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RESEARCH ARTICLE :

Determinants of farm diversification in dryland ecosystem

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SUMMARY : Dryland farming is marked by risk of uncertainty in rainfall, income and employment generation. Diversification of agriculture is advocated as one of the important strategies to stabilize and enhance farm income, increase employment opportunities and conserve natural resources. Identifying the determinants associated with diversification of small and big farmers was the main objective of the study. The study was conducted among 100 small and big farmers each in Namakkal district of Tamil Nadu. Totally 24 determinants of diversification have been revealed by small and big farmers. While motive to save money (41.00 %) and overcoming risk (39.00 %), were the major determinants of diversification for small farmers, Capital availability (45.00 %), motive to save money (41.00 %) were the major determinants expressed by the big farmers.

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BACKGROUND AND OBJECTIVES

Dryland have an immense scientific, economic and social value but faced with the twin problems of climatic instability and low productivity. They are the habitat and sources of livelihood for about one-quarter of the earth's population. It is estimated that these ecosystems cover one-third of the earth total land surface and about half of this area is economically productive (Convention to Combat Desertification (CCD) Secretariat, 1997). Investment to increase production in dryland has been limited, at least in part due to the popular misconception that drylands are empty, barren places (White *et al.*, 2002). Out of the total geographical area of 328.70 million ha, only 142.00 million ha of land is available for cultivation and the rest of the area is either under forests or not suitable for cultivation due to lack of water resources and other reasons. (Katyal *et al.*, 1994).

A review of the research and development activities of ICAR system during the first two years of the 10th five year plan has one if its weakness as the inadequate emphasis on the needs of dryland areas which account for over 60.00 per cent of cultivated area. The approach paper for the 11th five year plan indicated that the entire agriculture sector is in crisis and is not limited to small and marginal farmers. (Dev, 2009).

India has about 47.00 million ha of

drylands out of 108.00 million ha of total rainfed area. Drylands contribute 42.00 per cent of the total food grain production of the country. These areas produce 75.00 per cent of pulses and more than 90.00 per cent of sorghum, millet, groundnut and pulses from arid and semi-arid regions. By 2010 A.D., India will have to produce 300.00 million tonnes of food grains to feed her 1.5 billion population approximately. This target cannot be realized from irrigated areas alone as the irrigation potential is available for 178.00 million ha only. Therefore, an appropriate technology for dryland farming are to be evolved. On the other hand, it is said that second 'green revolution' in Indian agriculture can be had in rainfed or dryland agriculture. This is important to improve the standard of living of farmers residing in these areas as well. Thus, drylands and rainfed farming will continue to play a dominant role in agricultural production.

Dryland in Tamil Nadu :

The geographical area of Tamil Nadu is 13.00 million ha of which the cultivable area is 7.00 million ha and within this area, dryland farming is practiced in 3.10 million ha. The total dryland area is distributed in the seven agro-climatic zones of Tamil Nadu and the per cent distribution is 26.00 per cent in North Eastern zone, 24.00 per cent each in North Western and Southern zones, 12.00 per cent in Western zone, seven per cent in both in High rainfall and High altitude and hilly zones and six per cent in Cauvery delta zone (Balasubramanian, 2005).

Nearly three-fourth (74.00 %) of the holdings are below one hectare in size and most (90.00 %) of them are below 2 ha. Productivity is decelerating for most of the crops from 1990s onwards at low levels of average productivity compared to world average (Ashok *et al*., 2008). Hence, securing the livelihood security for this large number of farmers involve increasing the productivity of dryland areas and diversification of crops.

Need for diversification :

Dryfarming is marked by more quantum of risk and coping strategies to avoid risks. Integration of varied enterprises in dryfarming situations has become a mandate for sustainable development. This includes practice of diverse crops and cropping systems, dependence on livestock and other non-farm rural income and technology adoption. The dryland farm families were reported to be employed only for one-third part of the year. Changes in crops and cropping pattern and inclusion of other enterprises are considered as suitable avenues to generate additional employment to the dryland farm families. The economic viability of a farm is determined by the number of agricultural activities it possesses (*i.e.* the combination of varied crops, livestock components and non-farm activities possessed by the members of family).

