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EDITORIAL

Our country is expected to produce 260 million tones of cereals, the principal food items by 2020. We have enough technologies to achieve our food requirement. But poor delivery system restricts at achieve full potentials of production. The need of specialised extension services is being felt much more than ever before as extension continues to be challenged by new issues and opportunities.

I trust the readers will find this issue quite interesting as much variety has been incorporated specially from the areas like agriculture, dairy, gender issues, sustainability & tribal studies. Emphasis has also been given for including research studies on women constituting half of the population.

I regret for the delay in publication of the journal. We are taking all care for regular publication of the journal. I request the professionals to continue support with respect to articles and extend all cooperation for its regular publication. At the same time suggestions are invited for improvement of the journal.

Jai kishan

Rabindra Kumar Raj

Editor-in-chief

JOURNAL OF EXTENSION EDUCATION

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TO OUR ADVERTISEMENT SUBSCRIBERS

Sir/Madam,

I am happy to introduce our society "ORISSA SOCIETY OF EXTENSION EDUCATION" which committed itself to the farmers. The society is also publishing a biannual journal 'Journal of Extension Education' which published only research articles about research conducted at farmer's field, farmer's reaction, acceptance of new product/ innovation and all other aspects reflecting views of the farmers. We are interested to carry your advertisement in our esteemed journal which has circulation to all Agril. Institutes of India, Agril. Universities and leading farm entrepreneurs. We are confident that not only your advertisement will reach the scientists of the agril, but also widely to extension workers who subscribe to the journal maximum. Our rate of advertisement is enclosed for reference.

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Yours

R.K. Raj

Chief Editor

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Village Level Planning for Agriculture Development

L. N. Kar*

Although more than 70% people of Orissa are directly or indirectly depending upon agriculture for a living, it is a matter of great concern that we are not able to produce enough to meet our food requirement. It is also no secret that Orissa is depending on other states for pulses, oil-seeds, potatoes, onions, bananas, fruits, flowers, and many types of vegetables. Again, many farmers who still continue to stick to farming with much difficulties do not get enough profit. Many such farmers are shifting to other professions migrating to urban or industrial places in search of employment.

Since independence, many schemes and projects have been implemented with an aim of increasing agricultural production and thereby improving the living condition of the farmers. But all these programmes have failed miserably to solve problems of the farmers due to lack of proper management and administration support. As a result, our agriculture production is

not keeping pace with our demand. Unless we try sincerely to help our farmers solve their pressing problems through an integrated programme, there is no doubt that we will certainly face acute food shortage in future.

The most important problem standing as barrier against food production is absence of an integrated plan for agricultural production and to make agriculture a remunerative enterprise. Sometimes back, the state government had formulated a new agriculture policy, but that could not be implemented due to absence of clearcut direction for its implementation. Even now, our agriculture department does not have a plan for cultivation of different types of crops in each district and in each block.

In order to increase agriculture production, it is absolutely necessary to consider the following points and streamline the extension strategy for efficient management of production programmes.

*Ex- Director, Extension Education, OUAT, Bhubaneswar

1. To provide modern technology

We have plenty of scientific recommendations available for development of agriculture, but our farmers are not able to apply these technology due to ignorance, lack of funds and proper administrative support. Our agriculture department also does not have any extension programme for transfer of technology and motivating farmers for adoption of improved practices. Further, the government also made a blunder by transferring nearly 2000 village level agriculture workers to the control of Panchayati Raj Department, depriving farmers to get any help from them. It is high time to get them back to the agriculture department and strengthen extension activities for educating farmers about modern technology. It should be kept in mind that under present situation, Government or remote control system will have very little impact on our farmers. Personal contact, group discussion, skill oriented training, field days and demonstrations will be more effective in convincing farmers for adoption of remunerative farming

2. Development of required infrastructure

Certain important infrastructures are very much essential to accelerate agricultural production, such as irrigation, electrification, road and transport, cold storage, godown and agri-processing units. At present hardly 35%

of our agricultural land has irrigation facility, we do not have adequate number of cold storages or godowns or processing units. The problem is more acute in the tribal areas. Hence, all essential infrastructures should be provided on priority basis to facilitate agricultural production.

3. Availability of critical inputs

Critical inputs such as improved and high yielding seed, chemical fertilizer, plant protection chemicals, improved implements should be made available in time including production credit. Attempt should be made for production of seeds by the progressive farmers in order to meet the ever increasing demand for quality seeds.

4. Marketing of Agricultural products at a remunerative price

It is a fact that, our farmers are not able to dispose off their products at a remunerative price. Rather they are exploited by middlemen and forced to sell at a distress price. Farmers should be helped to dispose off their products at a reasonable price. Even farmers should be encouraged to grow crops which could be exported. Minimum support price should be fixed in such a manner which will provide attractive income.

5. Co-ordination among various departments:

Farmers should have keen contact with various departments and agencies such as Department of Agriculture, Horticulture, Irrigation, electrification,

Village level planning for agriculture development

credit agencies, marketing and block organizations. But unfortunately there is hardly any co-ordination among all these departments and farmers have to move from one place to another in order to get help from them. Further, farmers are also harassed and exploited in the hands of corrupt and unsocial elements. Hence attempt should be made at block, district and state level to maintain co-ordination. B.D.O. at the block level, Deputy Director of Agriculture at the district level and Agriculture production Commissioner at the state level may be entrusted to function as Co-ordinator in order to help solve problems of the farmers.

6. Planning for Agriculture Development

It is a fact that, we do not have an integrated plan for agriculture development in our state. For this reason our farmers are not getting enough opportunity to increase production as per the requirement of our state. For example, rice is grown in 40 lakh hectares and our production is only 70 lakh tonnes. But if our farmers will adopt scientific farming methods, they can easily increase the average yield of rice from 15 quintal per hectare to 30 quintals per hectare thus increasing the rice output upto 132 lakh tonnes. To overcome these difficulties, we should give importance to village level planning and its proper management.

First, an estimate be made of

various agricultural products required to meet our demand such as rice, pulses, oilseeds, potatoes, onions, bananas, fruits and vegetables. Besides, there should be also target for production of cash crops like sugarcane, jute, cotton, spices etc. In addition to our own requirement, the plan should include additional production for export or processing etc. The next step should be to decide about the crops to be grown in each district and in each block and area to be covered under each crop. Once this is decided, the farmers should be given skill oriented training on the technology of production. Extension activities should be streamlined and extension personnel should be appointed at Panchayat and Block level to render all types of help to the farmers. Attempt should be made to provide necessary infrastructures and inputs along with facilities for remunerative marketing. This should be done at the level of Directorate of Agriculture.

7. Planning from village level

Everybody has been talking about grass root planning, but no attempt has been made so far to implement it. But this is the only way to involve our farmers to increase production and thereby to improve their quality of life. Depending upon the location, climate, soil type, availability of infrastructures, crop planning should be done for each village. Farmers may be advised to grow varieties of crops in Kharif, Rabi and Summer as

per their convenience and requirement. This could be done with the help of the VAWs and Junior Agriculture Officers, in consultation with the farmers. Special attention should be given to the poorest farmers so that they will not feel neglected. If planning is done for each village, it will ultimately help planning for all the Panchayats and all the blocks. While taking final decision at the block level, creation of infrastructures such as road, irrigation, electricity, cold storage, godown, market etc. should be also decided. The greatest advantage of this type of planning is that all the villages and farmers will be covered under this programme. J.A.Os and District Agriculture Officers under the guidance of Deputy Director will be entrusted to look into planning and its execution with the co-operation of other line departments. Of course such type of planning will only be successful with active support of the district and state administration. Our district collectors should be involved in such type of planning and its implementation. Agriculture production commissioner, Secretary of Agriculture and Director of Agriculture should take active interest and provide necessary guidance. They should visit villages, interact with farmers, identify their problems and take appropriate action for solution of their problems. Special attention should be given to the tribal farmers by visiting the tribal areas and extending all types of help.

For successful implementation of such type of programme, our extension system need to be strengthened. VAWs should be placed in each Panchayat. They should be provided with residential quarters. The residence-cum-office of the VAWs will be used as place of contact for farmers.

At present many schemes are operating under the Department of Agriculture but needless to say that most of the farmers are completely ignorant about these schemes. As such, they are not able to get any help from these schemes. Unless our farmers are helped to raise their income to a reasonable level, we can never call our state a developed one. Farmers can only be able to raise their income by practising scientific farming and getting remunerative price for their products. This can only be achieved by giving importance to the village level planning and its successful execution. Agricultural scientists, extension personnel and personnel of the research station must move into the villages to interact with the farmers, identify their problems and sincerely try to solve their problems. Our administration has neglected our agriculture and our farmers for a long time. Time has come to realise this mistake and come close to the farmers and help them solve their pressing problems. Once this is done, our farmers will definitely hope for a good time.

Technological Adoption gaps Perceived among Wheat Farmers

Sarvesh Kumar* R.K. Kushwaha** A.K. Singh***

The latest estimated demand for wheat production for the year 2020 is approximately 87.5 million tons, or about 13 million tons more than the record production of 75 million tons harvested in last crop season. The country is going to witness record production of wheat consecutively for the second year with output estimated to surpass 78 million tones. Last year, 78.57 million tones of wheat was produced, which was the highest ever in the history of India. At present wheat price is of Rs. 1080 per 100 kg. U.P. is a state located in the northern part of India. With a population of over 190 million people, it is India's most populous state, as well as the world's most populous sub-national entity. With an area of 93,933 sq. mile (243,290 sq. km), Uttar Pradesh covers a large part of the highly fertile and densely populated upper Gangetic plain. Uttar Pradesh is the second largest state economy in India. Although Uttar Pradesh has first place in wheat and sugarcane

production, Etawah is one of the leading districts of Uttar Pradesh in wheat production and had area under wheat 83.901 hectares with production of 249.658 tones and Productivity (yield) 2976 kg per hectare. Here still exists a wide gap between the potential yield achieved at experimental farms and what the farmers are getting in their fields. Therefore, it is necessary to identify gaps in adoption so that it could be basis for technical planning of demonstration and training programmes. Keeping the above fact in the view this study was conducting to certain the existing technological adoption gaps and factors associated with wheat production technologies, under the following objectives-

1. To analyze the technological adoption gaps associated with the wheat crop in Etawah.
2. To identify the causes for technological adoption gaps in relation to wheat management.

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Methodology

The study was conducted in Uttar Pradesh during Rabi season of 2009. Out of 70 districts of the state, Etawah was selected purposely on the basis of major wheat growing area for the study. Out of three agro-ecological situations (AESs) one namely Yamuna –Sengar region (Ghar) was selected for this study. Out of 5 blocks of this region 2 blocks namely; Saifai and Jaswantnagar were purposely selected. A total of 80 wheat growers i.e. 40 from each block were randomly selected as the respondents. Information about technologies adopted by the wheat cultivators were collected personally through semi-structured interview schedule. Then data were analyzed through percentage statistical tool. Adoption gap was conceptualized as if

there was 50 per cent and above variation in adoption of recommended practices for wheat cultivation considered as **full gap**, 20 to 50 per cent variation as **partial gap** and 10 to 20 per cent variation was considerable and considered as **no gap** in technology adoption. In the study of technological adoption gap, twelve important wheat cultivation practices namely sowing time, varieties, seed rate, seed treatment, manures, fertilizers, method of NPK and FYM application, micronutrient, intercultural operations, water management, plant protection, harvesting and post harvest measures were considered. The gap has been expressed in per cent and presented in result and discussion.

Table: 1 Technical Adoption Gaps Related to Wheat Cultivation

S.No	Operation	No Gap		Partial Gap		Full Gap	
		No. of farmers	% of farmers	No. of farmers	% of farmers	No. of farmers	% of farmers
1	Sowing time	45	56.25	35	43.75	0	00
2	Varieties	11	13.75	59	73.75	10	12.5
3	Seed rate	0	00	80	100	0	0.0
4	Seed treatment	3	3.75	5	6.25	72	90
5	Manures	6	7.50	74	92.50	0	00
6	Fertilizers	0	00	77	96.25	3	3.75
7	Method of (NPK&FYM) application	0	00	75	93.75	5	6.25

Technological adoption gaps perceived among wheat farmers

8	Micronutrient	0	00	6	7.50	74	92.50
9	Intercultural	5	6.25	48	60	27	33.75
10	Water management	57	71.25	19	23.75	4	5.0
11	Plant protection	0	0.0	4	5	76	95
12	Harvesting	67	83.75	13	16.25	0	00

Table: 1 indicates that in case of wheat cultivation, use of plant protection, micronutrients and seed treatment were almost negligible at the farmer's level because 95 per cent, 92.25 per cent and 90 per cent of farmers were having full gap in these recommended practices respectively. Whereas, seed rate and fertilizers were found either higher or lower in case of all the respondents and thus, accepted as 100 per cent and 96.25 per cent partial gap by the farmers respectively. 93.75 percent partial gap showing farmers, who were not applying method of (NPK&FYM) application as per recommendations. The practices such as harvesting time, water management, registered 83.75 and 71.25 percent no gap means they were very near to scientific recommendations. Other four remained variables have also been presented in the above table.

CAUSES RESPONSIBLE FOR TECHNOLOGICAL ADOPTION GAPS IN WHEAT

Majority of farmers addressed to weak agricultural information communication systems as main reason for non adoption of efficient technologies in wheat cultivation. Simultaneously, non availability of any reliable extension systems like Village Knowledge Centers, Common Service Centers, Kisan Call Centers etc. and among many more respondents, low level of education, unwillingness, unawareness, lack of confidence about purity of seeds and poor economic condition were the considerable reasons for low adoption of technologies. Addition to these, farmers were facing many constraints in adoption of sophisticated technologies these were; inadequate extension facilities, poor marketing and storage facilities and incentives in the study area which adversely effects per unit wheat production resulting no adoption of new

technologies. Farmers also reported non-availability of disease resistant varieties and labour as the major problems and no support price fixed by the government for local mandies and buyer, therefore, farmers are forced to sell their produce at very lower price in domestic markets. **Singh et al.** (2008) also reported similar kinds of causes among wheat growers of Saharanpur and Bulandshahar district of western Uttar Pradesh, India, and by **Anuranjan et al.** (2007) during frontline demonstration (FLDs) and general demonstrations (GD) were conducted by Birsa Agricultural University, Ranchi, India, which also support this study.

Conclusion

Technological adoption gaps were found mostly in the operations like plant

protection (95 per cent, full gap), use of micronutrients (92.25 percent, full gap) and seed treatment (90 percent, full gap), seed rate (100 per cent, partial gap), fertilizers (96.25 per cent, partial gap), and method of (NPK&FYM) application (93.75 per cent, partial gap). It indicates that there is need to update knowledge of wheat cultivators regarding these variables and strengthening agricultural information communication systems with government support policies like support price of wheat, storage facilities and marketing infrastructure at domestic level. This will increase the flow of information of improved farm practices leading to higher technological adoption and income of small and marginal farmers. The area was found to be high potential to grow both tuber and cereals crops as well.

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Farmer-Led Extension, its Strength and Weakness with Special Reference to Coastal Orissa

S.K.Rout *

India being developing country, most of its poor people live in the rural areas depend on the agriculture for livelihood. In the past agricultural extension services in our country played a vital role in promoting technological innovation in agriculture leading to increase in agricultural productivity. While assessing the sustainability sometimes the picture is different. This is particularly true for the resource poor farmers operating in environment which can not be controlled by them and also be termed as Complex Diverse Risk Prone System (CDR). The local natural resources can also be termed as micro situation, need to be fitted with locally specific technological innovation. For successful implementation of this programme a close linkage between the farmer and researcher are needed so that by refining the existing technology a suitable area specific technology can be developed.

If we consider the paradigm of global extension we find expert driven

transfer of technology model to farmers first approach model for the agricultural extension.

Expert driven extension:

When agricultural extension services were first initiated in our country, Research Institutes, Agro-Industries and Govt. Departments developed a growing interest in the Extension Services and exerted increasing influence on their activities. Research Institutes explored their findings put into practice and commercial farmer were interested in selling their products like seeds, PPC etc. Govt. departments saw extension as an instrument for implementing rural development policy. As a result, all these extensionists acted as an experts, applying various rationality than the farmers themselves.

Transfer of technology model.

In course of time Scientists have developed a model of extension which became widespread and is still the

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underlined paradigm by which most extension services around the country are operating- the adoption-diffusion model for the dissemination of agricultural innovation. This approach proved to be well suited in some of the areas where the agro-ecology are controlled by the farmers without any stress and occasional perturbation. Through this approach the extensionist transferred their message to a particular target group fitting to their technological innovation. The extensionist became reinforced in the role of experts vi-a-vis their clients (Christoplos and Nitsch, 1995). The overpowering and dominating role of experts and this tool of adoption diffusion model acted efficiently on the practical goals of research, commercial firms and govt. departments. But in CDR system most of the time this approach could not be able to fulfill its goal thus criticized for not being effective in reaching majority of poor farmers.

The farmer's first approach.

In recent years a change in opinion is advancing. It is felt that the extension will have to be designed in a fundamentally different manner based on endorsing rather than replacing farmers' strategies of adapting to their environment. The farmers' first approach is based on adjustment to the complexity of social and physical environment. It has been realised that there is no single right technological solution. Instead options must be developed based on an intimate

appraisal by the farmers on the basis of farming system. Here the farmers will act as local experts and the experts will place them as facilitator or collaborator. The indigenous knowledge which is already prevailing in the farming system has been incorporated to develop technological options suiting to a particular micro situation. Participatory Rural Appraisal Tools are the basic components to develop the extension approach.

Farmer-led Extension.

Currently the Farmer-led Approach in agricultural extension has been understood by different regions with various descriptions. This is because the different regions have different situations and practices. The Farmers-led Approach in agricultural extension can be defined as a process of extension where farmers are playing the major actors in adopting a technology suiting to their own situation and ultimately the same technology is being adopted by a large group of farming community in the same locality (Young, 1995). Here, role of outside extensionists, research institutes and commercial firms are negligible or very passive.

In the process of Farmer-led Extension the farmers opinion should not be simply replaced with experts knowledge but to combine farmers point of view and the professional's knowledge together so as to improve farmer's ability

to understand social development and to help farmer's gradually to become the major decision maker, and directly participating in the process of decision making for the village development programme.

A Case Study under the coastal natural resource situation in Konark area, Orissa has been made by OUAT. This coastal region is having low lying land situation which suffers from water logging during the monsoon and salinity along with lack of irrigation facilities during the other cropping season. Farmers of this locality possess a very small holding of an average of 1 acre (0.4 ha) land. During monsoon only paddy is possible to be cultivated in this land. Each household is having a pond which has a narrow bond as upland. Farmers of the locality learnt the possibilities of vegetables cultivation in the upland situations (only 10% of the total available land) during post monsoon season to rabi season from OUAT and started the practice in this area to get the off-season vegetables resulting to economical upliftment.

i) Being learnt from them the other group of farmers who do not have the upland have converted small piece of paddy field to small pond, there by getting some upland. This has helped the farmers in growing off-season / early vegetables during kharif and rabi & summer season.

ii) These villages possess a good number of small water bodies and drainage channels which are utilized for freshwater aquaculture. The upper surface of these waterbodies (aerial space) are also used by the farmers to grow creeper vegetables without hampering aquaculture and without requirement of upland. The seed is sown on the side soil of the canal or on the bundh of the pond and allow to creep over the indigenous net fixed at a height on the above of this waterbody. A good harvest of 'bottle gourd' leads to alternative income of farmers even they have a small holding.

Studies have been made by DBT-RBC Project in 8 of the villages under Gop block of Orissa to identify the process of extension of these two technologies which are very much area specific and suiting to coastal micro situation. The entire extension approach of these technologies can be termed as farmer to farmer extension or farmer-led extension.

Materials and method

The area for this study was located in 8 villages under the Gop block of Puri district, a coastal region. A total of 40 farmers selected randomly from the above mentioned villages who are practicing the technology of *proper utilization of aerial space through vegetable cultivation*.

The descriptive information gathered by using relevant tools of Participatory Rural Appraisal Technique like semistructured house hold interviews, in-depth interview with farmer extensionist, participatory farm exploration technique and SWOT analysis etc.

Results and Discussion

Farmer-led extension experiences from the rural community of the study area have been analytically reviewed to judge the effectiveness of the approach in adoption of the 2 technologies and possibilities of empowerment of farmer in decision making for utilisation of space in collaboration with the Panchayat System in their respective villages.

The experiences gathered are briefly described for each separately below.

i) Utilisation of uplands and Bundh in the paddy fields through vegetable cultivation.

Respondent farmer extensionists and farmer adopter have described the fairly long process for adopting the technology on vegetable cultivation in paddy field bundhs. A group of farmers received training on winter vegetable cultivation from the DBT-RBC Project, OUAT. They acted as farmer trainers. In course of time they practised the technology in their small patch of upland and got a good return. Getting trained

from them on early vegetable cultivation in upland situation a farmer of Kantijhadi village adopted this technology of vegetable cultivation in early winter in the bundh of paddy field. The main field was engaged with paddy during that time. Two rows of winter vegetable (tomato) seedlings were planted in the 165 running meter bundh having a width of 1.5 mt. A portion of the technology, the spacing between the row and plants was modified by the farmer himself keeping the other packages like fertiliser management, pest management etc. unchanged. This in between cropping sequence could produce early winter vegetable (tomato and beans) and fetched a good market value as the produce came to the market in off- season. This village is connected with a marketing system of weekly 'hat'. This was done by the farmer in the year 2009.

Approximately 70% of the farmers who are possessing low lying paddy fields in the village Kantijhadi and other 8 villages of study area are practising this type of early vegetable cultivation both in the monsoon and winter-summer season by broadening their upland by putting additional earth from their low lying land. The earth is collected from the side of the bundh by excavating a narrow trench along the entire length of the same. The height of the bundh always depends on the

level of water stagnation during the pick monsoon. It is raised to such a height that even in the monsoon when paddy field is water logged upto a height of 2 ft. the bundh remains little above the water level. So, the land is being utilised for vegetable cultivation even during the monsoon months with a crop like Okra or Brinjal and during winter months those lands are cultivated with early winter vegetables (tomato, beans etc.).

While analysing the process, distinct steps of farmer-led extension on the adoption of this technology could be recorded. Farmer Trainers (Vegetable cultivator in upland)> farmer Adopter> Group of Farmer Adopter> Farmer

Instructor (with possible area specific refinement)> Farmers Extensionist Group (Farm science club memebbers)> Cross Visit to farmer’s adopted field > Adoption of technology in new villages. Farmers’ Extensionists Group in the study area have played a major role in dissemination of the technology in the adjoining villages. Obviously the marketing channel has also to be considered as a prime important factor for this extension. Unless the farmers could have received a much more remunerative price by adopting this technology they would not have adopted the same. A table on profitability of the technology is summarized below.

Table 1. Profitability of vegetable cultivation in Ali upland

Sl. No.	Name of the villages	No.of respondent	Average holding of Respondent (Low lying Paddy field) (m2)	Average unit area under the technology	Net income per Monsoon season (Rs.)	Rabi season (Rs.)
1.	Junei	5	0.4 ha	369	4300	5309
2.	Annasara	5	0.37ha	252	2200	4100
3.	Simili	5	0.45 ha	285	2000	5267
4.	Nuagaon	5	0.29 ha	220	2008	3580
5.	Matipada	5	0.50 ha	425	4400	6440
6.	Paitabarei	5	0.47 ha	380	4652	5200
7.	Kantijhadi	5	0.42 ha	375	4225	5300
8.	Siripur	5	0.35 ha	250	3300	3355

ii) Utilisation of aerial space for vegetable cultivation.

A group of farmers in the Kantijhadi village were cultivating bottlegourd since last 10 years. This crop has been chosed during the season of post Kharif to early rabi due to a good demand of this vegetable in the local market. This group of farmers acted as farmer extensionist in disseminating this technology in the adjoining villages. The farmer adopters who have received the technology have refined the same as per their suitability. These farmers are resource poor and not having a big land holding. But most of their land are situated by the side of the drainage canals owned by the public department. These farmer adopters started growing bottle gourd on the boundary land of their paddy fields and fix some poles over the drainage canals and spread torn nets or nylon ropes to form an aerial surface where this crop can sprawl and produce the fruits hanging. The farmer performs the daily management like pesticides application, harvesting of fruits etc. by moving under the net.

From the above studies it is revealed that farmers themselves have acted as farmer adopter, farmer instructor and farmer extensionist. They formed groups in village level and arranged cross visit for the successful dissemination of the technology. This farmer-led extension programme in the coastal region of Orissa is relatively small and localized.

Conclusion

Experiences presented in the paper dscribed a good example of farmer-led extension at local level. There are many such examples all over the globe. Attempts have been made by many authors to formulate the strategies and constraints of this extension techniques. However, from the above study following strategies can be identified for farmer-led extension.

1. To increase the number of farmer extensionist to reach more farmers.
2. To organize cross visit for exposure of other farmers for adoption of their technology.
3. To use PRA tools to facilitate the entire community in identifying problems and finding their solutions.
4. To organize farmer group as a basis for spreading extension effort. If it is not existing, help them to organize the groups.
5. To form a farmer network in the project area.

However, there may be many constraints in the farmer-led extension approaches. The farmer extensionists have limited mobility and interest for transferring their knowledge to large number of farmers beyond their community. As a result this programme have usually expanded at a slow pace. Moreover, farmer-led extension approach are more difficult to replicate in extremely

resource poor areas. This methodology also seems to be difficult to implement where the developmental programmes are highly subsidised.

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Training Needs of Farmers and Extension functionaries on IPM in vegetables

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Training is essential to enhance motivation, create confidence, improve skill and attitude and inculcate efficiency in an individual so that one can perform more effectively and meaningfully. A training programme will yield the desired result if the training needs of the target groups are assessed carefully. However, in most of the cases training is conducted in a very adhoc and routine way without proper identification of training needs of target groups resulting in wastage of time and money. A Training need may be described as existing in any time, an actual condition which differs from a desired condition in the human expect all organizational purpose or more specifically when a change in present human knowledge, skill or attitude can bring about the expected purpose. Schematically training need has been defined by Mishra (1990) in mathematical equation as under.

Training needs = (Job Requirement – Present Performance) + Development needs.

Training on improved technology is now regarded as one of the important critical inputs for the farmers in enhancing the production and productivity as faring with traditional methods are no more productive an profitable. Similarly upgradation of technical competency is regarded as an important factor in improving the subject matter knowledge and professional competence of the extension personnel for effective transfer of technology to the farmers. Hence, identification of the training needs of farmers an extension functionaries is one of the important factors for effective transfer of a specific technology.

Keonjhar is one of the tribal dominated districts of Orissa situated in the North Central agro-climatic zone as vegetable base farming system and one of the predominant farming system of the district. The climate and soil of the district is congenial to grow diverse vegetables through out the year. But heavy incidence of insect pest is one of the

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major production constraints that most of the farmers are confronting with. It not only reduces the yield but also impairs the quality thereby decreasing market acceptance of profit. Farmers mostly rely on chemical pesticides as the first line of defence against pest incidence and lack of adequate knowledge, skill and awareness leads to its indiscriminate application resulting in no. of adverse effect on health and environment. Pesticide dealers are still regarded as the primary source of information regarding the selection of pesticide and application procedure. To overcome these problems and to make vegetable farming more productive and profitable in harmony with the ecology and environment, adoption of Integrated Pest Management (IPM) approach is the best viable option. IPM as applied in agriculture is ideally the use of most effective, economically safest, ecologically sustainable and socially acceptable combination of physical, chemical and biological methods to limit the harmful effect of crop pests. However, capacity building of farmers and extension personnel regarding different components of IPM is the prerequisite to spread the area under IPM. If the farmers and extension officials are trained properly, they would perceive, understand and act upon properly. Keeping this in view a study was undertaken to assess the training needs of farmers and extension personnel of agriculture and horticulture departments on different aspects of Integrated Pest management (IPM) in vegetables.

Material & Method:

To assess the training needs of the farmers the study was conducted in Basudevpur and Bhalupali of Sadar block and Badadhanuryapur and Jamunaposi villages of Patna block. Total of 120 farmers were selected as respondents with 30 farmers from each villages. Besides 40 extension functionaries (JAO, JHO and VAW) of these blocks were interviewed to know their training needs on vegetable IPM.

The villages were purposefully selected as vegetables are extensively cultivated there and insect pest problem is one of the important production constraints resulting in the huge economic loss of farming community. The data were collected through structured interview schedule and analysis was done to tabulate and interpret the data.

Twelve specific subject matter areas of vegetable IPM were identified through review of available literature and experts' opinion which reflects the major training needs of the farmers. Training needs of farmers were assessed using three point rating scale viz. much needed, somewhat needed and least needed and were quantified by assigning corresponding weightage of 3, 2 and 1 respectively. Assessed training needs were ranked using their mean scores. Similarly 10 components of vegetable IPM were identified for the extension

functionaries and percentage analysis tool was used to assess their training needs.

Result and Discussion:

a) Training need assessment for farmers:

The training needs of the farmer in vegetable IPM are portrayed in Table-I.

The average mean score was found to be 2.43 which was used to categorize the training needs into more important and less important ones. The subject matter areas that had mean score above 2.43 were considered as more important and below 2.43 were considered as less important. The data which are presented in Table-I.

TABLE-I: Training needs of farmers on vegetable IPM (n=120)

Sl. No.	Major subject matter areas of vegetable IPM	Weighed Mean Score	Rank
1	Pest specific effective safer pesticides	2.92	I
2	Preparation and application technique of neem and other botanical pesticides.	2.84	II
3	Intercrop, trap crop and boarder crop for pest management	2.82	III
4	Use and installation technique of pheromone trap, light trap and sticky traps	2.70	IV
5	Seed, seedling and nursery treatment	2.62	V
6	Insecticide spray fluid preparation and spraying technique.	2.51	VI
7	Identification of pest, damage symptoms and natural enemies.	2.34	VII
8	Balanced dose of fertiliser	2.28	VIII
9	Resistant variety	2.16	IX
10	Water management	2.11	X
11	Collection and destruction target pests (egg mass, larvae and adults) and damaged plant parts	1.98	XI
12	Summer ploughing and other cultivation technique	1.92	XII
Average Mean Score		2.43	

Training Needs of Farmers and Extension functionaries

During the study it was observed that most of the farmers are not adopting IPM practice to minimise the pest incidence in vegetables and because of their faulty approach. Cost of plant protection has increased with many adverse impact on the environment. The study also clearly revealed that knowledge regarding Pest specific effective safer pesticides, Preparation and application technique of neem and other botanical pesticides, Intercrop, trap crop and boarder crop for pest management, Use and installation

technique of pheromone trap, light trap and sticky traps, Seed, seedling and nursery treatment and Insecticide spray fluid preparation and spraying technique are the important training need area of the farmers and proper orientation of the farmers on these subject matter areas will increase the adoption level of IPM in vegetables.

