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Editorial

Strategic Need for Extension Professionals

Advances in technology and an evolving understanding of effective educational practices underscore the need for a commitment to an increasingly diverse learning community and for investment in new and innovative methods of educational delivery. In the context of this rapidly changing, highly competitive global environment, as well as changes in state and regional demographics and shifting funding streams, extension must recognize and respond to the challenges and opportunities that impact our work. It is at this exciting and critical juncture that Extension presents a clear vision for its stakeholders and provides strategic guidelines for its research, education faculty and field professionals.

In the changing and competitive global marketplace, it is not only imperative that we assess our current situation, set goals, and develop organizational capacity to reach these goals, but that we set the stage for the kind of transformative change required to make the Extension organization and its work truly effective. Along with a formalized, institutional authentication of goals and strategies, Strategic Plan must be prepared for every extension effort to present a common vision, language and understanding. The Strategic Plan articulates a shared purpose that builds upon existing organizational strengths and successes to establish a framework for development and focus, where innovation, contribution and interdependence are valued and rewarded. This framework can guide our work and foster the kind of dynamic and cohesive environment that will inspire and equip our 21st Century extension workforce to collectively address complex needs and boldly deliver on our mission.

Dr. Rabindra K.Raj

Chief Editor

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The Process of Modernizations in Vegetable Enterprise: A Concept of Heterodoxy

M.M. Adhikary¹, S.K. Acharya², K. Pradhan³, H.K. Kalita⁴, M Adhikary⁵ & A. Mishra⁶

In the changing global scenario the modernization replicates the synthesis of the development concept in a different perspective. Modernization is a dynamic process and has got different dimension as well as significance in the context of time, space and momentum. It is the resultant of a diffusion process which direct characterizes and qualify both the modernization process and the modernity's imbibed with it. The innovation decision process is the mental process and as a psychological process it synthesizes both modernism and modernity in the bringing up of individual behaviour and institutionalization of change impact on both process and product of social dynamism. Any individual while modernizing himself, he has to pass through cognitive changes, affectional configuration, actional mettle, and perceptual accomplishment. All the component of changes dovetailed to the modernization process has got their unique social chemistry of disintegration and integrations. Rogers (1969) argued

that modernization could not occur unless peasants were individually and collectively persuaded to change their traditional way of life through group communication and group interaction. Malkote and Steevs (2001) identified mass media as agents and indices of modernization in the Third World Countries. Some of the socio-economic and techno managerial factors have been found to impact directly or indirectly on the modernization process and also been found to become an intrigued elements of modern social system and echelons [Lionberger (1968); Singh (1990); Nagraj (2000); Prasad and Siddaramaiah (2000)]. The modernization paradigm has emerged not only from economic theory but also from social evolutionary theory. At the macro level the theories applied Darwin's ideas to the process of modernizations of human society. The theories of social evolution influence and gave rise to important concepts in the sociology of development such as the various bipolar theories of modernization.

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The modernization process as has been happening in vegetable cultivation in the Borpeta district of Assam itself is a unique example of multilevel and multi graded change process through inviting exotics knowledge's, innovative skills and utilitarian attitudes to interplay between traditional knowledge and modern technology. The pseudo modernization process through a blend of skeptic outlook and modern technology, and also the reverses, has posited an interesting area to study the heterodox aspect of modernization process in a typical traditional Assam village.

Objectives

Hence the objectives of the study are i) To assess the level of modernization of vegetable growers in terms of knowledge, attitude and skills in this enterprise; ii) To measure the agro-economic, socio-psychological and management characteristics of vegetable growers and iii) To study the inter and intra level of relations of selected characteristics of the vegetable growers.

Methodology

The study was conducted among 200 vegetable growers of Borpeta district of Assam State. Two blocks viz. Bhawanipur and Gobordhana were

selected purposefully since these two blocks have undergone massive modernization process in vegetable cultivation over the last decade. Four gram panchayat area was again selected through purposive sampling method because of their high concentration of vegetable growers along with the characters selected for the research. Twenty farmers from each of the four gram panchayat were selected randomly from a comprehensive list of vegetable growers to ultimately attain a respondent size of 200 altogether.

Befitting statistical methods like, co-efficient of correlation (r); multiple regression analysis (B); path co-efficient and linear discriminate function etc were followed to derive logical conclusion as and when applicable.

Results & Discussion

Co-efficient of correlation of knowledge level with the independent variables:

Table: 1 depicts the co-efficient of correlation between cognitive or knowledge level of the vegetables growers in areas of inputs and technologies, exotic by nature, applied to increase the productivity level of vegetables, with those of selected socio-psychological and techno managerial variables operating in the behavioural disposition of the respondents.

Table No: 1**Correlation Coefficient of knowledge level with the independent variables**

Sl.No	Variables (X)	Correlation Coefficient (r)
1	Age (1)	0.013
2	Education (2)	0.120
3	Annual Income (3)	0.748**
4	Size of holding (4)	0.703**
5	Cropping Intensity (5)	0.800**
6	Farming Experiences (6)	0.055
7	Material Possession (7)	0.016
8	Training Status (8)	0.557**
9	Irrigation Status (9)	0.656**
10	Socio Political Participation (10)	-0.133
11	Cosmopolitaness (11)	0.623**
12	Utilization of Sources of Information (12)	0.703**
13	Achievement Motivation (13)	0.674**
14	Scientific Orientation (14)	0.813**
15	Risk Preference (15)	0.783**
16	Non-Fatalistic Orientation (16)	0.748**
17	Management Orientation (17)	0.757**
18	Value Orientation (18)	0.784**
19	Economic Motivation (19)	0.744**
20	Innovation Proneness (20)	0.692**

*** Significant at 5% level & ** Significant at 1% level**

The behavioural inputs like cosmopolitanness, utilization of sources of information, achievement motivation, scientific orientation, risk preference, non-fatalistic orientation, management orientation, value orientation, economic motivation and innovation proneness were found to elicit a positive correlation with the knowledge level of the vegetables growers. Both the cognitive changes and motivational transformation in the psyche of the farmers have been the resultant of impregnating of exogenous inputs, ideas, perceptions as well as skills that intern supposes to have attributed changes of yield level in vegetable enterprises. The cognitive changes and technology adoption, as a mutually coupling process, have essentially formed a dyad, socially evolving and culturally assimilating by nature.

Multiple Regression Analysis of knowledge level with the independent variables:

Regression Analysis has been carried out to elicit the causal impact of a score factors selected for the study on

the consequent factor that is changes of knowledge level of the farmers engaged in vegetable farming. It has been found that the variables annual income, size holding, cropping intensity, training status, socio-politico-participation, utilization of sources of information, scientific orientation have recorded significant regressional impact for both characterizing and quantifying the cognitive level of the vegetable growers.

The regression analysis suggest that the high income, better exposure to training experience, higher interaction with social and political institutions, wider exposure to media, and a pragmatic and scientific psyche, are all holistically helping to build up a better knowledge, a diverse cognizance and a wider canopy of visions to accept, respond and adopt to the element of modernization for bringing out desirable changes in the disposition of life process. The r square value being 0.854, it is to conclude that this conglomeration of 20 causal factors together has attributed to 85.40% explicability imbibed with the variability of the consequent factor.

