



Research Article

DETERMINANTS FOR LIVELIHOOD DIVERSIFICATION: AN EVIDENCE FROM IRRIGATED AREA AMONG WESTERN ZONE OF TAMIL NADU

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Abstract: The farmer's involvement in agricultural activities showed a declined growth over a period of time. The farmers go for livelihood diversification for overcoming agricultural risks. Livelihood diversification is a strategy that can improve the farmers' returns. Hence, an attempt was made to study the determinants for their livelihood change. The study was conducted in western zone of Tamil Nadu. The samples are the farmers with irrigation facilities as respondent and a sample size was 120. The samples were drawn by using purposive sampling method. The factors were collected from relevant literatures, farmers, extension personnel and scientists and finally the collected items were sent for judge's opinion. Based on the judges rating the valid items were selected and used for interview schedule construction. The information was gathered by using pretested well-structured interview schedule. The respondents asked to response each and every factors based on the nature of influence. The calculated index score was ranked for elucidate the higher influencing factors for livelihood diversification of agrarians.

Keywords: Determinants, Livelihood Change, Agricultural Risks, Influence Index, Irrigated Area

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Introduction

Irrigation is playing a vital role in developing farmer's economy in irrigated region. However, the ground water depletion adversely affects the irrigated crop cultivation. Overdraw of water consumption among the farmers from deep aquifers, causing substantial depletion of the water table and deterioration of water quality in many cases. This has been unprecedented crop diversification, due to unregulated groundwater development. Climate variation had increased uncertainties and risks in farming sector. In this regard, livelihood diversification is a key strategy and play a role in reducing climate vulnerabilities and adverse agricultural risks. Livelihood diversification is a strategy that can boost the farmer's income. The shift in occupational pattern from the primary sector to the secondary and tertiary sectors or a shift in the origination of income from agriculture to industry and the tertiary sector is considered to be a natural process of economic development. Engagement in non-farm activities, besides its contribution in absorbing rural surplus labor could enable to reduce income uncertainties, increasing agricultural productivity and could also be among the plausible adaptation strategies to climate change [1]. Barrett *et al.*, found that farm household diversification into non-farm activities emerges, from time-varying or diminishing returns to labor, market failures, as ex-ante risk management, and from ex-post coping with adverse shocks [2]. Ellis revealed that Livelihood includes natural, physical, human and financial goods, and social capital [3]. Facilities to access these goods determine rural families' livelihood and well-being. The author emphasizes that livelihood and profits are not the same, but are strongly related because individual and familiar structure and level of benefits will determine the access to these means of income and will convert them into better-off. An essential characteristic of rural families in developing countries is their adaptation ability when it concerns survival, it means they are able to change their way of living due to the changes on the circumstances that they will face, especially strategic changes in their living and its features as well as their activities' impact on the environment. Yaro (2013) stated that diversification of livelihoods both on the farm and non-farm is among the major policy areas for

building resilience to climate change and reducing vulnerability [1]. Amonge *et al.*, (2017) found that the probability of participation in non-farm sources of livelihoods favors younger and educated household heads as well as those who had a better frequency of contact with extension workers [4,5].

Materials and Methods

The study was conducted in western zone of Tamil Nadu, three districts were selected namely Coimbatore, Erode and Tirupur based on maximum area under agricultural operations. Gathering of in-depth knowledge, the study was carried in irrigated condition with a sample size of 120. The samples were drawn by using purposive sampling method. The factors were collected from relevant literatures, farmers, extension personnel and scientists and finally the collected items were sent for judge's opinion. Based on the judge's ratings, the valid items were selected and used for interview schedule construction.

The information was gathered by using pretested well-structured interview schedule. The respondents asked to response each and every factors based on the nature of influence. The influence interval is

SN	Very Low	Low	Medium	High	Very High
1	5	4	3	2	1

Finally calculates the Influence Intensity Index by using the following formulae.

$$\text{Influence Intensity Index (III)} = \frac{\text{Sum of factors influence of each statement}}{\text{Total number of respondents}}$$

The calculated index score was ranked for elucidate the factors having higher influence for livelihood diversification of agrarians.