During the study, efforts were also made to know the preferred time and duration of training programme and methodology of training which were mentioned in Table 2 .

TABLE-2 – Time, Duration and Methodology of Training preferred

Sl. No.	Particulars	Yes (%)	No (%)
A	Time of Training		
1	January to March	78	22
2	April to June	22	78
3	July to September	42	58
4	October to December	928	
B	Duration of Training		
1	1 Days	38	62
2	2-3 Days	86	14
3	3-4 Days	15	85
4	One week or more	6	94
C	Training Methodology		
1	Theoretical Lecturate	12	88
2	Interactive Lectuate with Method Demonstration	72	28
3	Interactive Lecturate with Method Demonstration and field visit	78	22
4	Participatory, practical oriented and use of audio-visual aids	89	11

From the Table-2 it is observed that majority of the farmer preferred to attend training programmes during the month of October to December and January to March as these two seasons are regarded as the season of vegetables and crops are in the field which will enable them to gain some practical knowledge regarding insect pest and their management . An overwhelming percentage of farmer (86%) revealed that the duration of the training should be of

2-3 days long. Most of the farmers preferred that the training methodology should be Participatory, practical oriented, use of audio-visual aids and distribution of IEC materials

b) Training need assessment of extension functionaries:

The training needs of the extension functionaries presented in Table 3 and percentage analysis method was adopted to know the major training need areas.

TABLE 3 – Training Needs of extension functionaries on the major subject matter areas of vegetable IPM. (N = 40)

Sl. No.	Subject Matter Wise Training Need	No. of Respondents	Percent	Rank
1	Target specific new generation pesticides	38	95	I
2	Bio-pesticides and Botanicals	36	90	II
3	Crop diversity in pest management (Intercropping & Trap Cropping)	35	87	III
4	Pest surveillance, monitoring and ETL	32	80	IV
5	Bio control agents & their augmentation and conservation measures	29	72	V
6	Life cycle of insects, biotic and abiotic factors for pest population build up	29	72	VI
7	Integrated nutrient management and induced resistance	25	62	VII
8	Pesticide residue and minimum waiting period	22	55	VIII
9	Insect and disease resistant variety	17	42	IX
10	Use of traps and other mechanical methods	14	35	X

Training Needs of Farmers and Extension functionaries

It is clearly observed that the extension personnel require more training on new generation pesticides, bio-pesticides and botanicals, crop diversity, pest surveillance, bio-control of insect pests and life cycle of insect pests as these subject matter areas are the emerging areas of vegetable pest management.

Conclusion:

Training needs assessment helps the trainer to decide on training curriculum, content, methods, techniques

of training, evaluation and outcome so as to make the training programme complete and successful. The findings of the study clearly revealed that the vegetable growers need to be trained on the important subject matter areas of IPM for scientific, cost effective and eco-friendly management of insect pest. The extension functionaries also to be trained on the emerging techniques of pest management not only to upgrade their knowledge but also guide the farmers accordingly.

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Management Skill of Milk Producers in Puri District of Orissa

B. Behera*, B. N. Sadangi and A. K. Dash*****

The development of scientific approach to animal husbandry did not make a universal debut in the Indian rural society. Only a few of the economically and socially privileged farmers started adopting modern animal husbandry practices at the initial stage of technology transfer for rural development. Development means the participation of the people in the determination of their environment. The vision of development is not just a question of economics, agriculture, self-sufficiency or of a technology transfer. Development is of the people with their proper capacity for imagination, creation, choice, responsibility and decisions with their environment.

There is a growing feeling worldwide that providing free and subsidised goods to the people who are at the bottom of the socio-economic ladder would not help much without corresponding increase in

their capabilities. So it is recommended that empowering the powerless should start from capacity building. In this context development of inner resources of the members is of paramount importance. These inner resources may spring into motivation, creativity, problem solving, sustainability and satisfactory living standards.

In India, the theory of "trickle down" has failed and specific target groups are formed for each scheme to ensure equity and social justice. In this context it is necessary to examine how beneficiaries belonging to different socio-economic strata have attained higher capacities to manage dairy enterprise.

Review of literature

Literates have better response than illiterates in improving their knowledge. Increase in knowledge about

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dairy innovations leads to higher adoption of dairy technology by dairy farmers (Tyagi and Sohal,1984).In earlier study also Sidhu (1980)reported that knowledge had positive and highly significant association with milk production per household per day, per household per year and per animal per day.

Materials & Methods

The design formulated for this study is ex-post-facto research design. The study was conducted in Puri district of Orissa. A sample of 100 dairy farmers ((beneficiaries/ non-beneficiaries of Operation Flood programme) from 28 villages of 20 milk producer's cooperative societies was drawn for the purpose of collecting information. Knowledge about dairy animal production practices was measured through knowledge test. For measuring the knowledge about feeding, test developed by Fulzele (1986) was used. For measuring knowledge about breeding, management and marketing, the knowledge tests developed by Rath (1978) were used.

Knowledge as defined in the present study included those behaviours and test situations which emphasised the remembering either by recognition or recall of ideas, material or phenomenon. The variable indicated the extent of knowledge the respondent possessed at the time of answering the questions scientifically prepared for this purpose. The content of

knowledge test is composed of items. Items for the test were compiled through literature, discussions with field extension personnel, subject mater specialists in veterinary and animal science, academicians and the researcher's own experience. The questions were designed to test the knowledge level of the dairy farmers of the study area (beneficiary and non-beneficiary). The selection of items was done on the basis of the following criteria.

«It should promote thinking rather than memorisation, and,

«It should differentiate the well informed dairy farmers from the poorly informed ones. Care was taken to frame questions of similar difficulty level. The procedure followed in selection of the test items was on the line used by Choudhury (1978) and Sagar (1983). All the 26 items collected for construction of the knowledge test were in objective form including dichotomous format. Each one of the respondents, to whom the test was administered, was given score 1 for correct answer and 0 for wrong answer. The knowledge scores of all the respondents were later on categorised into following classes after converting the scores into percentage.

High-60 per cent and above
Medium-30-59 per cent
Low-0-29 per cent

Attitude towards dairying

The attitude of dairy farmers is undoubtedly linked with the human actions and have been the subject of research and investigation by the researcher (Mc Clelland, 1961).

In this study the attitude scale developed by Gupta (1976) was used with modification for measuring the level of attitude of the dairy farmers. In this scale 18 statements were taken comprising equal number of positive and negative statements. Respondents were asked to express their views on five point continuum i.e. strongly agree, agree, undecided, disagree and strongly disagree. For positive statements

scoring was 5, 4, 3, 2, 1 and for negative statement it was 1, 2, 3, 4, 5 respectively.

On the basis of scores obtained by each respondent, they were classified into 4 categories as:

- 4 and above: Highly favourable
- 3-4: Moderately favourable
- 2-3: Less favourable
- Less than 2: Least favourable

Results and Discussion

In the present study it was aimed to study the development of inner

resources namely knowledge on dairy farming, attitude towards dairy enterprise, development of skills and managerial ability of the respondents. The findings of the above aspects would tell clearly the achievements as well as the lapses in the programme.

Table-1: Distribution of various categories of members according to the scores obtained in knowledge, attitude, skill and managerial ability by the beneficiaries

(N=100)

Components of inner resources	Categories of dairy farmers								
	Landless		Marginal		Small		Large		
	f	%	f	%	f	%	f	%	
Knowledge									
Low (Up to 29% score)	-	-	-	-					
Medium (30-59% score)	7	63.64	16	30.77	7	24.14	-	-	
High (60% and above score)	4	36.36	36	69.23	22	75.86	8	100.00	
Total	11	100.00	52	100.00	29	100.00	8	100.00	

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Attitude

4 and above Highly favourable	-	-	1	1.92	-	-	1	12.50
3-4 Moderately favourable	4	36.36	39	75.00	19	65.52	7	87.50
2-3 Less favourable	7	63.64	11	21.16	9	31.03	-	-
Less than 2 Least favourable	-	-	1	1.92	1	3.45	-	-
Total	11	100.00	52	100.00	29	100.00	8	100.00

Knowledge level (Beneficiaries vs. Non-beneficiaries)

Dairy is a promising enterprise as far as its potential and prospects in India are concerned. Progress of dairy farming is sine qua non for rural development. An up-to-date knowledge on the various dairy husbandry practices is a must for the beneficiaries in optimising return from dairy

farming. The present study was conducted to know the contribution of Operation Flood programme in increasing the knowledge level of beneficiaries compared to non-beneficiaries.

Table-2: Comparison of knowledge level between beneficiaries and non-beneficiaries (N=100)

Score range in percentage	Beneficiaries		Non-Beneficiaries				Z Value		
	F	%	Average Score	SD	F	%		Average Score	SD
Low (up to 29% Score)	-	-			5	5.00			9.59**
Medium (30-59% score)	30	30.00	65.57	13.51	88	88.00	44.67	9.69	
High (60% and above score)	70	70.00			7	7.00			

**** Significant at 1 per cent level of probability.**

The findings presented in Table-2 on knowledge level of beneficiaries and non-beneficiaries revealed that majority (70 per cent) of the beneficiaries had high knowledge level and the rest (30 per cent) were possessing medium level of knowledge. The average knowledge score of the beneficiaries was found to be 65.57. The knowledge level of non-beneficiaries when compared with beneficiaries showed very interesting result. Beneficiaries were found to have possessed significantly higher knowledge level than their counterpart. The Z value obtained from Wilcoxon-Mann-Whitney test at 0.01 level of probability suggested the above conclusion. The non-beneficiaries had only an average score of 44.67. The level of knowledge among different categories of members has been presented in Table-1. All the beneficiaries under large farmer category, 75.86 per cent under small farmer, 69.23 per cent under marginal farmer and 36.36 per cent under landless farmer category had attained high knowledge level. These findings are supported by the studies of Dubey *et al.* (1975), Sohal *et al.* (1978 and 1984), Sidhu (1980), Ram Kumar *et al.* (1993-94), Shivalingaiah *et al.* (1996), Gill *et al.* (1977), Gite (1980), Shreeshailaja *et al.* (1994), Narwal *et al.* (1991) and Nataraju *et al.* (1985 and 1986) who observed that more than 60 per cent of cattle

owners covered under different projects had knowledge about the recommended dairy production innovations.

It can be concluded very safely that the Operation Flood project is instrumental in raising the knowledge level of the beneficiaries on dairy enterprise. The findings emerging from the study also state that the beneficiaries have good exposure to different extension programmes and enjoyed the facilities created by the Operation Flood programme. All these have resulted in good learning by the beneficiaries. The project has also made a situation which is stimulating, informative and educative for the beneficiaries but all the categories of farmers have not derived equal benefits for gaining knowledge. The old trend more or less is found here. Beneficiaries in large farmer category due to their better socio-economic status have attained high knowledge level and gained more than the small, marginal and landless beneficiaries. Small and marginal farmers are at par with each other while small farmers are better in attaining higher knowledge.

Attitude towards dairy enterprise (Beneficiaries vs. Non-beneficiaries)

Attitude is another important human resource factor to affect the behaviour of the individual. Psychologists have given much emphasis to study and analyze the

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attitude of the individuals towards different psychological objects with a view to predict future behaviour and action. In agriculture also knowledge, attitude and skill are the basic ingredients of the behavioural studies. Favourable attitude of the individual towards developmental goals is

the prerequisite for the success of any programme. In the above backdrop it was considered to compare the attitude of the beneficiaries and non-beneficiaries to assess what exactly was the contribution of the Operation Flood in developing the attitude.

Table-3: Comparison of attitude towards dairying among beneficiaries and non-beneficiaries

Attitude score range	Beneficiaries				Non-Beneficiaries				Z Value
	f	%	Average score	SD	f	%	Average score	SD	
Highly favourable 4 and above	2	2.00			-	-			
Moderately favourable 3-4	69.00	3.15	0.42	3	3.00	2.35	0.25	10.79	
Less favourable 2-3	27	27.00		94	94.00				
Least favourable Less than 2	2	2.00		3	3.00				

The data presented in Table-3 indicate that very substantial (69 per cent) of the respondents showed moderately favourable (3-4 mean score range) attitude followed by 27 per cent respondents who had less favourable attitude towards dairy farming. About 2 per cent had highly favourable attitude and similar percentage had expressed least favourable attitude

towards dairy enterprise. The mean attitude score of the members was found to be 3.15 which fell in the moderately favourable attitude range. The non-beneficiaries on the other hand had mean attitude score of 2.35 which implied less favourable attitude of the non-beneficiaries. Almost all (94 per cent) the non-beneficiaries belonged to the less favourable attitude category. The

Whitney test employed to compare the attitude scores of beneficiaries and non-beneficiaries yielded a significant Z value at 0.01 level of probability implying that beneficiary's development in attitude was significantly higher than the non-beneficiary. This was due to the contribution of Operation Flood programme.

The data on attitude of different categories of beneficiaries as presented in Table-1 reveal that majority (63.64 per cent) of the landless farmers had less favourable attitude whereas majority of the small farmers (65.52 per cent), marginal farmers (75 per cent) and large farmers (87.50 per cent) belonged to moderately favourable attitude category. The results are in agreement with the findings of Roy *et al.* (2000), Sayed *et al.* (1984) and Sharma (1994).

The beneficiaries after joining the Operation Flood programme are not only exposed to information and training but also realised financial benefits from the enterprise. The significant development in their attitude may be due to their success in trying innovations and achieving higher yield. Since society has created facilities and arranged services which have helped

them to solve many problems. The members see the object in a real angle. All the above factors might have contributed for significantly higher attitudinal status of the beneficiaries. With respect to attitudinal status of the landless beneficiaries, it is found that they are unable to make use of the various opportunities and facilities given under the project due to their socio-economic backwardness. This has put them in a doubtful psychological state - a relatively lower level of favourable attitude than other categories of farmers.

Conclusion

From the study it could be concluded that beneficiaries had possessed significantly higher knowledge level than non-beneficiaries. The Operation Flood programme was instrumental in raising the knowledge level of the beneficiaries of the dairy enterprise. Similarly member's development in attitude was also higher than the non-members. The significant development in their attitude may be due to their success in trying innovations and achieving higher yield.

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Empowerment of Farmwomen: Perception and Image

*J.Nayak, **P.K.Mallick, K.M.Das*** and S.M.Prasad**

In India, the position of women was always been rather ambivalent one in our culture. On one side, she has been raised to the status of dignity and on the other side; she has been exploited as some body lower in status to men in every walk of life. Ever since independence, a number of innovative schemes have been launched for the upliftment and empowerment of women in our country. Despite the Government's efforts the representation and significantly marginal empowerment of women is in essential pre-requisite for economic development and social progress of the nation. Empowerment does not simply mean economic empowerment but it involves social-political, cultural empowerment along with economic empowerments. An attempt was done to know the different issues related to empowerment of farm women: Perception and Image with the following objectives.

- To study the socio-economic background of rural women and their empowerment aspect with a profile of the farm women.
- To highlight the problems and difficulties which they face.
- To identify the hurdles in the way of gender equality, emancipation, upliftment.
- To arrive at logical and implementable methods and procedures to achieve the empowerment of women qualitatively.

Materials & Methods

The universe in the present study represents the farmwomen of two blocks of Cuttack districts; one is Cuttack sadar and another Tangi-Choudwar, which are closely associated with KVK activities. In administering the schedule, a combination of random and purposive sampling was used. The study was first

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defined in terms of six variables: age, income, educational status, profession, marital status and religion. This was done because the study indicated that the respondent's socio-economic, political and cultural aspects generally depend upon these factors. Then, it was observed that younger respondents were more conscious and aware of their rights. A total of 50 respondents were selected. There are different techniques of data collection, like observation, interviews. In

the present study interview method has been used for collection of primary data.

Result and Discussion:

Age of the respondents in the present study is significant in dealing with, or realizing her feeling of being empowered, or knowing her rights and privileges. The age of a woman plays a significant role in her self realization. In the study the age groups were made into three classes. 18-30years, 31-45years and 45years and above.

Table-2: Age composition of respondents

Sl.No	Age	No	%
A	18-30 years	17	34
B	31-45years	23	46
C	45 and above	10	20
Total		50	100

Education:

Education not only brings transformation at the personal level, but

at the same time it contributes to the development of a society and a nation.

Table-2: Educational status of respondents

Level of education	No	%
Illiterate	7	14
Primary	23	46
Secondary	13	26
Higher education	7	14
Total	50	100

Marital status of respondents

Marital status influences the personality and out look of women and their status

Table-3: Marital status of respondents

Marital status	No	%
Married women	28	56
Unmarried	28	44

Occupation and position of women plays a significant role in their empowerment and upliftment

Table-4: Distribution of respondents by occupation

Occupation	No	%
Working(farm)	31	62
Non working	19	38
Total	50	100

Generally the head of the family plays a decisive role in the women's involvement in social, economic and political affairs

Table-5: Family type

Family type	No	%
Nuclear type	21	42
Joint family	29	58
Total	50	100

Decision regarding spending of family's income

Table-6: Involvement of women in same major decision

Decision item	No	%
Food	28	56
Saving and investment	7	14
Education of children	6	12
Expenditure of income	6	12
Sales and purchase of farm produce	5	10
Total	52	100

Empowerment of Farmwomen: Perception and Image

It is observed that the decision related to food i.e. procurement and cook of food item were generally taken by the house wives (56%). But for important aspects like saving and investment and sales and

purchase of farm produce the role of farm women in the study are of very negligible.

Political participation of women in the political process is key to the empowerment of women.

Table-7: Political participation

No of women	Not always	%	Occasionally	%	never	%
Casting vote	25	50	16	32	9	18
Voting decision						
Item		No		%		
Decision by self		12		24		
Decision by husband		27		34		
Decision by other		11		22		

Conclusion:

From the above study it was revealed that though the rural women were engaged in different activities for their economical as well as social empowerment but the percentage in important decisions is very negligible, "Women have still not been recognized as producers in their right". The

development of rural women has been recognized as crucial in the overall development of the country. For this qualitative change in our mind-set and method is the need of the hour. The Government, NGO, women's organization and men folk at large have to play crucial role in making gender equity and reality.

Socio-economic Impact of Self Help Groups

B.P. Mohapatra & S.K.Rout*

Over the past three decades, considerable efforts have been made to increase the quantum of institutional credit for rural development in order to reduce the extent of dependence of rural households on exploitative, non-institutional sources. There is, however a general feeling that the increased flow of institutional credit has not yielded the expected results. In this scenario, the challenge was to develop a village centered development strategy for the marginalised rural poor who always experienced the shortage of liquidity to respond to new investment opportunities, especially in agriculture. The strategy was to develop in such a way that people can 'plan' for their means and have the 'power' to implement their programmes. Analysing this possibility, the Non-Governmental Organizations decided that the strategy can be made possible by putting together small groups of poor people with similar interests and other homogenous factors. The present

study was undertaken with the objective to study the socio-economic impact among the members of women Self Help Groups.

Methodology

The study was undertaken with the women Self Help Groups monitored by the D.B.T-RBC project OUAT, Bhubaneswar for Development of Women of Puri District in Orissa. They were selected from Gop block considering the project operational area. Accordingly, six Self Help Groups were selected from Nuagaon, Junei, Annasara, Matiapara, Paitabarei & Simili villages of Puri district. Twenty members from each SHGs thus comprising of 120 women SHG members formed the sample for the study.

The socio-economic impact of the members of the SHGs was measured under ten dimensions for the study. The dimensions selected included area , production, income, information, credit, marketing, knowledge, attitude, adoption

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of recommended paddy technologies and asset creation. The impact of the dimensions viz., area, production and income were measured by taking the difference between the scores before and after becoming member and the respective indices for SHG member were calculated. For the remaining dimensions, viz., information, credit, marketing and attitude, the perceived change in the scales developed was used for calculating the respective SHG members cumulative frequency and indices. The level of knowledge, adoption and asset creation of the members before and after becoming a member were considered based on the scores in the respective scales and were used to

calculate SHG members indices. Based on the impact of the individual dimensions, a total impact index was also calculated to bring out the overall socio-economic impact of SHG members.

RESULTS AND DISCUSSION

This section deals with the results obtained from SHG members with respect to individual dimensions as well as the sum total of all the dimensions along with the discussion.

Socio-economic impact of SHG members

This relevant data regarding the impact of women SHG members on various dimensions are presented in Table.1.

Table 1: Distribution of SHG members according to the impact (n = 120)

Sl.	Dimensions	Low				Medium				High			
		N	P	I.S	I	N	P	I.S	I	N	P	I.S	I
1.	Area	56	46.67	56	0.15	16	13.33	32	0.09	48	40.00	144	0.40
2.	Production	20	16.67	20	0.05	84	70.00	168	0.46	16	13.33	144	0.13
3.	Income	20	16.67	20	0.05	62	51.66	124	0.34	38	31.67	114	0.32
4.	Information	9	7.50	9	0.02	62	51.67	124	0.34	49	40.83	147	0.42
5.	Credit	11	9.17	11	0.03	94	78.33	188	0.52	15	12.50	45	0.12
6.	Marketing	29	24.17	29	0.08	56	46.77	112	0.31	35	29.16	105	0.29
7.	Knowledge	25	20.83	25	0.07	65	54.17	130	0.36	30	25.00	90	0.25
8.	Attitude	45	37.50	45	0.12	50	41.67	100	0.28	25	20.83	75	0.21
	group												
9.	Adoption	29	24.17	29	0.08	61	50.83	122	0.34	30	25.00	60	0.17
10.	Credit	30	25.00	30	0.08	43	35.83	86	0.24	47	39.17	141	0.39

N- Number.; P- Per cent; I.S.- Index score and I- Index.

Area

The study revealed that only two-fifth of the women SHG members possessed high level of area (40.00 percent) after being a member of the group. This might be due to the following reasons. The members had already possessed adequate area for cultivation and another supporting reason was the non-availability of leased land. Moreover, nearly one-third of the members of selected SHGs had non-agriculture as their secondary occupation.

Production

It could be observed from Table 1, that a majority (70.00 percent) of the respondents had medium level of production. Such a medium level of production increase might be mainly due to the adoption of recommended paddy practices. Thus increase in production might have resulted with increased yield parameter, thereby ultimately increasing the production.

Income

More than half of the respondents fall under medium level of income (51.66 percent). The reason for majority of them belonging to medium level income might be due to the adoption of recommended paddy practices and high yielding varieties and adoption of diversified farming system.

Information

It could be observed from Table 1, that a little more than half (51.67 percent) of the women members had medium level information utilization behaviour. This might be due to the following reasons. Members of all the group had undergone trainings and had resorted to collective activities with constant association of OUAT. In addition to these factors, dedication by OUAT officials and their follow up might have contributed more towards this finding. The reports of Vipinkumar (1998) are in line with the present investigation on the information utilization behaviour of the respondents.

Credit

A majority of the respondents had medium level of credit utilization (78.33 percent). Their traditional nature of prompt repayment of loans, efficient planning and appropriate utilization of credit might have facilitated the members of SHG to have better access to credit. The flexibility of credit provisions and relatively faster sanctioning of loans were also the other reasons for the obtained results.

Marketing

As much as 46.77 percent of women belonged to medium level of marketing behaviour. About half of the

SHG members had maximum marketing activities because of the well developed marketing system through the farmers market by the collective action of all the members.

Knowledge

A majority of the respondents belonged to medium level of knowledge (54.17 percent) category on paddy cultivation practices. The reasons behind such a high level of knowledge towards the various cultivation aspects were high level of mass media exposure, positive attitude towards group activity and the existence of strengthened leadership among the group.

Attitude towards group

A little above two-fifth (41.67 percent) of the women had midium level of atitude towards group activities. Rotation of leadership, better co-operation among the members and all supporting staff may be the factors leading to favourable attitude towards group activities. The result is in agreement with the results of Vipinkumar (1998).

Adoption

Nearly half of the SHG members fell under medium level of adoption (50.83 percent) of various cultivation practices in paddy with an adoption index of 0.59. It could be observed that the knowledge level of the members of SHG was also found to be high. Hence, this would have resulted with high adoption level. The other reasons behind such a high level of adoption may be contributed to efficient use of extension methods, achievement oriented farm women members, skill oriented training programme provided by OUAT and collective activities performed by the members of the group.

Asset Creation

Nearly two-fifth (39.17 percent) of the women members had high level of asset creation. As the income level of almost 50.00 percent of the members were found to be under medium level, It is possible to incure from savings. The findings of this study are in line with that of Yogananda (1999).

Overall socio-economic impact

The relevant data regarding the overall socioeconomic impact index are presented in Table-2.

Table 2 : Distribution of SHG members according to their overall socio-economic impact index.

Dimensions	Actual impact	Max.impact	Index
Area	232	360	0.64*
Production	236	360	0.64*
Income	258	360	0.71**
Information	280	360	0.78**
Credit	244	360	0.64**
Marketing	246	360	0.68**
Knowledge	245	360	0.68**
Attitude	220	360	0.61*
Adoption	211	360	0.59*
Asset Creation	257	360	0.71**
Total	2429	3600	0.67

* Indicate below average score; ** Indicate above average score.

It is obvious from Table 2 that out of the ten dimensions studied for assessing the total impact, income (0.71), information(0.78), credit (0.67), marketing (0.68), knowledge (0.68) and asset creation (0.71) were found to be above the average socio-economic index among the SHGs members. Information index was found to be the highest among all the dimensions. The remaining dimensions viz., area (0.64), production (0.69), attitude (0.61) and adoption were (0.59) found to be below the average socio-economic impact Index.

The SHG members impact on income, information, credit, marketing, knowledge and asset creation were found to be above average the socio-economic index category. The members have shown a considerable reduction in cultivation expenditure through group activity, women were getting ample opportunities to interact with other members of the group to share mutual experiences and practices and to share their knowledge in the field situations. Besides, due to the group members thrift and savings behaviour and with adequate

amount of credit, women were making better profit through collective marketing and had also improved the bargaining power by collective action through SHGs.

The SHGs members overall socio-economic impact on area, production, attitude and adoption was found to be below the average socio-economic index category. Lack of achievement made in terms of adoption of fertilizers, need based pest management practices, organic manure and advanced production practices would be the probable reasons for their low impact on these dimensions.

CONCLUSION

Among the ten dimensions considered for calculating the overall impact index, it was inferred that only six dimensions viz., information, credit, income, marketing, knowledge and asset creation were found to be high compared to the other dimensions. Hence, efforts to improve other dimensions uniformly among SHG members should be taken up to improve production by proven technology intervention and also to bring uncultivated area under cultivation. Situation of women taking credit to repay old loans should be prevented. Improved marketing and further activities venturing into agro-processing and change in the extension strategies to make women utilize different information sources are also needed.

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Relationship between Affordability to pay for the Veterinary Services and Profile Characteristics of Sheep and Goat Farmers

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In India, the veterinary services have been funded, managed and delivered by the public sector. But in recent past the governments financial resources for the provision of veterinary services have not kept pace with the increased livestock population (Carney, 1998) and production resulting in deterioration of quality services by the public sector agencies (Anteneh, 1984; dehaan and Nissen, 1980). Hence privatisation of veterinary services is considered as one strategy that could be implemented to improve the quality of the services and to decrease the financial and administrative burden on scarce public resources. Therefore, the time has come to make transitional shift to private sector for support, though not for total substitution. Intermediate steps do exist between a solely public veterinary service system along with private partnership.

Keeping the above facts in view, the present study is designed to know the relationship between affordability to pay for the veterinary services and profile and selected psychological characteristics of sheep and goat farmers in Andhra Pradesh.

Materials and Methods

An Ex-post facto research design was used to conduct the present study in 3 mandals comprising 6 villages of Mahaboobnagar district of Andhra Pradesh. A total of 90 farmers were selected based on stratified random sampling method. A structured interview schedule was developed and used.

Results and Discussion

The affordability to pay for the veterinary services by the sheep and goat farmers was ascertained and the results were presented in Table 1.

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Table 1: Distribution of the respondents according to their affordability to pay for the veterinary services

S.No	Category	Sheep & Goat farmers	
		N=90	
		f	%
1	Less affordable	18	20.00
2	Medium affordable	61	67.18
3	High affordable	11	12.22
Total		90	100

Mean: 36.14

S.D.: 9.68

From the table 2 it could be inferred that, majority of the sheep and goat farmers (67.18%) had medium affordability to pay for the veterinary services. About 20.00 percent of sheep & goat farmers were in less affordable category, while 12.22 percent were highly affordable to pay for the veterinary services.

It could be concluded that, farmers were affordable to pay for the profitable and result oriented services because of the reason that they rear the animals for their livelihood security. Hence we have to generate the competent technological services and then formulate the privatisation strategies accordingly. The results were in accordance with the findings of Ahuja (2004) and Jagadeeswari (2003).

Correlation analysis between the affordability and Profile Characteristics of Sheep and Goat farmers:

Further the data was subjected to correlation analysis to understand the nature of relationship between the profile and other selected psychological characteristics viz., age, education, socio-economic status, innovativeness, achievement motivation, decision making ability, information seeking behaviour, deferred gratification, rationality, scientific orientation, economic orientation, value orientation, marketing orientation and management orientation and the scores of affordability to pay for the veterinary services are presented in Table 2.

Table 2: Correlation analysis between affordability to pay for the veterinary services and the profile characteristics of sheep and goat farmers.

S.No	Variables	'r' values
1	Age	-0.851**
2	Education	0.402**
3	Socio economic status	0.216**
4	Innovativeness	0.572**
5	Achievement Motivation	0.817**
6	Decision making ability	0.333**
7	Information seeking behaviour	0.864**
8	Deferred gratification	0
9	Rationality	0.824**
10	Scientific orientation	0.759**
11	Economic orientation	0.773**
12	Value orientation	-0.026
13	Marketing orientation	0.660**
14	Management orientation	0.619**

** Significant at 0.01% level

From the Table 2, except the variables like age, deferred gratification and value orientation the rest of the variables had positive and significant correlation with the farmers' affordability to pay for the veterinary services. Where as age is having significant and negative correlation.