Table No: 2

Multiple Regression Analysis of knowledge level with the Independent variables

Sl.No	Variables (X)	B	BXR	Multiple Regression Coefficient 'b'	S.E of 'b'	't' value of 'b'
1	Age (1)	-0.013	-0.020	-0.021	0.117	0.183
2	Education (2)	-0.021	-0.298	-0.244	0.346	0.704

3	Annual Income (3)	0.203	18.602	0.191	0.059	3.238**
4	Size of holding (4)	-0.065	-5.362	-0.179	0.152	1.777*
5	Cropping Intensity (5)	0.129	12.091	0.042	0.020	2.063*
6	Farming Experiences (6)	-0.008	-0.054	-0.015	0.127	0.116
7	Material Possession (7)	0.009	0.014	0.124	0.407	0.305
8	Training Status (8)	0.095	6.214	0.228	0.088	2.580**
9	Irrigation Status (9)	0.037	2.845	0.041	0.046	0.886
10	Socio Political Participation (10)	-0.056	0.868	-0.646	0.348	1.857*
11	Cosmopolitaness (11)	0.022	1.583	0.159	0.325	0.490
12	Utilization of Sources of Information (12)	0.144	11.859	0.401	0.117	3.432**
13	Achievement Motivation (13)	0.043	3.425	0.289	0.280	1.025
14	Scientific Orientation (14)	0.146	13.953	0.363	0.167	2.175*
15	Risk Preference (15)	0.093	8.530	0.284	0.189	1.507
16	Non-Fatalistic Orientation (16)	0.162	14.221	0.112	0.034	3.343**
17	Management Orientation (17)	-0.010	-0.880	-0.015	0.085	0.180
18	Value Orientation (18)	0.116	10.654	0.343	0.161	2.133
19	Economic Motivation (19)	0.001	0.104	0.004	0.202	0.021
20	Innovation Proneness (20)	0.021	1.665	0.070	0.171	0.408

$R^2 = 0.854$ Adjusted $R^2 = 0.0.838$

*** Significant at 5% level & ** Significant at 1% level**

Path Analysis of knowledge level with the causal variables:

Table-3 present the path analysis to decompose the total effect into direct, indirect and residual effect of the exogenous variables on the predicted variable that is, level of knowledge.

Path analysis is a unique statistical approach for decomposition of

apparently 'linear relation' for deriving their multi-collinear direction. Thus this is a logical expansion of coefficients of correlation to assess the mode of traveling of different variables to enjoy the association of other cognate variables.

It was found from the table that the direct effect of all variables was smaller than their indirect effect. It was found that the variable **annual income** had yielded the highest direct effect. The economic support in the form of annual income explains the ability to absorb the

risks if any. It also makes people capable of accessing information and their by topping of their knowledge base.

Table No: 3

Path Analysis of knowledge level with the causal variables(X)

Sl.No	Variables (X)	Total effect	Direct effect	Indirect effect	I	Substantial effect II	III
1	Age (1)	0.013	-0.013	0.026	0.011 (x16)	-0.007(x6)	0.003(x15)
2	Education (2)	0.120	-0.021	0.141	0.0254(x3)	0.021(x18)	0.02(x14)
3	Annual Income (3)	0.784	0.203	0.581	0.102(x5)	0.095(x14)	0.093(x16)
4	Size of holding (4)	0.703	-0.065	0.768	0.167(x3)	0.093(x5)	0.089(x14)
5	Cropping Intensity (5)	0.800	0.129	0.671	0.161(x3)	0.100(x14)	0.099(x12)
6	Farming Experiences (6)	0.055	-0.008	0.063	0.19(x16)	-0.012(x1)	0.011(x14)
7	Material Possession (7)	0.016	0.009	0.007	0.006(x10)	0.060(x12)	0.004(x18)
8	Training Status (8)	0.557	0.095	0.462	0.106 (x3)	0.170(x5)	0.056(x12)
9	Irrigation Status (9)	0.656	0.037	0.619	0.130(x3)	0.086(x14)	0.084(x5)
10	Socio Political Participation (10)	-0.133	-0.056	-0.077	-0.023(x14)	-0.01(x14)	-0.01(x16)
11	Cosmopolitaness (11)	0.623	0.022	0.601	0.013(x3)	0.092(x5)	0.077(x14)
12	Utilization of Sources of Information (12)	0.703	0.144	0.559	0.126(x3)	0.090(x14)	0.088(x5)
13	Achievement Motivation (13)	0.674	0.043	0.631	0.119(x3)	0.097(x14)	0.093(x16)
14	Scientific Orientation (14)	0.819	0.146	0.673	0.132(x3)	0.088(x5)	0.086(x18)
15	Risk Preference (15)	0.783	0.093	0.690	0.122(x14)	0.122(x16)	0.119(x3)
16	Non-Fatalistic Orientation (16)	0.748	0.163	0.585	0.116(x3)	0.107(x14)	0.081(x18)
17	Management Orientation (17)	0.757	-0.010	0.767	0.135(x3)	0.112(x12)	0.108(x16)
18	Value Orientation (18)	0.784	0.116	0.668	0.138(x3)	0.114(x16)	0.108(x14)
19	Economic Motivation (19)	0.744	0.001	0.743	0.134(x3)	0.108(x14)	0.105(x16)
20	Innovation Proneness (20)	0.692	0.021	0.671	0.12(x13)	0.097(x14)	0.816(x5)

Residual effect = 0.1459

It was found that the variable viz. size of holding, management orientation and economic motivation had occupied three successive positions in wielding

distinctive indirect effect to characterize level of knowledge. Larger size of holding had gone supportive in enhancing the resource capacity of farmers and

enriching their knowledge base. Management orientation in today's rural enterprise is crucial to the point where essential inputs such as meaningful and effective participation, pragmatic decision making, and judicious resources use and knowledge up-gradation come into interplay.

Conclusion

It was found the variables scientific orientation had gone instrumental to channel its substantial indirect effect (1st, 2nd and 3rd position) in

as many as 16 variables to prove its imbibing and associational role to characterize multi collinear nature of this important variable.

The residual effect being 0.1459 obviously implied that even with the constellation of these 20 variables, 14.59 per cent of the variation left unexplained. This should further suggest that inclusion of more relevant and contextual variables could have explained more variations than what had been explained in the present study.

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Constraints Analysis in Adoption of Rice Production Technology as Faced by Marginal and Small Farmers

Pradeep Kumar¹ and Prakash Singh²

Rice (*Oryza sativa* L.) is a staple food of majority of the people of Asian countries. About 90 percent of all rice grown in the world is produced and consumed in Asian region. Rice is one of the most important crops in Indo-Gangetic plain region of Uttar Pradesh. Rice is the main staple food crop of eastern U.P. which is grown under different agro-ecological conditions like water logged area, deep water area, irrigated and unirrigated area, upland and usar soil. The performance with respect to adoption of high yielding varieties of rice in the plains of North Western Uttar Pradesh is satisfactory in case of small, medium and large farmers, where about 70 percent of small farmers, percent of the medium and large farmers were adopting HYVs of rice. The extensive adoption of modern and improved production technology was accelerated through favorable government policy like expansion of irrigated areas, accessibility to agricultural credit, intensive extension services and the availability of agro-chemicals, especially fertilizers and herbicides. Many a time, the farmers are not in a position to

continue the adoption of all recommended practices; hence, there may be some gap. Knowledge about the constraints responsible for such gap is very important to maintain feedback among research, extension and client system so that appropriate changes could be made for effective management. On this context, this study was carried out to identify the major constraints of the client system with respect to adoption of the improved rice production technology with the following objectives:

Objectives

1. To find out the constraints in adoption of rice production technology.
2. To seek remedial measures to overcome the constraints in adoption of rice production technology.