Results and Discussion

This section deals with the various factors responsible for diversification among the respondents in irrigated area. The factors were classified into two categories i.e., 'push factors' and 'pull factors'.

Table-1 Production factors responsible for livelihood diversification

SN	Push Factors	Very low		Low		Medium		High		Very High		Influence intensity index (III)	Rank
		No.	%	No.	%	No.	%	No.	%	No.	%		
1	Poor irrigation facility	2	0.02	7	0.06	10	0.08	26	0.22	75	0.63	4.38	1
2	Labour scarcity	1	0.01	16	0.13	19	0.16	26	0.22	57	0.48	4.00	2
3	High wage rate of labour	11	0.09	20	0.17	20	0.17	40	0.33	29	0.24	3.47	3
4	High hiring charges of farm implements	18	0.15	19	0.16	24	0.20	37	0.31	22	0.18	3.22	5
5	High incidence of pest and disease	19	0.16	23	0.19	32	0.27	29	0.24	17	0.14	3.02	6
6	Lack of input supply	34	0.28	21	0.18	23	0.19	27	0.23	15	0.13	2.73	12
7	Variation in seasonal rainfall	30	0.25	19	0.16	24	0.20	30	0.25	17	0.14	2.88	9
8	Unfavourable agro climate	27	0.23	25	0.21	20	0.17	34	0.28	14	0.12	2.86	10
9	Lack of advisory services	27	0.23	17	0.14	22	0.18	27	0.23	27	0.23	3.25	4
10	Lack of training facility	26	0.22	20	0.17	26	0.22	31	0.26	17	0.14	2.94	7
11	Lack of storage facility	25	0.21	29	0.24	19	0.16	28	0.23	19	0.16	2.89	8
12	In adequate processing and value addition unit	36	0.30	18	0.15	26	0.22	27	0.23	13	0.11	2.69	13
13	Lack of insurance facilities	33	0.28	30	0.25	22	0.18	27	0.23	8	0.07	2.56	14
14	Inadequate resource availability	39	0.33	24	0.20	27	0.23	23	0.19	7	0.06	2.46	16
15	Fragmented land holdings	31	0.26	31	0.26	24	0.20	28	0.23	6	0.05	2.56	14
16	Small land holdings	26	0.22	33	0.28	17	0.14	22	0.18	22	0.18	2.84	11

Table-2 Economic factors responsible for livelihood diversification

SN	Push Factors	Very low		Low		Medium		High		Very High		Influence intensity index (III)	Rank
		No.	%	No.	%	No.	%	No.	%	No.	%		
1	Lack of credit facilities	19	0.16	31	0.26	17	0.14	32	0.27	21	0.18	3.04	1
2	Increased cost of cultivation	13	0.11	36	0.30	33	0.28	22	0.18	16	0.13	2.93	2
3	Increased family expenditure pattern (Food, Clothing, Housing, Education, Medical, Social, Religious activities, Recreation)	28	0.23	30	0.25	23	0.19	27	0.23	12	0.10	2.71	3
4	Poor asset base	33	0.28	30	0.25	18	0.15	28	0.23	11	0.09	2.62	4
5	Asset deterioration	40	0.33	24	0.20	26	0.22	22	0.18	8	0.07	2.45	5
6	Substantial income fluctuation	37	0.31	31	0.26	33	0.28	16	0.13	3	0.03	2.31	6
7	Inadequate farm output	46	0.38	32	0.27	21	0.18	19	0.16	2	0.02	2.16	7