Regression analysis between the affordability to pay for the veterinary services and profile characteristics:

Further, the data was analysed to quantify the contribution of independent variables with the variation in the dependent variable and the results were presented in the Table 3.

Table 3 : Regression analysis between independent variables and affordability to pay for the veterinary services in sheep and goat farmers

		Coefficients	T
	(Constant)	31.707	2.424
1	Age	-0.297	-4.695**
2	Education	-0.031	-0.078
3	Socio Economic status	-0.439	-0.703
4	Innovativeness	1.227	2.51*
5	Achievement Motivation	-0.429	-0.887
6	Decision making ability	-0.1	-0.182
7	Information seeking behaviour	0.805	3.382**
8	Deferred gratification	0.253	2.123
9	Rationality	0.249	0.446
10	Scientific orientation	0.232	0.857
11	Economic orientation	0.602	1.569
12	Value orientation	-0.375	-0.085
13	Market orientation	0.413	0.958*
14	Management orientation	-0.454	3.159**
R ²	0.712		

** Significant at 0.01% level

* Significant at 0.05% level

It was observed from the Table 3 that, the selected independent variables contributed to explaining 71.2% of the variation in the affordability to pay for the veterinary services among sheep & goat farmers and the remaining 28.8 per cent of the variation was might be due

to the external factors or the factors which are not controlled in the research design.

Further, it can be inferred that, out of 14 independent variables, 4 variables (innovativeness, information seeking behaviour, market orientation and management orientation) had significant and positive impact on the dependent variable; while only one variable namely,

age had significantly negative impact. The remaining 9 variables were not significant. The findings are in accordance with the results of Woodford, J D (2003).

By this relationship, we can conclude that the sheep and goat farmers who are having high and medium profile characters are obviously having high and medium affordability to pay for the services and they are ready to pay for that resulting in the high coefficient of determination.

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Drudgery Reducing Farm Implement for Farm Women- A Case Study in Kandhamal District of Odisha

Shradhanjali Mohapatra*

Women have pivotal role in agriculture; they are involved in planting ,transplanting ,weeding ,harvesting & processing to marketing .Studies on participation of rural women in India in rice cultivation indicate that women participated 15 of 18 rice farming operations either alone or jointly with male counterpart. Therefore attention is important on gender roles so that suitable interventions can be planned. Drudgery is generally conceived as physical & mental strain, agony ,monotony, hardship experienced by human beings while all these results are declined in living & working conditions affecting men & women. The plight of the women in this regard is alarming as they continue to be constrained by illiteracy, malnutrition & unemployment. The energy spent by them in performing these tasks is more than it is physically feasible for them to spend particularly in a below subsistence level of living.

Problem Addressed:

High drudgery and low efficiency of farm women involved in intercultural operations like ridging. The majority of farm women in Kandhamal district continue to use age old local tools & implements which are slow in operation & cause considerable fatigue & drudgery during intercultural operations.

Technology Assessed:Hand Ridger

Tested: KVK, Kandhamal, Odisha

Age of respondents: 20-40 years

Genesis of work: In Kandhamal district Cabbage & Cauliflower is being cultivated in 2057 ha & 3419 ha respectively throughout the year. Intercultural operation like weeding, hoeing & ridging is important in vegetable crops like Cabbage & Cauliflower. This intercultural operations mostly done by farm women & they usually use age old local implements which causes drudgery & decrease their working efficiency. This research is aimed to reduce their drudgery and increase their working efficiency by introducing hand ridger for ridging.

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Working principle of equipment:

1. It is very handy to use & manually operated.
2. Its a Light weight (1.25 kg) ,low cost equipment.
3. It consists of a “V” shaped blade connected with a bend clamp & a long wooden handle.
4. Simple to operate which improves the work posture and also reduces the drudgery of the women worker.
5. This is operated at optimum soil moisture condition and preferably after 40-45 days of planting

Methodology applied:

5 farmwomen from different adopted villages were selected for the study. Ridging in Cabbage with hand Ridger was compared with local Phoura . During the experiment various parameters viz., time ,working efficiency, labour cost & B C ratio .were taken into consideration.

Ridging efficiency calculated by the formulae-

$$R = \{(R1 - R2) / R2\} \times 100$$

Where, R = Ridging efficiency, %

➤ R 1= Ridging area (m²/hour) using hand ridger.

➤ R 2= Ridging area (m²/hour) using local implements.

$$R = (R1 - R2) / R2 = \{(96 - 62) / 62\} \times 100 = 54\%$$

Performance data

Particulars	KVK	
	FP	IP
No. of Trials	5	5
No. of farmers involved	5	5
Crop	Cabbage	Cabbage
Soil condition	Sandy	Sandy
Weeding intensity%	-	-
Output m ² /h	62	96
Est. Energy Expenditure kj/min.	-	-
WHR beat/min.	-	-
% reduction in drudgery	-	40
% increase in efficiency	-	54
Impact: no. of farmers adopted %	-	45

FP= Farmer’s practice IP=Improved practice

Analysis:

Making ridge & furrow in vegetable cultivation is costlier. By using hand ridger the labour cost is reduced by 50 % & increase in output is 54 %.

Comparing with local implement it is found that hand ridger was easy to operate, no bending required, no muscle strain, less energy expenditure for doing intercultural operations.

Output:

Intercultural operations is one of the important labour intensive activity. The implement is low cost & easy to operate; so farm women accepted this implement. It also saves labour cost by 50 %. One of the ways to substantially reduce drudgery of farm women is to popularize low cost women friendly implements.

Conclusion:

Availability of women friendly, cost effective implements will ease out the drudgery of farm women & will leave enough time for income generating enterprises as well. Hand Ridger is women friendly tool because the assessment of technology increases the efficiency and reduces drudgery and it avoids bending and squatting posture. By introducing such small tools, the work and work environment can be improved, physiological workload can be reduced in the agriculture and the efficiency and work out put can be improved significantly.

Impact of Dyadic Communication for Taking Decision in Farm Family

Chitrasena Padhy*, B.P. Mohapatra** and A. Sarkar***

Dyadic communication is the direct communication between two people or groups of people. It involves face to face speaking situation. It is described as communication between participants who are dependent upon one another. It is a communication process in which two people interact face to face as sender and receivers.

Better Dyadic communication plays a vital role in disseminating information about scientific farming operations between the family members such as dyad 1 between family head and wife, between family head and son (dyad-2), between family head and daughter (dyad-3). Interpersonal communication occurs when a person communicates directly with other people in a one to one situation or in small groups. The number of people is not the factor that identifies interpersonal communication, direct communication on a one to one basis is an essential feature. There are varying

levels of interdependence among concept or events.

Objective:-

1. To study the dyadic communication pattern between husband and wife for taking farming decisions in study area.
2. To find out the distance maintained while communicating in different dyadic situations.

Materials and Methods

The blocks Chikiti and Digapahandi of Ganjam district were purposively selected. Two villages namely Gadagovindapur and B-Nuapada were randomly selected under the two blocks. Fifty farmers were taken from each village. Purposive as well as simple random sampling techniques were adopted for the study. For selection of district and blocks purposive sampling technique was adopted and in case of selection of villages and respondents

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Impact of Dyadic Communication for taking

simple random sampling technique was taken up. The total number of farm respondents under study were 100. Dyadic communication among the farm family members with respect to their scientific farming operation is the dependent variable of the study.

Results and Discussion

Dyadic

Pattern 1: Communication between family Head (F.H) and his wife (DI)

Table 1: Co-efficient of correlation between dyadic communication and 18 causal variables

Variables (D ₁)		Family head & wife
1. Age	X ₁	-0.0024
2. Occupation	X ₂	0.0359
3. Caste	X ₃	-0.0630
4. Educational Level	X ₄	0.1857
5. Family education status	X ₅	0.0602
6. Family size	X ₆	-0.0673
7. Social participation	X ₇	-0.0734
8. House type	X ₈	0.0072
9. Materials Possession	X ₉	-0.0551
10. Land holding	X ₁₀	0.0551
11. Agricultural implements	X ₁₁	0.0304
12. Risk taking ability	X ₁₂	0.0240
13. Cosmpoliteness	X ₁₃	0.0283
14. Mass media exposure	X ₁₄	0.0387
15. Fatalism	X ₁₅	0.0410
16. Dependency	X ₁₆	0.0713
17. Tolerance	X ₁₇	0.2219*
18. Faith	X ₁₈	-0.1328

* Significant at 5% level

Table 1 shows the relations between i) family head and his wife (D1) Tolerance of a farmer is positively and significantly correlated with the dyadic communication in case of dyad 1 i.e. in between family head and his wife.

Tolerance is a measure to listen something with patience from any other. One influences the degree of communication in between 2 persons. Degree of communication will increase by listening some one with patience.

Table 2: Multiple regression analysis of dyadic communication pattern (D1) and 18 causal variables.

Variables		Standardized β xR	Multiple regression coefficient (B)	SE of 'b' regression coefficient	T value	of 'b'
1. Age	X1	0.110	-0.148	0.060	0.085	0.103
2. Occupation	X2	0.065	1.332	0.506	0.955	0.530
3. Caste	X3	-0.151	5.404	1.081	0.198	1.355
4. Education level	X4	0.282	29.667	0.458	0.212	2.163*
5. Family education status	X5	-0.073	-2.483	-0.166	0.295	0.561
6. Family size	X6	-0.067	2.559	-0.112	0.269	0.415
7. Social participation	X7	-0.015	0.632	-0.040	0.339	0.119
8. House type	X8	0.038	0.156	0.309	1.209	0.256
9. Material possession	X9	-0.007	0.207	-0.007	0.150	0.047
10. Land holding	X10	0.180	5.207	0.081	0.072	1.134
11. Agricultural implements	X11	0.073	1.250	0.120	0.238	0.503
12. Risk taking ability	X12	-0.018	-0.243	-0.255	1.592	0.141
13. Cosmopolitaness	X13	-0.083	-1.339	-0.382	0.621	0.615
14. Mass media exposure	X14	-0.095	2.087	-0.085	0.142	0.598
15. Fatalism	X15	-0.003	-0.059	-0.002	0.094	0.019
16. dependency	X16	0.079	3.184	0.123	1.178	0.688
17. Tolerance	X17	0.265	33.403	0.880	0.358	2.460*
18. Faith X18	-0.255	19.183	-0.661	0.340	1.944*	

** Significant at 5% level*

Above table represents the multiple regression analysis between dyadic communication in case of family head and his wife and 18 predicted variables to predict the effect of individual predicted variables in presence

of other variable on predicted one. The variable education of the respondent, tolerance and faith on others had shown a positive and significant effect on the dyadic communication.

Impact of Dyadic Communication for taking

The education status of the respondent helps to build a perfect cushion for information endowment and experience procurement to flourish their individual activity towards the communication between family head and his wife.

The variable tolerance of the respondent prepares the mental set up to listen and learn from other people which ultimately leads to the information procurement and creates the analytical framework in their mind. It enhance to believe on the others' information and

rationalize that information which he had received from others.

The b x R value represents the percentile contribution of the individual predicted variable to predict the dependent variable. The variable tolerance had shown the highest percentile contribution towards the prediction of dependent variable, the communication in dyad 1, followed by the variable education of the respondent (29.66%).

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Entrepreneurial Characteristics of Women Dairy Cooperative Society Members

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The cooperative sector in general and the dairy cooperative in particular continues to occupy an important place in India's economy and rural development strategies. Dairy cooperative societies have been playing a pivotal role in bringing about white revolution in India. The first dairy cooperative society registered in Allahabad in UP in 1993 and was called "Katra Cooperative Dairy Society". The dairy cooperative movement in India has achieved a remarkable success in the past 50 years, more so in the last 20 years. The number of registered dairy cooperative societies has reached over 74,000 and 170 milk unions are being operated in 264 districts and more than 10 million dairy farmers have joined the dairy societies (Kurien, 1999).

Women's cooperative societies have made women's participation in different socio-economic activities more challenging. Cooperatives are considered as an important tool for effecting sustainable rural development by utilizing locally available resources. Their role is instrumental in getting higher

income, ensuring equitable distribution of income and employment opportunities. Increasing women involvement and motivation in cooperative can bring remarkable changes in their socio-economic status and assist them in equity, social justice, self-help, development and encouraging the women's organizations with requisite technical and management skill and credit facilities to their activities and operations. In India and Indonesia, special women cooperative societies are the sources of inspiration of women welfare. Since 1988 the National Dairy Development Board (NDDB) through its cooperative development programme in different parts of India, decided to involve women dairy farmers through cooperative movement.

WDCS (Women Dairy Cooperative Society) is an entrepreneurial unit of livelihood. Many families in rural areas depend upon dairy animals for their living. Milk production and productivity and the remunerative price are the key factors for the successful dairy units. It

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is hypothesized that entrepreneurial characteristics of the individuals are related with success or failure of the enterprise. Within the frame work of the study an attempt was made to identify entrepreneurial characteristics of the WDCS members.

Materials and methods:

The study was conducted in two undivided districts namely Cuttack and Dhenkanal in the state of Orissa, which were selected on the basis of performance of milk root and the respondents were selected covering 22 number of WDCS with high and low performance. A multistage sampling procedure was followed to select the sample for the study. The district milk

unions and the milk routes were selected purposively, whereas the Women Dairy Cooperative Societies and the members were made purposively. From 22 numbers of WDCS, a sample of 110 respondents covering 50 from Cuttack and 60 from Dhenkanal districts were finally selected and informations were secured through a structured interview schedule adopting personal interview method.

Results and Discussions:

Entrepreneurial characteristics of the WDCS members on ten important aspects as has been explained in the Table 1 in all the cases, the response was measured on a three point scale which have been analyzed.

Table 1. Entrepreneurial behaviour of WDCS members

Characterisc	Cuttack	Dhenkanal	Average	Gap(%)
Hard work	1.84	1.18	1.51	50.66
Desire of achievement	2.04	1.57	1.80	40.00
Optimistic	2.34	2.03	2.18	27.33
Foresightedness	1.70	1.11	1.40	62.00
Independent	1.43	1.38	1.40	53.33
Future planning	1.45	1.26	1.35	55.00
Good organizer	1.60	1.56	1.58	47.33
Innovativeness	1.70	1.61	1.65	45.00
Information seeking	1.60	1.23	1.41	53.00
Quality consciousness	1.45	1.04	1.24	58.66
Average	1.71	1.39	1.55	49.73

A glance at the table reveals that the gaps in different aspects vary from 27.33% to as high as 62.00%. The analysis reveals that maximum gap is observed in case of foresightedness (62%) followed by quality consciousness (58.66%), future planning (55%), information seeking habits (53%), independent in taking decision (53.33%) and hard work (50.66%).

The other aspects in which considerable gap is observed are to be good organizer, innovativeness, desire for achievement and optimistic in maintenance of enterprise. Taking into consideration of Cuttack and Dhenkanal district, the gap is observed to be more in case of Dhenkanal district than Cuttack. The overall gap is 49.33%, and district wise gap is found to be 43% and 53.66% for Cuttack and Dhenkanal district respectively. So, the overall conclusion is that the members of WDCS have not been educated or trained to exhibit their entrepreneurial characteristics. The high percentage of gap indicates need for intervention in entrepreneurial aspects to boost up their production and productivity level leading to success of the society. The difference between Cuttack and Dhenkanal districts is due to higher level of education, closeness to milk processing unit, better socio economic status and exposure to mass media.

Conclusion and recommendation

In most of the WDCS, it was seen that a dull and lethargic working culture was prevailing. Because of their low level of education and orthodox culture, there was very slow progress of the society. They have not yet realized the importance of cooperatives for betterment of their livelihood. Inability to engage the professional managers are due to small business turnover and net profit. Participatory approach and dynamic leadership are two of the pre-requisites not only for creating and nurturing the WDCS but also for providing a vision, inspiring and guiding both the members and the management so as to enable the WDCS to achieve its purpose. In this respect, no stone should be left unturned in educating to all associates of WDCS about the guidelines, objectives, roles, duties, philosophy of WDCS and its operational procedures.

Another important area to be attended too is the training procedure. Training methods should be of interactive and participatory enough rather than vertical training confined to theoretical orientation. Use of posters, charts, demonstration, field visits and share of success stories and more so a training with problem solving mode to be adopted. Creation of a mobile training unit would help to secure the participation of more women in group at their suitable time and at their home site.

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Constraints Perceived by the Tribal Women in Rice Farming-A Case Study in Orissa

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It has been found that farm women perform varieties of functions in the farm as producers, wage earners and post harvest managers (Balaguru, 1992). They play a crucial role in agriculture development and allied fields. In the tribal economy of Orissa, shifting cultivation ('bogodo'), women spend 105.4 days per year on agricultural operations compared to men who only spend 59.11 days per year on agriculture work (Fernandes and Menon, 1987). No doubt, the farm women face some problems and risks due to our male agricultural extension systems which are not so effective in providing technical information to women farmers. Many constraints exist simultaneously in several stages of development and patterns of progression from one stage to another depending upon the time, place and other sets of conditions (Mishra et.al., 1987). Therefore, recognize to this serious lacuna in extension, it is essential to know the needs and constraints faced by tribal

women. So that their capabilities and contribution can be increased significantly.

Objective

Keeping this in view, the study was conducted in tribal belt of Orissa to know the constraints perceived by the tribal women who are involved in rice farming so that the measures can be taken.

Methodology

For the study, four villages in two blocks like Kolenchia and Nuapada were selected in the district of Nuapada. Total 60 numbers of tribal women were selected having direct involvement in rice farming as primary occupation.

Results and Discussion

I. Personal and economic status

Data was collected from tribal women to get information on their personal and economic status which is reflected in the following table.

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Constraints Perceived by the Tribal Women

Table 1: Personal and Economic status

Sl. No.	Personal and Economic status	Frequency	n= 60 Percentage (%)
1.	Age		
a)	20-30 years	08	13.33
b)	31-40 years	44	73.34
c)	> 41 years	08	13.33
	Total	60	100.00
2.	Education		
a)	Illiterate	46	76.67
b)	Primary	11	18.33
c)	High school	03	5.00
d)	Above high school	00	0.00
	Total	60	100.00
3.	Occupation		
a)	Farming (primary)	60	100.00
b)	Business (secondary)	20	33.33
c)	Labour work (tertiary)	14	7.77
4.	Land holding		
a)	< 1 acre	04	6.66
b)	1-3 acre	46	76.67
c)	> 3 acre	10	16.67
	Total	60	100.00
5.	Annual Income		
a)	<Rs. 15,000	08	13.34
b)	Rs.15,001 -Rs.25,000	16	26.66
c)	>Rs.25,001	36	60.00
	Total	60	100.00

It reveals from the above table that majority of the respondents were from the age group of 31 to 40 years (73.34%) and illiterate (76.67%). All most all had farming as their primary occupation (100%) followed by business (33.33%) and labour work (7.77%) as secondary and tertiary occupation respectively. About 77% of tribal women had 1-3 acres of land followed by more than 3 acres (16.67%) and less than 1 acre (6.66%). Rice was the only field crop in kharif for all whereas vegetable in homestead was found with very few

respondents in rabi season. Majority of them were (60%) within the income group of more than Rs.25,001-as annual income against having the income range from Rs. 15,001- to Rs.25,000/- (26.66%) and less than Rs. 15,000- (13.34%).

II. Social status

Social status and social participation plays a great role to get new information for solving the constraints. So, analysis was done in this aspect and data is reflected in table as follows.

Table 2: Social status

			n = 60
Sl. No.	Social status	Frequency	Percentage(%)
1.	Family head		
	a) Husband	54	90.00
	b) Parents/children	06	10.00
	Total	60	100.00
2.	Social participation		
	a) SHG	60	100
	b) Mahila Samiti	02	3.33
3.	Extension exposure		
	a) VLW	58	96.68
	b) Block functionaries	01	1.66
	c) No contact	01	1.66
	Total	60	100.00
4.	Mass media exposure		
	a) TV	40	66.66
	b) Radio	60	100.00

Constraints Perceived by the Tribal Women

5. Field exposure			
a)	Farmers field	18	30.00
b)	No exposure	42	70.00
Total		60	100.00

6. Undergoing training			
a)	Yes	16	26.66
b)	No	44	73.34
Total		60	100.00

The above table shows that 90% of families were headed by their husbands followed by parents/ children (10%). It is clear that the tribal women have no headship in families. Their participation in social organization was limited to only SHGs and 3.33% had contact with Mahila Samitis. As far as exposure with extension people was concerned, about 97% had contact with local VLW and mass media exposure was TV (66.66%) and radio (100%). Out of total 60 respondents, only 30% had visited other farmer's vegetable field

demonstrated by watershed department as field exposure whereas 70% had no such type of field exposure. Regarding undergoing agricultural training, about 73% was not imparted any training against 27% who were trained in agriculture field.

III. Perceived constraints

Questions were asked to the tribal women to know the constraints perceived by them in rice farming under five areas like technological, economical, input service supply, institutional and general and then it was analyzed in rank order.

Table 3: Perceived constraints (rank order analysis)

Sl. No.	Constraints	Percentage	Rank
1.	Technological	63.33	II
2.	Economical	58.33	III
3.	Input service supply	75.00	I
4.	Institutional	51.66	IV
5.	General	50.00	V

The obtained data reveals that input service supply was the major problem which 75% of respondents face and they put it as 1st rank followed by technological (63.33%), economical (58.33%), institutional (51.66%) and general (50.00%) as 2nd, 3rd, 4th and 5th rank.

Table 4: Perceived constraints

(n=60)			
Sl. No.	Areas	Percentage	Rank
A. Technological constraints			
1.	Lack of knowledge about improved varieties	3.33	VI
2.	Lack of knowledge about latest technology	11.66	II
3.	Lack of skill about latest technology	5.00	V
4.	Lack of knowledge about IPM	6.66	IV
5.	Lack of knowledge about agricultural extension functionaries	0.00	-
6.	Lack of technical guidance at proper time	10.00	III
7.	Unavailability of latest technology at village	26.66	I
B. Economic constraints			
1.	Lack of money in time	3.33	IV
2.	Low market price	11.66	II
3.	High fluctuations of rice	1.66	V
4.	Higher cost of quality inputs	6.66	III
5.	Distress sale due to urgent need of money	21.66	I
6.	Lack of proper market	6.66	III
7.	Labour intensive crop	3.33	IV
8.	Problem of transportation charges	0.00	-
9.	Lack of subsidies on inputs	3.33	IV
C. Constraints related to input service supply			
1.	Non-availability of suitable rice varieties	0.00	-
2.	Supply of low quality rice seeds	6.66	VI
3.	Inadequate and untimely canal irrigation	18.33	I
4.	Non-availability of manures and fertilizers	13.33	II
5.	Non-availability of insecticides/ pesticides	10.00	IV
6.	Non-availability of suitable farm implements	8.33	V
7.	Higher agro inputs	11.66	III
8.	Non-availability of initial inputs	6.66	VI

Constraints Perceived by the Tribal Women

D. Institutional constraints			
1.	Lack of training institutions for farmers	3.33	IV
2.	Hardship of credit facilities	8.33	II
3.	Lack of coordination among working institutions	5.00	III
4.	Non-availability of village level agricultural worker	5.00	III
5.	Contact farmers' preference by extension workers	3.33	IV
6.	Lack of active and local leaders	1.66	V
7.	No trust worthiness of Agricultural functionaries among farmers	25.00	I
E. General constraints			
1.	Natural calamities	3.33	IV
2.	Lack of supervision by extension personnel	15.00	II
3.	Lack of coordination among the farmers	11.66	III
4.	Fragmented and undulated land resource of poor farmers	20.00	I

Under technological constraints, non-availability of latest technology at village was ranked as first (26.66%) while lack of knowledge about agricultural extension functionaries was not a problem for them. According to Chander & Singh (2003) lack of knowledge about recommended dose of pesticides, bio-pesticides and fertilizers ranked first as technological constraints.

Likewise, distress sale due to urgent need of money was perceived by the tribal women as most economic constraint (21.66%) followed by low market price and lack of proper market. Similar contentions under economic constraints have been reported by Jana (2000).

Inadequate and untimely canal irrigation was viewed to be most serious problem under input service supply followed by non-availability of manures and fertilizers. Input service supply being ranked as most serious constraint has similarity with the contentions of Sudhakar (1998) & Suresh (1998).

Institutional constraints was another important area where the tribal women felt the problem of no trust worthiness of agricultural functionaries among farmers (25.00%) and the less constraint was with lack of active and local leaders.

Lastly, under general constraints, they ranked the area in descending order like fragmented and undulated land

resource of poor farmers (I), lack of supervision of extension personnel (II), lack of coordination among the farmers (III) and natural calamities (IV). Political interference was not felt as a constraint by any of the tribal women.

Suggestions

- A separate support system including financial, research and training institutions, extension and consultancy services, etc. should be developed for tribal women.
 - First of all, the agriculture extension functionaries should create faith among the tribal women before transferring any technology.
 - The concept of village banking and mobile banking should be introduced.
 - Seeing is believing. Hence local research institutes must arrange exposure visit of tribal women to successful demonstration units.
 - Education-cum-training facilities should be provided to understand the latest technology and its scope.
- Linkage with funding agencies should be developed for easy finance.
 - With widespread illiteracy among tribal women, the crucial skill of “effective communication” should be developed. Technology translator concept can be adapted.
 - Rural marketing centers should be established for marketing functions of local, national and export market.

Conclusion

Sea change is required in case of roles played by NGOs, community based organizations and local government organizations. They must intervene in removing constraints to increase productivity and production to go up in the ladder of economy. Task forces and high-level experts should look at the science and technology inputs for tribal women and consider the problems and their solutions to improve the quality of life for women in all walks of life. Location specific policy and plan is needed to minimize the constraints.

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Awareness of Consumer Issues among the Members of Women Self Help Groups in Jharsuguda District

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Every person in the society is a consumer of goods/services from the time of his/her birth. Consumption is the sole end and purpose of all production and the interest of both the producer and the consumer ought to be attended. But in an environment of limited choice, inadequate supplies, incomplete information and unlimited demand, it is inevitable that the poor consumer gets cheated.

Now-a-days the women are largely coming to the marketing front which was meager in the past. The women SHG movement in the state has proved that the SHGs have benefited the poor members in myriad ways. The SHGs have provided access to financial services for a large no. of people who previously did not have this opportunity. The SHG members of the district predominantly invest both in small scale agriculture and non farm activities. It implies the women are no longer the consumers in micro environment; they have also entered to the complex macro environment of consumerism.

Objective

To find out the awareness of various consumer issues among the women SHG members.

Materials and methods

A randomly selected 60 members of ten Women Self Help Groups of different blocks in Jharsuguda district constituted the sample for the present study. The data was collected using interview schedule by personal interview method. Statistical analysis of the data was carried out using means, frequencies and analysis of variance.

Results and Discussions

Table-1 reveals the general profile of the sample selected. From the result it is clearly evident that a high percentage of respondents belonged to the age group of 35-45 years (51.7%) representing the expanding stage of family life cycle. Nearly sixty percent of respondents had primary education and only five percent respondents were

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graduates. Majority of the respondents (86.7%) were from joint families. Nearly half of the respondents were involved in

post harvest value addition of crops. Fifty one per cent of the respondents had monthly income ranging from Rs.5,000 to 10,000.

Table-1 Profile of Respondents

Profile details	No.	Percentage
Age (in years)		
25-35	20	33.3
35-45	31	51.7
45-55	9	15
Total	60	100
Education		
Illiterate	4	6.7
Primary	37	61.6
High school	15	25
Intermediate	1	1.7
Graduate	3	5S
Total	60	100
Type of family		
Joint	52	86.7
Nuclear	8	13.3
Total	60	100
Income generating activities undertaken		
Mushroom cultivation	6	10
Post harvest value addition	28	46.7
Vegetable growing	18	30
Broom stick making from Biren grass	20	33.3
Total	72 *	100

Total Family Income

Below 5,000	1	1.7
5,000 – 10,000	31	51.6
10,000 – 15,000	25	41.7
15,000 – 20,000	3	5
Total	60	100

* Indicate multiple responses

Standard Marks

To ensure better quality products, women as consumers are expected to check standard marks like I.S.I, AGMARK, F.P.O, WOOLMARK, and TRADEMARK etc. on the products. Table-2 explains the extent of awareness of respondents in

general towards standard marks. It is evident from the findings that a negligible proportion of the respondents were aware of the standard marks like I.S.I, F.P.O and trademarks. As a whole it is understood that the respondents were unaware of the standard marks in general.

Table-2 Distribution of respondents towards Awareness of Various Standard Marks

Sl. No.	Standard marks	Aware		Not aware	
		No.	Percentage	No.	Percentage
1	I.S.I	2	3.3	58	96.7
2	AGMARK	-	-	60	100
3	F.P.O.	1	1.7	59	98.3
4	WOOLMARK	-	-	60	100
5	TRADEMARK	2	3.3	58	9

Consumer Rights

The findings of table-3 reveal that a very low proportion of the present sample is aware of consumer rights. Comparatively a higher proportion (15%) of the sample is aware of the right to

consumer education and right to healthy environment. Reasons for this could be ignorance, lack of interest among respondents, low level of education and lack of exposure to any awareness programme covering this aspect.

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Table-3 Distribution of respondents towards Awareness of Consumer Rights

Sl. No.	Consumer Rights	Aware		Not aware	
		No.	Percentage	No.	Percentage
1	Right to Safety	3	5	57	95
2	Right to be Informed	3	5	57	95
3	Right to Choose	2	3.3	58	96.7
4	Right to be Heard	3	5	57	95
5	Right to Redress	2	3.3	58	96.7
6	Right to Consumer education	9	15	51	85
7	Right to Healthy Environment	9	15	51	85

Consumer Responsibilities

Data on consumer responsibilities (table-4) reveals that a very low proportion of the present sample is aware of consumer responsibilities which are same as in case of the consumer rights. Comparatively a higher

proportion (11.7%) of the sample is aware of the responsibility for environmental awareness. This may be because of more no. of awareness programmes on environmental issues, as the district is presently facing environmental pollution hazards due to rapid industrialisation without safeguards in this aspect.