Methodology

The study was conducted in Milkipur block of Faizabad district which was selected purposively, on the criteria of rice growing belt and nearer location of NDU&T, Kumarganj and its

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convenient accessibility. At first stage, out of 113 villages in the selected block, 4 villages were selected randomly i.e., (1) Sidhauna, (2) Anjrauli, (3) Severa and (4) Uchhahpali. Then after, the list of rice growers, were prepared separately for each sample village and then, a total number of 100 rice growers (50 marginal+ 50 small) from 4 sample villages were selected through proportionate random sampling technique on the basis of land categories. A structured schedule was developed keeping in view the objectives & variables (Independent variables & Dependent variables) under study. The respondents were contacted personally for data collection. The percentage, mean, standard deviation were used for analysis and drawing the inferences.

Results and Discussion

(1) Constraints analysis in adoption of rice production technology:

(A) Social constraints

The Table-1 indicates the rank order of social constraints faced by marginal & small farmers, majority of the marginal farmers reported most important constraint *i.e.*, 'It is more difficult to watch the crops & safeguard it against the animals' which was ranked Ist (0.804) followed by 'lack of proper guidance & supervision for modernized cultivation', ranked IInd (0.724), 'progressive farmer leadership lack in our village', IIIrd (0.700), 'lack of scientific knowledge about rice cultivation', ranked

IVth (0.664), 'risk orientation lacks in farming community', ranked Vth (0.628), 'scientific orientation lacks in farming community', ranked VI (0.620), 'lack of interaction between scientist & progressive farmers', ranked VII (0.608), 'lack of Khalihan for threshing the harvest crop', ranked VIII (0.588) and 'lack of contact with extension personnel', ranked IX (0.500). Likewise the constraints as reported by small farmers *i.e.*, 'it is more different to watch in crops & safe guard it against the animals' was ranked Ist (0.824) followed by 'lack of scientific knowledge about rice cultivation', ranked IIrd (0.712), 'lack of proper guidance & supervision for modernized cultivation', ranked IIIrd (0.688), 'lack of interaction with scientist & progressive farmers', ranked IVth (0.680), 'progressive farmers leadership lack in our village', ranked V (0.644), 'risk orientation lacks in farming community', ranked VI (0.640), 'scientific orientation lacks in farming community', ranked VII (0.636), 'lack of contact with extension personnel', ranked (0.616) and 'lack of Khalihan for threshing the harvested crops', ranked IX (0.304).

The score values for each constraint indicates the seriousness of constraints caused low adoption of technology focuses that the marginal & small both the farmers differed in ranking of constraints they face in their surroundings & conditions as it appeared from over all mean values in case of marginal farmers (0.648) & small farmers (0.640).

Table-1: Social constraints in adoption of rice production technology

S. N.	Social constraints	Marginal farmers (N-50)			Small farmers (N-50)		
		Total Scores	Mean score values	Rank	Total Scores	Mean score values	Rank
1.	Lack of scientific knowledge about rice cultivation	166	0.664	IV	178	0.712	II
2.	Lack of contact with extension personnel	125	0.500	IX	154	0.616	VIII
3.	Lack of interaction with scientist & progressive farmers	152	0.608	VII	170	0.680	IV
4.	Lack of proper guidance & supervision for modernized cultivation	181	0.724	II	172	0.688	III
5.	Lack of Khalihan (common spot) for threshing the harvested crops	147	0.588	VIII	076	0.304	IX
6.	It is more difficult to watch the crops & safeguard it against the animals	201	0.804	I	206	0.824	I
7.	Progressive farmer leadership lacks in our village	175	0.700	III	161	0.644	V
8.	Scientific orientation lacks in farming community	155	0.620	VI	159	0.636	VII
9.	Risk orientation lacks in farming community	157	0.628	V	160	0.640	VI
Overall average		162	0.648		160	0.640	

(B) Economic constraints

The Table-2 shows the rank orders for economic constraints as faced by marginal and small farmers, majority of the marginal farmers reported most important constraints *i.e.*, ‘irrigation expenses are high due to costly diesel and electric charges’ which was ranked 1st (0.860) followed by ‘labours are hardly available for agricultural operations’, ranked 2nd (0.840), ‘lack of subsidy on inputs purchase for rice cultivation’,

ranked 3rd (0.768), ‘more involvement of intermediary in rice marketing’, ranked 4th (0.720), ‘economics motivation lack among farm families’, ranked 5th (0.596), ‘resource poor farmers fail to afford the expenses needed for rice cultivation’, ranked 6th (0.592), ‘corruption prevailing in financial institutions *i.e.* banking system, cooperative credit society, etc ranked 7th (0.588), ‘lack of nearby located appropriate market to dispose off the farm produce’, ranked 8th (0.576), ‘less

profit due to less remunerative crop', ranked IX (0.568) and 'farmers purchasing power is poor', ranked X (0.584). The similar response was given by small farmers for Ist and IInd constraint. The other constraints listed were 'economic motivation lacks among farm families', ranked IIIrd (0.640), 'more involvement of intermediaries in rice marketing', ranked IV (0.628), 'lack of subsidy on inputs purchase for rice cultivation', ranked V (0.616), 'lack of nearby located appropriate market to dispose off the farm produce', ranked VI (0.576), 'corruption prevailing in financial institutions i.e. banking system,

cooperative credit society, etc ranked VII (0.536), 'resource poor farmers fail to afford the expenses needed for rice cultivation', ranked VIII (0.500), 'less profit due to less remunerative crop', ranked IX (0.392) and 'farmers purchasing power is poor', ranked X (0.388).

Thus, it focuses that both marginal and small the farmers differed in ranking of constraints except Ist and IIrd as they face from their surroundings and conditions as appeared from over all mean values which was 0.668 in case of marginal farmers and 0.604 in case of small farmers.