Table-3 Marketing factors responsible for livelihood diversification

SN	Push Factors	Very low		Low		Medium		High		Very High		Influence intensity index (III)	Rank
		No.	%	No.	%	No.	%	No.	%	No.	%		
1	Lack of marketing infrastructure	27	0.23	29	0.24	12	0.10	36	0.30	16	0.13	2.88	3
2	Less market price for the product/commodity	13	0.11	25	0.21	39	0.33	32	0.27	11	0.09	3.19	1
3	Poor transport facility	16	0.13	27	0.23	38	0.32	18	0.15	21	0.18	3.01	2
4	Inadequate processing facility	30	0.25	25	0.21	27	0.23	32	0.27	6	0.05	2.66	6
5	Market distance	25	0.21	39	0.33	17	0.14	28	0.23	11	0.09	2.68	5
6	Middle men involvement	28	0.23	29	0.24	28	0.23	22	0.18	13	0.11	2.69	4
7	Excessive product availability	39	0.33	30	0.25	21	0.18	24	0.20	6	0.05	2.40	7
8	Poor consumer preferences	36	0.30	37	0.31	27	0.23	13	0.11	7	0.06	2.32	8

Table-4 Social factors responsible for livelihood diversification

SN	Push Factors	Very low		Low		Medium		High		Very High		Influence intensity index (III)	Rank
		No.	%	No.	%	No.	%	No.	%	No.	%		
1	Lack of awareness on new inventions	29	0.24	36	0.30	17	0.14	30	0.25	8	0.07	2.60	12
2	Fear of risk taking	19	0.16	41	0.34	22	0.18	26	0.22	12	0.10	2.76	6
3	Family type	24	0.20	23	0.19	31	0.26	29	0.24	13	0.11	2.87	4
4	Health status	19	0.16	20	0.17	22	0.18	31	0.26	28	0.23	3.24	1
5	Family members decision	30	0.25	17	0.14	22	0.18	22	0.18	29	0.24	3.03	2
6	Lack of rural infrastructure	37	0.31	25	0.21	16	0.13	29	0.24	13	0.11	2.63	10
7	Poverty	27	0.23	28	0.23	25	0.21	27	0.23	13	0.11	2.76	6
8	Disasters	34	0.28	32	0.27	29	0.24	20	0.17	5	0.04	2.42	15
9	Population growth	33	0.28	33	0.28	27	0.23	19	0.16	8	0.07	2.47	14
10	Ex post risk coping strategy	30	0.25	35	0.29	21	0.18	19	0.16	15	0.13	2.62	11
11	Societal factors	33	0.28	23	0.19	22	0.18	24	0.20	18	0.15	2.76	6
12	Working age of family members	26	0.22	26	0.22	22	0.18	28	0.23	18	0.15	2.88	3
13	Elevation in choosing nonfarm wage strategy	28	0.23	25	0.21	27	0.23	26	0.22	14	0.12	2.78	5
14	Guilty feel about the business	33	0.28	25	0.21	23	0.19	19	0.16	20	0.17	2.73	9
15	Less support from family members	40	0.33	28	0.23	18	0.15	19	0.16	15	0.13	2.49	13

Push factors are the path way for finding up of new dimensions of opportunities. Pull factors should prick the minds towards the newer dimensions. The Push and Pull factors responsible for livelihood diversification of farmers collected were classified as production factors, economic factors, marketing factors and social factors as in the following tables. The respondents were asked to express the factors responsible for the diversification and gathered information was analyzed and tabulated as below.

Push factors responsible for livelihood diversification of Agrarians in irrigated area

Production factors responsible for livelihood diversification

The collected responses related to production factors were analysed and presented in the following [Table-1]. From the [Table-1] it can be concluded that, influence intensity index had the maximum influenced production factors viz., poor irrigation facility (4.38), labour

Table-5 Production factors responsible for livelihood diversification of agrarians