Table-4 Distribution of respondents towards Awareness of Consumer Responsibilities

Sl. No.	Consumer Responsibilities	Aware		Not aware	
		No.	Percentage	No.	Percentage
1	Responsibility for Critical Awareness	3	5	57	95
2	Responsibility for Action	1	1.7	59	98.3
3	Responsibility for Social Concern	3	5	57	95
4	Responsibility for Environmental Awareness	7	11.7	53	88.3
5	Responsibility for Solidarity	1	1.7	59	98.3

Protective Laws

It can be inferred from table -5 that general awareness towards

protective laws was very poor among the women SHGs. However there is a substantial no. of women in the sample (11.7%) who are aware of the consumer protection act.

Table-5 Distribution of respondents towards Awareness of Protective Laws

Sl. No.	Consumer Rights	Aware		Not aware	
		No.	Percentage	No.	Percentage
1	Sale of Goods Act, 1930	-		60	100
2	Agricultural produce Act, 1937 (Grading & Marketing)	-	-	60	100
3	The Drugs & Cosmetics Act, 1940	-	-	60	100
4	Food Adulteration Act, 1954	3	5	57	95
5	Monopolies and Restrictive Trade Practices Act, 1977	-	-	60	100
6	The Standard of Weights & Measures Act, 1977	4	6.7	56	93.3
7	Bureau of Indian Standards Act, 1986	3	5	57	95
8	Household Electrical Appliances Order, 1976	2	3.3	58	96.7
9	Consumer Protection Act, 1986	7	11.7	53	88.3

Fraudulent Practices

Table- 6 signifies the extent of awareness of the consumers towards fraudulent practices used by the sellers. A large group of consumers i.e. 21% to 55% of the respondents were aware of the fraudulent practices such as improper

weighing and measuring, misleading or false advertisement, selling inferior quality products and adulteration of foods. Murali and Kulkarni (1990) in their study reported that majority of the homemakers were aware that most of the food stuffs were adulterated.

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Table-6 Distribution of respondents towards Awareness of Fraudulent Practices

Sl. No.	Fraudulent Practices	Aware		Not aware	
		No.	Percentage	No.	Percentage
1	Selling Inferior Quality Products	17	28.3	43	71.62
2	Improper Labeling of the products	9	15	51	85
3	Misleading or False Advertisement	19	31.6	41	68.3
4	Duplicate Products are sold at Original Price	11	18.3	49	81.6
5	Hoarding of Goods	11	18.3	49	81.6
6	Adulteration of Foods	13	21.6	47	78.3
7	Improper Weighing & Measuring	33	55	27	45

Consumer Organisations

Table-7 shows that the awareness of the respondents on the existing consumer organizations in Jharsuguda district is lacking among the respondents. It is very disheartening to note that only fifteen per cent of the respondents is aware of the district consumer forum followed by ten

per cent of the respondents aware of the NGO named as CAPARD.(Centre of advancement of public and rural development services)

Table-7 Distribution of respondents towards Awareness of Consumer Organisations

Sl. No.	Consumer Organizations	Aware		Not aware	
		No.	Percentage	No.	Percentage
1	District Consumer Forum	9	15	51	85
2	CAPARD	6	10	54	90
3	The awareness	-	-	60	100

Redressal Procedure

It was observed in the table-8 that nobody was aware of the redressal procedures among the women of the Self

Help Groups expect a very negligible proportion (3.3%) who were aware of the procedures like who can file a complaint and when to file a complaint.

Table-8 Distribution of respondents towards Awareness of Redressal Procedures

Sl. No.	Consumer Organizations	Aware		Not aware	
		No.	Percentage	No.	Percentage
1	Who can file a Complaint	2	3.3	58	96.7
2	When to file a Complaint	2	3.3	58	96.7
3	Where to file a Complaint	-	-	60	100
4	With whom to file a Complaint	-	-	60	100
5	On what grounds Complaint can be made	-	-	60	100
6	How to file a Complaint	-	-	60	100
7	Benefits and Protective Measures	-	-	60	100

From the results of the study it can be concluded that the awareness on consumer issues like consumer rights, responsibilities, protective laws, redressal procedures, possible consumer actions and consumer organizations is negligible among the members of the women Self Help Groups. It is very important to make the women aware of the consumer issues so as to create an atmosphere of

consumer satisfaction which will lead to better economic transaction. To create a true sense of empowerment among the rural women and to save them from the clutches of the middlemen, the most effective measure will be consumer education. Hence, consumer education is the utmost need of the hour to bring a desirable change in the present situation.

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Role of Nokma (Village Headman) in Agriculture of West Garo Hills, Meghalaya

Biswajit Lahiri* and Puspita Das**

In India, most of the states are dependent on agriculture. Higher percentage of contribution in Gross Domestic Production in the economy of most states is the proof of their dependency on agriculture. The state of Meghalaya is also no exception. Almost eighty per cent of total population of Meghalaya is dependent on agriculture for earning their livelihoods. Although agriculture occupies an important place in the economy of the state but only a little more than 8 percent of the total geographical area is available for cultivation and out of which only 13 percent of the cultivated land produces more than one crop in a year (Bhakta, 2002). The rainfall in the state is adequate for agriculture, but due to rugged topography and other various reasons, productivity is not satisfactory. After independence, this part of our country has experienced several geo-political transformations. Inevitably, the development of agriculture also suffered little bit due to these changes. But, after

achieving the statehood in 1972, development of agriculture got an impetuous, which is evident by almost forty two per cent increases in total cropped area during last twenty five years. Particularly, in cultivation of food grains, vegetables, fruits, commercial flowers, plantation crops, orchids and *Anthorium*, state have achieved a remarkable progress. (Source: Statistical Hand Book, Meghalaya, 2007). But, like other hilly states, the development of agriculture is also not easy task due to several constraints, like tough terrains, traditional jhum cultivation, tradition bound farmers, poor infrastructural facilities, inadequate marketing facilities and lack of intensive extension activities. Moreover, like other north-eastern states, Meghalaya has diverse ethnicity, which also hinders to take some common programme for the development of agriculture. In Meghalaya, three major tribes, Khasi, Garo and Jaintia are visible, who have different cultures, norms, taboos, customary laws, languages etc.

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Since, time immemorial, agriculture is interwoven with culture of a society, so there are also differences in terms of agriculture among these tribes. Like, most of the north-eastern states, shifting cultivation (Jhuming) are also popular in Garo hills. The Garo tribe of the plain areas practice wet-rice agriculture. According to Nakane (1967), they live in a cultural and ecological environment entirely different from that of the Garo of the hills. Thus, the traditional approach of extension activities taken in other parts of the country for development of agriculture may not be too much effective due to different socio-economic, socio-cultural and socio-anthropological situation in this part of the country.

The present study has been confined to particularly on Garo tribes and the contribution of *Nokma* (Village Headman) in the agricultural activities in the area. Thus it is essential to have an idea about the Garo hills, the Garo tribes and their agricultural practices. The majority of the population in Garo hills belongs to the Garo tribe, who called themselves *Aychik*. Garo society is matrilineal, and inheritance is through the mother. Kar (1982) stated in his study, in Garo hills, the land is of two types; *ayking* and *aymilam* land. The management of the *ayking* land is entrusted to the *Nokma* or Village Headman. *Nokma* is the husband of the main lady of the founder clan (*Machong*) of the community. The District Council possesses complete records of the boundaries of each tract

of an *ayking* land and handover to *Nokma*. *Nokma* distributes his *ayking* land among the individual farmer for a particular period for cultivation purpose. The individual needs not to pay any tribute to the *Nokma*. Obviously, *Nokma* has very important role in agriculture in Garo Hills, because he has the sole authority to distribute the land to the villagers and also provides some directions. As *Nokma* has the supreme authority in his *ayking*, he can play a pivotal role in agricultural development in Garo hills and in extension point of view, they have certain edge to help their people to help themselves.

Thus in this backdrop, the present study was formulated with the following objectives;

- To study the different socio-economic condition of the *Nokma*
- To assess the *Nokmas'* role in different aspects of agricultural operation,
- To explore the potentiality of *Nokma* as rural leader for betterment of agriculture in the area,

Materials & Methods:

The present study was conducted on exploratory type of research design. Data were collected from both primary and secondary sources. Different information regarding Garo customary laws in relation to agriculture were collected from secondary sources, like Garo Autonomous

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District Council, *Nokma* Association (Council), District Commissioner's Office, Krishi Vigyan Kendra, State Agricultural Department, NGOs etc. For the present study, among the three districts in Garo hills, West Garo hills District was selected purposively for the convenience of the researchers and easy accessibility. For selection of villages, all the villages of West Garo Hill district were grouped into three different categories, namely high hills, medium hills and plain areas. Ten villages from each category were selected by Simple Random Sampling

(Without Replacement) from list of total villages in each category. So, altogether 30 (thirty) villages were selected from three categories in the district. Now, each village is governed by only one *Nokma*. Due to lack of proper communication facilities and insufficient funds, study area was confined in thirty villages. So, the 30 *Nokmas* (Thirty) in those thirty villages were also interviewed with semi-structured interview schedule. The data were analyzed through frequency distribution, percentage distribution and correlation co-efficient.

Results and Discussion:

Table-1. Educational Status

Education	Frequency	Percent
Illiterate	1	3.3
Can Read only	2	6.7
Read and Write	10	33.3
Primary Level	1	3.3
Middle Level	8	26.7
Higher Secondary School	8	26.7
Total	30	100.0

The above table reveals the educational status of the *Nokmas*. It was found from the study that 33.3 per cent of *Nokma* can read and write only. But, at the same time, more than 50 per cent of the *Nokmas* studied up to Middle level

or above. Thus, it can be stated that in terms of higher education, educational status of *Nokmas* was not very high, but the elementary educational status was quite good.

Table-2. Family Type

Family Type	Frequency	Percent
Nuclear Family	4	13.3
Joint Family	26	86.7
Total	30	100.0

The table states that 86.7 percent of the *Nokmas* lived in joint family and only 13.3 percent of the *Nokma* were staying in nuclear family, which suggests *Nokmas* did not want to break their tradition in terms to their dwelling status.

Table-3. Family Size

Family Size	Frequency	Percent
Up to 5	5	16.7
Above 5	25	83.3
Total	30	100.0

It is evident from the table that in 83.3 percent cases, there were more than 5 family members in *Nokmas'* family.

This is probably because majority of the *Nokmas* belonged to joint family.

Table-4. Patterns Followed for Distribution of Land

Distribution of Land	Frequency	Percent
First come first serve	5	16.7
First to our clan then to others	10	33.3
It was done years back	15	50.0
Total	30	100.0

In the Garo Customary Law, *Nokma* has the sole authority for distribution of agricultural lands to the villager. From the study, it was found that in 50 per cent villages, present *Nokmas* had no role in distribution of agricultural

lands as it had been done years back. But, 33.3 percent of *Nokmas* stated that land was distributed first to those farmers, who belong to their clan and then to others, whereas 16.7 percent of the *Nokmas* stated that land was distributed on first come first serve basis.

Table-5. Problem Regarding Distribution of Land

Response	Frequency	Percent
Yes	2	6.7
No	28	93.3
Total	30	100.0

From the study, it was found that 93.3 percent of the *Nokmas* are not facing any problem regarding distribution of land

whereas 6.7 percent of the *Nokmas* opined that there are some problems regarding the distribution of land.

Table-6. Undergone Training in Agriculture

Response	Frequency	Percent
Workshop	5	16.7
No	25	83.3
Total	30	100.0

Though *Nokmas* are taking important decisions regarding agricultural activities in their villages, but the study reveals that 83.3 percent of the *Nokmas* did not

undergone any training regarding agriculture. Only 16.7 percent of the *Nokmas* attended some workshops on agriculture, which were held in their villages.

Table-7. Types of Farming Followed In the Villages

Types of Farming	Frequency	Percent
Settled Cultivation	8	26.7
Jhum Cultivation	16	53.3
Both	6	20.0
Total	30	100.0

The table suggests that 53.3 percent of the *Nokmas* opined that jhum cultivation was mostly practice in their villages, 26.3 percent of the *Nokmas* stated that settled

cultivation was mostly practice in their villages and in 20 percent cases both jhum and settled cultivation were practice in their village.

Table-8. Received Plant Nutrients from Different Sources

Different Sources	Frequency	Percent
Government Officials	8	26.7
Purchase from Market	3	10.0
Not Using	19	63.3
Total	30	100.0

That above table reveals that 26.7 percent of the *Nokmas* were receiving plant nutrients in their villages from the Government officials, whereas 10 percent of the *Nokmas* stated that they

purchase the plant nutrients from the market for their cultivation. But, most astonishing in 63.3 per cent cases, they were not using or receiving any plant nutrients in their villages.

Table-9. Knowledge about Integrated Nutrient Management

Response	Frequency	Percent
Yes	4	13.3
No	26	86.7
Total	30	100.0

The above table envisages that 13.3 percent of the *Nokmas* had some knowledge about Integrated Nutrient

Management whereas 86.7 percent of the *Nokmas* do not have any knowledge about Integrated Nutrient Management.

Table-10. Use of Plant Protection Measure by Villagers

Response	Frequency	Percent
Nothing	20	66.7
Use scarecrow	4	13.3
PP Chemicals	6	20.0
Total	30	100.0

66.7 percent of the *Nokmas* stated that villagers were not provided any kind of plant protection measures to protect their

plants. Only 20 percent of the *Nokmas* told villagers use some plant protection chemicals for their crops.

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Table-11. Knowledge about Integrated Pest Management

Response	Frequency	Percent
Yes	4	13.3
No	26	86.7
Total	30	100.0

The above table states that like Integrated Nutrient Management practices, 86.7 percent of the *Nokmas* have no knowledge about Integrated Pest Management whereas 13.3 percent of the *Nokmas* opined that they have some the knowledge about Integrated Pest Management.

Table-12. Help Villagers in Showing Direction

Response	Frequency	Percent
Yes	18	60.0
No	12	40.0
Total	30	100.0

The above table reveals that 60 percent of the *Nokmas* showed direction to the villager for the betterment of their agriculture whereas 40 percent of the *Nokmas* did not.

Table-13. Help Villagers with Man Power

Response	Frequency	Percent
Not required	15	50.0
Yes, if needed	15	50.0
Total	30	100.0

The table shows that 50 percent of the *Nokmas* help the villager with man-power if they needed and 50 percent of the *Nokmas* opined farmers did not need help regarding man-power.

Table-14. Help in Obtaining Agricultural Equipments

Response	Frequency	Percent
Yes	22	73.3
No	8	26.7
Total	30	100.0

The above table depicts that 73.3 percent of the *Nokmas* help their villagers in obtaining agricultural

equipments and 26.7 percent of the *Nokmas* did not help their villagers in obtaining agricultural equipments for their cultivation.

Table-15. Help in Obtaining Necessary Seeds

Response	Frequency	Percent
Yes	17	56.7
No	13	43.3
Total	30	100.0

The above table reveals that 56.7 percent of the *Nokmas* help their villagers in obtaining necessary seeds for

plantation, 43.3 percent of the *Nokmas* stated they did not provide any help as because some farmers collect their own seeds.

Table-16. Inspect Agricultural Activities

Response	Frequency	Percent
Yes	5	16.7
No	19	63.3
No Formal Inspection	6	20.0
Total	30	100.0

From the study, it was found that 63.3 percent of the *Nokmas* did not inspect the agricultural activities of their villagers and 16.7 percent of the *Nokmas* inspect the agricultural activities of their

villagers on regular basis. Besides that 20 percent of them inspected villager's agricultural activities as when it was necessary.

Table-17. Attitude towards Modern Agriculture

Response	Frequency	Percent
Good	16	53.3
Good but expensive	7	23.3
Not affordable	5	16.7
No idea	2	6.7
Total	30	100.0

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53.3 percent of the *Nokmas* opined that modern agriculture is good as it is evident from the table. But, 23.3 percent of the *Nokmas* told that modern agriculture is good but expensive and 16.7 percent of the *Nokmas* expressed that modern agriculture is not affordable by their villagers.

Table-18. Satisfied with Agricultural Production

Response	Frequency	Percent
Yes	27	90.0
No	3	10.0
Total	30	100.0

Most interestingly, it was found from the study that 90 percent of the *Nokmas* were satisfied with agricultural production in their village and 10 percent of the *Nokmas* were found to be not satisfied in their agricultural production.

Here an attempt was made to find out, whether any relation exist between opinion of *Nokma* in development of agriculture in village as dependent variable (Y) and other different variables as causal variables or

dependent variables (X_1, \dots, X_{11}). The opinion of *Nokma* in development of agriculture in village was measured in 5-point semantic scale against some statement regarding agricultural activities in the villages. The data of the causal variables were also collected in the standard scale developed by the earlier researchers. To find out cause and effect relation, Pearson Correlation Co-efficient were measure. The significant test of the Correlation Co-efficient was done at 5% and 1% level.

Table-19. Correlation between Opinion of *Nokmas* in Development of Agriculture in Village and Other Independent Variables

Independent Variables	Correlation Co-efficient (r)
Categories of Area (X_1)	-0.312
Educational Status (X_2)	0.443*
Family Type (X_3)	0.005
Family Size (X_4)	0.097
Material Possession (X_5)	0.254
Undergone Training (X_6)	-0.003

Types of Farming Followed (X_7)	-0.090
Knowledge about Integrated Nutrient Management (X_8)	0.243
Knowledge about Integrated Pest Management (X_9)	0.096
Inspect Agricultural Activities (X_{10})	0.457*
Attitude towards Modern Agriculture (X_{11})	0.039

(*5% level of significance)

From the table it is evident that most of dependent variable has no significant relation with the opinion of Nokma in development of agriculture in village. Only Educational Status(X_2) and Inspect Agricultural Activities (X_{10}) are positively correlated (significant at 5% level) with the opinion of Nokma in development of agriculture in village. Hence, any increase in educational status of Nokma and inspection of agricultural activities of farmers will bring positive change in the opinion of Nokma in development of agriculture in village.

Thus, it was evident from the study that the elementary education status of *Nokmas* is fairly good, but they do not have higher education which has some bearings over their opinion regarding development of agriculture in their villages. Lack of proper education also becomes a hindrance regarding some training in agriculture. But, in Garo Customary Laws, *Nokma* plays a very

important role in almost every aspects of village life. But, form the study; it was found that *Nokmas* do not properly inspect the agricultural activities of the villagers, though in some areas they try to help the farmers. Most, interestingly, most of the *Nokmas* were satisfied with agricultural production in their villages, though productivity data of Garo Hills is not up to the standard. It happens mainly because the lack of proper technical knowhow in field of agriculture. This also restricts the adoption of modern practices of agriculture. Hence, for agricultural development in the village, *Nokma* should possess a very good technical knowledge of agricultural activities. Government should prepare a meticulous plan of location specific extension activities for different terrain (high hills, medium hills, plain areas) to train the *Nokmas*, in different aspects of agricultural activities, so that the *Nokmas* can become the vanguard for agricultural development in Garo Hills.

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Increasing Production of Crops through Village Adoption

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The agricultural technology recommendations until and unless reach the end users, the esteemed farming community do not serve the purpose. Transfer of technology is better defined as the dissemination of innovations and research recommendations appropriate for these farm operators to serve the nation in terms of food and economic security. The Krishi Vigyan Kendras in this backdrop play a major role rather catalytic for transfer of technology with scientific touch through methodology of village adoption. The emphasis is laid on capacity building of interest groups, cluster village approach and model technology dissemination system in varieties of farming systems through knowledge intensive programs for bridging the gap between what is and what ought to be. In this context a study was undertaken in Puri district of Orissa in adopted villages of KVK during 2009 with the following objectives.

1. To study the extent of increase in productivity of crops due to village adoption
2. To study the factors contributing towards the increase in productivity of crops due to village adoption.

Materials & Methods

Methodology of before and after design of study was followed for the study keeping the external factors as limitations like supply and services rendered by the agriculture extension mechanism of the state. The technological interventions were made after prioritization of problems through participatory rural appraisal, need assessment and follow up activities. The data were collected from three hundred farmers from six adopted villages during the year 2009 through proportionate random sampling technique using pre tested semi structured interview schedule through personal interview method and participant observation technique. The data were analyzed using simple statistics and interpretations were made as per the results revealed.

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Results and Discussion

The findings of the study include the productivity before and after the village adoption as per the tables follow.

Table 1: Year wise distribution of households and their categories in adopted villages

Sl. No	Name of the village	Year of adoption	Total no. of house holds
1	Sundara	2007	78
2	Nandipur	2007-08	31
3	Silary	2008-09	21
4	Damasun	2007	56
5	Suara	2007-08	107
6	Chandikuda	2007	103

The year wise details of households (Table 1) and their categories revealed that the house holds range from 21 (Silari) to 107 (Chandikuda). Though the farmers get HYV seeds, fertilizers and other

critical inputs at ease, still they have shown low adoption behavior in use of inputs in crops identified through participatory approach and prioritization by the farmers in order of importance (Table 2).

Table 2: Crops identified for increasing productivity

Sl.No.	Name of the village	Crops identified
1	Sundara	Rice, Groundnut, sunflower, vegetables, betel vine, coconut
2	Nandipur	Rice, cabbage, brinjal, coconut
3	Silary	Okra, betel vine
4	Damasun	Rice, coconut
5	Suara	Rice, vegetables, betel vine, coconut
6	Chandikuda	Vegetables, betel vine, coconut
7	Othaka	Rice, vegetables, betel vine, coconut
8	Gokulapur	Rice, betel vine

The interventions in the village due to adoption includes the motivation towards the use of monetary and non monetary inputs (Table-3) that are responsible for increasing the productivity and production. The monetary inputs alone would not enhance the productivity without proper knowledge on management of soil health, timeliness and appropriate dose

of inputs as well as crop rotations that contribute in terms of qualitative improvement of soil which brings productivity up. The continuous follow up by the scientists also are responsible for management of knowledge at critical stages of crop growth in order to have better retention of knowledge on production technology.

Table 3: Interventions of Technology / Inputs

Sl.No.	Type of interventions	Details of interventions
1	Monetary inputs	<ul style="list-style-type: none">• HYV seeds• Adoption of seed treatment• Use of balanced fertilizers (FYM, NPK, Green manures and Bio-fertilizers)• Appropriate plant protection measures
2	Non-monetary inputs	<ul style="list-style-type: none">• Maintaining optimum plant population and spacing• Optimum time of sowing• Proper management of irrigation• Scientific crop rotations• Green manuring with Dhanicha in rice• Use of bio fertilizers & Azolla in rice• Use of bio-fertilizers in oilseeds and pulses• Field visits, focus group discussion and follow up action by KVK scientists for effective monitoring in regular intervals at critical crop growth stage.

Increasing Production of Crops through Village Adoption

Table 4: Crop wise and average productivity of crops of the adopted villages

Sl.No.	Name of the Village	Crops	Avg. Productivity (q/ha)	District avg. productivity
1	Sundara	Rice	20.0	20.46
		Groundnut	12.5	22.30
		Sunflower	3.0	4.72
		Vegetables	185.0	253.8
		Betel vine	17 lakh leaves/ha/yr	25-30 lakh leaves/ha/yr
		Coconut	5490 nuts/ha	7086 nuts/ha
2	Nandipur	Rice	19.5	20.46
		Cabbage	210	276.15
		Brinjal	165.4	145.0
		Coconut	5320 nuts/ha	7086 nuts/ha
3.	Silary	Okra	90.3	
		Betel vine	18.0 lakh leaves/ha/yr	25-30 lakh leaves/ha/yr
4.	Damsun	Rice	16.0	20.46
		Coconut	5600 nuts/ha	7344 nuts/ha
5.	Suara	Rice	18.0	22.46
		Betel vine	19.0 lakh leaves/ha/yr	25-30 lakh leaves/ha/yr
		Vegetables	190.0	253.8
		Coconut	6030 nuts/ha	7086 nuts/ha
6	Chandikuda	paddy	20	22.46
		Betel vine	21.0 lakh leaves/ha/yr	25-30 lakh leaves/ha/yr
		Vegetables	190.0	253.8
		Coconut	5400 nuts/ha	7086 nuts/ha
		Vegetable	190.0	253.8

Table5: Status of inputs used in the adopted villages (2006-07)

Sl.No.	Name of the Village	Crops	HYV/Hybrids fertilizer	Seed treatment	Plant protection measures	
1	Sundara	Paddy	44(88)	29(58)	21(42)	21(42)
		Groundnut	40(80)	15(30)	16(32)	14(28)
		Sunflower	30(60)	12(24)	14(28)	12(24)
		Vegetables	30(60)	19(38)	21(42)	18(36)
		Betel vine	0	0	18(36)	13(26)
		Coconut	0	0	0	3(6)
2	Nandipur	Paddy	27(54)	25(50)	12(24)	21(42)
		Cabbage	24(48)	15(30)	16(32)	0
		Brinjal	14(28)	11(22)	13(26)	11(22)
		Coconut	12(24)	0	3(6)	3(6)
3.	Silary	Paddy	26(54)	14(28)	9(18)	18(36)
		Okra	32(64)	17(34)	9(18)	12(24)
		Betel vine	NA	0	14(28)	16(32)
4.	Damsun	Paddy	22(44)	17(34)	12(24)	18(36)
		Coconut	NA	0	12(4)	2(4)
5.	Suara	Paddy	35(70)	22(44)	14(28)	22(44)
		Betel vine	NA	10(20)	11(22)	19(38)
		Vegetables	32(64)	13(26)	13(26)	18(36)
		Coconut	9(18)	0	0	0
6.	Chandikuda	Paddy	25(50)	12(24)	15(30)	25(50)
		Betel vine	NA	0	15(30)	12(24)
		Vegetables	32(64)	12(24)	11(22)	13(26)
		Coconut	NA	0	0	0

NA-Not available(Local vars.)

Increasing Production of Crops through Village Adoption

Table 6: Level of increase of various inputs by the farmers in selected crops

Sl. No.	Name of the Village	Crops	Level of inputs before adoption				Level of inputs after adoption			
			HYV/ Hybrids	Seed treatment	Balanced fertilizer	Plant protection measures	HYV/ Hybrids	Seed treatment	Balanced fertilizer	Plant protection measures
1	Sundara	Paddy	44(88)	29(58)	21(42)	21(48)	(49)98	29(58)	34(68)	
		Groundnut	40(80)	15(30)	16(32)	14(28)	(48)96	45(90)	25(50)	32(64)
		Sunflower	30(60)	12(24)	14(28)	12(28)	(48)96	47(84)	44(88)	31(62)
		Vegetables	30	19(38)	21(42)	18(36)	(47)94	44(84)	32(64)	34(68)
		Betel vine	0(0)	0(0)	18(36)	13(26)	(0)0	32(64)	31(62)	31(62)
		Coconut	0	0(0)	0(0)	3(6)	(0)0	20(40)	38(76)	32(64)
2	Nandipur	Paddy	27(54)	25(50)	25(50)	21(42)	(49)98	42(84)	29(58)	30(60)
		Cabbage	24(48)	15(30)	15(30)	21(42)	50(100)	47(98)	31(62)	31(62)
		Brinjal	14(28)	11(22)	13(26)	11(21)	(37)74	32(64)	31(62)	33(66)
		Coconut	12(24)	0(0)	3(6)	3(6)	(11)22	20(40)	24(48)	21(42)
3.	Silar	Paddy	26(52)	14(28)	9(18)	18(36)	40(80)	31(62)	35(70)	50(100)
		Okra	32	17(34)	9(18)	12(24)	47(98)	24(48)	29(58)	37(74)
		Betel vine	0(0)	0(0)	25(50)	16(32)	0(0)	25(50)	27(54)	26(52)
4.	Damsun	Rice	22(44)	17(34)	12(24)	18(36)	(36)72	39(78)	37(74)	28(56)
		Coconut	0(0)	0()	12(24)	2(4)	(10)20	32(64)	15(30)	13(26)
5.	Suara	Paddy	35(70)	22(44)	14(28)	22(44)	(48)96	32(64)	31(62)	31(62)
		Betel vine	9(18)	10(20)	11(22)	19(38)	(0)0	30(60)	33(66)	32(64)
		Vegetables	32(64)	13(26)	13(26)	18(36)	(47)84	42(84)	32(64)	31(62)
		Coconut	9(18)	0(0)	0(0)	0(0)	20(40)	30(60)	21(42)	11(22)
6	Chandikuda	paddy	25(50)	12(24)	15(30)	25(50)	38(76)	38(78)	20(40)	40(80)
		Betel vine	0(00)	0(0)	15(30)	12(24)	0(0)	20(40)	14(28)	32(64)
		Vegetables	32(64)	12(24)	11(22)	13(26)	96(48)	42(84)	33(66)	31(62)
		Coconut	0(0)	0(0)	0(0)	0(0)	20(40)	20(40)	20(40)	20(40)

The year wise, crop wise area along with the average productivity of village and that of the district has been appraised for productivity enhancement in the crops. The status of level of inputs used and the extent of adoption of

different inputs was also found out before technology dissemination for analytical study. The level of inputs used was seen to be increased after adoption of different components of the technology through interventions of KVK.

Table 7: Increase in productivity of various crops in the adopted villages

Sl.No.	Name of the Village	Crops	Productivity before adoption (q/ha) after adoption increase	Productivity adoption (q/ha)	%
1	Sundara	Rice	20.0	26.0	30.0
		Groundnut	12.5	20.0	60.0
		Sunflower	4.0	9.0	125
		Vegetables	185.0	245	32.43
		Betelvine leaves/ha/yr	17 lakh leaves/ha/yr 41.0	24 lakh	
2	Nandipur	Coconut	5490 nuts/ha	7224 nuts/ha	31.0
		Rice	19.5	25.0	28.2
		Cabbage	210	285	33.0
		Brinjal	165.4	220.0	33.0
3.	Silary	Coconut	5320 nuts/ha	7124 nuts/ha	33.9
		Paddy			
		Okra	90.3	125.0	38.42
4.	Damsun	Betelvine leaves/ha/yr	18.0 lakh leaves/ha/yr 27.7	23 lakh	
		Rice	16.0	22.0	37.5
5.	Suara	Coconut	5600 nuts/ha	7123 nuts/ha	27.19
		Rice	18.0	24.0	33.0
6.	Chandikuda	Betelvine leaves/ha/yr	19.0 lakh leaves/ha/yr	23.0 lakh leaves/ha/yr	21.0
		Vegetables	190.0	225	18.42
		Coconut	6030 nuts/ha	7520 nuts/ha	20.29
		Paddy	22	30	36
		Betel vine leaves/ha/yr	21.0 lakh leaves/ha/yr	26 8lakh leaves/ha/yr	23
		Vegetables	190.0	249	31.0
		Coconut	5400 nuts/ha	7285 nuts/ha	34.90

Increasing Production of Crops through Village Adoption

The productivity has been increased in all the crops ranging from 21% in betelvine to 125.0% in sunflower. The farmers could be able to get the incremental benefits due to increase in productivity of crop through adoption of improved technology through village adoption and knowledge intensive program of KVK.