Diversification of agriculture is advocated as one of the important strategies to stabilize and enhance farm income, increase employment opportunities and conserve natural resources. However, the return from diversification depends on the availability of such infrastructural facilities as irrigation, electricity, transportation, storage, markets, etc. (Bala and Sharma, 2005).

Determinants of diversification :

The determinants of diversification have varied over time. During the first 15 years following the onset of green revolution, irrigation played the most important role, predominance of small holdings discouraged it. From early eighties, credit availability emerged as a significant determinant of diversification. Smaller farms continued to face rigidity in cropping patterns because of binding food production constraints. This made them to divert their attention to livestock enterprises. It has been reported that at the end of the millennium, there was consensus that diversification to higher value enterprises like, vegetables, fruits, livestock products, fisheries, value-added agricultural products etc. is the new pathway for income growth in agricultural and rural sector. (NAAS, 2001). Hence, the present study focused on identifying the determinants of diversification, in order to project the cause factors associated with diversification and to differentiate the factors determining diversification among small and big farmers under the following research methodology.

RESOURCES AND METHODS

The present study was carried out in Namakkal district of Tamil Nadu using *ex post facto* design during 2009-10. Namakkal district with vast area under dryland was purposively selected based on the percentage of unirrigated area (56.41%) and presence of more diverse combination of enterprises such as dairy, goat, sheep, desibirds and turkey along with several non-farm

enterprises as source of livelihood for the farmers. Out of the total 15 blocks, 10 blocks were selected based on percentage of unirrigated area. Initially, it was thought to pre-stratify the respondents into marginal, small and big farmers. But the pre-test and pilot survey experiences revealed that, marginal and small farmers could not be differentiated significantly in their diversification patterns and as such engaged in similar type of activities and occupations. Hence, to avoid stereotypic reporting of findings, the marginal farmers category was excluded.

In order to select the villages for the study, the list of revenue villages in each of the ten selected blocks was collected. Two revenue villages from each of the selected blocks were identified purposively based on the cultivation of dryland crops in larger extent, more area under dryland conditions and scope for farm diversification. Five farmers each from small and big farm categories for each of the selected revenue villages have been randomly identified from the details of farmers collected from the extension officials of State Department of Agriculture. Thus, the total sample constituted 100 small and 100 big farmers.

OBSERVATIONS AND ANALYSIS

The results obtained from the present study as well as discussions have been summarized under following heads :

Determinants of diversification - Small farmers :

Totally 24 determinants have emerged as revealed by small and big farmers. Even though many determinants were found common for both small and big holdings, the data exhibited significant differences in the distribution patterns. The related findings are presented below.

It is clear from Table 1 that, motive to save money (41.00 %),overcoming risk (39.00 %), indebtedness (38.00 %), providing better education to children (35.00 %), infrastructure access (33.00 %), and loss

Table 1 : Determinants of diversification for small farmers

Sr. No.	Determinants	Small farmers (n=100)*	
		No.	%
1.	Motive to save money	41	41.00
2.	Overcoming risk	39	39.00
3.	Indebtedness	38	38.00
4.	Providing better education to children	35	35.00
5.	Infrastructure access	33	33.00
6.	Technical guidance	31	31.00
7.	Social participation	31	31.00
8.	Loss encountered in agriculture	29	29.00
9.	Crop failure	28	28.00
10.	Access to market	25	25.00
11.	Availability of capital	24	24.00
12.	Meeting out emergency expenses	22	22.00
13.	Irregularity in monsoon	21	21.00
14.	Entrepreneurship quality	21	21.00
15.	Satisfaction of basic needs	20	20.00
16.	Availability of family labour	19	19.00
17.	Insufficient rainfall	18	18.00
18.	Standard of life	18	18.00
19.	Lesser income in agriculture	17	17.00
20.	Price fluctuation for agricultural commodities	15	15.00
21.	Interest and involvement in agriculture	14	14.00
22.	Self employment	14	14.00
23.	Resource availability	13	13.00
24.	Regular income in non-farm sector	11	11.00

*-Multiple responses

encountered in agriculture (29.00 %) were the determinants of diversification for majority of the small farmers.