SN	Pull Factors	Very low		Low		Medium		High		Very High		Influence intensity index (III)	Rank
		No.	%	No.	%	No.	%	No.	%	No.	%		
1	Low level of water consumption	11	0.09	31	0.26	23	0.19	36	0.30	19	0.16	3.18	1
2	Agriculture mechanization	8	0.07	32	0.27	30	0.25	41	0.34	9	0.08	3.09	2
3	Availability of Farm inputs/implements	21	0.18	31	0.26	27	0.23	32	0.27	9	0.08	2.81	4
4	Low pest and disease occurrence	25	0.21	36	0.30	25	0.21	19	0.16	15	0.13	2.69	5
5	Availability of advisory services (ICT enabled)	31	0.26	38	0.32	27	0.23	18	0.15	6	0.05	2.42	13
6	Export potential oriented business	34	0.28	31	0.26	16	0.13	27	0.23	12	0.10	2.60	11
7	Excess training facility	32	0.27	29	0.24	18	0.15	29	0.24	12	0.10	2.67	7
8	Resource availability	30	0.25	29	0.24	23	0.19	31	0.26	7	0.06	2.63	9
9	New affordable technology emergence	29	0.24	29	0.24	33	0.28	16	0.13	13	0.11	2.63	9
10	Dynamic agricultural environment	35	0.29	26	0.22	20	0.17	25	0.21	14	0.12	2.64	8
11	Easy farm operation related business emergence	30	0.25	27	0.23	27	0.23	23	0.19	13	0.11	2.68	6
12	Accessibility of business inputs	29	0.24	37	0.31	22	0.18	18	0.15	14	0.12	2.59	12
13	Booms in oil sector	26	0.22	25	0.21	15	0.13	22	0.18	32	0.27	3.08	3

Table-6 Economic factors responsible for livelihood diversification of agrarians

SN	Pull Factors	Very low		Low		Medium		High		Very High		Influence intensity index (III)	Rank
		No.	%	No.	%	No.	%	No.	%	No.	%		
1	Less cost with increased remuneration	17	0.14	30	0.25	26	0.22	31	0.26	16	0.13	2.99	4
2	High price for specific commodity	16	0.13	39	0.33	26	0.22	28	0.23	11	0.09	2.83	8
3	Excess credit/subsidy facility	23	0.19	21	0.18	42	0.35	20	0.17	14	0.12	2.84	6
4	Group activity	26	0.22	24	0.20	27	0.23	29	0.24	14	0.12	2.84	6
5	Storage facility	26	0.22	19	0.16	31	0.26	30	0.25	14	0.12	2.89	5
6	Value addition/Processing unit	35	0.29	26	0.22	23	0.19	27	0.23	9	0.08	2.58	12
7	Better relative returns	24	0.20	29	0.24	32	0.27	22	0.18	13	0.11	2.76	10
8	Income rise motivation	30	0.25	22	0.18	27	0.23	28	0.23	13	0.11	2.77	9
9	Full time farmer strategy	33	0.28	26	0.22	16	0.13	36	0.30	9	0.08	2.68	11
10	Farmer and farm worker strategy	24	0.20	17	0.14	26	0.22	26	0.22	27	0.23	3.13	2
11	Mixed strategy	23	0.19	22	0.18	20	0.17	29	0.24	26	0.22	3.11	3
12	Attractive income from livestock	16	0.13	29	0.24	22	0.18	26	0.22	27	0.23	3.16	1

Table-7 Marketing factors responsible for livelihood diversification

SN	Pull Factors	Very low		Low		Medium		High		Very High		Influence intensity index (III)	Rank
		No.	%	No.	%	No.	%	No.	%	No.	%		
1	Availability of various marketing opportunities	19	0.16	34	0.28	21	0.18	29	0.24	17	0.14	2.93	2
2	Market demand	13	0.11	32	0.27	25	0.21	33	0.28	17	0.14	3.08	1
3	Product perishability	38	0.32	26	0.22	17	0.14	25	0.21	14	0.12	2.59	4
4	High market competition	44	0.37	21	0.18	19	0.16	18	0.15	18	0.15	2.54	6
5	Commodity based approaches	27	0.23	27	0.23	33	0.28	27	0.23	6	0.05	2.65	3
6	Demand in processing industry	32	0.27	30	0.25	29	0.24	22	0.18	7	0.06	2.52	7
7	Demand in value added preferences	33	0.28	32	0.27	23	0.19	16	0.13	16	0.13	2.58	5
8	Consumer preference	37	0.31	29	0.24	19	0.16	28	0.23	7	0.06	2.49	8