Factors contributing towards increasing production and productivity

Four important factors were taken as parameters of the study contributing to increasing production and productivity such as technical, extension, social/management and suitability of the technology. The data in table-8 revealed that choosing HYV/Hybrid seeds, appropriate seed rate and seed treatment were ranked first followed by soil test, appropriate plant protection measures and use of bio fertilizers (ranked second). Rest sub factors are timely irrigation, method of sowing and fertilizer application, use of farm implements etc. The data in table-9 revealed that out of the extension factors training and demonstration were ranked first followed by counseling, group discussion, field visit and technical literatures. Similarly the findings of social and management factors revealed that understanding,

group formation and sharing of technology among the farmers were ranked first followed by sharing of irrigation, marketing, problem solving, cooperation and cosmopolitaness. Regarding the suitability of the technology the data in table-11 revealed that profitability, ecological soundness, humanness and adaptability of the technology were ranked first followed by availability, replicability, stability, gender balancing and accessibility of the technology.

The analysis of the factors that contributed for increasing productivity of crops revealed that due to intervention of KVK an effective linkage could be established among the farmers and input dealers as well as the state department of agriculture for ensuring the supply of critical inputs at the time of need. Similarly the continuous follow up by the scientists of KVK could render immense impact towards adoption of improved technology by the farmers through formation of groups, encouraging cooperation for sharing the technology and understanding of the technologies in terms of suitability that includes profitability, humanness, ecological soundness, adaptability and accessibility etc.

Table-8 Technical factors

SL. No	Factors	Rank
1	Choosing hyv/hybrid var	I
2	Appropriate seed rate	I
3	Soil test	II
4	See treatment	I
5	Application of balanced fertilizer	II
6	Appropriate plant protection measures	II
7	Timely irrigation	III
8	Method of sowing	IV
9	Method of fertilizer application	IV
10	Method of application of plant protection materials	IV
11	Use of bio fertilizers	IV
12	Use of farm implements	II

Table-9 Extension factors

SL. No	Factors	Rank
1	Training	I
2	Demonstration	I
3	Group discussion	III
4	Field visit	II
5	Technical literature	III
6	Counseling	II

Table-10 Social/Management factors

SL. No	factors	Rank
1	Understanding among farmers regarding technology adoption	I
2	Group formation for procurement of inputs	I
3	Sharing of technology	I
4	Sharing of irrigation	II
5	Sharing of marketing	II
6	Sharing of problem solving	III
7	Cooperation among farmers	III
8	Cosmopolite ness	IV

Table-11 Technical factors

SL. No	factors	Rank
1	Availability of the technology	II
2	Accessibility of the technology	II
3	Profitability of the technology	I
4	Humanness of the technology	I
5	Ecological soundness of the technology	I
6	Acceptability of the technology	I
7	Replicability of the technology	II
8	Stability of the technology	II
9	Adaptability of the technology	I
10	Gender balancing of the technology	II

Conclusion

The study concluded that increase in productivity of crops could be achieved due to the communicative and total effect of the technological interventions suitable to the farming situations could be placed and delivered in a holistic approach. The study further emphasizes

that for the better applicability if the technology they need to be assessed in terms of money and time as and when required. The technology should be applicable in similar farming situation to have a better coverage and bringing self reliance among a sizable number of farmers through horizontal spread.

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Estimation and Analysis of the Problem and Possibility of Sustainable Livelihood Generation :

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The gradual impoverishment of purchasing capacity of rural masses appears to be a threat in Indian economics. Even suicidal cases among the farmers due to poverty and frustration are not rare cases (Bagchi, 2008). There are several factors, which may be responsible for making the farmers resource poor, poverty driven and victim of malnutrition. Lack of education, lack of knowledge, insufficient extension coverage, weak market accessibility and several other factors may have contribution in this regard. At the same time the soil health and the ecological balance are deteriorating day by day due to excessive use of input like chemical fertilizers, chemical pesticides etc. in most of the areas. As a result of that productivity is also reducing simultaneously.

With this background, the present research, as being designed with the above stated topical expanse, have envisaged to study the problem and possibility of sustainable livelihood generation. Although the term sustainable livelihood itself is a difficult proposition to attain and the very epistemology is suffering from sharp transition of yardsticks to measure. There is a need to generate a comprehensive perception on the dynamics of livelihood creation for the socially and economically peripheral people and also to generate social indicators to measure the progress based on a community perception.

Different endeavor has been taken from the pre-Independence era to uplift the economy of the rural poor. But till now livelihood security is a burning issue. Hence there is necessity to

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investigate reasons behind the distress condition of the rural poor and suggested way of assuring livelihood security.

Now the situation demands a diversification of agriculture and allied entrepreneurship, nourishment of human and natural resources and secured livelihood.

A sustainable livelihood : The components of Sustainable Livelihood are:

- Enables a family to cope with and recover from stresses or shocks
- Maintains or improves assets and capabilities
- Maintains or improves the natural resource base
- Does not undermine the livelihoods of others
- Provides for future generations

Rather than focusing on problems and 'needs,' we help people identify individual and community assets and find ways of using and increasing these assets to develop sustainable livelihoods. These might include social assets (*e.g. social networks, self-help groups, Community Based Organizations*), natural assets (*e.g. land, sea, rocks, trees*), human assets (*e.g.*

knowledge, skills, experience, mental and physical health), physical assets (*e.g. roads, buildings, equipment, telecommunications*) and financial assets (*e.g. savings, pensions, remittances, credit*). We help households, producer groups and NGO/CBOs assess their resources, plan and achieve their livelihood goals and monitor change.

Sustainable approaches to marginal areas must recognize that both men and women, especially in poor households, can engage in diverse and multiple activities that improve their livelihoods by maximizing income-generating activities while minimizing vulnerability and risk and achieving other household objectives. (Bilaro, A.L.2007)

It is revealed that potential of cultivating out-of-season vegetables, fruits, and cash generating products is considerably higher than traditionally cultivating subsistence cereal crops (Sati,-V-P 2008).

This article reported that the Sustainable Livelihood approach helps clarify the relationship between assets and activities at individual, household and community level and the interacting social, economic and policy conditions that affect them. (Kebe-M; Muri,-J 2008)

With this background the objective of the research work have been delineated as follows;

General objective: Estimation and analysis of the problem and possibility of sustainable livelihood generation.

Specific Objectives:

- i) To conceptualize sustainable livelihood in terms of a set of socio-economic, agro-economic and socio-personal variables.
- ii) To identify and analyze constraints of sustainable livelihood as perceived by them.
- iii) To analyze the relation, both an inter and intra level, between the level of livelihood (Prediction Character) and the agro-economic and socio –personal characters (Predictors Character)

Materials & Methods:

Methods of sampling

Purposive as well as simple random techniques were adopted for the study. For selection of district, block, village purposive sampling technique was employed.

100 families are randomly selected each from the identified villages for the data collection.

Variables and measurements

Various socio-economic variables are described below

Independent variables and dependent variables and empirical measurement.

Independent variables.

A. Socio-personal variables Age (X_1), Education (X_2), Family size (X_3), Family member (adult (X_4), Functional Education Strata (FES) (X_5),

B. Agro-economic variables. Cropping Intensity (X_6), Irrigation status (X_7), Animal enterprise intensity –(X_8), Nutrition (X_9), Holding size (X_{10}), Income(Rs) per cottah – (X_{11}), Seed type X_{12} , Spacing (%) X_{13} , Value of the source of material (X_{14}), Fertilizer application (X_{15}), Organic manure application (X_{16}), Irrigation status (X_{17}), Pesticide application (X_{18}), Fungicide application X_{19} , Credit access (X_{20}), Yield level –(X_{21}), Communication status (X_{22}).

Dependent Variables: Sustainable Livelihood (Y).

Result and discussion:

Sustainable livelihood: an estimation from a set of predictors; agro-economic and socio-personal by nature

Table-1 presents the correlation coefficient between sustainable livelihood (Y) Vs twenty two independent variables.

The epistemology of the word sustainability has got differential application in a variability of situation and context sustainability means the whole of a system performance through a natural transformation as well as movement of one equilibrium into a new equilibrium where in all the economic, ecological and social elements do form a palpable combination.

A sustainable livelihood (Y) here, in the study, has become a composite disposition of six selected sub predictors viz. wage (y_1), man days (y_2), level of decency (y_3), livelihood security (y_4), food intake volume / value (y_5) and health hazard (y_6) that presents a dynamic interplay amongst themselves and recoded as (X_{23}), (X_{24}), (X_{25}), (X_{26}), (X_{27}) and (X_{28}) respectively.

Purulia has so far been backward in agriculture and social process as a whole; it needs at the initial stage a change in yield performance of its farming system. By making this typical rain fed farming system a performing one through the application of material and knowledge inputs, the need for food, wage and nutrition could be mitigated.

These by becoming pertinent requirement the inputs like fertilizer (X_{15}), Organic Manure (X_{16}), pesticide (X_{18}), Fungicide (X_{19}) have stimulated the process of attaining sustainable livelihood. Other economic characters like holding size & value of resource material have also recorded strong bearing with the sustainable livelihood.

This relation study hereby is generating a host of strategic implication of an initial modernization of this apparently stale and traditional farming system, so that the people there in can thrive well and get the meaning of livelihood operationally and meaningfully through.

Table -1: Coefficient of correlation between sustainable livelihood (Y) and 22 independent variables.

Variables		r value
X ₁	Age	0.11
X ₂	Education	0.08
X ₃	Family Size	-0.09
X ₄	Family member (adult)	-0.05
X ₅	Functional education status	0.08
X ₆	Cropping intensity	-0.02
X ₇	Irrigation status	0.11
X ₈	Animal Enterprise Intensity	-0.02
X ₉	Nutrition	0.08
X ₁₀	Holding size	0.21*
X ₁₁	Income Rs/Katha	-0.10
X ₁₂	Seed type	-0.13
X ₁₃	Spacing %	0.14
X ₁₄	Value of the source of material	-0.24*
X ₁₅	Fertilizer application	0.41**
X ₁₆	Organic manure application	0.22*
X ₁₇	Irrigation Status	0.10
X ₁₈	Pesticide application	0.22*
X ₁₉	Fungicide application	0.41**
X ₂₀	Credit access	0.01
X ₂₁	Yield level	0.45**
X ₂₂	Communication status	0.06

*Significant at 0.05 level

** Significant at 0.01 level

Table-2: Presents the path analysis to decompose the total effect into direct, indirect and residual effect of the

exogenous variables on the variable sustainable livelihood (Y).

It has been found that the variable family size has recorded the highest direct effect on the sustainable livelihood.

In any rural marginal economy as sustained by the poor farmers, family size has got stupendous impact on livelihood generation or livelihood consumption. The negative value of direct effect indicated that sustainable livelihood can well be estimated by the small size family. When family size gone smaller, the stress and risk to reel under punitive poverty will be reduced. One of the reasons why sustainable livelihood could not be attained is that the soaring population contributed by high family size of the rural families has distorted the scope for assuring a better economy for them. Subsequent to it, holding size, has recorded the second highest direct effect

on sustainable livelihood. Holding size is a resource parameter and possibly is the most important parameter to support any kind of livelihood. The holding size of a rural family is both the direct and indirect predictor of income, wage, owner of expected yield and a negotiator in the labour market too. Quite logically, it has recorded a substantive and direct impact on sustainable livelihood. The variable fungicide application has routed the highest indirect effect of as many as 8 variables to characterize the behaviour of the consequent variable sustainable livelihood.

The residual effect being 0.5432 per cent, it is to conclude that even with of 22 exogenous variables around 46 per cent of the variance embedded with the consequent variable have been explained.

Table-2: Path analysis for deriving direct, indirect and residual effect of exogenous variable on consequent variables (sustainable livelihood (y) vs 22 antecedent variables).

Variables	Total effect (r)	Direct effect (d)	Indirect effect (r-d)	Substantial indirect effect		
				(i)	(ii)	(iii)
X ₁ Age	0.11	0.04709	0.06291	-0.14499(X ₃)	0.08502(X ₄)	0.07698(X ₁₀)
X ₂ Education	0.08	0.09592	-0.01592	0.09592(X ₂)	0.05417(X ₁₀)	-0.03920(X ₆)
X ₃ Family Size	-0.09	-0.36249	-0.45249	-0.36249(X ₃)	0.16806(X ₄)	0.10835(X ₁₀)
X ₄ Family member (adult)	-0.05	0.19772	-0.24772	-0.30811(X ₃)	0.19772(X ₄)	0.10835(X ₁₀)
X ₅ Functional education status	0.08	0.10377	-0.02377	0.10377(X ₅)	-0.07975(X ₃)	-0.04060(X ₆)
X ₆ Cropping intensity	-0.02	-0.13998	0.15998	-0.13998(X ₆)	0.06883(X ₁₉)	0.06273(X ₁₀)

X ₇	Irrigation status	0.11	0.07021	0.03979	0.07021(X ₇)	0.04067(X ₁₉)	0.03992(X ₁₀)
X ₈	Animal Enterprise Intensity	-0.02	0.04541	-0.06541	0.08700(X ₃)	-0.04943(X ₄)	0.04541(X ₈)
X ₉	Nutrition	0.08	-0.00559	0.07441	-0.04786(X ₁₂)	0.04151(X ₅)	0.03696(X ₁₅)
X ₁₀	Holding size	0.21	0.28512	-0.07512	0.28512(X ₁₀)	-0.13774(X ₃)	0.07909(X ₄)
X ₁₁	Income Rs/Katha	-0.10	-0.11325	-0.21325	-0.11325(X ₁₁)	-0.07419(X ₆)	0.05702(X ₁₀)
X ₁₂	Seed type	-0.13	-0.12935	-0.25935	-0.12935(X ₁₂)	-0.04899(X ₆)	-0.03398(X ₁₁)
X ₁₃	Spacing %	0.14	-0.01498	0.12502	0.06883(X ₁₉)	0.06558(X ₁₀)	0.05983(X ₂₁)
X ₁₄	Value of the source of material	-0.24	-0.20601	-0.44601	-0.20601(X ₁₄)	-0.10638(X ₁₉)	0.07413(X ₁₀)
X ₁₅	Fertilizer application	0.41	0.15398	0.25602	0.19399(X ₁₉)	0.15398(X ₁₅)	0.14566(X ₂₁)
X ₁₆	Organic manure application	0.22	-0.01129	0.20871	0.17522(X ₁₉)	0.11705(X ₂₁)	0.08777(X ₁₅)
X ₁₇	Irrigation Status	0.10	-0.11224	-0.01224	0.13454(X ₁₉)	-0.11224(X ₁₇)	0.08324(X ₂₁)
X ₁₈	Pesticide application	0.22	-0.16638	0.05362	0.25657(X ₁₉)	-0.16638(X ₁₈)	0.10404(X ₂₁)
X ₁₉	Fungicide application	0.41	0.31288	0.09712	0.31288(X ₁₉)	0.15086(X ₂₁)	-0.13643(X ₁₈)
X ₂₀	Credit access	0.01	-0.11785	-0.10785	-0.11785(X ₂₀)	0.03442(X ₁₉)	0.02660(X ₆)
X ₂₁	Yield level	0.45	0.26011	0.18989	0.26011(X ₂₁)	0.18147(X ₁₉)	0.08623(X ₁₅)
X ₂₂	Communication status	0.06	0.03537	0.02463	0.04693(X ₁₉)	0.04317(X ₂)	0.03537(X ₂₂)

Residual effect-0.5432913

Table-3: Factor analysis for clubbing of variables into factor based on factor loading

(Considering both the dependent and independent variables in the same domain of interaction)

The Factor-1 has accommodated the following variables X₁₅ (Fertilizer), (Organic manure) X₁₆, (Applied Pesticide) X₁₈, (Applied Fungicide) X₁₉, (yield) X₂₁, (Food intake Volume /g/day/head) X₂₇ has been renamed as Input factor. The

factor has contributed 14.247 percent of variance

The Factor-2 has accommodated the following variables X₁ (Age), X₂ (Education), X₃ (Family size), X₄ (Family Statement with adult person), X₁₀ (Holding size) has been renamed as Bio-Social Factor contributing variance percentage was 9.342.

The Factor-3 has accommodated the following variables X₆ (Cropping Intensity), X₁₁ (Income), X₁₂ (Seed type), and has been renamed as Livelihood Status. The factor has contributed 8.141

percent of variance of the predictable character.

It has found that factor-4 accumulated X_8 (Animal Enterprise Intensity), X_{13} (Spacing), and with 6.030 percent Cumulative Variance and has been renamed as Ancillary factor.

Factor-5 has accommodated the following variables X_2 (Education), X_{22} (Communication status), and has been renamed as Communication contributing variance was 5.601 percent.

It has found that factor-6 accumulated X_{24} (Man days), X_{25} (Level of decency), and with 48.887 percent Cumulative Variance and has been renamed as Man days.

The Factor-7 has accommodated the following variables X_5 (Functional education strata), X_9 (Nutrition), X_{14}

(Value of the source of material) and has been renamed as Agro-Activities. The factor has contributed 5.088 percent of variance.

The Factor-9 has accommodated the following variables X_{17} (Irrigation), and has been renamed as Agro-Economic contributing variance was 4.950 percent.

It has been found factor-10 has accumulated X_{26} (Livelihood security), X_{28} (Sustainable livelihood), and could be renamed as Agro-Eco system, contributing variance percentage was 4.571.

It has been found factor-11 has accumulated X_7 (Irrigation status), X_{20} (Credit required), and could be renamed as Access contributing variance percentage was 4.544.

Table -3: Factor analysis – Factor eigen value and factor rename.

Factor	Variables	Factor loading	Eigen value	% of variance	Cumulative %	Factor rename
Factor I	X_{15} Fertilizer application	0.831	3.989	14.247	14.247	Input factor
	X_{16} Organic manure application	0.710				
	X_{18} Pesticide application	0.755				
	X_{19} Fungicide application	0.881				
	X_{21} Yield level	0.714				
	X_{27} Food intake Volume	0.547				
Factor II	X_1 Age	0.639	2.616	9.342	23.589	Bio-Social
	X_3 Family Size	0.904				
	X_4 Family member (adult)	0.916				
	X_{10} Holding size	0.463				
Factor III	X_6 Cropping intensity	0.778	2.280	8.141	31.730	Agro Status
	X_{11} Income Rs/Katha	0.764				
	X_{12} Seed type	0.406				
Factor IV	X_8 Animal Enterprise Intensity	0.798	1.689	6.030	37.761	Ancillary Status
	X_{13} Spacing	0.653				
Factor V	X_2 Education	0.806	1.568	5.601	43.362	Communication
	X_{22} Communication status	0.845				
Factor VI	X_{24} Man days	0.475	1.547	5.525	48.887	Man days
	X_{25} Level of decency	0.751				

Factor VII	X ₅	Functional education status	0.769	1.470	5.250	54.138	Agro-Activity
	X ₉	Nutrition	0.475				
	X ₁₄	Value of the source of material	-0.454				
Factor VIII	X ₂₃	Wage	0.842	1.425	5.088	59.225	Agro-Economic
Factor IX	X ₁₇	Irrigation	0.715	1.386	4.950	64.176	Agro-Eco system
Factor X	X ₂₆	Livelihood security	0.530	1.280	4.571	68.747	Livelihood
	X ₂₈	Sustainable livelihood	0.847				
Factor XI	X ₇	Irrigation status	0.627	1.272	4.544	73.291	Access
	X ₂₀	Credit required	0.753				

Conclusion:

Sustainable livelihood is a composite disposition of livelihood, interactions and componential interdependency amongst and between different sub predictors. Livelihood is both the economic means and the social status. Livelihood combined production relation and social interaction.

These villages, Bundla, Joradi and the likes in Purulia are having some transformations in different agrarian enterprises towards generating, distributing, and accessing livelihoods. The PRA results have become a splendid example on how to estimate and rate the

rural peoples attributes, choices, seasonality and migratory nature of livelihood based on their perceived realities.

Future study should incorporate not only the sustainability aspects of livelihood, but also the changed dynamics of livelihood. The other dimensions of livelihood like gender, ethics, human rights, policies, migration, livelihood-forecasting in terms of demand and market, negotiation, spatiality etc. can be put under deeper insights through a comprehensive analysis, and there from, keeps characterizing the conventional framework of sustainable livelihood analysis.

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Extent of Adoption of Organic Farming Practices by the Respondent Farmers of Andhra Pradesh

***Dr. B. Savitha**

India being the second most populous country in the world, agriculture and food security are the main concerns of the country. Agricultural production, especially food grain has increased to 210 MT over the last few decades in India. This achievement is a contribution of Green Revolution and led to the food self sufficiency in India. But the spill over effects of Green Revolution resulted in challenges to sustainability of soil and environment.

Sustainable production at higher levels becomes possible only when the factors leading to the continued maintenance of soil health are adequately taken care of. The modern farming systems aim at maximizing production through the use of increased quantities of external inputs such as fertilizers and plant protection chemicals without due consideration to their ill effects. Consequently, the traditional agronomic practices such as green

manuring, use of farm wastes either as such or after composting and other soil ameliorative measures have vanished from the existing farming systems. This has resulted in a slow but steady decline in the productive and recuperative capacity of the soil.

During the last few decades, approach and outlook towards agriculture and marketing of food has seen a quantum change worldwide. The focus is more on quantity and covert appearance rather than intrinsic or nutritional quality. This commercialization of farming has also had a very negative effect on the environment. In the name of growing more to feed the earth, we have taken the wrong road of sustainability. This is where organic farming comes in. Prior to Green Revolution, farmers in India were largely dependent on monsoon, organic matter from farm animals and previous year's harvest for meeting the seed requirement. Organic farming is a system

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of producing Agricultural and animal husbandry commodities by the use of organic inputs without disturbing the natural balance. This is an age-old concept in India, which changed during the 1st green revolution. Organic farming has the capability to take care of each of these problems. Besides, the obvious immediate and positive effects organic farming has on the environment and quality of food, it also greatly helped a farmer to become self-sufficient in his requirements for agro-inputs and reduce his costs.

In the era of globalisation, WTO opened the opportunities for earning foreign exchange even in agriculture exports and emerging areas. Indian Agriculture must become efficient, competitive, low cost and sustainable and the possible alternatives available to the farming community and country are organic farming and integrated use of organic and inorganic farming methods. Agriculture exports mainly concentrating on the pesticide free or chemical residue free food because of the increased health consciousness among the consumers. In this direction, nowadays agriculture is shifting from modern to organic farming. Organic agriculture system is based on ecological principles and applying ecological practices to maintain soil fertility to manage crop and animal health and to keep soil and water in a good condition without the use of

chemical inputs (Siddaraju and Rajendran, 2006).

Andhra Pradesh is a state with very diverse agricultural production systems, exposure to a long coast-line, continuous harnessing of the river waters for irrigation, varied agro climatic situations and existence of different types of soils, natural vegetation, precipitation patterns and more than anything, hard working and innovative farmers that offer unlimited possibilities for adoption of novel farming practices. There are excellent untapped potential for export of fruits such as mango, banana and citrus, spices like chilies, food grains like rice, pulses and plantation crops such as cashew, coconut and medicinal and aromatic plants. The farmers need support by way of researched information on agronomic practices, economics, certification and labelling to take forward the concept of organic farming and dedicated extension workers and NGOs can help the farmers of Andhra Pradesh a great deal in ushering in an era of Sustainable Agriculture through Organic Agriculture. With this background an effort was made with an objective to study the extent of adoption of organic crop production standards by the organic farmers and to analyze the relationship between the extent of adoption and profile characteristics of the respondent farmers.

Materials & Methods

An exploratory research design was followed to conduct the present study. Three districts namely, Warangal, East Godavari and Chittoor of Andhra Pradesh were selected based on the criteria of highest area under organic farming. Six mandals from the selected districts were selected and from these six mandals 2 villages from each mandal were considered for the study. A total of 60 organic farmers at the rate of five farmers from each selected village were selected based on stratified random sampling method.

Extent of adoption of organic crop production practice is operationally defined as the degree of organic farmer's use of an organic crop production practices. To study the extent of adoption of organic crop production practices by the organic farmers, a semi structured interview schedule was developed by using organic crop production standards developed by the NPOP (2005). The instrument consisted of organic crop production practices under different management practices which are given in two point continuum i.e. adopted or not adopted. Based on the responses of the farmers, frequencies and percentages were calculated to study the extent of adoption of organic crop production practices. To study the adoption quotient,

the scores for all the recommended practices in each district were added up for each respondent and then the adoption quotient for each individual was worked out by using the following formula as used by Sengupta (1967).

The adoption quotient was used to find out the overall adoption of the organic crop production practices by the organic farmers in each of the selected districts. Based on the adoption quotient values, the organic farmers were grouped as Low, Medium and High categories by using class interval method.

RESULTS AND DISCUSSION

Extent of adoption of organic farming practices

From the Table 1, it was evident that the majority of organic farmers of Warangal district were under the medium adoption category followed by high and low adoption categories. The trend might be due to the fact that, majority of them middle to young aged, possessed high school level education, good access to natural resources, sources of information and market, involvement of NGOs and Government in promoting and educating the organic farmers on the organic crop production practices and standards might have motivated them to adopt the organic farming practices.

Further it was also observed that, the majority of the organic farmers of East Godavari district were under medium adoption category followed by low adoption and high adoption categories. This might be due to the fact that majority of the farmers were cultivating plantation crops and paddy where the scope for organic farming was found to be high and access to market and medium level of scientific and risk orientation motivated them to adopt organic farming practices. Lack of knowledge on complex practices, cost involvement, and insufficient time were the major reasons which compelled them to belong to medium level of adoption.

Majority (45.00%) of the organic farmers of Chittoor district were under medium adoption category of organic farming followed by low adoption (35.00%) and high adoption (20.00%) categories. In Chittoor district access to market and interest of the farmers in cultivation of chemical free vegetables with low cost of cultivation motivated them to go for organic farming. Lack of knowledge on complex practices, cost involvement, and insufficient time might be the major reasons for this trend.

The findings were in consonance with that of Juliana *et al.* (1991), Muthuraman (1995), Saxena and Singh (2000) Ranganatha *et al.*, (2001), Loganandhan and Premlata (2003), Navadkar *et al.* (2004).

Correlation analysis between independent variables and extent of adoption

From the above table 2, it was observed that, six independent variables selected for the study were found to be influencing extent of adoption significantly. Situational variables namely, access to natural resources and access to market were correlated significantly and positively at 0.001 per cent level of probability where as, in case of personal variables, family size was found to be correlated positively at 0.05 per cent probability and socio-economic variables namely, farm size, herd size and annual family income were found to be correlated significantly and positively at 0.01 per cent level of probability.

A positive significant relationship was observed between extent of adoption and personal variables. It was found from the literature that, organic farming demands high labour and time. The farmers with medium to big family sizes would not find it difficult to participate in the family farm activities and participate in preparation of various organic crop inputs, weeding, harvesting and processing operations etc, might be the reason for such results.

In socio-economic variables, farm size, herd size and annual family income were correlated positively. Farm size, herd size and annual family income were

found to be the most contributing factor for adopting organic farming. This showed the possibility of adopting organic farming, if the farmer possesses big farm size, large herd size and with high annual income might have showed interest to try out new ventures on experimental basis and can afford to take possible risk if any, in the initial period. The findings were in consonance with that of Junial *et al.* (1991), Muthuraman (1995), Saxena and Singh (2000) Ranganatha *et al.*, (2001), Loganandhan and Premlata (2003), and Navadkar *et al.* (2004).

Regression analysis between independent variables and extent of adoption

From the table 3, the results inferred that, access to natural resources and innovativeness were found to be significant at 1 per cent level of probability. The rest of the variables were found to be non-significant.

From the significant value of R^2 it can be concluded that, only 2 variables contributed up to 53.24 per cent of variation on the extent of adoption of organic farming and the remaining 46.76 per cent variation was due to extraneous variables. An over view of table on regression analysis indicated that, all the sixteen independent variables included under personal, socio-economic, situational and psychological

characteristics explained about 53.24 per cent of variation in the extent of adoption of organic farmers.

The situational variable access to natural resources and psychological variable innovativeness were significant in predicting the extent of adoption of organic farmers. It was clear from the above results that, farmers who had more access to natural resources and high innovativeness tends to adopt organic farming.

Past studies and experiences indicated that, an innovative farmer always reaped windfall profits from new technologies. An innovation in farming has the potential to exploit new markets and thereby an innovator can command the market and get remunerative prices for the produce. It was clear that the farmers who are more innovative will try to gather the information from all the media sources available to them once they find a new method / idea in the agriculture. They will try to utilize the knowledge of that particular practice / idea to decide the pros and cons of it before actually implementing it in their fields. These farmers always try to follow new practices and methods of cultivation and will be more informative than the other farmers with respect to organic farming hence it was found significant in predicting the extent of adoption of organic farming.

It was therefore, advisable that agencies concerned with transfer of technology should lay more emphasis on demonstrations, exhibitions, field days, crop days, kisan melas, visits to research

stations, field schools, campaigns etc to ensure more participation and interaction of farmers. They should also organize more number of training programmes and ensure the timely supply of crop inputs.

