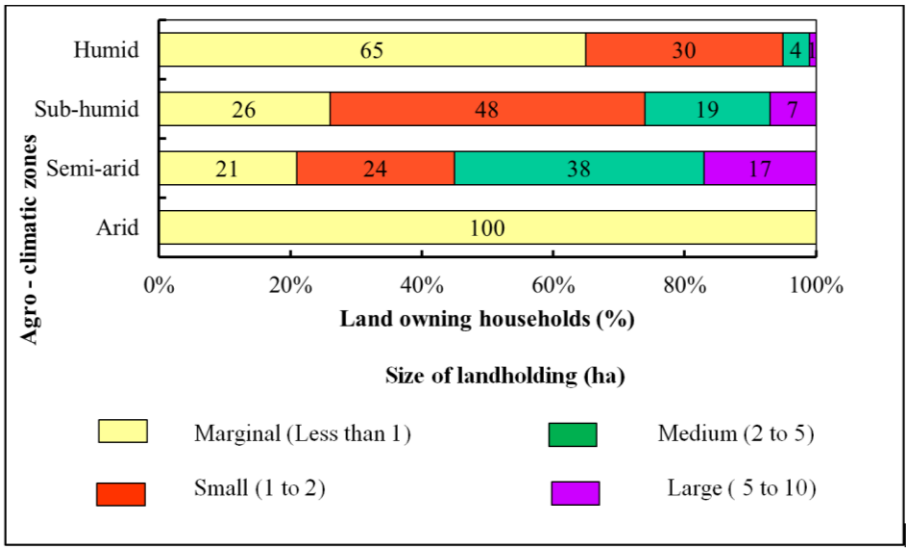



**Fig. 4: Agricultural inputs usage (%) by households in different agro-climatic zones**

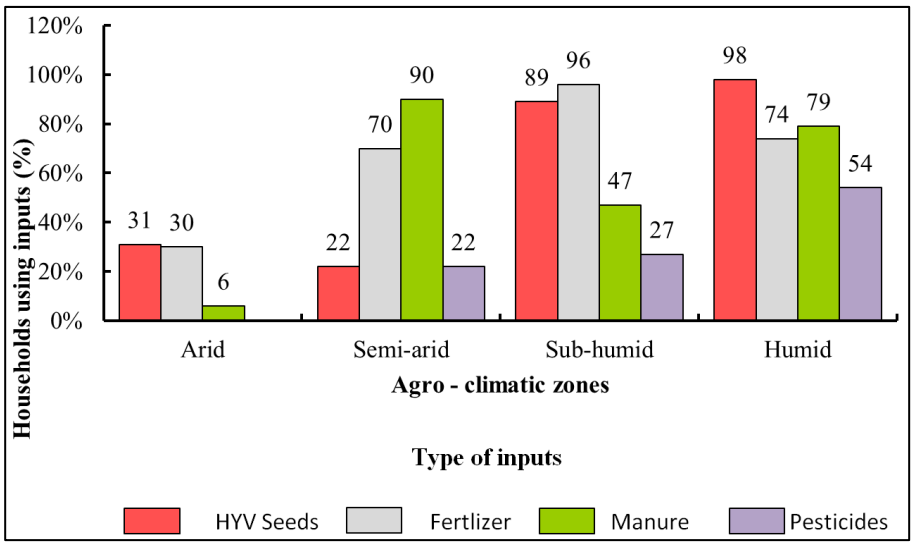
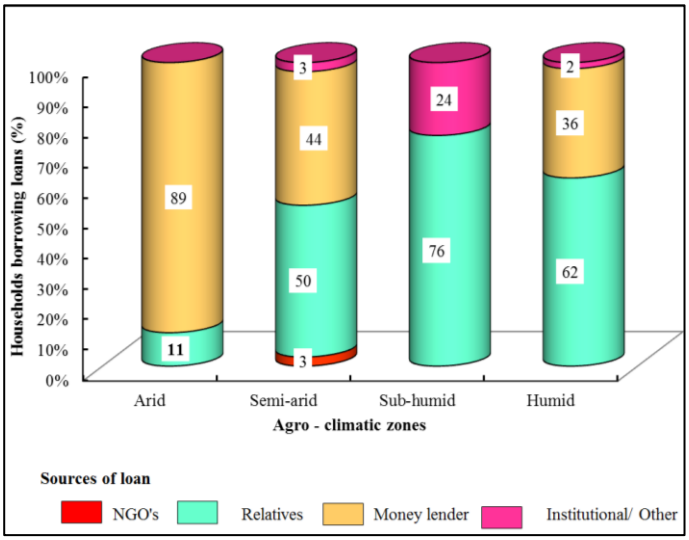