Table-8 Societal factors responsible for livelihood diversification

SN	Pull Factors	Very low		Low		Medium		High		Very High		Influence intensity index (III)	Rank
		No.	%	No.	%	No.	%	No.	%	No.	%		
1	Social recognition	19	0.16	34	0.28	25	0.21	27	0.23	15	0.13	2.88	1
2	Less risk	17	0.14	40	0.33	24	0.20	24	0.20	15	0.13	2.83	2
3	Improved social status	30	0.25	23	0.19	25	0.21	31	0.26	11	0.09	2.75	5
4	High exposure	26	0.22	25	0.21	29	0.24	25	0.21	15	0.13	2.82	3
5	Specific work knowledge	22	0.18	36	0.30	31	0.26	23	0.19	8	0.07	2.66	6
6	Development policy	48	0.40	27	0.23	16	0.13	16	0.13	13	0.11	2.33	10
7	Socio cultural system	41	0.34	38	0.32	11	0.09	19	0.16	11	0.09	2.34	8
8	Social cohesion	37	0.31	41	0.34	11	0.09	26	0.22	5	0.04	2.34	8
9	Work experiences	26	0.22	26	0.22	29	0.24	28	0.23	11	0.09	2.77	4
10	Social recognition	32	0.27	27	0.23	29	0.24	19	0.16	13	0.11	2.62	7

scarcity (4.00), high wage rate of labour (3.47), lack of advisory service (3.25), high farm implementation hires (3.22) and high incidence of pest and diseases (3.02). Moderate influenced factors were lack of training facility (2.94), lack of storage facility (2.89) and variation in seasonal rainfall (2.88). Remaining factors such as unfavourable agro climate (2.86), small land holdings (2.84), lack of input supply (2.73), inadequate processing unit (2.69), fragmented land holdings (2.56), insurance market failure (2.56) and increased access to resource (2.46) were slightly influenced the farmers to change the regular occupation. At the time of survey the irrigated respondents told that, they faced irrigation related issues like deficit canal inflow of water periodically In irrigated area canals and wells were the major irrigation sources. Due to poor rainfall distribution and excess water

allocation induced the irrigated farmers to face irrigation related issues periodically. Another major problem among the irrigated growers was insufficient labour availability. Generally irrigated crops were labour intensive in nature. Besides, labour shortage, high wages and high hire on farm implements were aroused due to the implementation of MGNREGA and industrialization. These might be the reasons for majority of the irrigated respondents shift from the regular farm activities to other non-farm activities. The irrigated respondents felt that the trainings organized by government or non-government organization were entrepreneurial development oriented than the farmer's need based. It would led to prevent the respondents to participate in trainings. The irrigated respondents can't afford storage facility in the farm itself due to the higher implementation cost.

These factors would lead to the moderate level livelihood diversification. The reasons behind for slight level diversification were small land size, land fragmentation, less number of processing units in the nearby area and crop insurance failure.

Economic factors responsible for livelihood diversification

The collected responses related to economic factors were analysed and presented in the following [Table-2]. From [Table-2] indicated that, lack of credit facility (3.04), increased cost of cultivation (2.93), increased family expenditure (2.71) and poor asset base (2.62) were influenced highly for occupational change. The remaining factors were asset deterioration (2.45), substantial income fluctuation (2.31) and inadequate farm output (2.16) marginally influenced. During the survey the respondents said that, credit agencies followed rigid rules and regulations for getting loans. Hence, the farmers can't afford need based credit. Also increased family expenditure due to children education, home construction and development, family function and social ceremonies etc., might be the reasons for respondent's diversification at high level. Further notified issues among the respondents were unmanageable family problems and long term loans pushed to sell out the properties. These problems would lead to moderate level of livelihood change. The respondents perceived that farm income is a dynamic one it fluctuated to low and high levels. For overcoming the issues, the respondents move towards a static income oriented jobs.