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TABLE 1 DISTRIBUTION OF ORGANIC FARMERS ACCORDING TO THEIR ADOPTION OF ORGANIC CROP PRODUCTION PRACTICES

S.no.	Category	Warangal (n=20)		East Godavari (n=20)		Chittoor (n=20)		Total(N=60)	
		f	%	f	%	f	%	f	%
1	Low	04	20.00	08	40.00	07	35.00	19	31.67
2	Medium	11	55.00	10	50.00	09	45.00	30	50.00
3	High	05	25.00	02	10.00	04	20.00	11	18.33

TABLE 2 CORRELATION ANALYSIS BETWEEN INDEPENDENT VARIABLES OF ORGANIC FARMERS AND EXTENT OF ADOPTION OF ORGANIC FARMING

S.no	Independent variables	'r' values
Personal variables		
1	Age	-0.0431 NS
2	Education	0.1957 NS
3	Farming experience	0.0246 NS
4	Family size	0.3159**
Socio-economic variables		
5	Farm size	0.2401***
6	Sources of information	0.1103 NS
7	Herd size	0.3010***
8	Farming system	0.2049 NS
9	Family income	0.2820***
Situational variables		
10	Cropping intensity	0.0504 NS
11	Access to natural resources	0.5205*
12	Access to market	0.4518*
Psychological variables		
13	Scientific orientation	0.0086 NS
14	Innovativeness	-0.0139 NS
15	Risk orientation	0.0563 NS
16	Fatalism	-0.1095 NS

* Significant at 0.001 level of probability

** Significant at 0.05 level of probability

*** Significant at 0.1 level of probability

TABLE 3 REGRESSION ANALYSIS BETWEEN INDEPENDENT VARIABLES OF ORGANIC FARMERS AND EXTENT OF ADOPTION OF ORGANIC FARMING

S.no.	Independent variables	Partial regression coefficient	Standard Error	t-value
Personal variables				
1	Age	0.1687	0.1176	1.4344
2	Education	0.6207	0.5555	1.1173
3	Farming experience	-0.0730	0.1234	0.5914
4	Family size	0.0634	0.6807	0.0932
Socio-economic variables				
5	Farm size	-0.0511	0.1698	0.3013
6	Sources of information	-0.0182	0.1404	0.1300
7	Herd size	0.5272	0.3481	1.5146
8	Farming system	9.1278	0.7975	1.3428
9	Family income	0.0119	0.0201	0.5913
Situational variables				
10	Cropping intensity	0.0109	0.0262	0.4188
11	Access to natural resources	1.717	0.4987	3.4432*
12	Access to market	0.5484	0.4914	1.1159
Psychological variables				
13	Scientific orientation	-0.0642	0.4703	0.1366
14	Innovativeness	-0.5700	0.2575	2.2133*
15	Risk orientation	0.2330	0.4720	0.4937
16	Fatalism	-0.1221	0.5030	0.2428

R² = 0.5324; F = 3.095*;

* Significant at 1 per cent level of probability;

NS - Non significant

SWOT of SHG : A Grass Root Level of Study

Shesasmita Mohapatra* & C.Satapathy**

Starting a group is not a simple matter, and running it successfully requires a many qualities and characteristics. In the beginning, a group requires skills like drive and initiatives, resource mobilization, mobility, quick decision making which are very different from skills required later on like persistence, business ethics, stamina, goal setting. Hence a SWOT analysis of the groups under study can be undertaken to enquire into strengths, weaknesses, opportunities and threats, of the groups.

SWOT as an acronym stands for strength, weakness, opportunities and threats of a group or an organization. These four attributes are also called "SWOT". The parameters. 'Strength' is the basic asset of an organization that would provide competitive advantage for its growth and development; 'weakness' is the ability of an organization which create a state of time and situation to be specific, dis-advantage for the growth and development; 'opportunity' is the ability of the organization to grow and

achieve its specific objective in a given situation. 'Threat' is the situation that blocks the abilities of the organization to grow and develop for meeting its ultimate goal. SWOT parameters may differ from organization to organization, company to company and from Government to Government. Thus, these parameters defy strain jacket and exact definition. Recently a few managers prefixed to 'SWOT' parameters as potential internal and potential external and called potential internal strength and potential internal weaknesses, potential external opportunity and potential external threats. In the management Science, SWOT analysis is of paramount importance for understanding the management problems at all stages irrespective of the types of organization. The concept is meant to help in making appropriate decisions for the development of an organization in a particular operational environment. It has also an application for strategic decisions in organizational environment. The

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present paper is a part of Ph.D thesis of "A SWOT analysis of S.H.Gs in Khurda District of Orissa".The study was designed to investigate into the following issues.

Objectives:

1. To find out strength of SHG in the area of study for growth and development.
2. To determine weakness and threat experienced by SHG in the area of study.
3. To understand opportunities opened for SHG to satisfy interest of SHG members.

Review of Literature:

Espy, (1987) applied SWOT analysis on competition, development of the marketing plan and also in building evaluation mechanism with success.

Cristensis et al. (1983) considered SWOT analysis as a tool essential in strategic management for state government.

Kothai(1993) employed SWOT analysis on three development projects viz. farm clinic (FC), Sai Kshetra Dharmasala Research Rural Employment project and IRDP and indicated its importance for consolidation of gains of strength for harnessing the availability potential.

Hatten and Hatten (1993) employed SWOT analysis for strategic evaluation of the organization. They also applied it to arrive at its evaluation framewok.

Rao (1996), while reporting about the "stone quarry women worker organization in Puddukkottai district of Tamil Nadu" revolved that the group processes were weak group meetings were irregular and only few issues were discussed therein. They lacked a sense of dynamic internal leadership and on many occasions the rift between the leaders and the members was wide.

Materials & Methods

The study "A SWOT analysis of S.H.Gs in Khurda District of Orissa" was examined in three blocks of coastal zone Khurda, Bhubaneswar and Baliana blocks covering 29 villages with a sample of 120 respondents representing equally irrigated and non-irrigated situation.The respondents were personal interviewed with a interview schedule to collect relevant information. Appropriate statistical measures were adopted for analysis of data.

1. Strength

The strength of SHG is the sum total of perceptions of the respondents towards the strength on which the SHG can survive and function. To provide benefits to its members , the strength of SHG need to be analyzed in proper prospective. Under the study as much as 16 variables are taken to be considered and the responses are obtained on a 3 point scale ranging from little to very much. The analyzed data is presented for both situations i.e. irrigated and non-irrigated track in the following table.

SWOT of SHG : A Grass Root Level of Study

Table No-1 : Strength of SHGs

Sl. No.	Statement	Irrigation	Non Irrigation	Avg. Score	Rank
1	Unity among members.	3.2	5.2	4.20	I
2	Efficiency of leadership.	2.8	2.65	2.72	IV
3	Contact with outside agency.	1.03	1.03	1.03	XVI
4	Support of govt.	1.16	1.1	2.00	VII
5	Support of NGOs.	1.43	1.26	1.34	XIV
6	Bank loan facilities.	1.25	2.4	2.0	VI
7	Market facilities.	2.016	1.3	1.65	XIII
8	Risk bearing capacity.	2.2	2.08	2.14	V
9	Autonomy in decision making.	2.7	2.8	2.75	III
10	Family support.	2.9	2.85	2.875	II
11	Training on enterprises.	1.05	1.2	1.125	X
12	Technical support.	1.11	1.15	1.13	XV
13	Demandable market.	1.95	1.9	1.925	VIII
14	Favourable climate.	2	1.9	1.95	XI
15	Storage facilities.	1.63	1.38	1.505	IX
16	Availability of loan	2.08	1.78	1.93	XII
Mean average		1.90	1.99	2.01	

Data presented in table above reveal that unity among members, family support, autonomy in decision and efficiency of leadership are strength in order followed by risk bearing capacity. These are the major strength of the SHG as perceived by the respondents. The least strength as evidenced in table are contact with out-side agency, training on enterprises and technical support

mentioned by both groups. The difference in mean average score of irrigated and non-irrigated track in less than 10% which does not appear to be significant. In other words, the SHGs do not differ in their perceptions about the strength for their existence, unity among members (4.20) and indicated that these are important aspects for survival and growth of SHG.

Family support (2.875) is the second important factor that member have expressed in favour of strength. Particularly for women in villages, the family support is required to permit them to take part in SHG's activities. Autonomy in decision making (2.75) occupied 3rd position in the scaling of strength. It is so because decision to work outside making investment and expenditure are the promoting factors for a woman to take decision.

The interesting part of the study is that contact with out-side agency and technical support did not figure prominently because these are available at the block level as has been advocated by the government. These supports are

to be streamlined. It is common observation that SHGs in rural areas perform well when strengths of SHGs are available.

2. Weakness

Weakness is an indicator of the deficiencies that do not permit SHGs to grow and share benefit to its members. In a social system like rural sector, SHG is confronted with number of problems. The weakness implies difficulties, constraints and backwardness that act as resisting block in promotion of activities of SHG. Keeping this consideration in view the weaknesses of SHG was studied on 10 different parameters which have been reflected in table below.

Table No-2: Weakness of SHGs

Sl. No	Statement	Irrigation	Non-Irrigation	Avg. Score	Rank
1	Lack of Credit Support	1.65	1.8	1.725	III
2	Unfavorable climate	1.66	1.6	1.63	VI
3	Lack of demand for produce.	1.48	1.31	1.395	IV
4	Lack of marketing network	1.16	1.38	1.27	X
5	Unavailability of input	1.15	1.38	1.265	V
6	Lack of technical support.	2.28	2.3	2.29	I
7	Lack of unity among members.	1.08	2.08	1.58	VII
8	Low risk bearing capacity.	1.00	2.06	1.53	VIII
9	High -cost in-put	1.48	1.3	1.39	IX
10	Lack of infra-structure	2.4	2.4	2.4	II
Mean Average		1.534	1.761	1.64	

A look at the table indicates that weakness of the SHG have been perceived from different angles. In total 10 aspects have been studied. The lack of technical support has been figured top followed by lack of infrastructure, lack of credit support and unfavorable climate. The findings appear to be logical because the sample SHG have realized that role of technical support is a must to boost up their activities. The list of weakness like lack of marketing network, non-availability of input and lack of demand for the products are found in order. The SHG under study are facing multiple of problems. A significant difference is marked with reference to low risk-bearing capacity which is less in irrigated track compared to non-irrigated track. On the whole, the difference is significant. The findings implies that SHGs operating in non-irrigated area face more problems compared to irrigated areas. The findings recommend that weakness like lack of technical support, lack of infra-structure, lack of credit support, un-favourable climate and lack of unity among members can be avoided provided a professional approach is made.

Sometimes weakness are in the system itself. The problems and weakness seem to be difficult to be eliminated. The problems and weaknesses seem to be difficult for elimination. In the present study, the responses obtained in this regard clearly reveal that the weakness are of man-made which can be taken care of. To provide stimulation to the members of the SHG in both the tracks suitable action plans need to be developed, ensuring adequate technical support, infra-structure and credit facilities to improve the functioning of SHGs.

3. Opportunity

Opportunities in SWOT analysis refers to a wider spectrum of activities. The opportunities that are existing or can be secured are placed before people for achievement. Opportunities is not confined to a particular SHG or village. These are location specific and people's specific. In other words what people can avail to benefit themselves are the opportunities that SHG can explore. The present study attempted to enlist as much as 12 such opportunities as per expression of the sample.

Table No-3: Opportunity of SHG

Sl. No	Statement	Irrigation	Non-Irrigation	Avg. Score	Rank
1	Availability of profitable technology.	1.25	1.13	1.190	XI
2	Constant contact with technical personnel.	1.016	10.16	5.588	I
3	On spot technical support.	1.016	1.00	1.008	XII
4	Support of government.	1.16	1.15	1.155	X
5	Favourable marketing facilities.	1.93	2.00	1.965	IX
6	Good future of the product.	2.8	2.13	2.465	V
7	More and more family support.	2.78	2.83	2.805	III
8	More of homogeneity in the group.	2.8	1.95	2.375	VI
9	An assured way of income.	2.8	2.60	2.700	VII
10	Better engagement of family members	2.76	2.73	2.745	IV
11	Creation of SHG federation.	2.63	7.00	4.815	II
12	More of monitoring and evaluation.	2.016	2.00	2.008	VIII
Mean average score		3.056	3.056	2.560	

A look at the table indicates the opportunities of SHG as perceived by the sample under study. The pooled data reveal constant contact with technical personnel, creation of SHG federation, increase family support and engagement of family members are the important opportunities that SHG can look forward. The subsequent opportunities in order, are future of produce, homogeneity in the group, marketing facilities and support of government. However, availability of profitable technology and on-spot

technical support rated to be last as these are available in coastal belt of Orissa.

The district Khurda is one of the most developed districts of the state. The technological facilities are available at door step owing to intervention of ATMA and other technical institutions. It is the observation that on the spot technical help is available to the SHG members as and when required. The first two top ranking opportunities, are contact with technical personnel and a creation of SHG

federation. These two factors influence functioning and growth of SHG because of profitability and marketing of produce through federation. These two factors need consideration at policy making bodies. The difference between two situation i.e. irrigated and non-irrigated track is 49.80% which is significant.

4. Threats

The concept of threats in SWOT is as one of the elements that are location specific and depend on local environment. Sometimes good planning, profitable technology and good market fail to help SHG because of threat. The study analyzed threat of SHG in the area of survey as perceived by sample.

Table No-4: Threats of SHGs

Sl. No	Statement	Irrigation	Non-Irrigation	Avg. Score	Rank
1	Unfavourable climate	1.46	0.48	1.457	II
2	Sudden fall in demand.	1.41	0.48	1.46	VII
3	Change in choice of customer	1.38	0.30	1.435	III
4	High labour cost.	1.6	0.91	1.416	IV
5	Political interference.	1.00	—	1.00	XI
6	Breaking of unity.	1.00	0.48	1.37	VIII
7	Non-existing regulatory market.	1.16	0.35	1.51	VI
8	Lack of keeping quality of produce.	1.33	0.75	2.08	I
9	Low quality input	1.28	0.38	1.66	V
10	Difficulty to maintain production unit.	1.16	0.46	0.81	X
11	No legal stand.	1.40	0.33	1.07	IX
Mean average score		1.457	1.458	1.388	

Analysis of table reveals that there are as many as 11 items that constitute threat for SHG. The pooled data reveal that low keeping quality of produce, unfavourable climate, change in choice of customer, high labour cost and low quality input are the major threats that

the SHG face in the production system. The following threats in order of mention are non-existing of regulatory market, sudden fall in demand, breaking of unity, lack of legal support and difficult to maintain production unit.

Low keeping quality of produce refers to production of perishable items that put SHG in problems to dispose-off. Unfavourable climate refers to change in rain-fall pattern that affect the production of vegetable and other crops. Since the society is changing at a faster rate, the choice of customer is also at change. The SHGs are not in a position to face with needs of the customers .In

other hand, there is a need for sustainable production system being neutral to climate to meet the demands of the market. The difference between the two situations does not exist, since the threat is constant irrespective of an irrigation or non-irrigation. In analyzing the strength, weakness, opportunity and threat of the SHG under study, the comparative analysis is presented below.

Table No-5: A comparative analysis of ‘SWOT’(average mean score)

Elements of SHG	Irrigated	Non-irrigated	Difference (%)
1.Strength	1.90	1.99	4.52
2.Weakness	1.53	1.64	13.06
3.Opportunity	1.53	3.05	49.80
4.Threats	1.45	1.45	0.00

The analysis reveals that the difference is significant in case weakness (13.06%) and opportunities (49.80%).The study leads to conclude that the differential perception about SWOT of SHGs in irrigated and rain-fed areas only in matter of opportunities and weakness. There are number of factors in weakness and opportunities which can be manipulated to make activities of SHGs profitable and sustainable.

Summary:

The findings of study lead to arrive at following conclusions.

1. SWOT of SHG was studied in relation to four components like strength,

weakness opportunities and threat . The elements attribute towards strength of SHG reveal that SHG under study in irrigation and non irrigation situation count towards unity among members, family support, autonomy in decision making, efficient in leadership and risk bearing capacity. However, contact with outside agency, technical support and support of other NGOs are not given much emphasis because of their well known presence in the locality. The strength of SHGs does not differ because of irrigation facilities.

2. As much as 10 attributes of weakness covered under investigation reveal that non-availability of inputs, lack

of infrastructure, lack of adequate credit support, lack of demand for produce are the major weakness faced by the SHG under study. Irrigation as a factor does not make any difference in functioning and are weakness dimension of SHG.

3. As much as 12 opportunities for SHG were identified. These are constant contact with technical personnel, creation of SHG federation, more of family support and engagement of family member are the opportunities that SHG members can avail to accelerate growth

and development of their SHGs. The irrigation in this case also does not make any different.

4. Threat of SHG are many. The sample respondents feel, lack of keeping quality of produce, unfavourable climate, change in choice of customer, high labour cost and low quality inputs are the major obstacles in prosperity of SHG. In case of threat irrigation hardly plays any significant role.

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Involvement of Garo Women in Paddy Cultivation and their Preferred Training Needs – A study in Meghalaya.

*Puspita Das and **Biswajit Lahiri

In West Garo Hills Meghalaya, majority of the People depend on agriculture for their livelihood. The hilly state characterized by elevated ranges, foot hills and valleys have less than 10 percent of the geographical area under cultivation. The soils are red and yellow, moderately deep, acidic and low phosphorus. Shifting cultivation (jhum) is the traditional farming practiced here. The main crop is paddy. Wet rice cultivation is practiced in the plain areas while in the hills, the popular practice is jhum or shifting cultivation.

Objectives of the study:

- a.) To study the extent of involvement of Garo Women in different activities in paddy cultivation.
- b) To assess the training needs of Garo women in the cultivation of paddy.
- c) To study the constraints of participation in training.

Materials & Methods:

The study was conducted in West Garo Hills in four blocks comprising of 8 villages and two hundred Garo-women respondents were selected randomly. Data has been collected through a structured interview schedule. Statistical tools like frequency, percentage, weighted score and ranking were applied for analysis to reveal the following results .

Results and Discussion:

Objective I:

Shifting cultivation is a way of life of Garo tradition. Garo women are engaged in different operations of shifting cultivation. This is from sowing to the post harvest of the produce in shifting cultivation apart from others. In some activities they are much more conversant than other activities. The table 1 depicts the involvement of Garo women in shifting cultivation of paddy.

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Table. No. 1. Involvement in Paddy cultivation n =200 (Shifting cultivation)

Activities	Involvement			Weighted Score	Rank
	No	Seldom	Always		
Crop husbandry					
Land preparation	27 (13.5)	26 (13)	147 (73.5)	520	iv
Seed selection & treatment	19 (9.5)	309 (15)	151 (75.5)	532	ii
Sowing & nursery raising	179 (89.5)	17 (8.5)	4 (2)	225	ix
Transplanting	182 (91)	12 (6)	6 (3)	224	x
Manuring	170 (85)	23 (11.5)	7 (3.5)	237	viii
Plant protection measure	162 (81)	15 (7.5)	23 (11.5)	261	vii
Harvesting	30 (15)	36 (18)	134 (67)	504	v
Threshing	13 (6.5)	4 (2)	183 (91.5)	570	i
Seed or grain storage	23 (11.5)	30 (15)	147(73.5)	524	iii
Sale & purchase	138 (69)	23 (11.5)	39 (19.5)	301	vi

(Figures in parenthesis presented percentage).

Above table reveals that, threshing is the activity in which women were mostly involved followed by seed selection and treatment and the third activity is seed or grain storage. For these three activities concerned weighted scores are 570, 532 and 524 respectively. After storage the involvement of women were more in land preparation followed by sales and purchase, plant protection measures, manuring respectively and the concerned weighted scores are 520, 301, 261 and 237 respectively. Sowing and nursery raising and transplanting are the

activities in which they are least involved.

Involvement in Paddy cultivation (Settled)

With the advancement of agriculture, Garo people have adopted improved method of Agriculture and shifted from Shifting cultivation to settled cultivation. Women are involved in different agricultural operation in settled cultivation of paddy. An attempt has been made to explore the extent of involvement of Garo women in different operations of settled cultivation of paddy in table below:

Table.No.2.Involvement in Paddy cultivation (Settled)

n=200

Activities	Involvement			Weighted score	Rank
	No	Seldom	Always		
Crop husbandry					
Land Preparation.	141(70.5)	25(12.5)	34(17)	293	vi
Seed selection and treatment.	50(25)	56(28)	94(47)	444	iv
Sowing and nursery raising.	46(23)	104(52)	50(25)	404	v
Transplanting.	37(18.5)	27(13.5)	136(68)	499	iii
Manuring.	179(89.5)	9(4.5)	12(6)	233	viii
Plant protection measures	179(89.5)	15(7.5)	6(3)	227	ix
Harvesting.	28(14)	22(11)	150(75)	522	i
Threshing	33(16.5)	18(9)	149(74.5)	516	ii
Seed and grain storage.	31(15.5)	16(8)	153(76.5)	522	i
Sales and purchase.	148(74)	22(11)	30(15)	282	vii

(Figures in parenthesis presented percentage).

It is clear from the above table that in settled cultivation of paddy there are two activities in which women were involved with equal and highest degree (522) and those two were seed and grain storage and harvesting followed by threshing, transplanting, seed selection and treatment, sowing and nursery raising, land preparation, sales and purchase respectively with the weighted scores 516, 499, 444, 404 293 and 282 respectively. In plant protection measure their involvement is lowest.

Objective II:

To understand the training needs of Garo women in farm activities entire farming operation were divided into several steps, which completes the cycles for all activities. Their opinion were asked about the training need through three point scale, which were mostly needed, moderately needed and not needed. Based on the total scores obtained on training need in different areas ranks were assigned. Table 3 describes the training need of Garo women in shifting cultivation of paddy.

Table.No. 3. Training need; Paddy (Shifting cultivation).

Activities	Training Need			Weighted score	Rank
	No	Moderate	Most		
Land preparation	22(11)	13(6.5)	165(82.5)	543	ii
Seed selection and treatment	26(13)	8(4)	166(83)	540	iii
Sowing and nursery raising	31(15.5)	21(10.5)	148(74)	517	v
Transplanting	49(24.5)	27(13.5)	124(62)	475	viii
Manuring	66(33)	23(11.5)	111(55.5)	445	x
Plant protection measures.	16(8)	12(6)	172(86)	556	i
Harvesting.	23(11.5)	32(16)	145(72.5)	522	iv
Threshing	33(16.5)	23(11.5)	144(72)	511	vi
Seed and grain storage	30(15)	42(21)	128(64)	498	vii
Sales and purchase	56(28)	31(15.5)	113(56.5)	457	ix

(Figures in parenthesis presented percentage).

It is observed from the above table, that plant protection measures ranked first with a weighted score 556 followed by land preparation with a weighted score 543 whereas manuring ranked last with weighted score 445. Respondents have opined that plant protection measures is the area in which the training is highly required followed by land preparation, seed selection and treatment, harvesting, sowing and nursery raising, threshing, transplanting and sales and purchase respectively.

Manuring is the lowest rank as far as training need is concerned.

Training need in settled cultivation of Paddy

Women are involved in different operations of settled cultivations of paddy. With the advancement of technologies their needs to adopt those technologies are also changing time to time. Identified training needs of Garo women in settled cultivation of paddy are depicted in the table no.4.

Table.No.4. Training need: Paddy (Settled cultivation).

Activities	Training Need			Weighted score	Rank
	No	Moderate	Most		
Land preparation	25(12.5)	45(22.5)	130(65)	505	iv
Seed selection and treatment	71(35.5)	25(12.5)	104(52)	433	vii
Sowing and nursery raising	35(17.5)	37(18.5)	128(64)	493	v
Transplanting	46(23)	34(17)	120(60)	474	vi
Manuring	69(73.5)	32(16)	99(49.5)	430	viii
Plant protection measures	0	2(1)	198(99)	598	i
Harvesting.	5(2.5)	14(7)	181(90.5)	576	ii
Threshing	10(5)	18(9)	172(86)	562	iii
Seed and grain storage	69(34.5)	63(31.5)	68(34)	399	ix
Sales and purchase	90(45)	60(30)	50(25)	360	x

(Figures in parenthesis presented percentage).

Above table reveals that plant protection measures ranked first with a weighted score 598 followed by harvesting with a weighted score 576, threshing with a weighted score 562, land preparation with a weighted score 505, sowing and nursery raising with a weighted score 493, transplanting with a weighted score 474, seed selection and treatment with a weighted score 433, manuring with a weighted score 430 and

seed and grain storage with a weighted score 399 where as sales and purchase ranked last with a weighted score 360 in terms of training need of the respondents. Respondents have opined plant protection measures is the training area in which training component is highly required followed by harvesting, threshing, land preparation, seed selection, manuring and seed and grain storage respectively. Sales and purchase is the area which was considered as lowest as far as their training need is concerned.

Objective: III

Constraints for Non-participation and low-participation of tribal women in training programme

Table.No.5: Social Constraints

Social constraints	Agree	Partial	Dis-agree	Weighted score	Rank
Social restriction like, Taboo, Mores etc.	0	7	0	14	iii
Lack of proper information.	139	62	3	544	i
Difference in status of women.	0	10	3	29	ii
Lack of group cohesiveness	0	0	0	0	iv

Above table reveals that Lack of proper information is the main constraint for which women are unable to attend training programmes. Difference in status of women ranked as second constraint

followed by social restriction and lack of group cohesiveness respectively.

Table.No.6 :Economic constraints:

constraints	Agree	Partial	Dis-agree	Weighted score	Rank
Less incentive	29	36	2	163	ii
Loss of wages.	39	52	8	229	i
Lack of family support	9	29	4	89	iii

Above table depicts that loss of wages stood as first constraint or the prime economic cause for non-participation in the training programme followed by less incentive and lack of

family support respectively. There was also marked variation in the concerned weighted score such as 229, 163 and 89 for loss of wages, less incentive and lack of family support respectively.

Table.No.17. Organizational constraints:

Constraints	Agree	Partial agree	Dis-agree	Weighted score	Rank
Lack of visit of Village Level Extension Functionaries	3	3	0	15	iii
Apathy of training official.	3	1	0	11	iv
Lack of adequate training facility.	3	0	0	9	v
Non supply of inputs	28	10	0	104	ii
Lack of monitoring by group leader	56	15	4	202	i

Table No.7 explains the organizational constraints faced by the respondents. Lack of monitoring by group leader ranked first, followed by non supply of inputs at proper time, lack of visit of village level extension functionaries, pathy of training official, lack of adequate training facilities respectively. As Lack of monitoring by group leader has maximum weighted score such as 202, facility lack of adequate training has lowest weighted score that is 9.

Conclusion: It can be concluded that involvement of women differ in different area of agriculture and allied sector. It can be suggested that appropriate technologies should be introduced to enhance their performance in concerned sectors. Women friendly equipments should be disseminated / provided to reduce their drudgery if any. Training programmes should be designed as per their preferred needs. Planners, policy makers and extension functionaries should take steps to address the constraints faced.

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Role of NGO in Sustainable Livelihood Development of the Tribal Farmers

*** S. Painkra & K. Ghadei****

The constitution of India has defined “scheduled tribes” as such tribes or tribal communities or parts of or groups with in such tribes or tribal communities as are deemed under article 342 to be scheduled tribes for the purpose of this constitution. The Narainpur is a one of the most backward tribal district of Chhattisgarh. In this area, agriculture is remaining backward due to natural, technological as well as institutional factors. Whereas the acidic soil certainly act as a constraint on increasing productivity by indigenous methods, inadequacy of irrigation facilities, lack of due to adequate extension facilities etc. Expected change on tribes of Bastar has not been achieved so far. During the last 62 years the NGOs have played a very positive role not only in providing social welfare but also going into newer areas of education both formal and non formal, health and medical, rural development and transfer of agricultural technology. The Ram Krishna Mission Ashram, Narainpur has been entrusted with the

added responsibility of implementing the central sector scheme for Agricultural Extension in the District of Bastar since 1994-95.

Objective : To study the changes in land, yield, cropping and soil in the sample area.

Research Methodology

The district of Narainpur is administratively divided in to two blocks namely Narainpur and Orchha. There are a total 50 adopted villages under Ramkrishna mission in Narainpur block of Chhattisgarh. The sample size is of 10.00 per cent of the total adopted village’s i.e. 05 villages were selected randomly for the study. One member of every farm family was considered for the study. Out of a total of 881 farmers in the five selected villages, 25% farmers each village were selected. Thus, a total of 220 farmers were considered to from sample through a random sampling procedure.

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Result and discussion

Table-1 Change in land development activities for the period 2000-01 to 2008-09

N=220

S.No.	Land development	Mean score		
		Base year 2000-01	Current year 2008-09	Percentage Increase
1.	Land leveling	0.38	0.63	65.78
2	Gulley erosion control	0.44	0.68	54.54
3	Counter earth building	0.49	0.66	34.69
4	Stone bonding	0.32	0.60	87.50
5	Field bonding	0.46	0.59	28.26
6	Cover crops	0.28	0.50	78.57
7	Plantation for waste/ barren land development	0.13	0.25	92.30

The analysis of the data in table-1 indicates a significant increase in the level of mean score and mean percentage under land development programme. Due to intervention of Ramkrishna Mission, the mean score and mean percentage was more than before. The highest mean score 0.68 obtained in case of Gulley erosion control and largest score of 92.30 by plantation for waste land/barren land development. Similarly the mean score and mean percentage were increased

under other components of land development programme. The reason behind that the increase of mean score & mean percentage due to water shed development scheme and land development programme which was implemented with proper monitoring execution as well as the training programme related to land development organized by RKM/ Similar findings reported by Narayan et al (1981)

Table-2 Changes of yields during the period 2001 to 2009:

N=220

S.No.	Name of crops	Mean yields (q/ ha.)		
		Base year 2001	Current year 2009	Per cent increase (in yield)
1	Arhar	2.50	3.35	34.00
2	Urd	4.60	5.10	10.86
3	Moong	4.50	4.95	10.00
4	Kulthi	3.80	4.75	25.00
5	Niger	2.50	3.40	36.00
6	Maize	5.15	7.05	36.89
7	Rapeseed mustard	1.11	1.40	26.12
8	Rice	11.45	15.15	32.31
9	Gram	4.80	6.10	27.08
10	Wheat	13.20	16.50	25.00
11	Vegetable :			
	(a) Tomato	85.00	115.00	35.29
	(b) Potato	80.00	112.00	37.50
	(c) Brinjal	65.00	105.00	38.46
12	Fodder.	600.00	620.00	3.33

Table-2. indicates that arhar, urd, moong, kulthi, niger, maize, rapeseed mustard, rice, gram, wheat, vegetable (i.e. tomato, potato and brinjal) were taken for the study. The yield of crops current year, 2009 was more than base year, 2001. Highest increase in yield level is observed with brinjal (38.46%) followed by potato (37.50%), nizer (36.89%), maize

(36.89%) and tomato (35.50%), However lowest increase is recorded in case of fodder (3.33%), urds (10.56%) and moong (10.00%). Due to constant improvement in farm technology and constant efforts by RKM significant increase in yield of many crops is observed. The lower yield of crops like fodder, urd, moong is probably due to absence of high yielding

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packages. The reason of increase the yield account for the training and

demonstration programme, input facility, farmers fair and field days organized by RKM during the period in the study area.