**Fig. 5: Sources of credit to indebted sampled households in different agro-climatic zones**




## TABLES

**Table 1: Criteria for selecting research areas**

| Areas | Drought intensity | Amount of rainfall (mm) | Major drought prone districts |
|---|---|---|---|
| Arid | Exceptional | Up to 375 mm | Jaisalmer, Churu, Kutch, Nagaur, Mohindragarh, Jalore, Barmer, Bikaner, Jodhpur etc. |
| Semi – arid | Extreme | 375–750mm | Amreli, Sangli, Jamnagar, Kurnool, Pali, Bijapur, Anantpur, Chitradurg, Rajkot, Doda, Kolar, Dharwar, Cuddapah etc. |
| Sub – humid | Severe | 750- 1125mm | Jalaun, Dhar, Chittor, Banda, Jhabua, Panchmahal, Banaswara, Nasik, Satara, Chittor, Varanasi etc. |
| Humid | Moderate | Above 1125mm | Puruliya, Kalahandi, Poona, Phulbani, Bankura, Manipur etc. |

**Source:** Report on Development of Drought Prone Areas, Planning Commission, Government of India (1981, New Delhi); Irrigation Commission (1972); DAC, Ministry of Agriculture (1989, 2009).

**Table 2: Occupational structure (%) of sampled households in different agro-climatic zones**

| Parameters | Agro-climatic zones | | | |
|---|---|---|---|---|
| | Arid | Semi-arid | Sub-humid | Humid |
| Cultivators | 39 | 66 | 68 | 40 |
| Allied agricultural activities | 14 | 4 | 4 | 10 |
| Agri. labourers | 2 | 10 | 2 | 2 |
| Household industry/business | - | 5 | 2 | 10 |
| Other workers | 45 | 15 | 24 | 38 |

**Source:** Primary survey, 2012-15

**Table 3: Agricultural assets (%) possessed by households in sampled villages in different agro-climatic zones**

| Parameters | Agro-climatic zones | | | |
|---|---|---|---|---|
| | Arid | Semi-arid | Sub-humid | Humid |
| Tractor | 13 | 4 | 53 | 82 |
| Thresher | 0 | 10 | 4 | 48 |
| Planter | 0 | 2 | 0 | 1 |
| Tiller | 0 | 0 | 0 | 2 |
| Other | 0 | 0 | 0 | 0 |

**Source:** Primary Survey, 2012-15

**Table 4: Households with lease in- and out of agricultural land in different agro-climatic zones**

| Parameters | Households in sample villages (%) | | | |
|---|---|---|---|---|
| | Arid | Semi-arid | Sub-humid | Humid |
| Lease – in land | 13 | 1 | 10 | 7 |
| Lease – out land | 6 | - | 3 | 13 |

**Source:** Primary Survey, 2012-15

**Table 5: Livestock composition (%) and products in sampled households in different agro-climatic zones**

| Parameters | Agro-climatic zones | | | |
|---|---|---|---|---|
| | Arid | Semi-arid | Sub-humid | Humid |
| **Livestock type** | | | | |
| Camel | 3 | 0 | 1 | 0 |
| Cattle | 46 | 25 | 42 | 56 |
| Buffalo | 0 | 63 | 76 | 1 |
| Poultry/birds | 5 | 16 | 38 | 45 |
| Others | 89 | 0 | 3 | 37 |
| **Livestock products** | | | | |
| Milk | 84 | 48 | 81 | 40 |
| Milk products | 0 | 17 | 12 | 3 |
| Hide/Skin | 2 | 0 | 0 | 0 |
| Others | 0 | 0 | 0 | 5 |

**Source:** Primary Survey, 2012-15

**Table 6: Occupation and sources of credit of households in sample villages (%)**

| Sources of finance | Occupations | | |
|---|---|---|---|
| | Cultivators | Agricultural labourers | Others |
| Relatives | 126 | 42 | 41 |
| Money Lenders | 56 | 50 | 57 |
| Institutional/ others | 18 | 8 | 2 |

**Source:** Primary Survey, 2012-15

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