Marketing factors responsible for livelihood diversification

The collected responses related to marketing factors were analysed and presented in the following [Table-3]. The above [Table-3] revealed that less market price rate for the commodity (3.19), poor transport facility (3.01), lack of marketing infrastructure (2.88) and middle men involvement (2.69) were pushed highly towards diversification followed by market distance (2.68) and demand in processing industry (2.66) at medium level. The least influencing factors were excessive product availability (2.40) and poor consumer preferences (2.32). In connection with marketing factors the respondents faced constraints due to price fluctuations. In irrigated condition the respondents cultivated the crops like paddy, vegetables, fruit crops and coconut. Due to the insufficient storage facility and product perishability, the respondents were sold their products at farm gate level without concerning product price. Besides the farmers faced problem like poor transport facility, because of some of the respondents possessed interior lands without proper road connectivity. Lack of awareness about marketing facilities, the respondents sold the commodity through middlemen. These might be the reasons for occupational change and crop change among the respondents. Sometimes, in irrigated area all the respondents were oriented towards mono crop cultivation because of climatic condition and easy cultural operations, it would be the reason for excessive product availability in market and also price fluctuation. Because of these reasons the respondents were pushed to select high remunerative business activities.

Social factors responsible for livelihood diversification

The collected responses related to social factors were analysed and presented in the following [Table-4]. From [Table-4], showed that the various push factors for livelihood diversification of respondents such as health status (3.24), joint decision by family members (3.03), working age of family members (2.88), family type (2.87), elevation in choosing nonfarm wage strategy (2.78), fear of risk taking (2.76), poverty (2.76), societal factors (2.76), guilty feel about the business (2.73), lack of rural infrastructure (2.63), ex-post risk coping strategy (2.62), lack of awareness about new inventions (2.60), less support from family members (2.49), population pressure (2.47) and disaster (2.42). With regards to social factors, owing to poor health status the respondents unable to do all the farm practices efficiently. Besides, the family members left the farm activities and actively involved in non-farm activities for better family income. These might be the reason for livelihood diversification of farmers in irrigated area. In other circumstances, the respondents were attracted by luxurious jobs in nearby area. Because these jobs provide life security to people and less risk oriented. These factors hints the farmers to choose non-farm wage works enormously and also induced to left from

farming and make guilty feel about farm works. Hence, the respondents changed the occupation from farming to non-farm work. Due to unstable income from farming, the family members not shown interest to support farm practices. Also the household members desired to move other works. In this case the unirrigated respondents move from agriculture to other less risk oriented non-agricultural works.

Pull factors responsible for livelihood diversification of Agrarians in Irrigated condition

The collected responses related to production factors were analysed and presented in the following [Table-5]. [Table-5] revealed that the major influenced pull factors were low level water consumption (3.18), agricultural mechanization (3.09), booms in oil sector (3.08), availability of farm inputs (2.81), low pest and disease occurrence (2.69) and easy farm operation related business emergence (2.68). Excess training facility (2.67), dynamic agricultural environment (2.64), resource availability (2.63), new affordable technology emergence (2.63), export potential oriented business (2.60), accessibility of business inputs (2.59) and availability of advisory services (ICT enabled) (2.42) were influenced the people to move from agriculture to other occupations. Due to climatic variation the respondents faced risks like crop failure and poor yield, hence the respondents moved to low water consuming crop cultivation (i.e., maize and sorghum). The emergence of agricultural industrialization concept induced the value addition and processing units related to agriculture it might be the reason for crop change among the irrigated farmers. The respondents were interested to change the crop from cereals to oilseeds because the emergence of oil industries in nearby area and drought resisting nature of crop. And also availability of enormous farm inputs and pest and disease resistance of crop might be the reasons for crop change among the irrigated respondents. Less risk oriented farm operations, need based location specific technology emergence, resource availability in nearby area, export potential and timely advisory services availability were the reasons for livelihood diversification of irrigated respondents.