Table-3 Change in the cropping area for the period 2001 to 2009:

S.No.	Crops name	Cropping area (in ha.)		
		Base year 2001	Current year 2001	Per cent increase
1	Arhar	98.56	125.29	27.12
2	Urd	152.68	199.93	30.94
3	Moong	7.32	12.32	68.30
4	Kulthi	130.24	149.60	14.61
5	Niger	137.50	149.27	8.56
6	Maize	210.32	301.40	43.30
7	Rapeseed mustard	62.48	89.10	42.60
8	Rice	359.48	408.98	13.76
9	Gram	29.04	37.40	28.78
10	Wheat	5.06	5.94	17.39
11	Vegetable :			
	(a) Tomato	8.30	15.38	85.30
	(b) Potato	9.35	16.36	74.97
	(c) Brinjal	8.11	14.19	74.96
12	Fodder	2.10	2.31	10.00

It is the observed from table-3 that Grhar, 4rd, moong, kulthi, niger, maize, rapeseed mustard, rice, gram, wheat vegetable (i.e. potato, tomato, brinjal) and fodder crops were taken under the development of sustainable

livelihood strategy of the tribal farmers. The area under crop in current years, 2009 was more than the area of the crops in base years, 2001 due intervention of RKM.

It was further noted that the area of arhar increase up to 27.12 percent over the period of eight years. Further increase in area was noted to be 30.94 per cent in Urd, 68.30 per cent in moong, 14.61 per cent in kulthi, 8.56 per cent in Niger, 43.30 per cent in maize, and 42.60 per cent in rapeseed mustard, 13.76 per cent in rice, 28.78 per cent in gram and 17.39 per cent in wheat respectively.

It was also observed that crops area increased under the vegetables like tomato, potato and brinjal i.e. 85.30, 74.97 and 74.96 per cent respectively. The area under fodder also increased up to 10.00 per cent during this period. The reason of the increase of cropping area is behind that the all agricultural activities was monitored by RKM with in scientific ways at the village level in the study area. Kolgane et al (2002) also made similar observation.

Table-4 Change in soil health for the period 2001 to 2009:

S. No.	Soil health conservation	Mean score		
		Base year 2001	Current year 2009	Per cent increase
1	Increase in soil fertility	0.37	0.39	5.40
2	Water holding capacity	0.28	0.30	6.66
3	Increase in organic matter	0.43	0.45	4.65
4	Control of soil erosion	0.36	0.38	5.55

N=220

Data reveals that increase in soil health on four parameters varies from 4.65 to 6.66 %. The soil health has not been changed much. However, there is

increase in water holding capacity, soil fertility, increase in organic matter and control of soil erosion. These findings are in conformity with observation of Narayan et al (1981).

Table-5 Change in use of improved farming technology during period 2001 to 2009.
N=220

S. No.	Faming Technologies	Mean score		
		Base year 2001	Base year 2009	Per cent increase
1	Soil testing	0.11	0.12	12.00
2	Improved seeds	0.22	0.26	18.30
3	Balance dose of fertilizers	0.08	0.09	15.80
4	Pesticides/herbicides	0.09	0.10	16.68
5	Use of manures			
	(a) FYM/compost	0.53	0.75	41.50
	(b) Vermi compost	0.00	0.10	10.00
	(c) Green manuring	0.07	0.08	15.00

It is observed from table-5 that soil testing, improved seeds, balance dose of fertilizers, pesticide/herbicide, use of manure (i.e. FYM/compost, vermi compost, green manure) were studied under improved farming technologies. The mean score and mean percentage after the intervention of RKM were more than before the intervention of RKM. The highest mean percentage 41.50 was increased by FYM/compost and lowest 10.00% by vermi composting. Other improved farming technologies also had significant increase. The increase of the mean score and percentage is due to seeds, manure and fertilizers were

availed by the RKM with in time with minimum supporting price. Soil testing kits were distributed to the farmers and also given training on it. The result supports the findings of Chauhan et al (1990).

Conclusion:

The finding reveals that there has been significant change in between base year and current year i. e. 2000-01 to 2008-09 covering 08 years. The area under introduction of new varieties of crops up to 45.73 per cent was increased. It was also observed that crops area increased under the vegetables like

tomato, potato and brinjal i.e. 85.30%, 74.97% and 74.96% per cent respectively. The area under fodder also increased up to 20.00 per cent in this period.

Land development and change in yields levels have been spectacular along

with cropping area. Change in soil health and use of improved farm technology are increased during this period. It is the reason behind that this could be possible due to intervention of Ramkrishna Mission.

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Impact of KVK Intervened Technology on the Farming Community of Jharkhand

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The technology innovation process includes research followed by technology development, testing and adaptation of technology, integration and ultimately technology diffusion. The teaching function includes all the elements taken together from all the items of technology innovation process. The discovery or development of new knowledge by the scientists is usually in the form of scientific knowledge, the bits and pieces of such knowledge are brought together for development of technology for the users (farmers).

In this study altogether 9 technology interventions related to tomato, brinjal, cauliflower, capsicum were assessed and refined under well-endowed production system through verification trials (VTs) and in small production system through on farm trials (OFTs). After assessment and refinement

altogether 6 technologies were finally selected for their dissemination in similar environments through extension education programmes and activities like demonstrations and training. The selected technologies were wilt resistant variety of tomato "Arka Alok", wilt resistant variety of brinjal "Swarnshree", soil application as well as spraying of borax and molybdenum in cauliflower and improved variety of capsicum "California wonder". Demonstrations equipped with organization of training on related interventions and field days were conducted for popularizing the technologies in both the small and well-endowed production systems. The impact of the demonstration, therefore, were studied both in case of the demonstrating and participating farmers after completion of the project.

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Objective

To study the effect of selected technologies on productivity, income, household food security and employment.

Materials & Methods

The study was undertaken in the five purposively selected villages of Karge panchayat in Mandar Block, namely , Karge, Rege, Hatma, Chatwal and Kesvani-kumbatoli. The rationale behind selection of the villages was their adoption under Institution - Village Linkage Programme of Birsa Agricultural University Center, where demonstrations and on farm trials (OFT) were conducted for assessment and refinement of technologies.

Three categories of respondents, namely, demonstrating farmers, experimenting farmers and participating farmers were selected from each of the five adopted villages related to demonstrations, verification trials and on-farm trials conducted on important vegetables, viz., tomato, cauliflower,

capsicum and brinjal. Rationale behind selecting these vegetable crops were their predominance in the study villages. Thus, the whole sample consisted of 270 respondents. Selection of demonstrating farmers and experimenting farmers was done on the basis of purposive sampling technique and selection of participating farmers was done on the basis of simple random sampling technique. Village-wise distribution of respondents has been presented in table 1

Results and Discussion

Effect of selected technologies on productivity

The effects of demonstrations on selected technologies were studied in terms of changes in productivity, income, food security and employment. Data on effects of demonstrations on assessed technologies on productivity of selected vegetables in well-endowed production systems have been presented in Table 1.

Table 1: Effect of selected technologies on productivity of vegetables in well endowed production systems

Crop	Average yield (q/ha) among Demonstrating farmers (N=60)			Average yield q/ha among Participating farmers (N=150)		
	Before	After	% increase	Before	After	% increase
Tomato	51	89	74.50	47	86	82.97
Cauliflower	46	83	80.43	48	98	104.16
Capsicum	62	98	58.06	49	77	157.14

Impact of KVK Intervened Technology on the Farming Community

Table 1 shows that use of soil treatment practice in tomato i.e. soil application of 6 kg bleaching powder + 12 kg lindane dust/ha before 15 days of transplanting helped in increasing the productivity of tomato from 51 q/ha to 89 q/ha among the demonstrating farmers and from 47 q/ha to 86 q/ha among participating farmers with an increase of 74.5 per cent and 82.97 per cent respectively. Soil application of 8 kg borax + 1.5 kg molybdenum//ha during land preparation contributed to increasing the productivity of cauliflower from 46 q/ha to 83 q/ha among of demonstrating farmers and 48 q/ha to 98 q/ha among of participating farmers with an increase of 80.43 per cent and 104.16 per cent respectively. Improved variety of capsicum (California Wonder) under farmers' management contributed to increasing the productivity

of capsicum from 62 q/ha to 98 q/ha among demonstrating farmers and 49 q/ha to 77 q/ha among participating farmers with an increase of 58.06 per cent and /57.14 per cent respectively.

It is evident from the Table that except capsicum the percentage increase in productivity of tomato and cauliflower was relatively higher among participating farmers, of course increase in productivity was recorded from a tune of 57 per cent to 104 per cent.

This happened due to the fact that before the demonstrations farmers were not using micronutrients in cauliflower and soil treatment measures in tomato as well as improved varieties of capsicum which mitigated the production problems considerably and thereby substantial increase in yield was recorded in the three vegetable crops.

Table 2: Effect of technology interventions on productivity of vegetables in small production systems

Crop	Average yield of (q/ha) among demonstrating farmers (N=60)			Average yield (q/ha) among participating farmers (N=150)		
	Before	After	%	Before	After	%
	experiment	experiment	increase	experiment	experiment	increase
Tomato	38	86	126.31	36	71	97.22
Brinjal	43	97	125.58	42	83	97.61
Cauliflower	44	92	109.09	46	87	89.13

Table 2 shows that under small production systems wilt resistant variety of tomato (Arka Alok) under farmers' management condition helped in increasing the productivity of tomato from 38 q/ha to 86 q/ha among demonstrating farmers and from 36 q/ha to 71 q/ha among participating with an increase of 126.31 per cent and 97.22 per cent respectively. Similarly in case of brinjal the wilt resistant variety (Swarnshree) succeeded in increasing the yield to a tune of 125.58 per cent among demonstrating farmers and 97.61 per cent among participating farmers. In case of cauliflower due to spraying of 2 gram borax/litre of water + 1 gram molybdenum/litre of water thrice during

different growth stages increased the productivity from 44 q/ha to 92 q/ha among demonstrating farmers and 46 q/ha to 87 q/ha among participating farmers. The percentage increase in productivity of cauliflower found to be 109.09 per cent and 89.13 percent among demonstrating and participating farmers respectively.

This happened due to the fact that before demonstrations of the refined technologies farmers were either using their local varieties along with traditional nutrient management practices or inappropriate improved varieties, which were not finding place in their bio-physical situations and household perspectives.

Effect of technology interventions on income

Table 3: Effects of technology interventions on income in well-endowed production system before and after the project

Crop	Average income of three year Rs/ha of Demonstrating farmers (N=60)			Average net income of three year Rs/ha of Participating farmers (N=150)		
	Before	After	% increase	Before	After	%
	demonstration	demonstration	demonstration	demonstration	increase	
Tamato	16800	44000	161.94	14600	41000	180.82
Cauliflower	14300	46000	221.67	12000	39000	225.00
Capsicum	17900	47000	162.56	16500	36000	118.18

Impact of KVK Intervened Technology on the Farming Community

Table 3 shows that use of soil treatment practice in tomato i.e. soil application of 6 kg bleaching powder + 12 kg lindane dust /ha before 15 days of transplanting increased the income from Rs. 16800/ha to Rs. 44000/ha among the demonstrating farmers and from Rs. 14600/ha to Rs. 41000/ha among participating farmers i.e. 161.94 per cent increase and 180.82 per cent respectively. Soil application of 8 kg borax + 1.5 kg molybdenum/ha during land preparation increased the income of cauliflower growers Rs. 14300/ha to Rs. 46000/ha among demonstrating farmers and from Rs. 12000/ha to Rs. 39000/ha among participating farmers i.e. an increase of 221.67 per cent and 225.00 per cent respectively. Improved variety of capsicum (california wonder) under farmers' management contributed to

increased income of capsicum growers from Rs. 17900/ha to Rs. 47000/ha among demonstrating farmers and from Rs. 16500/ha to Rs. 36000/ha among participating farmers i.e. increase of 162.56 per cent and 118.18 per cent respectively. It is evident from the table that the percentage increase in income from cauliflower was relatively higher among demonstrating as well as participating farmers compared to tomato and capsicum.

This happened due to the fact that before the demonstrations farmers were not using micronutrients like boron and molybdenum in cauliflower which mitigated the production problems considerably and thereby substantial increase in yield was recorded and ultimately income was increased.

Table 4: Effect of technology interventions on income in small production systems before and after the project.

Crop	Average income of three year Rs/ha of Rs/ha of experimenting farmers			Average net income of three year Rs/ha of Rs/ha of experimenting farmers		
	Before	After	% increase	Before	After	%
	demonstration	demonstration	demonstration	demonstration	increase	
Tamato	13000	39500	203.84	13500	36000	166.66
Brinjal	16000	42000	162.50	17000	34000	100.00
Cauliflower	11000	38000	245.45	14000	33500	139.28

Table 4 shows that under small production systems wilt resistant variety of tomato Arka Alok under farmers' management condition helped in increasing the income of tomato growers from Rs. 13000/ha to Rs. 39500/ha among demonstrating farmers and from Rs. 13500/ha to Rs. 36000/ha among participating farmers with an increase of 203.84 per cent and 166.66 per cent respectively. Similarly in case of brinjal the wilt resistant variety (Swarnshree) increased the income from a tune of 162.50 per cent among demonstrating farmers and just double among participating farmers. In case of cauliflower due to spraying of 2 gram borax/litre of water + 1 gram molybdenum/litre of water thrice during different growth stages increased the income from Rs. 11000/ha to Rs. 38000/ha among demonstrating farmers and Rs. 14000/ha to Rs. 33500/ha among participating farmers. The percentage increase in income in cauliflower was calculated to be 245.45 per cent and 139.28 per cent among demonstrating and participating farmers respectively.

It is evident from the Table that percentage increase in income of demonstrating farmers was relatively higher compared to the participating farmers in all the vegetable crops. This happened due the fact that intervened technologies were not easily available in local market, due to which the participating farmers were unable to procure readily.

Extent of farm women's involvement in vegetable production practice

In Jharkhand, where the study was conducted, irrespective of socio-economic considerations, women play an important role in contributing to their family income through their participation in various farm operations. Keeping this in view, an attempt was made to examine the women's involvement in selected practices of vegetable production in general and selected interventions in particular. The findings on extent of women's participation in selected production practices of vegetables have been presented in Table 5.

Table 5: Average weighted mean scores on extent of women’s involvement in vegetable production practices before and after the project

Sl. Practices	Average weighted mean scores					
	Demonstrating farm families		Experimenting farm families		Participating farm families	
	Before Project	After Project	Before Project	After Project	Before Project	After Project
1. Nursery Preparation	1.50 (M)	2.50 (M)	1.16 (L)	3.76 (H)	1.53(M)	3.60(H)
2. Field preparation	1.25 (L)	1.35 (M)	0.82 (L)	1.25 (L)	1.32 (L)	1.36 (M)
3. Transplanting	3.25 (H)	4.44 (H)	2.72 (M)	4.34 (H)	2.94 (H)	4.11 (H)
4. Weeding/interculturing	4.34 (H)	4.50 (H)	4.35 (H)	4.20 (H)	4.94 (H)	4.11 (H)
5. Manure/ fertilizer application	3.25 (M)	4.44 (H)	3.20 (H)	3.22 (H)	3.24 (H)	3.11 (H)
6. Irrigation	1.25 (L)	1.21 (L)	1.22 (L)	1.25 (L)	1.30 (L)	1.75 (M)
7. Plant protection	0.82 (L)	0.86 (L)	0.60 (L)	1.20 (L)	0.84 (L)	0.82 (L)
8. Harvesting	3.12 (H)	4.46 (H)	3.16 (H)	3.22 (H)	3.25 (H)	3.60 (H)
9. Post-harvest operations	1.50 (M)	4.50(H)	2.72 (M)	4.34 (H)	1.53 (M)	4.34 (H)
10. Marketing	0.60 (L)	1.25 (L)	0.82 (L)	1.20 (L)	1.32 (L)	1.36 (M)

H = High (>2.93)

M = Medium (1.33 to 2.93)

L = Low <1.33

Table 5 shows that in case of demonstrating farm families before demonstrations women’s involvement was high in three practices i.e. transplanting, weeding/interculturing and harvesting, medium in nursery preparation, manure/fertilizer application and post-harvest operations, and low involvement in field preparation, irrigation, plant protection and marketing. But after integration of demonstrated technologies the women’s involvement

increased substantially. It increased substantially in transplanting, weeding/interculturing, manure/fertilizer application, harvesting and post-harvest operations as the average mean scores were found to be 4.44, 4.50, 4.44, 4.46, and 4.50 respectively. The findings presented above indicated that women’s involvement increased after integration of technologies due to their interaction with the scientist and solution of the production problems and increase in

productivity of the crops. Apart from this the technologies intervened were found to be increasing the employment opportunities due to enhancement of women's workload.

Farmers Opinion on Refinement of Intervened Technologies

Farmers are the end users of any technology. So, their opinion were sought for eliciting the reasons for their preference for the refined technologies. The data have been presented in Table-6.

Table 6: Frequency distribution of respondents according to their opinion on reasons for their preference for refined technologies.

N=270

Sl.	Technology interventions	Choice	No. of farmers	Reason	
				i.	Less wilting
1.	Wilt resistant variety of tamato and	Arka Alok	129 (47.77)	ii.	Inlcreasing the productivity of tamato iii. Good stand of the crop iv. Provide fruit in off season
2.	Wilt resistant variety of brinjal	Swarnshree	148 (54.81)	i.	Highly resistant to wilting ii. Highly suitable for red soil iii. Adaptable in rainy season iv. Choice of customers
3.	Soil treatment practices in cultivation of tamato	Soil application of bleaching powder +12kg lindane dust/ ha before 15 days of transplanting	108 (40.00)		Less wilting and attractive colour
4.	Use of micro nutrients in cauliflower	A) Spraying of 2 gram borax/litre of water during different growth stages B) Soil application of 8 kg borax + 1.5kg moly bedenum/ha during land preparation	92 (34.07) 168 (62.22)	i.	Highly effective in minimizing broading of heads ii. Colour of heads is more white iii. Consumer linkings iv. Attractive heads
5.	Use of improved variety of capsicum	Califomia Wonder	112 (41.48)	i.	High yielder ii. Quality of fruit is better iii. Market value is high compared to farmers' variety

The findings led to the fact that most of the intervened technologies of vegetable production like wilt resistant varieties of tomato and brinjal, soil treatment practices in cultivation of tomato, use of micronutrients in cauliflower and use of improved variety of capsicum were in accordance with the farmers' need and location specificity and were adaptable in the existing socio-cultural and existing farming situations of the farmers. But some technologies did not find favour in farmers' opinion, making it imperative to refine them for making them location-specific, profitable and compatible in the existing infrastructures and farming situations.

Conclusion

Effects of demonstrations on selected technologies resulted into higher productivity with increased income and level of household food security as well as employment opportunities as compared to farmers' practice. The extent of farm women's involvement in production, protection and post-harvest operations including marketing increased substantially among

both demonstrating and participating farm families. Among demonstrating farm families, the extent of women's involvement was relatively higher among three practices i.e. transplanting, weeding, interculturing and harvesting. Similarly it was relatively higher among participating farm families in manure/fertilizer application, besides the three practices mentioned in case of demonstrating farm families. The farm women's involvement increased considerably due to integration of demonstrated technologies into their farming systems, which resulted into increasing employment opportunities due to enhancement of women's workload. The findings on farmers' opinion on refinement of intervened technologies revealed that the refined technologies were found to be problem-solving, need-based and location-specific which were highly compatible with the farming system components and household internal resources. Since the technologies were found to be profitable and appropriate for meeting the requirements of household food security they found favours and preferences by the respondents.

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Background and Perception of the Agriculture Students

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The University Education Commission (1949) headed by Dr. S.Radhakrishnan

recommended the establishment of Rural Universities in India. The two joint Indo-American teams on Agricultural Research and Education during 1954-55 and 1954-60 recommended the setting of Agricultural Universities in the States on the pattern of Land Grant Colleges of United States of America. The first farm University came in to existence in 1960 at Pantanagar, Utter Pradesh now in Uttarakhand. The Orissa University of Agriculture and Technology, Bhubaneswar is the second farm University in India established during 1964. The purpose of establishing Farm Universities is to educate the rural children on agriculture and allied enterprises so that they can serve the rural people in increasing production and productivity. It has been observed in the recent past that urban students coming in a big way to choose agriculture as their profession. These urban students after completion of their education have no interest to work in rural areas as well as

to the farming community. An attempt was therefore made to ascertain the profile of students reading in farm universities particularly in Agriculture College.

Objective:

1. To study the socio-economic profile of the students.
2. To ascertain their perception to choose agriculture as vocation.
3. To study their reaction about the profession.

Materials and methods:

The study was undertaken in the College of Agriculture, Bhubaneswar during 2009. Twenty students from each year of the under graduate classes were selected randomly constituting the total sample size of 80. Information collected personally through a structured schedule were analyzed and presented here with.

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Result and Discussion

Table-1: Socio-economic profile of the students (N = 80)

Sl.No.	Profile	Frequency	Percentage
1.	Type of Residence		
i.	Rural	19	23.75
ii.	Semi urban	28	3.00
iii.	Urban	33	41.25
2.	Occupation of parents		
i.	Farming	3	3.75
ii.	Up to 1 ha	9	11.25
iii.	Caste Occupation	2	2.50
iv.	Govt.Job	61	76.25
v.	Faming + business	5	6.25
Sl.No.	Profile	Frequency	Percentage
3.	Holding size		
i.	Landless	1	1.75
ii.	Up to 1 ha.	42	52.50
iii.	1.1-2 ha	20	25.00
iv.	2.1-5	7	8.75
v.	Above 5ha	10	12.25
4.	Type of house		
i.	Kachha	18	22.50
ii.	Semi Pucca	13	16.25
iii.	Pucca	49	61.25
5.	Family size		
i.	Up to 3	5	6.25
ii.	Up to 4	33	41.25
iii.	Up to 6	31	38.75
iv.	Up to 8	5	6.25
v.	Above 8	6	7.50
6.	Position in family		
i.	1st Child	40	50.00
ii.	2nd child	32	40.00
iii.	3rd child	8	10.00

7. Annual Income

i.	Up to 50,000	10	12.50
ii.	Up to one lakh	21	26.20
iii.	Up to two lakhs	31	38.75
iv.	3 lakhs and above	18	22.50

8. Educational background of parents.

Sl. No.	Education	Father		Mother	
		F	%	F	%
i.	Illiterate	--	--	2	2.50
ii.	Up to Primary	1	1.25	4	5.00
iii.	Up to middle school	3	3.75	8	10.00
iv.	Up to high school	7	8.75	26	32.50
v.	Graduation	44	55.00	30	37.50
vi.	Post Graduation	17	21.25	10	12.50
vii.	Above Post Graduation	8	10.00	--	--

The socio-economic background of the students reading in Agriculture College were examined. It is observed from the table-1 that only 23.75% of the students are coming from rural areas to study agriculture. Majority (76.25%) of the parents are in Govt. Job having annual income above 2 lakhs (61.25%) and family size of 4-6members (80.00%). The parents of majority students are highly educated but landed property having less than one hectare. Majority of the students are the 1st child of their parents followed by 40% as the 2nd child.

The information contained in the table revealed that majority of the students reading agriculture are from urban area, educated family, better socio-economic status but low holding size. This indicates that the students had poor agricultural background. Unless the students come from rural areas

particularly farm families, they will not have interest to work in rural areas and with agricultural vocation.

Further attempt was made to invite the reasons for studying agriculture It is revealed from Table-2 that majority of the respondents not strongly supported any reasons of motivation as mentioned in the table. However, majority of the respondents agreed for better job opportunity (72.50%), entrepreneurship (56.25%) and less investment (50%). At the time, majority of 65% of the students disagreed for not qualified in better vocations like engineering, medical science etc. The mean score value did not indicate any significant difference. However, better job opportunities and easy vocation may be considered as the important motivating factors to read agriculture.

Table-2 Motivation to read Agriculture (N = 80)

Sl. No.	Factor	Strongly agree		Agree		Disagree		Mean score
		F	%	F	%	F	%	
i.	Better job opportunity	9	11.25	58	72.50	13	16.25	1.95
ii.	Entrepreneurship	7	8.75	45	56.25	28	35.00	1.74
iii.	Easy vocation	17	21.25	35	43.75	28	35.00	1.86
iv.	Not qualified for better vocation	4	5.00	24	30.00	52	65.00	1.40
v.	Less investment	7	8.75	40	50.00	33	41.25	1.64

Table-3 Motivating agents to read agriculture

Sl. No.	Agent	(N = 80)	
		Frequency	Percentage
1.	Self	27	33.75
2.	Parents	43	53.75
3.	Friends	9	11.25
4.	Mass media	1	1.25

It is also further observed from Table-3 that majority of the parents are motivating their child to read agriculture. It indicates that the parents are also considering agriculture as an important vocation.

Job preferences of the students

were also assessed. It is observed from Table-4 that the students preferred banking and Govt. Jobs in first order followed by civil services., private company, teaching profession, research system and establishing own home industry as the least preferred job.

Table-4 Job preferences for the students

Sl. No.	Perference	Mean score	Rank
1.	Govt.job	0.842	ii
2.	Entrepreneurship	0.488	v
3.	Bank jobs	0.861	i
4.	Private company	0.512	iv
5.	Civil service	0.599	iii
6.	Forest service	0.390	viii
7.	Teacher	0.439	viii
8.	Scientist	0.456	vi

Information were collected about the strengths and weakness of the institution. As revealed from Table-6, majority of the studnts stated cultural activities as excellent in the institution. Similarly, 58.33% of the respondents stated for good teacher and 55% for average teaching aids. The students had poor opinion about physical facilities, laboratory facilities, sports and games activities. The mean score value indicated that teachers, library facilities, cultural activities, entertainment

facilities are better in the campus which may be considered as the strengths of college. Staffs of the college, accommodation, fooding and social activities may be considered satisfactory. Poor weightage given to physical facilities, teaching aids and laboratory facilities is definitely a concern to every body. Quality teaching depends on physical facilities, appropriate teaching aids and laboratory facilities which are the deficiencies in the institution.

Table-5 Strengths observed in the institutions:

Sl. No.	Strength	Excellent (%)	Good (%)	Average	Sub-standard (%)	Mean score
1.	Teacher	31.67	58.33	10.00	--	3.21
2.	Staff	13.33	46.67	40.00	--	2.68
3.	Physical facilities	5.00	40.00	43.33	11.67	2.38
4.	Teaching aids	1.67	33.33	55.00	10.00	2.27
5.	Laboratory facilities	5.00	38.33	45.00	11.67	2.37
6.	Accommodation	20.00	43.33	23.33	13.34	2.70
7.	Fooding	11.67	41.67	33.33	13.33	2.52
8.	Sports and games	5.00	33.33	46.67	15.00	2.28
9.	Cultural activities	60.00	28.33	11.67	--	3.48
10.	Social activities	18.33	41.67	23.33	16.67	2.62
11.	Entertainment	43.33	30.00	21.67	5.00	3.12
12.	Library	41.67	41.67	16.66	--	3.25

The studnts were also asked to give their opinion about the problems they faced in the instituion. It is observed form the table-6 that majority of 51. 67% of the students strongly agreed for the too much examinations, agreed for the poor practical (58.33%), excessive

teaching incompetence of the teachers. The mean score value indicated that too much examinations, theory oriented teaching, poor practical and excessive teaching load are the major problems of the students in the institution.

Table-6: Problem faced in the institution.

Sl. No.	Problem	Strongly agree(%)	Agree(%)	Disagree(%)	Mean Soore
1.	High fee structure	28.33	18.33	53.34	1.75
2.	Sub standard food	8.33	50.00	41.67	1.67
3.	Poor accommodation facilities	5.00	46.67	48.33	1.57
4.	Teachers not competent	8.33	21.67	70.00	1.38
5.	Excessive teaching load	21.67	58.33	20.00	2.02
6.	Too much examinations	51.67	43.33	5.00	2.47
7.	Theory oriented teaching	45.00	48.33	6.67	2.38
8.	Poor practicals	21.67	58.33	20.00	2.02

Open ended questions were asked to invite suggestions of the students for better teaching environment in the college. It is observed from the Table -7 that more emphasis on practical, recent books in the library, more interaction with farmers, discouraging dictation of

lecturer notes, more exposure visit to gain experience, class room examination of 15-20 marks and external examination were the major suggestions of the students for better teaching environment in the college.

Table-8: Suggestions for better teaching environment:

Sl. No.	Suggestion	Frequency	Percentage
1.	Change of examinations system	21	26.25
2.	More stress on practical	62	77.50
3.	External exam immediately after internal	44	55.00
4.	Examination to be good standard	32	40.00
5.	Uniform examination system in all SAUs	27	33.75
6.	Dictating notes to be discouraged	56	70.00
7.	Modification of syllabus for the current situation	36	45.00
8.	More interaction with farmers	48	60.00
9.	Class room exam. for 15-20 marks	45	56.25
10.	Recent books in the library	57	71.25

Conclusion:

The study leads to conclude that majority of the students reading in agriculture are from urban areas, relatively rich family and having less landed property. About 90% of the students are the 1st and 2nd child of the parents which indicate the importance of agriculture as vocation. Since, the students are mostly from urban culture, they preferred bank jobs, Govt. jobs, civil service and private companies. The students had poor opinion about laboratory and physical facilities, teaching aids, laboratory facilities, too

much examination and excessive teaching loads.

It is therefore suggested that some mechanism to be developed for more enrollment of rural students so that they have the interest to serve the rural people and improve agriculture in the State. The suggestions particularly more stress on practical restricting dictation of notes, more interaction with farmers and equipping the library with recent books should be considered for developing good teaching environment in the college.

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An Impact Study on the Integrated Pest Management Programme of Divyayan KVK

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Integrated Pest Management (IPM) is a significant improvement in the management of insect pests and diseases of crops. Despite its techno-economic superiority over conventional chemical control, the adoption of IPM has been limited to only 2 per cent of cropland treated with plant protection inputs (Brithal and Sharma, 2004). There are a number of technological, social, economical, institutional and policy factors restricting the adoption of IPM. Therefore, in recent years, progressive incorporation of socio-economic issues is viewed as an important component in farm research, development and extension processes worldwide.

Now the challenge before us is to sustain food security and have some surplus for export to take advantage of globalization of agriculture. Environmental protection and conservation of natural resources base will be the key to realization of the situation and also to sustain them over

the run. Towards this goal, the protection technology through the use of both chemical and biological control agents in an integrated manner is being advocated through Integrated Pest Management (IPM) approach.