Table-2: Economic constraints in adoption of rice production technology

S. N.	Economic constraints	Marginal farmers (N-50)		Small farmers (N-50)			
		Total Scores	Mean score values Scores	Rank	Total score values	Mean score	Rank
1.	Resource poor farmers fail to afford the expenses needed for rice cultivation.	148	0.592	VI	125	0.500	VIII
2.	Lack of nearby located appropriate market to dispose off the farm produce.	144	0.576	VIII	144	0.576	VI
3.	Corruption prevailing in financial institutions i.e. banking system, cooperative credit societies etc.	147	0.588	VII	134	0.536	VII
4.	Lack of subsidy on inputs purchase for rice cultivation.	192	0.768	III	154	0.616	V
5.	Less profit due to less remunerative crop.	142	0.568	IX	098	0.392	IX
6.	Farmers' purchasing power is poor.	146	0.584	X	097	0.388	X
7.	More involvement of intermediaries in rice marketing.	180	0.720	IV	157	0.628	IV

8.	Irrigation expenses are high due to costly diesel & electric charges.	215	0.860	I	221	0.884	I
9.	Labours are hardly available for agricultural operations.	210	0.840	II	217	0.868	II
10.	Economic motivation lacks among farm families.	149	0.596	V	160	0.640	III
Overall average		167	0.668		151	0.604	

(C) Technological constraints

The Table-3 shows the rank orders of technological constraints as faced by marginal and small farmers. The majority of marginal farmers reported most important constraints *i.e.*, 'lack of availability of manure & fertilizers in the market at appropriate time' which was ranked Ist (0.792) followed by 'ineffectiveness of plant protection chemicals available in the market if used by farmers', ranked Ist(0.712), 'lack of soil testing facilities promoted imbalanced use of fertilizers', ranked IIIrd (0.644), 'duplicate fertilizers sold to the farmer's which damage the crop and adversely

affect the yield', ranked IV (0.604), 'more incidence of pest & diseases damage the crops', ranked V (0.600), 'non-availability of quality HYVs seeds when required', ranked VI (0.552) and 'Tractor on hire are hardly available at the time in the village', ranked VII (0.524). Almost similar pattern was found in case of responses given by the small farmers.

Thus, it focuses that both marginal and small farmers do not differ more in ranking of constraints, as they face in their surroundings and conditions as it appeared from overall constraint mean values of marginal farmers (0.616) and small farmers (0.680).

Table-3: Technological constraints in adoption of rice production technology

S. No.	Technological constraints	Marginal farmers (N-50)			Small farmers (N-50)		
		Total	Mean score values	Rank	Total	Mean score values	Rank
1.	More incidences of pest & diseases which damage the crops.	150	0.600	V	148	0.592	IV
2.	Non-availability of quality HYVs seeds when required.	138	0.552	VI	147	0.588	V

3.	Lack of availability of manures & fertilizers in the market at required time.	198	0.792	I	187	0.748	I
4.	Duplicate fertilizers sold to the farmers' damage the crop and adversely affect the yield.	151	0.604	IV	134	0.536	VI
5.	In-effectiveness of plant protection chemicals available in the market if used by farmers.	178	0.712	II	170	0.680	II
6.	Tractor on hire is hardly available at the time in the village.	131	0.524	VII	100	0.400	VII
7.	Lack of soil testing facilities promoted imbalanced use of fertilizers.	161	0.644	III	169	0.676	III
Overall average		154	0.616		145	0.580	

(2) Remedial measures to overcome the constraints in adoption of rice production technology as suggested by respondents:

The following remedial measures to overcome the constraints were suggested by the farmers in descending order 'blue bull killing and catching campaign should regularly be against to safeguard the crops', 'A permanent source of information (i.e. T.V., Radio of Forum, Chaupal etc.) should be managed

by village panchayat for the farmers related to crop production' and 'timely supply improved quality seeds, fertilizers & pesticides should be ensured', hence for own irrigation services should be facilitated on subsidized rates by government financial agencies, mobile soil testing service should be managed in the villages at farmers door and flexible and transport services of credit management at gross root level most be done to meet the credit needs of the farmers .

Table-5: Remedial measures to overcome the constraints in adoption of rice production technology as suggested by respondents

S. No.	Suggestive measures	Marginal farmers (N-50)			Small farmers (N-50)		
		No.	%	Rank	No.	%	Rank
1.	Blue bull killing and catching campaign should be regularly organized to safeguard the crops.	45	90	I	47	94	I
2.	A permanent source of information (i.e. T.V., Radio-Forum, Chaupal etc.) should be managed by village Panchayat for the farmers related to crop production.	44	88	II	42	84	IV
3.	Flexible & transparent sources of credit management at gross root level must be done to meet the credit needs of the farmers.	40	80	V	43	86	III
4.	Finance for own irrigation sources should be facilitate on subsidized rates by govt. financing of the credit.	35	70	VI	39	78	VI
5.	Timely supply of improved quality seeds, fertilizers and pesticides timely supply should be ensured.	43	86	III	44	88	II
6.	Mobile soil testing van service should be managed there in the village at farmer's doors.	41	82	IV	40	80	V

Conclusion

Majority of both the farmers were found in medium scientific orientation, economic motivation and risk orientation. It was observed that the marginal farmers faced more social, economical and technological constraints as compared to the small farmers. Based on

inferences and observations, it may be suggested that the crops should be insured against the animals and natural hazards. Besides, the farmers training programme for commercial farming and value addition in rice be imparted with a view to make the marginal and small families economically sound.

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Awareness & Adoption of Indigenous Technical Knowledge (ITK) in Jamtara District of Jharkhand

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Indigenous Knowledge (IK) is the actual knowledge of a given population that reflects the experience based on tradition and includes more recent experience with modern technology. Indigenous knowledge system may appear simple to outsider but they represent mechanism to ensure the minimal livelihoods for local people (Havekort, 1993). The indigenous practices are perceived better than the modern veterinary drug due to their availability, lesser side effects and lower cost (De *et al*, 2004). Rural people especially the tribes are the rich reservoir of ethnoveterinary knowledge and practices (Das and Tripathi, 2009). But these ITKs are not well disseminated among urban people.

Objective

To know the awareness and adoption of the various ITKs used by the livestock owners.

Methodology

The study was conducted in Jamtara district of Jharkhand. In this

district 50 livestock owners which were known to use ITK's and 10 traditional healers which were considered to be knowledgeable in ITK's in animal husbandry in surrounding areas were selected randomly. Therefore, all together 50 livestock owners and 10 traditional healers (60 respondents) were selected for the study. The respondents were interviewed to know the awareness and adoption of ITKs.

Results and Discussion

The extent of awareness and adoption was studied for ITKs by the livestock owners in their animals for ten commonly found animal diseases viz. diarrhoea, fever, fracture, constipation, pneumonia, bloat, gastrointestinal parasites, foot and mouth disease, wound and ectoparasitic infestation.

1. Extent of awareness and adoption of indigenous practices among livestock owners in Jamtara district of Santhal Pargana division of Jharkhand.

Diarrhoea - Most of the livestock owners (60%) were aware of the ingredients

(powdered of Hartaki, Bahera and Aonla mixed with fermented rice) followed by 54% (paste prepared from Banana flower and Turmeric), 40% (unripe Mango, bark of Pojo and Janum) and, 32% (roots, fruits and seeds of Elaichi) used in indigenous preparation to control diarrhoea. These practices were adopted by 56%, 48%, 36% and 28% of the livestock owners respectively.

Fever

In case of fever, most of the respondents (62%) were aware of use of powdered root of Jharmanik and Black pepper, 52% were aware of use decoction of Kalmegh and 46% were aware of application of powder of roots of Akandi and Black pepper. These practices were commonly adopted by

54%, 46% and 42% of the livestock owners respectively.

Fracture

Majority of the livestock owners (58%) were of the ingredients (paste made from Harjora plant) and 42% were aware of ingredients (paste made from bark of Sankerjata) used in indigenous preparation in case of fracture. These practices were adopted by 52% and 36% of the livestock owners respectively.