Economic factors responsible for livelihood diversification of agrarians

The collected responses related to economic factors were analysed and presented in the following [Table-6]. From [Table-6] it could be inferred that, the pull factors responsible for diversification were attractive income (3.16), farmer and farm worker strategy (3.13), mixed strategy (3.11), less cost with increased remuneration (2.99), storage facility (2.89), group activity (2.84), excess credit/subsidy facility (2.84), group activity (2.84), high price for specific commodity (2.83), income rise motivation (2.77), better relative returns (2.76), full time farmer strategy (2.68) and value addition unit (2.58). During the survey, the respondents told that high remunerative business with less input cost, integrated farm activities, availability of storage structures in nearby area, collective farming, subsidies related to farm operations and market price of produce might be the reasons for farm diversification. The farmers were interested in getting better relative returns, as a result the respondents were attracted by mixed farm strategy and farmer - farm worker strategy rather than full time farmer strategy. It might be the reasons for farmer's change from mono cropping to multiple cropping and multiple farm business.

Marketing factors responsible for livelihood diversification

The collected responses related to Marketing factors were analysed and presented in the following [Table-7]. A cursory look on to the table that, market demand (3.08), availability of various marketing opportunities (2.93), storage facility (2.83), commodity based approaches (2.65), product perishability (2.59), demand in value added preferences (2.58), high market competition (2.54), demand in processing industry (2.52) and consumer preferences (2.49) were responsible for livelihood diversification among irrigated respondents. Due to price fluctuations farmers get low income. For overcome price fluctuations risks, the irrigated respondents were oriented with demand based crop cultivation. The other factors induced the farmers to change crops were marketing infrastructure and facilities in nearby area. Hence, the respondents changed the crop cultivation from food crops to commercial crops.

Social factors responsible for livelihood diversification

The collected responses related to economic factors were analysed and presented in the following [Table-8]. The above table revealed that social recognition (2.88), less risk (2.83), high exposure (2.82), work experiences (2.77), improved social status (2.75), specific work knowledge (2.66), social recognition (2.62), socio cultural system (2.34), social cohesion (2.34) and development policy (2.33) were the major pull factors responsible for livelihood change. With regards to societal factors, the respondents were seeking high social recognition and social status among the society members. It might be the main factor of agrarian's occupational change. From the result, the respondents were highly pulled for diversification by less risk oriented works, knowledge and experience on work followed by social cohesion and socio cultural system. This might be due to the fact that, respondents were interested to live a sophisticated life with less risk and also expected higher social value.

Conclusion

Production related factors are the major determinants of agrarian's livelihood diversification in the study area. Though the respondents shift from agriculture to non-agriculture showed a positive growth and non-farm activities are supplementary sources of livelihood for a greater proportion of households in the irrigated area. Generally livelihood diversification in the study favored the better-off groups and special support has to be given for the marginalized sections of the population. Expansion of rural off- farm and non-farm economies which requires low entry capital and suitable for home-based activity would be viable adaptation option to climate change-induced shocks. On-farm and off-farm livelihood diversification strategies need to be incorporated in the rural development policies and technical as well as financial supports have to be given to the farming households. To that end, policy makers have a concentration on integration of on-farm, off farm and non- farm activities with local institutions like producer's cooperatives, and agricultural extension programs as part of their program.

Application of research: Study elucidate the major factors responsible for agricultural area reduction in the irrigated region

Research Category: Agricultural Extension and Rural Development

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References

- [1] Yaro J.A. (2013) *Accra: Department of Geography and Resource Development, University of Ghana.*
- [2] Barrett C.B., Reardon T. and Webb T. (2001) *Food Policy* 26 (4), 315–331.
- [3] Ellis F. (1998) *The Journal of Development Studies* 35 (1),1–38.
- [4] Amogne Asfaw, Belay Simane, Ali Hassen & Amare Bantider (2017) *Development Studies Research*, 4,1, 22-36.
- [5] Sathyapriya E. and Rexlin Selvin (2017) *Journal of extension education*, Vol 29(1), 5827-5830.