Availability of various modules for different crops under different production systems is well documented. Until now, the farmers have not been able to take advantage of IPM technology made available by the plant protection workers. This is basically due to three reasons. One, interference between institutions working on IPM is lacking, two the IPM modules have not so far been tested on small scale and three efforts in the adoption of this programme by the various agencies had been lacking. The present approach is of integrating the research extension farmer's participatory approach to validate the IPM modules taking village as a unit. The relevant technologies have to be fine tuned with the participation of

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farmers, and the research extension machinery will have to be mobilized to take the technology to the door steps of the users. Carrying out socio economic survey of farming families and preparing them psychologically, thus removing the mental block is an important aspect for conducting on farm demonstration of IPM. Apart from training of existing extension machinery and convincing them of this holistic approach, the supply of agri-inputs especially such as bio – pesticides and bio – fertilizers and making their timely availability in an easy and cost effective manner has to be ensured. (Source: *Recent Advances in Integrated Pest Management, National Centre for Integrated Pest Management, New Delhi*).

Srivastava and Butani (1998) stated that at one time, researchers developed pesticide spray schedules that involved calendar spraying whether the pest was present or not. This approach had led to increased dependence on pesticides and consequent adverse effects of higher costs of production, environmental pollution, destruction of natural enemies, and development of pesticide resistance. The current pesticide use is not only non – sustainable but, if continued, it will adversely affect production of crops and vegetables. There was, therefore, an urgent need for developing alternative

control strategies like the Integrated Pest Management (IPM) programme and so the programme was launched by the KVK.

METHODOLOGY

The study site was located in Ranchi district, Jharkhand, India. Nine KVK villages were selected. The respondents were selected randomly making the sample size of 200 from the KVK (Programme Group) villages comprising about 40 percent of the total farm families. The villages under study were homogeneous in nature. The actual data collection work was carried out in the months of October 2008 to July 2009. The “BEFORE – AFTER” type of experimental design with one control group to undertake the study was finalized (Das Gupta 2008). The data obtained were quantified as per rules to statistical analysis for drawing meaningful conclusions.

RESULTS AND DISCUSSION

The table 1 reflects that almost all the farmers under review attended IPM training at least once whereas 73.50 per cent attended twice, 27 per cent thrice and 10.50 per cent more than three times. The table depicts that all the farmers had attended the IPM training at least once and most of them twice. The data also revealed that 21 farmers had attended the IPM training programme more than three times.

TABLE 1: IPM module and frequency of attending IPM farmers' training programmes

IPM Module	Farmer (No)	Percent (%)	Frequency (IPM training)	Farmer (No)	Percent (%)
Tomato	92	46.00	Once	200	100.00
Tomato and Cabbage	39	19.50	Twice	147	73.50
Cabbage	23	11.50	Thrice	54	27.00
Brinjal	46	23.00	> Three times	21	10.50

The IPM programme was undertaken to reduce the level of pesticides misuse and introduce this eco-friendly technology. IPM tomato module was the most popular choice and 46 per cent were interested followed by brinjal (23 per cent) and cabbage (11.50 per cent). Some farmers were interested to adopt both tomato and cabbage during the rabi season on separate plots and they constituted 19.50 per cent.

Boral *et al.* (2006) concluded that greater awareness about IPM technologies as well as awareness about technological failures of chemical pesticides also reduces the level of pesticide misuse. Training and membership with a farmer organization reduce the level of pesticide misuse.

TABLE 2: Adoption of IPM technology under 'before-after' condition

Technology	BEFORE EXPOSURE		AFTER EXPOSURE		(+ / (-) % Change
	Farmer (No)	Per cent	Farmer (No)	Per cent	
Soil solarisation	26	13.0	179	89.50	(+)76.50
Summer ploughing	52	26.0	191	95.50	(+)69.50
Seed treatment	94	47.0	181	90.50	(+) 43.50
Use of bio fungicides	20	10.0	183	91.50	(+)81.50
Use of bio pesticides	49	24.5	194	97.00	(+) 72.50
Use of Pheromone traps	—	—	22	11.00	(+) 11.00
Use of trap crops	18	09.0	176	88.00	(+) 79.00

Among the IPM technologies, the highest adopted IPM practice was bio-pesticides (97.0 per cent), followed by summer ploughing (95.5 per cent), bio fungicides (91.5 per cent), seed treatment (90.5 per cent), soil solarisation (89.5 per cent), trap crops (88 per cent) and lastly pheromone trap (11 per cent). The non-adoption of pheromone traps was due to non-availability of insect specific lures and the problem with the storage of lures resulting in less effective performance. The acidic nature of the soils of Jharkhand encouraged wilt diseases in various crops. The seed treatment and soil incorporation of bio-fungicides

(*Trichoderma* sp.) mixed with Farm Yard Manures (FYM) had helped in the reduction of wilt disease incidence causing immense financial loss to the farmers. The above figure favoring 81.35 per cent change in the adoption of this particular technology substantiated the claim. Another important IPM practice that had been adopted by the farmers was soil solarisation of nursery beds with transparent polythene sheets of recommended thickness to ward off soil borne diseases affecting seedlings and the percent change was respectable 76.5 per cent.

TABLE 3: Analysis of variance with respect to adoption of IPM technology

Items	z-test
Soil solarisation	15.205*
Summer ploughing	14.130*
Seed treatment	9.277*
Use of bio fungicides	16.202*
Use of bio pesticides	14.745*
Use of trap crops	15.707*

(Condition: before- after),* Significant at 5% level of probability

The highly significant value of the z-test further substantiated the significant adoption of IMP technology under the 'before-after' condition. This was corroborated by the findings of researchers Murthy and Veerabhadraiah (1999).

TABLE 4: Distribution of adopter categories

Type of village	Laggard		Late Majority		Early Majority		Early Adopter	
	Before	After	Before	After	Before	After	Before	After
PG Villages	42	8	101	19	28	67	29	106

The above table concludes on the increase in the number of early adopters from 29 to 106 in PG villages. In the case of early majority the shift was from 28 to

67 and for late majority the change was from 101 to 19. The reduction of the number of laggards was from 42 to 8.

TABLE 5: Dissemination of IPM technology among fellow farmers

Name of the technologies	No	Percentage
Summer ploughing	82	41.00
Seed treatment with bio -fungicides (<i>Trichoderma</i>)	29	14.50
Balanced plant nutrients	40	20.00
Preventive use of bio pesticides	34	17.00
Trap crops	15	7.50

The farmers under review had considered summer ploughing as the most disseminated technology followed by balanced plant nutrients, preventive use of bio-pesticides, and seed treatment with bio – fungicides. The least popular of the IPM technology was trap crop.

Therefore, from the above discussion it is clear that the adoption and dissemination of IPM technologies under ‘before’ exposure condition and among the fellow farmers had been noteworthy and substantiated statistically.

TABLE 6: Extent of dissemination of technologies – Number of people and their characteristics

No. of people to whom the technologies were disseminated	Caste			Locality (Km)			
	SC	ST	OBC	2	4	6	8
158	2	91	65	35	39	76	08

Nature and extent of dissemination of technologies from PG villages was another important indicator of the overall impact of IPM. From table 48 it is observed that 91 of them belonged to the

ST category and 65 belonged to the OBC category. The extent of diffusion was confined within a radius of 6 km from the PG village.

The increase in income due to adoption of IPM strategy in the study area was noteworthy, of which the producers gained a large share as also consumers who were offered with healthy and pesticide free vegetables. The impact of

increased income indicated large economic potentiality of the IPM technology. Economic benefits of the IPM strategy appeared to be attractive enough to induce farmers to adopt it.

TABLE 7: Increase in income in Rs lakh per hectare

Crop	Before	After	% Change
Tomato	0.770	2.448	217.92
C.V.	16.401	9.410	
Cabbage	0.786	2.856	268.36
C.V.	13.271	4.405	
Brinjal	0.630	1.742	176.51
C.V.	8.324	4.472	

TABLE 8: Analysis of variance with respect to increase in income

Crops	t-value
Tomato	2.78967*
Cabbage	2.15141*
Brinjal	1.38513

(Condition: Before- After),* Significant at 5% level of probability

The highest increase in income had been in the case of cabbage which was 268.36 per cent followed by tomato and brinjal. The reduced values of Coefficient of Variation (C.V) at the 'after IPM' were indications that increase in

income had been more consistent. The significance of t- test value further clarified the increase in income, which was imperative. The findings were similar to the study conducted by Boral *et al.* (2006).

TABLE 9: Decrease in the cost of chemical pesticides (Rs. lakh/ha)

Crop Before	Before	After	Change in (Rs.)	% Change
Tomato	0.051	0.013	0.039	308.48
C.V.	3.276	13.686		
Cabbage	0.050	0.025	0.026	104.19
C.V.	5.1905		4.521	
Brinjal	0.055	0.027	0.029	107.22
C.V.	2.782	19.00		

TABLE 10: Analysis of variance with respect to decrease in the cost of chemical pesticides

Crops	t-value
Tomato	3.07469*
Cabbage	1.32235
Brinjal	4.91425*

(Condition: Before- After), * Significant at 5% level of probability

The table 10 reflects the reduction in the usage of chemical pesticides. There had been a remarkable reduction in the cost of chemical pesticides in tomato, which were 308.48 per cent followed by brinjal and cabbage. Surveys conducted in Bangladesh indicated that farmers spray insecticides up to 84 times during a 6 – 7 month cropping season (Bangladesh Agricultural Research Institute, 1995). The pesticide load in case of brinjal was the highest when it came to control the stubborn Brinjal Shoot and Fruit Borer (BSFB). The reduction in chemical cost in brinjal by 107.22 per cent was

substantial. There had been considerable reduction in the cost of cultivation due to less use of pesticides. The decline was about Rs 38558 in tomato, Rs 28520 in brinjal and Rs 25580 in case of cabbage per hectare. The C.V. values of tomato and brinjal indicated that the reduction in the cost of chemical pesticides had been drastic whereas the reduction was more or less consistent in the case of cabbage. The significant t-test values further statistically substantiate the claim in case of tomato and brinjal. The reduction in the cost of chemical pesticides was not statistically significant in cabbage.

TABLE 11: Reasons for following /not following IPM practices

YES:- 158			No:- 42		
Technology	% of total	Rank	Technology	% of total	Rank
Environment friendly	20.89	III (33)	Delayed results	28.5	II (12)
Cost effective	36.71	I (58)	Non availability of bio products	52.3	I (22)
Increase in the population of pest predators	12.02	IV (19)	Time Consuming	19.04	III (8)
Home-made (indigenous)	30.38	II(48)	--	--	--

The above table depicts that 158 of the respondents responded in the affirmative with regard to following IPM practices. This technology being cost effective was ranked first followed by home made, environmental friendly and increase in the population of pest predators in decreasing order of preference. The remaining 42 farmers replied in negative mainly due to non-availability of bio-products, delayed impact of the technology to suppress pest population and finally it was time consuming.

CONCLUSION

The Integrated Pest Management Programme (IPM) undertaken by the KVK made the farmers aware about the ill effect of indiscriminate usage of chemical pesticides. The usage of pesticides in improper dosage, marketing of produce soon after chemical

pesticides application and the effect of pesticide residue in the food chain have prompted to undertake the implementation of cabbage, tomato and brinjal or egg plant IPM. The results of the study suggested that there had been a decrease in usage of pesticides resulting in low cost of cultivation followed by enhanced income and productivity. The adoption and dissemination of technologies had been satisfactory except for the fact that the farmers were not able to use certain technologies like insect egg - parasitoids (*Trichogramma* sp.) because of its non-availability in the local market. The pesticides dealers should also be encouraged to sell bio-pesticides and bio-fungicides and related products and encourage farmers to use these products and boost sale by focusing on its positive effect. Finally, the consumers should also be enlightened about this technology so

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that the farmers are able to obtain a comparatively higher price towards the sale of toxic free vegetables. Hence, capacity building of the farmers and pesticide dealers and awareness of customers was necessary for popularizing this eco-friendly technology.

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Microfinance in India: New Approach for Financing the Rural Poor

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There is no doubt that strong demand exists for microfinance services, among the poor around the world. Recent statistics on the global outreach of microfinance institutions (MFIs) report that as of December 31, 2000, over 30 million families had access to microfinance services, of which more than 19 million qualified as poorest. This is both encouraging and daunting. Encouraging because the number has increased substantially since 1997, when the Microcredit Summit Campaign was launched. It is overwhelming because that still leaves 81 million poorest families to be reached by 2005, if the Campaign target of 100 million of the poorest is to be achieved. On a regional basis, coverage remains extremely low. In Asia, where almost 15 million poorest families have access to microfinance services, still only 9.3 per cent of all poorest families are being reached. And in Africa and Latin America, only 6% of all poorest families have access to financial services. It is not surprising, therefore, that NGO-MFIs

wanting to increase their outreach to the poorest, having the necessary institutional capacity and access to the necessary funding, have no difficulty in attracting new clients. Good examples are SHARE in India, CARD in the Philippines, FINCA in Uganda and CRECER in Bolivia.

In the Indian context, the microfinance sector has witnessed an unprecedented growth in the last few years, and has firmly established itself as significant potential contributor in the government's agenda of "Financial Inclusion". In terms of numbers while more than 2.2 Million SHGs are credit linked by the banks under the SHG Bank Linkage Programme (SBLP), an additional 10 million clients are served through MFI channel.

At present in the paradigm of "Financial Inclusion" the debate has moved from microfinance to Microfinance Livelihoods Linkage (MLL). There is a growing realization to look beyond the delivery of financial services to offering services for livelihood security, promotion

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of rural entrepreneurship, technology infusion and market linkage. There is also a need to innovate and engineer micro financial products to cater to the need of the poor in terms of strengthening their livelihood in general and addressing their vulnerability affecting livelihood in particular.

In places like Madhya Pradesh where the above support doesn't exist, it is hypothesized that microfinance cannot meet the need of the poor and address rural poverty in isolation. Hence, there is an urgent need to test this hypothesis and identify the possible bottlenecks to improve the efficiency and effectiveness of micro finance in the state as a powerful tool to solve the problem of poverty. The present study attempts to test the hypothesis using secondary data collected for Madhya Pradesh State.

Inadequacies in rural access to formal finance and the apparently contrasting terms of informal finance for the poor provide a strong need and ample space for innovative approaches to serve the financial needs of India's rural poor. In past, the efforts have been made by government, financial institutions, and NGOs, often in partnership, to develop new financial delivery approaches. From the last decades, microfinance approaches have been designed to combine the safety and reliability of formal finance with the convenience and flexibility that are typically associated with informal finance. They typically involve providing thrift, credit and other financial services and products of very small amounts to the poor,

with the aim to raise income levels and improve living standards.

Linking Banks to Grassroots level: SHG Bank Linkage

Excitement about SHG Bank Linkage has been growing, and many believe it is destined to become the country's dominant system of mass-outreach banking for the poor. The SHG model was started in the 1980s by social-development NGOs, many of whom took up group-formation; especially of women as their main tool. Having group members learn how to pool savings into loans particularly small, short-term consumption loans was seen as empowering disadvantaged women three dimensionally, socially and politically as well as financially. After liberalizing the policy about the NGOs in 1992, the legal obstacles were removed and subsidies made available to SHGs could take bulk loans from banks. That's may results to financing to group member to take up or expand their micro enterprises. The model developed so that SHG Bank Linkage today involves having the group save, and then linking it to a bank (usually the rural branch of a state-owned commercial bank, but also RRBs, cooperative banks, etc. Funds saved by SHGs are placed in a group deposit account in the bank.

The group then borrows from the bank (at about 12% per annum), using its saving and group guarantee as the collateral. To encourage banks to lend to SHGs, NABARD has provided subsidized refinancing support to banks, although the demand for such refinancing has declined

as banks begin to discover that SHG lending is quite profitable, and characterized by default rates (less than 1%) that are, in fact, much lower than the rate of default on their regular lending portfolios (11%-12%).

Financial status in Madhya Pradesh

The Government of India, as part of its strategy to boost agriculture production, announced a package to double the flow of institutional credit to agriculture within three years starting 2004-05. Consequently, targets were set and the

programme was implemented during the period 2004-05 to 2006-07. Among the 48 Districts of Madhya Pradesh, only 38 Districts have achieved the target of doubling of agricultural credit disbursement (Table 1). However bottom 10 districts in the table (accounts for more than 20 % of total districts) have not achieved the target of doubling. Due to the re-organisation of the districts, data could not be available for three districts Khandwa, Khargone and Burhanpur.

Table 1: District-wise credit flow to agriculture in Madhya Pradesh

Districts	2003-04	2004-05	2005-06	2006-07	Percentage increase over 2003-04		
					2004-05	2005-06	2006-07
Khargone	18791.00	36466.50	42301.37	67358.77	1.94	2.25	3.58
Bhopal	4646.91	7087.31	39830.40	48603.22	1.53	8.57	10.46
Indore	19137.60	33243.00	54180.00	44336.51	1.74	2.83	2.32
Raisen	12717.30	20689.30	23289.68	41770.88	1.63	1.83	3.28
Shajapur	12780.50	27434.40	28088.01	39355.23	2.15	2.20	3.08
Ujjain	15012.80	32651.70	26785.85	38353.48	2.17	1.78	2.55
Dhar	9388.00	26788.70	27791.19	37572.30	2.85	2.96	4.00
Dewas	9711.30	21898.60	20775.99	31270.46	2.25	2.14	3.22
Sehore	11946.20	17411.00	25399.79	30571.90	1.46	2.13	2.56
Vidisha	12266.90	30304.40	40886.83	30170.20	2.47	3.33	2.46
Hoshangabad	16917.10	25142.20	21753.23	26802.04	1.49	1.29	1.58
Gwalior	6810.80	8124.02	24916.67	24349.79	1.19	3.66	3.58
Ratlam	9594.01	13521.00	16804.40	23327.59	1.41	1.75	2.43
Khandwa	9093.32	12079.10	17269.67	21760.28	1.33	1.90	2.39
Mandsaur	8936.00	11590.50	15874.43	21089.73	1.30	1.78	2.36
Sagar	8492.92	14042.00	16424.00	19810.32	1.65	1.93	2.33
Harda	8196.58	17525.40	10476.45	18994.35	2.14	1.28	2.32
Burhanpur	5779.11	7722.39	14282.86	18444.32	1.34	2.47	3.19
Satna	6860.40	18669.90	14175.79	18034.57	2.72	2.07	2.63

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Narsinghpur	5617.10	9850.15	13002.57	177715.69	1.75	2.31	31.64
Bhind	7464.51	10525.60	10654.82	17013.12	1.41	1.43	2.28
Barwani	7081.00	9745.74	10868.00	16461.55	1.38	1.53	2.32
Guna	4723.37	8580.41	11209.82	16090.02	1.82	2.37	3.41
Chhindwara	7626.17	9575.94	13307.57	16036.64	1.26	1.74	2.10
Damoh	4387.38	7796.41	11692.76	14755.44	1.78	2.67	3.36
Shivpuri	5192.00	7157.31	9350.93	13740.90	1.38	1.80	2.65
Morena	5767.15	9012.16	12759.84	13331.64	1.56	2.21	2.31
Rajgarh	6594.01	11872.70	12735.75	13243.84	1.80	1.93	2.01
Jabalpur	4704.26	7312.38	8780.63	13055.67	1.55	1.87	2.78
Jhabua	4930.57	7407.44	6621.80	12917.27	1.50	1.34	2.62
Betul	4701.09	7048.02	7023.77	11126.23	1.50	1.49	2.37
Rewa	5340.20	8271.66	8052.82	10898.41	1.55	1.51	2.04
Tikamgarh	5681.48	6273.92	7927.28	10647.84	1.10	1.40	1.87
Chharpur	6615.08	7840.05	10593.00	10587.49	1.19	1.60	1.60
Datia	5328.35	7820.84	8040.46	10550.66	1.47	1.51	1.98
Balaghat	4556.70	6075.99	6334.97	9647.54	1.33	1.39	2.12
Panna	3407.80	4484.80	6670.35	9538.77	1.32	1.96	2.80
Ashoknagar	4413.29	5096.49	7332.82	8095.68	1.15	1.66	1.83
Neemuch	3456.67	5041.74	7414.68	7923.34	1.46	2.15	2.29
Seoni	3666.14	5139.12	5071.06	6447.77	1.40	1.38	1.76
Sheopur	2774.45	3601.13	3505.55	5401.07	1.30	1.26	1.95
Katni	2467.48	3398.27	3489.24	5303.39	1.38	1.41	2.15
Sidhi	2179.60	3599.09	3591.00	4592.99	1.65	1.65	2.11
Mandla	1765.18	2265.42	2546.33	4364.06	1.28	1.44	2.47
Shahdol	1408.40	2104.42	1922.85	3221.63	1.49	1.37	2.29
Dindori	703.60	1506.36	1243.73	1329.85	2.14	1.77	1.89
Umaria	734.58	1331.75	1369.29	1264.05	1.81	1.86	1.72
Anuppur	520.26	1055.53	1013.60	943.51	2.03	1.95	1.81
Madhya Pradesh	330886.62	563182.26	695433.90	1048222.00	1.70	2.10	3.17

Source: NABARD (2009)

In the year 2004-05 Shajapur, Ujjain, Dhar, Dewas, Vidhisha, Harda, Satna, Dindori and Mandla districts observed doubling of credit over 2003-04 while Khargone Bhopal, Shajapur, Indore, Dhar, Dewas, Sehore, Vidhisha, Gwalior, Burhanpur, Satna, Guna, Damoh, Morena, Panna and Neemuch doubled credit disbursement in 2005-06 over 2003-04 (Table 2). Some of the districts like Hoshangabad, Tikamgarh, Chhatarpur, Ashoknagar, Seoni, Sheopur, Dindori, Umariya and Anuppur did not fulfill the

doubling of credit target even by 2006-07. Thus, it may be concluded that though the target of doubling has been achieved at the state level, however, inter district variations does persists in the disbursement credit in the state. If we separate the crop loans and term loan, the condition of term loan is still worst in most of the districts. Around 2/3rd of districts have not achieved the target of doubling of credit.

**Table 2: District wise Increase of Agricultural Credit in the Doubling Period
(Number of times increase in credit during the doubling period)**

Rank	District	Crop Loan	Term Loan	Rank	District	Crop Loan	Term Loan
1	Bhopal	7.4	14	26	Barwani	2.3	2.2
2	Dhar	4.2	3.5	27	Harda	2.3	2.2
3	Khargone	3.3	5.4	28	Indore	2.8	1.5
4	Gwalior	4.4	2.9	29	Morena	3.2	1.6
5	Guna	5.6	1.8	30	Neemuch	2.4	1.6
6	Damoh	4.3	1.4	31	Shahdol	3.8	1.3
7	Raisen	3.5	2.5	32	Bhind	4.4	0.8
8	Dewas	3.3	2.9	33	Katni	3.1	1.2
9	Burhanpur	3.1	3.8	34	Balaghat	2.2	1.7
10	Narsinghpur	3.8	1.8	35	Sidhi	2.2	2
11	Shajapur	3.1	2.9	36	Chhindwara	2.3	1.4
12	Panna	3.1	2.1	37	Rewa	2.4	1.7
13	Jabalpur	3.3	2.2	38	Rajgarh	2	1.9
14	Shivpuri	4.7	0.8	39	Datia	2.1	1.7
15	Satna	3.5	1.8	40	Sheopur	2.8	0.8
16	Jhabua	2.5	3.2	41	Dindori	3.3	1.1
17	Sehore	3	1	42	Tikamgarh	1.9	1.9
18	Ujjain	2.5	2.9	43	Ashoknagar	4.3	0.7
19	Mandla	3.4	1.8	44	Anuppur	3.3	1.1
20	Vidisha	2.6	1.9	45	Seoni	2.3	0.7
21	Ratlam	2.5	2.1	46	Umariya	2.8	0.8
22	Khandwa	2.6	1.5	47	Chhatarpur	1.8	1
23	Betul	2.8	1.7	48	Hosangabad	1.9	0.8
24	Mansaur	2.8	1.3		Madhya pradesh	2.9	2.1
25	Sagar	2.5	2.1				

Source: NABARD (2009)

Micro finance in Madhya Pradesh

Madhya Pradesh is in the take-off stage of microfinance activity. The state is uniquely placed in terms of a willing government, eager financial institutions and a resourceful voluntary sector. Information on MFI/MFOs has been presented in Table

3. Table shows that total number of 23 MFI are operating in the state out of which 9 has their head offices in the state offering financial services in the state. The micro-finance is covered through 56 banks in the state. State has 1.74 lakhs Self Help Groups (SHGs).

Table 3: Some facts about micro-finance in Madhya Pradesh

Particulars	Numbers/Amounts
Total no. of MFIs operating in the state	23
No. of MFIs having HQ in the state	9
Banks providing microfinance services	56(Public Banks=17, Private Banks=2, RRBs=8, DCCBs=29)
Total no. of SHGs under SBLP in the state	173725
Total savings - client outreach	2432150
Total SHG - savings with banks(in lakhs)	7191.54
Total credit - client outreach	1494966(MFIs=1005834, Banks=489132)
Total portfolio outstanding(in lakhs)	72636.32(MFIs=59381.38, SHG=13254.94)
No. of districts served by MFI	33
Out of which no. of poorest districts	17

Poverty vis- a -vis micro finance

Table-4: District wise status of poverty vis- a -vis microfinance in M.P.

Districts	% of Population below poverty line			No of SHGs providing with bank loan during 2006 and 2007	Bank loan disbursed during 2006 and 2007 (Lakh Rs.)
	1993-94	2004-05	Change over 1993-94		
Balaghat	49.7	63.5	13.8	919	303.6
Barwani	13.5	58.9	45.4	1092	229
Betul	57.5	60.2	2.7	2035	212
Bhind	8.9	51.5	42.6	385	25.82
Bhopal	53.7	39	-14.7	306	14.26
Chhatarpur	54.3	52.5	-1.8	1000	68.77
Chhindwara	26.4	56.9	30.5	1357	53.84

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Damoh	56.6	78.8	22.2	509	73.05
Datia	14.2	42.8	28.6	641	54.79
Dewas	9.8	48.3	38.5	3147	266.25
Dhar	13.5	46.4	32.9	6198	385.63
Dindori	80.6	50.9	-29.7	205	35.52
Khandwa	7.4	53.7	46.3	2877	148.85
Guna	26	48.4	22.4	2273	139.6
Gwalior	9.7	35	25.3	1341	108.21
Harda	34.7	52.8	18.1	304	17.36
Hoshangabad	32.7	52.8	20.1	2337	156.28
Indore	12.2	41.5	29.3	2964	236
Jabalpur	30.3	45.6	15.3	2456	8946
Jhabua	57.2	41.6	-15.6	10049	498.98
Katni	49.5	45.6	-3.9	830	29.08
Mandla	77.5	50.9	-26.6	908	73.37
Mandsaur	17.8	61.9	44.1	2059	340.75
Morena	14.9	49.3	34.4	1158	84.09
Narsimhapur	44	43.6	-0.4	709	48.65
Neemuch	0.1	61.9	61.8	902	211.61
Panna	47.6	51.1	3.5	579	38.91
Raisen	60.4	59.1	-1.3	603	65.9
Rajgarh	12.1	59.6	47.5	694	75.64
Ratlam	29.8	33.1	3.3	1788	146.79
Rewa	43.6	47.5	3.9	490	108.49
Sagar	54.4	68.1	13.7	1385	191.3
Satna	16.8	48.5	31.7	2094	71.49
Sehore	49.1	54.3	5.2	956	56.27
Seoni	61.8	49	-12.8	1193	22.67
Shahdol	64.1	49.7	-14.4	1098	131.33
Shajapur	27.6	52	24.4	1234	146.8
Sheopur	24.5	49.3	24.8	131	6.98
Shivpuri	43	46.9	3.9	1146	96.24

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Sidhi	60.6	38.7	-21.9	117	27.63
Tikamgarh	49.2	52.3	3.1	663	114.15
Ujjain	27.3	33.1	5.8	2572	110.55
Umaria	85.1	49.7	-35.4	250	27.62
Vidisha	54.1	52.6	-1.5	664	110.04
Khargone	15.4	58.9	43.5	1818	403.55

Source: Compiled from different sources like Batra *et al.* (2005), NABARD (2010)

To investigate whether the number of SHGs and amount disbursed has any impact on poverty reduction or not, a correlation between these variables was worked out. The results of correlation showed that variable percent of population below poverty line and number of SHGs were negatively correlated, though the coefficient was non-significant. Similarly, the variable amount of bank loan disbursed was also found negatively associated percentage of population below poverty line. However, the correlation between change in per cent of population over two poverty census and number of SHGs as well as amount of loan disbursed was recorded positive though it was non-significant. It may be concluded from these results that the correlation coefficients were as per the a-priori hypothesis but due to the poor infrastructural support and poor mechanism as well as monitoring of microfinance in the state, it has no significant impact on reducing poverty in the state. The fact of poor infrastructural support was also pointed out different studies. In one of the study, it was showed that the Infrastructure Development Index is low in the state of Madhya Pradesh (CMIE, 2000). As it was also pointed out by

Indian Rural Development Report that Madhya Pradesh comes under the state where more than 40 per cent regions fall in bottom 30 percent for infrastructural ranking(NIRD, 1999).

Conclusions

The demand for microfinance services exists very high among the poor around the world. In Indian, the microfinance sector has witnessed an unprecedented growth in the last few years, and has firmly established itself as significant potential contributor in the government's agenda of "Financial Inclusion". Microfinance approaches have been designed to combine the safety and reliability of formal finance with the convenience and flexibility that are typically associated with informal finance. They typically involve providing thrift, credit and other financial services and products of very small amounts to the poor, with the aim to raise income levels and improve living standards. The present paper investigates the impact of microfinance on reducing poverty with special reference to Madhya Pradesh state. The results of the study found that the correlation between change in per cent of

population over two poverty census and number of SHGs as well as amount of loan disbursed was recorded positive though it was non-significant.

It may be concluded from these results that the correlation coefficients were as per the a-priory hypothesis. The poor infrastructural support, inappropriate legal structure, inadequate amount of loan, lack of transparency and

accountability, high interest rate, etc. are the major constraints in effectiveness of micro-finance in reducing poverty in the state. The study suggest for infrastructural development, strong regulatory framework, regulating interest rates for bringing more effectiveness of microfinance in reducing poverty in the state.

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