Constipation

In case of constipation, most of the respondents (42%) were of the ingredients (mixture prepared from Hartaki, Ajwain, Wheat bran, Hing and Jaggery) followed by 28%

Table-1: Extent of awareness and adoption of Indigenous practices among livestock owners in Jamtara district of Santhal Pargana division of Jharkhand

SI No.	Indigenous practice	Awareness level		Adoption level	
		<i>f</i>	%	<i>f</i>	%
1	Diarrhoea				
(a)	Powdered of Hartaki, Bahera and Aonla mixed with fermented rice water	30	60	28	56
(b)	Paste prepared from Banana flower and turmeric	27	54	24	48
(c)	Roots, Fruits and Seeds of Elaichi	16	32	14	28
(d)	Unripe Mango, Bark of Pojo and Jamun	20	40	18	36

2	Fever				
(a)	Decoction of Kalmegh	26	52	23	46
(b)	Powder of root of Jharmanik (<i>Rauvolfia serpentine</i>) and Black pepper	31	62	27	54
(c)	Roots of Akandi (<i>Stephania japonica</i>) and Black pepper	23	46	21	42
3	Fracture				
(a)	A luke warm paste of Harjora plant is applied with external fixation	29	58	26	52
(b)	A paste is made from Bark of Sankerjata (<i>Uraria picpa</i>)	21	42	18	36
4	Constipation				
(a)	Mixture prepared from Hartaki, Ajwain, wheat bran, Hing and Jaggery	21	42	19	38
(b)	Isabgol (<i>Plantago ovate</i>) husk mixed with luke warm water	14	28	12	24
(c)	Desi ghee is given orally	13	26	9	18
5	Pneumonia				
(a)	Extract made from Tejpata (<i>Sinnamomum tamala</i>) and Ginger	20	40	18	36
(b)	A paste is made from Ghee , Black pepper, Ginger and Garlic (<i>Allium sativum</i>)	16	32	14	28
(c)	Juice of Begna leave, Ginger and Black pepper	26	52	23	46
6	Bloat				
(a)	Ginger and salt is mixed	16	32	13	26
(b)	Mixture made from Bitla ban (<i>Natrum murbit</i>), Groundnut sulphur, Molasses and Black pepper	14	28	11	22
(c)	Decoction of Stem and bark of Kadam	24	48	19	38

7 Gastrointestinal parasites					
(a)	Seed of palas (<i>Butea monodisperma</i>)	27	54	24	48
(b)	Paste prepared from papaya (Carica papaya) and Neem seed	29	58	26	52
(c)	Extract of Neem leaves	24	48	22	44
8 FMD					
Foot lesion					
(a)	Animal is allowed to stand in muddy areas of paddy field/ river banks	21	42	19	38
(b)	Neem leaves are boiled. The extract applied on the affected part. Then Neem oil is applied	30	60	28	56
Mouth lesion					
(a)	Extract of stems and leaves of Pataldudhi (<i>Hemidesmus indicus</i>) is mixed with honey and fed to the animal	29	58	23	46
(b)	Geru is applied on the affected lesion	20	40	17	34
9 Wound					
(a)	Roots of Kuchila (<i>Strychnos nuxvomica</i>), roots of Surajmukhi (<i>Helianthus annuus</i>) is mixed with Palas Petals and Mustard oil and applied topically over the wound	26	52	23	46
(b)	Application of Haldi (<i>Curcuma domestica</i>)	29	58	26	52
(c)	Milky juice of Kukur-Botur (<i>Vallisneria spiralis</i>) is applied on wounds	20	40	18	36
10 Ectoparasitic infestation					
(a)	Leaves of Neem or Neem oil	32	64	30	60
(b)	Tobacco shoot with Kerosine oil	12	24	9	18

(Isabgol husk) and 26% (Desi Ghee) used in indigenous preparation, whereas, these practices were adopted by 38%, 24% and 18% of the respondents respectively.

Pneumonia

Most of the livestock owners (52%) were aware of use of extracted juice of Begna leaves, Ginger and Black pepper, 40% were aware of use of extract made from Tejpata and Ginger and 32% were aware of use of paste made from Ghee, Black pepper, Ginger and Garlic in case of pneumonia and these practices were adopted by 46%, 36% and 28% of the livestock owners respectively.

Bloat

In case of bloat, most of the livestock owners (48%) were aware of the ingredients (decoction of stem and bark of Kadam) followed by 32% (Ginger and salt) and 28% (mixture made from Bitlaban, Groundnut, Molasses and Black pepper) used in indigenous preparation. These practices were adopted by 38%, 26% and 22% of the livestock owners respectively.

Gastrointestinal parasites

The study indicated that 58% livestock owners were aware of use of paste prepared from Papaya and Neem seed, 54% were aware of use of seed of Palas and 48% were aware of use of extracted of Neem leaves and for treatment of gastrointestinal parasites and these practices were adopted by 52%, 48%, and 44% of the livestock owners respectively.

Foot and Mouth Disease

For the treatment of foot lesions in FMD, majority of the livestock owners

(60%) were aware of use of extract of Neem leaves and Neem oil and 42% were aware of animal allowed to stand in muddy areas of Paddy field/river banks. These practices were adopted by 56% and 38% of the livestock owners respectively.

For the treatment of mouth lesions in FMD, 48% livestock owners were aware of applying stems and leaves of Pataldudhi mixed with honey and 40% were aware of applying Geru on the affected lesion. These practices were adopted by 46% and 34% of the livestock owners respectively.

Wound

In case of wound, most of the livestock owners (58%) were aware of the ingredients (application of Haldi) followed by 52% (roots of Kuchila, roots of Surajmukhi mixed with Palas petals and Mustard oil) and 40% (milky juice of Kukur -Botur) used in indigenous preparation. These practices were adopted by 52%, 46% and 36% of the livestock owners respectively.

Ectoparasitic infestation

Majority of the livestock owners (64%) were aware of application of leaves of Neem or Neem oil and 24% were aware of application of Tobacco shoot with Kerosine oil. These practices were adopted by 60% and 18% of the livestock owners respectively.

Conclusion

The awareness and adoption varied widely from ITK to ITK. The finding revealed that 24 to 64 percent of livestock owners were aware of ITKs and 18 to 60 percent have adopted ITKs in their animals. These ITKs need to more effectively disseminate among the

livestock owners. To increase the awareness and adoption several programmes should be conducted. Livestock owners, traditional healers, veterinary staffs and non-government organizations should be involved in the project identification, implementation, reviewing and monitoring process for sharing knowledge and skills effectively.

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Constraints Perceived by the Dairy Personnel in the functioning of Dairy Plants in Bihar - A study in Organizational Perspectives

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Dairying has been considered as 'rural banking' in Indian conditions as it is practiced by the marginal and small farmers for their sustenance and livelihood. With the success of 'Operation Flood' and advent of 'White Revolution' even resource poor farmers are able to get regular income by supplying milk to the Dairy Cooperative society in their villages. An organization is made up of mainly four components i.e. organizational structure, goals & targets, people and technology. The effectiveness of the organization depends upon the overall performance of all these components. Empirical studies supports that the organizations responded to the changes in the internal and external environment grown well and achieved its set target effectively. This happens by proper implementing the change management strategies like organizational diagnosis, organizational development, etc. Organizational development is an educational strategy

designed to increase organizational effectiveness through planned intervention so that the organization can better adapt to new technologies, markets and challenges as well as faster the rate of change in the environment. It is a modern approach of change management and human resource development. Human resource is the very important resource and deciding factor of organizational effectiveness. Moreover, many times it has been observed that organizations are unable to respond the changes due to many limitations that can be broadly classified into: technological, economic/marketing, infrastructural, administrative and miscellaneous etc.