Small farmers who faced consistent drought expressed that farming in dry tracts do not enable them to save money for future use. Rather it demands money for investment every time and hence their activities have been diversified to livestock and non-farm components. Further they strongly pointed out that, without diversifying the income sources, it would be very difficult to sustain their livelihoods.. Dryland farming poses several threats and risks to the farmers in the form of insufficient rainfall, poor crop stand, less benefit cost ratio and crop failure. Hence, diversification of farm activities is a risk coping mechanism in such a way that even if crop fails, income generated from animal husbandry enterprises and non-farm occupations would support the farmer.

Another important factor that emerged was, providing better education to children. Big farmers with good economic status were able to provide better education (especially college education) to children whereas children of small farmers could not pursue college education due to inability in paying college fees. Many of the small farmers pointed out that selling of goat and sheep has been the usual way to meet out education fees. Availing credit facilities for agriculture forced them to shift towards other enterprises to repay loan and earn additional income.

Followed by this, technical support and social participation were the other determinants expressed by one-third of the small farmers. It was observed that KVK (TANUVAS) in the district was providing training and expert advise to farmers on agroforestry, goat and sheep rearing, backyard poultry rearing, and rearing turkey. Interaction with scientists revealed that, small farmers were found to attend more number of trainings and many would have started practising these enterprises. Higher social participation also provided motivation to the fellow farmers to opt for allied enterprises.

The other determinants perceived by less than one-

Table 2 : Determinants of diversification for big farmers

Sr. No.	Determinants	Big farmers* (n=100)	
		No.	%
1.	Capital availability	45	45.00
2.	Motive to save money	41	41.00
3.	Regular income in non-farm sector	35	35.00
4.	Entrepreneurship quality	34	34.00
5.	Loss encountered in agriculture	33	33.00
6.	Resource availability	32	32.00
7.	Infrastructure access	31	31.00
8.	Overcoming risk	31	31.00
9.	Crop failure	30	30.00
10.	Market access	27	27.00
11.	Insufficient rainfall	27	27.00
12.	Irregularity in monsoon	25	25.00
13.	Social participation	22	22.00
14.	Providing better education to children	21	21.00
15.	Interest and involvement in agriculture	19	19.00
16.	Indebtedness	18	18.00
17.	Meeting out emergency expenses	18	18.00
18.	Lesser income in agriculture	17	17.00
19.	Price fluctuation in agricultural commodities	17	17.00
20.	Self employment	13	13.00
21.	Availability of family labour	11	11.00
22.	Satisfaction of basic needs	11	11.00
23.	Technical guidance	11	11.00
24.	Standard of life	9	9.00

*-Multiple responses

fourth of the small farmers were market access (25.00 %), meeting out emergency needs (22.00 %), irregularity in monsoon (21.00 %), entrepreneurship quality (21.00 %), satisfaction of basic needs (20.00 %), availability of family labour (19.00 %), interest in agriculture (14.00 %) and resource availability (13.00 %), respectively.

Determinants diversification - Big farmers :

The determinants of diversification as perceived by the big farmers and their distribution are presented in Table 2.

Capital availability (45.00 %), motive to save money (41.00 %), regular income from non-farm sector (35.00 %), entrepreneurship quality (34.00 %), loss encountered in agriculture (33.00 %), resource availability (32.00 %), infrastructure access and overcoming risk (31.00 %) were the major determinants expressed by the big farmers. Capital availability is the foremost determinant which enables the farmer to invest in other activities and starting new enterprises. Generally, big farmers were found to possess adequate capital essential for starting new enterprises and that determined their extent of diversification. Non-farm sector was found to attract all categories of farmers in recent years due to the regular income obtained from it. Transport services, working as service providers (supervisors, marketing executives), and other off-farm activities such as vermicompost and biofertilizer production were the popular non-farm activities found among the big farmers.