Objective

Keeping above fact in view, the present study was undertaken to delineate the constraints perceived by the dairy personnel in the organizational development.

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Methodology

This exploratory study was conducted in 2009-10 in purposively selected Bihar State Cooperative Milk Producers Federation (COMPFED), an apex body at state level controlling the dairying activities. By using multistage stratified random sampling, Bhagalpur Dairy (BD), Bhagalpur, Tirhut Milk Union Ltd. (TIMUL), Muzaffarpur and Barauni Milk Union (BMU), Barauni were selected for this study. In all, 50 dairy personnel as respondents were selected randomly by using proportionate sampling technique at Union (n=50). A suitable interview schedule was developed to study the constraints faced by the respondents. The respondents were asked to pin-point the constraints faced/perceived by them in their working environment. The collected data was analyzed by using descriptive statistics viz., mean, percentages, etc to draw logical inferences.

Table 1: Perception towards technological constraints.

Sl.	Constraint	BD (n=10)		TIMUL (n=15)		BMU (n=25)		Pooled (n=50)	
		f	rank	f	rank	f	rank7	f	rank
1.	Lacking knowledge & skill for new dairy products.	7 (70.0)	III	7 (46.7)	V	11 (44.0)	IV	25 (50.0)	V
2.	Inadequate storage facilities	9 (90.0)	I	8 (53.3)	IV	9 (36.0)	V	26 (52.0)	IV
3.	Absence of well equipped quality control lab	8 (80.0)	II	14 (93.3)	I	23 (92.0)	I	45 (90.0)	I
4.	Non-availability of modern processing techniques	5 (50.0)	IV	13 (86.7)	II	21 (84.0)	II	39 (78.0)	II
5.	Lack of advance packaging equipment	3 (30.0)	V	12 (80.0)	III	19 (76.0)	III	34 (68.0)	III

(Figure in parentheses indicate percentage)

Results & Discussion

1. Technological Constraints

As evident from Table-1, majority of the respondents (on pooled basis) identified absence of well equipped quality control lab, non-availability of modern processing technologies and lack of advanced packaging equipment as the most important technological constraints. The respondents at TIMUL and BMU identified similar constraints in their respective organizations. But respondents at BD expressed inadequate storage facilities for milk & milk products, absence of well equipped quality control lab and personnel lacking knowledge & skill for preparing new dairy products in their working environment. These findings were in conformity with the findings of Huli (1989) and Sharma (1994) during his study of dairy plants.

These constraints stemmed up in the organization due to fast technological changes in the Indian dairy industries and the organization requires to manage the changes to compete in the domestic and international market. Further the technological advancement along with the time helps in regular growth of the particular organization. By nullifying these technological constraints, the overall performance of the worker could be improved which in turn will lead to their higher efficiency and effectiveness.

2. Economic/Marketing Constraints

A perusal of Table-2 revealed that there is great variation about the economic constraints as perceived by the majority of the respondents in their respective dairy plants. For example - at BD, majority of the respondents expressed stiff competition with the

private dairies, lack of sufficient capital and lack of sufficient buyers of the manufactured milk products were the most important constraints, which hindered the faster growth of the BD. However, at TIMUL, the major constraints were lack of sufficient capital, competitive selling price of milk and milk products, and lack of sufficient buyers of the manufactured milk products as expressed by majority of the respondents. At BMU, competitive selling price of milk and milk products, stiff competition with the private dairies, and lack of sufficient capital were expressed by the majority of the respondents. There are several factors responsible for the above constraints felt by the respondents. These constraints should be delineated at earliest possible time for economic well being of the concerned dairies.

Table 2: Perception towards economic constraints.

Sl.	Constraint	BD (n=10)		TIMUL (n=15)		BMU (n=25)		Pooled (n=50)	
		f	rank	f	rank	f	rank	f	rank
1.	Lack of sufficient working capital	8 (80.0)	II	14 (93.3)	I	17 (68.0)	III	39 (78.0)	II
2.	Competitive selling price of milk & milk products	4 (40.0)	V	12 (80.0)	II	22 (88.0)	I	38 (76.0)	III
3.	Lack of sufficient local buyers of the products	6 (60.0)	III	11 (73.3)	III	8 (32.0)	V	26 (52.0)	V
4.	Poor purchasing power of the consumers for packaged products	5 (50.0)	IV	7 (46.7)	V	15 (60.0)	IV	27 (54.0)	IV
5.	Stiff competition with private dairies	9 (90.0)	I	11 (73.3)	IV	20 (80.0)	II	40 (80.0)	I

(Figure in parentheses indicate percentage)

3. Infrastructural Constraints

A critical look of Table-3 revealed that majority of the respondents identified major constraints such as poor condition of routes and roads for milk procurement, inadequate facilities for servicing and repair of equipment and inadequate

numbers of chilling centers in the respective ranks. Besides, some other constraints were also perceived by the respondents, but were ranked lower than the above listed constraints as depicted in the Table 3. Similar situations were observed at TIMUL and BMU.

Table 3: Perception towards infrastructural constraints.

Sl.	Constraints	BD (n=10)		TIMUL (n=15)		BMU (n=25)		Pooled (n=50)	
		f	rank	f	rank	f	rank	f	rank
1.	Inadequate facilities for servicing & repair of equipment	9 (90.0)	II	10 (66.7)	III	21 (84.0)	II	40 (80.0)	II
2.	Erratic supply of electricity	5 (50.0)	V	8 (53.3)	IV	13 (52.0)	IV	26 (52.0)	V
3.	Inadequate numbers of chilling centres	8 (80.0)	III	11 (73.3)	II	17 (68.0)	III	36 (72.0)	III
4.	Poor conditions of routes & roads	9 (90.0)	I	12 (80.0)	I	22 (88.0)	I	43 (86.0)	I
5.	Non-availability of required number of milk vehicles	7 (70.0)	IV	10 (66.7)	III	17 (68.0)	III	34 (68.0)	IV

(Figure in parentheses indicate percentage)

The findings revealed the identified infrastructural constraints are working as a barrier in the way of higher achievements of the dairies. If milk procurement and marketing has to be efficient, the adequate number of milk

vehicles and chilling centers should be available. These measures can maintain the quality and quantity of milk upto maximum extent. Thus, above constraints should be taken care without further delay.

Table 4: Perception towards administrative constraints.

Sl. Constraint	BD (n=10)		TIMUL (n=15)		BMU (n=25)		Pooled (n=50)	
	f	rank	f	rank	f	rank	f	rank
1. Poor implementation & execution by the top management	7 (70.0)	III	12 (80.0)	II	22 (88.0)	I	41 (82.0)	I

2.	Interference of local leadership in procurement	9 (90.0)	I	9 (60.0)	III	21 (84.0)	II	39 (78.0)	II
3.	Frequent transfer of top officials	5 (50.0)	IV	7 (46.7)	IV	10 (40.0)	IV	22 (44.0)	IV
4.	Much bureaucratic interference	9 (90.0)	II	14 (93.3)	I	13 (52.0)	III	36 (72.0)	III

(Figure in parentheses indicate percentage)

After observing the above constraints, it could be inferred that the respondents perceived several constraints regarding their administration that has to be taken care by the competent authority to make proper organizational development.

5. Other Constraints

A perusal of Table-5 indicates that there were several constraints among which major constraints as expressed by the majority of the

respondents are difficulties in getting regular supply of milk, seasonal variation in public demand, and much interference of trade unions/contractors. The similar results obtained in all three studied dairy plants. These constraints are miscellaneous type but, are very important because it is concerned with input supply and changing market demand. It should be attended properly, for the rapid growth of the concerned organization.

Table 5: Perception towards other constraints.

Sl. Constraint	BD (n=10)		TIMUL (n=15)		BMU (n=25)		Pooled (n=50)	
	f	rank	f	rank	f	rank	f	rank
1. Difficulties in getting regular supply of milk	9 (90.0)	I	10 (66.7)	II	17 (68.0)	II	36 (72.0)	I
2. Seasonal variations in public demand	8 (80.0)	II	13 (86.67)	I	7 (28.0)	III	28 (56.0)	III
3. Much interference of trade unions	4 (40.0)	III	6 (40.0)	III	19 (76.0)	I	29 (58.0)	II
4. Inadequate incentives & promotion to the staffs	2 (20.0)	IV	5 (33.3)	IV	3 (12.0)	IV	10 (20.0)	IV

(Figure in parentheses indicate percentage)

Conclusion

After afore-said discussion, it is evident that economic constraints are the crucial factors for all decisions taken in the organizations about any investment. The installation of new machines and other gadgets solely depend upon the economic condition of the organization. Therefore; economic well being of the organizations should be ensured by using several tools like market survey, consumers' feedback,

export orientation, product diversification, proper advertisement etc. Then the, technological constraints should be attended so that it can reduce the human drudgery and enhance the productivity of the workers. Administrative constraints should be delineated which can yield in better working environment and motivational organizational climate. The basis infrastructure should be reviewed time to time so that all activities be maintained in the proper time.

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Sustainability Index For Scientific Crop Cultivation Practices

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India achieved self-sufficiency in foodgrain production through use of high yielding varieties, increased use of chemical fertilizers and plant protection measures in assured irrigation areas and succeeded to increase the food grain production from 51 million tonnes in 1950s to 241 million tonnes in 2010-11. This not only enhanced the income, improved the life-style and comforts of the farmers but also became mantra of rural development. However, green revolution remained restricted to the well endowed irrigated areas of the country. The impact on environmental aspect on account of high input regime was ignored and over-use of chemicals to intensify crop production led to health problems in people and animals as well as environmental pollution ultimately leading to unsustainable system. FAO (1989) defines 'sustainable agriculture' as "the management and conservation of the resource base and the orientation of technological and institutional changes in such a manner as to ensure

attainment and continued satisfaction of human needs for present and future generations". Adoption of improved and sustainable agricultural technologies holds the key to ensuring both sustainability as well as increased productivity in agricultural production in different regions of the country.

Objective

Hence, keeping in view, the importance of scientific practices and fragile ecology, the measurement of the level of their sustainability is of utmost importance and can be calculated using sustainability index. The present study was conducted to develop sustainability index for assessing level of sustainability of scientific maize cultivation practices.

Methodology

The study was conducted during 2004-06 in Division of Dairy Extension NDRI, Karnal. Scientific crop cultivation practices of Paddy, Wheat and Maize is essential as they continue to be the

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mainstay of Indian food basket. The index development involves various logical steps. The present study to develop sustainability index for scientific crop cultivation practices adopted two steps: selection of dimensions and selection of indicators under each dimension.

It requires selection of various dimensions of sustainability and indicators under selected dimensions for assessing the sustainability of scientific maize cultivation practices. Swaminathan (1995) suggested fourteen dimensions for assessing sustainability of agricultural technology. Keeping in view the present study coupled with available literature and experts' advice ten dimension were taken into consideration. Judges' opinions were sought to assess relative importance of selected dimensions and selection of indicators. The sampled forty judges included social scientists and experts in maize.

Result and Decision

Selection of Dimensions:

Based on available literature and experts advice ten dimensions were selected. The opinion of the judges regarding each dimension was sought as more important, important and less important for which the scores assigned

were 3, 2 and 1 respectively. From the scores obtained on the basis of the opinions, the total score, mean score and nearest whole number for all dimensions were calculated. Mean scores of dimensions reflects its relative importance, such as economic viability as more important dimension, followed by technological appropriability, resource use efficiency, environmental soundness and so on. Based on mean scores and nearest whole number, number of indicators under particular dimension was selected. The results of judges' opinion are presented in Table 1.

Out of 40 judges, 29 were of the opinion that technological appropriability is more appropriate, 9 were of the opinion that this dimension is important and rest two judges were of the opinion that it is less important. Thus, total score for technological appropriability was 107 and mean score of 2.67. Three (3) was considered nearest whole number of 2.67. Similarly, total score, mean score and nearest whole number for other selected dimensions were calculated. Mean score indicates relative importance of dimensions. Higher the mean score more important the dimension is. Nearest whole number indicates number of indicators to be selected.

Table 1 Relative importance of dimensions of sustainability of scientific crop cultivation practices.

Sr. No.	Dimensions	More Important (3)	Important (2)	Less Important (1)	Total Score	Mean Score	Whole No.
1.	Technological appropriability	29	9	2	107	2.67	3
2.	Economic viability	30	8	2	108	2.70	3
3.	Environmental soundness	16	14	10	86	2.15	2
4.	Socio-cultural compatibility	8	26	6	82	2.05	2
5.	Stability	11	21	8	83	2.07	2
6.	Resource-use-efficiency	18	11	11	87	2.17	2
7.	Productivity	21	7	12	88	2.2	2
8.	Local adaptability	12	17	11	81	2.02	2
9.	Equity	5	16	19	66	1.65	2
10.	Government policy	6	16	18	68	1.7	2

Selection of indicators of dimensions:

Judges opinion were taken for selection of indicators. Questionnaire was sent to forty judges for their opinion against each statement for its appropriateness to particular dimension of sustainability. The opinions were given as more appropriate, appropriate, less appropriate and not appropriate for which the scores assigned were 3, 2, 1 and 0 respectively.

On the basis of obtained mean score the statements were ranked under each selected dimension. Statements

which got rank I, II and III were selected for technological appropriability. Two statements shared 2nd rank for economic viability, therefore the statement which ranked I was selected along with these two statements for this dimension. For remaining dimensions, two statements, which got first and second ranks were selected. Thus 22 statements (three each for technological appropriability and economic viability and two each for remaining eight dimensions) were finally selected as indicators. These indicators are mentioned in Table 2.