Market access (27.00 %), insufficient rainfall (27.00 %), irregularity in monsoon (25.00 %), social participation (22.00 %) providing better education to children (21.00 %) and price fluctuation in agricultural commodities (17.00 %), were the other determinants expressed by more than one-fourth of the big farmers. Repeated crop failure due to irregular rainfall might have forced the farmers to diversify within crops and also other enterprises.

Better linkages with State Department of Agriculture, KVK and opinion leaders were found to motivate the farmers to practise different combinations of enterprises. Farmers who had regular contact with KVK, Namakkal had started rearing turkey birds for meat purpose and succeeded out of it. On seeing the success, farmers in and around had shown interest in rearing it and started initiating the task. Hence, it could be interpreted that diversification generally arises out of stress created in agriculture and motivation from success experiences of peer groups.

Comparison of determinants expressed by small and big farmers revealed that both small (41.00 %) and big farm (41.00 %) categories had motivation to save money as their foremost determinant. Capital availability acted as a determinant for 45.00 per cent of the big farmers and 17.00 per cent of small farmers. The above results indicated that the investment capacity is found more among big farmers due to their capital reserve. Nearly one-third (32.00 %) of the big farmers expressed resource availability as their determinant against 13.00 per cent of their counterparts. Being blessed with more area under farming, resources would have been relatively high for big farmers.

Entrepreneurial quality was found to be the other determining factor for 34.00 and 21.00 per cent of big and small farmers, respectively. Indebtedness was the determinant for one-third of small farmers and 18.00 per cent of big farmers. Apart from all these determinants, it could be observed that one-fifth of the small farmers had expressed that satisfaction of basic and emergency needs was the major determinant while big farmers perceived it as the least factor.

Conclusion :

Motive to save money and overcoming risk were the major determinants of diversification for small and big farmers. Appropriate saving schemes with reasonable interest rate could be afforded for the dryland farmers. Crop insurance scheme in selected crops could be advocated especially for dryland farmers since dryland farming is always associated with risk and uncertainty.

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REFERENCES

Ashok, K.R., R. Balasubramanian and S. Ramesh. 2008. Role of Infrastructure in Productivity and Diversification of Agriculture. South Asia Network of Economic Research Institutes (SANEI) Evaluation report. Department of Agricultural Economics, TNAU, Coimbatore.

Bala, B. and S.D. Sharma. 2005. Effect on Income and Employment of Diversification and Commercialization of Agriculture in Kullu District of Himachal Pradesh. *Agricultural Economics Research Review*, 18 : 261-269.

CCD Secretariat. 1997. United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and or Desertification Particularly in Africa. Text with Annexes, Geneva: 71.

Dev, S.M. 2009. Challenges for Revival of Indian Agriculture. *Agricultural Economics Research Review*, 22: 21-45.

Katyal, J.C., S.K. Das, G.R. Korwar and M. Osman. 1994. Technology for Mitigating Stresses : Alternative Land Uses in Stressed Ecosystems and Sustainable Agriculture. (eds.) S.M. Virmani, J.C. Katyal, H. Easwaran and I.P. Abrol. ICRISAT, ICAR and SMSS, Oxford and IBH publishing company, New Delhi.

White, R.P., D. Tunstall and N. Henninger. 2002. An Ecosystem Approach to Drylands: Building Support for New Development Policies. Information Policy Brief No. 1. World Resources Institute, Washington : DC.

WEBLIOGRAPHY

Balasubramanian, T.N. 2005. Enforcing Green Revolution in Drylands of Tamil Nadu. Available at : *http://www.worldcolleges.info/staffdetails/description.php?arid=83&staffid=227&arts=5&art=6*

NAAS. 2001. Diversification of Agriculture for Human Nutrition: Policy Paper - Chapter 7. National Academy of Agricultural Sciences, New Delhi, India. Available at : *http://www.naasindia.org/Policy%20Papers/pp7.pdf*