Table2: Indicators

Dimensions and indicators of sustainability	Responses given by respondents			
	Crops (Paddy, Wheat, Maize)			
	Use of HYV seed	Application of FYM	Application of synthetic nitrogenous fertilizers	Irrigation
1. Technological Appropriability				
a.				
b.				
c.				
2. Economic Viability				
a.				
b.				
c.				
3. Environmental Soundness				
a.				
b.				
4. Socio-cultural Compatibility				
a.				
b.				
5. Stability				
a.				
b.				
6. Resource-use-efficiency				
a.				

- b. *Quality produce/output is not obtained with adoption of SCCP
- 7. Productivity
 - a. *SCCP is not yielding as per the expectation and its potential on farm
 - b. SCCP helped to enhance production and/or productivity level of farm
- 8. Local adaptability
 - a. *SCCP is not adaptable to physical and climatic factors at the farm such as soil, ground water, rainfall, air, temperature etc.
 - b. Coping strategies exist for unfavorable conditions (e.g. flood, drought, epidemic etc.) during implementation of SCCP
- 9. Equity
 - a. Common resources used are within the access of all the farmers
 - b. *Technical assistance of SCCP is not available for all farmers.
- 10. Government Policy
 - a. Existence of govt. Incentive/support for implementation of SCCP
 - c. *Govt. is not facilitating supply of essential inputs and/or purchasing produce at reasonable price.

Sustainability of scientific crop cultivation practices:

The present study is based on assessing sustainability index for scientific crop cultivation practices viz., use of High Yielding Variety seed, application of farm yard manure, application of synthetic nitrogenous fertilizers and irrigation. The schedule (Table 2) was developed by using all above mentioned dimensions and indicators. Nearly 50% of the indicators in each dimension were framed

negatively worded to get correct and actual perception of respondents regarding sustainability of SCCP. Responses were taken from both farmers as well as expert respondents on three point continuum, i.e., agree, undecided and not agree. Score 2 for agree, 1 for undecided and 0 for not agree were given. Scoring was reversed in case of negativity worded indicators. Total obtained score for each selected practice was calculated. It was divided by number of respondents, which gave mean

sustainability score. Dimension wise mean sustainability scores were also calculated. For a total of ten dimensions of sustainability, maximum possible mean score was 44, out of which for two dimensions, viz., technological appropriability and economic viability, the maximum possible mean score was 6; whereas, for rest of them it was 4.

In this way, mean sustainability score for the four scientific crop cultivation practices is obtained. The sustainability index developed is used to assess the level of sustainability of SCCP as mentioned above.

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Improved Pig Rearing Practices its Adoption and Constraints in NAIP Adopted Village of Jharkhand

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Pig production is considered as one of the most important activities in animal husbandry programme especially for improvement of economic status of farmers in tribal belt and north eastern states of the country. A number of scientific innovations were recommendation potential of pigs. So far,

no attempt has been made to analyze the extent of adoption of improved pig rearing practices (IPRP) and constraints in its adoption.

Objective

To analyze the extent of adoption of improved pig rearing practices (IPRP) and constraints in its adoption.

Table – 1: Adoption of improved pig rearing practices

	Particulars	NAIP adopted village		Non-adopted village	
		Frequency	Percent	Frequency	percent
1.	Grading up of desi pigs with large white Yorkshire or other exotic pigs.	2	10	0	0
2.	Rearing of newly developed T & D pigs	20	100	0	0
3.	Provision of paddy husk and 20 % concentrate mixture with 3-4 hrs grazing per day	6	30	2	20
4.	Vaccination against swine fever	20	100	0	0
5.	Provision of paddy straw as bedding material to new born piglets	16	80	5	50
6.	Provision of Infeon Injection at 3-4 days of age	0	0	0	0
7.	Deworming every year	20	100	2	20

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8.	Castration of male at 2-4 months	16	80	4	40
9.	Use of Karanj oil/melathion/ cythion to prevent from ectoparasite	16	80	6	60
10.	Selling up of grown up pigs on the body weight	14	70	4	40

Methodology

The present study was carried out in purposively selected tribal dominated of Jharkhand. A random sampling procedure was used to select the sample households. All the pig farmers of the NAIP adopted and non adopted village formed the sample of the study. The sample consisted of 30 (20 NAIP adopted and 10 non-adopted) Pig farmers. A schedule was developed to know the response of Pig farmers. The data was collected by personal interview method.

Results and Discussion:

The result pertaining to adoption of IPRP and constraints in its adoption are presented in table 1 and 2.

Breeding:

To improve production potential of the indigenous pigs upgrading with large white yorkshire or other exotic pigs is highly recommended. Adoption percentage of grading up of local pig with large white Yorkshire or other exotic pigs was 10% and 0% in NAIP adopted and non adopted village respectively (table 1). About 10% and 80% of NAIP adopted and non adopted pig owners respectively, had expressed non availability of improved pigs in the area as a constraints (table 2). Similar observation was also made by Pandey & Kumar (2000).

Table2: Constraints in adoption of improved pig rearing practices (IPRP)

Sl.no.	Constraints	NAIP adopted (n=20)			Non-adopted (n=10)		
		f	%	Rank	f	%	rank
1	Non-availability of improved breed	2	10.00	V	8	80.00	III
2	Improved breeds are susceptible to disease	3	15.00	IV	5	50.00	V
3	High cost of concentrate	10	50.00	I	9	90.00	II
4	Non-availability of vaccine	2	10.00	V	10	100.00	I
5	Unawareness about bedding materials	4	20.00	III	3	30	VII

6	Non-availability of inferon injection	1	5.00	VI	2	20	VIII
7	Lack of deworming facility	2	10.00	V	10	100.00	I
8	Belief that castration at young age will result in ill health	2	10.00	V	4	40.00	VI
9	Lack of knowledge about karanj oil/ malathion/cythion to prevent from ectoparasite	1	5.00	VI	2	20	VIII
10	Distant location of market	5	25.00	II	7	70.00	IV

Adoption percentage of rearing of newly developed T & D pig was 100% and 0% by pig owners of NAIP adopted and non adopted village respectively (table 1). All the pig owners in NAIP adopted villages adopted T&D, because of free distribution of T&D pigs in NAIP adopted villages, whereas in non-adopted villages the pig farmers could not found access to it. Some of the farmers (15%) in NAIP adopted village and half of the pig farmers of non-adopted village listed susceptibility of improved breed of pig to disease as constraint in adoption of improved pig breed.

Adoption percentage of rearing of newly developed T & D pig in NAIP adopted village was 100% it was due to distribution of T & D pigs in NAIP adopted villages and adoption percentage of rearing of newly developed T & D pigs in non adopted villages was 0% it was due to unavailability of T & D pigs in non adopted village.

Feeding:

Only 30% NAIP adopted pig farmers and 20% pig farmers from non adopted villages were maintaining their pigs on paddy husk and concentrate mixture (table 1). 50% pig farmers of NAIP adopted and 90% pig farmers of non adopted perceived high cost of concentrate as major impediment (table 2). In adopted village the pig rearers were maintaining their pigs by feeding the vegetable and hotel waste and only half of the farmers were providing concentrate to pigs. In non adopted villages the pigs were maintained in scavengers system.

Management:

Management practice viz. provision of paddy straw as bedding material to new born piglets and castration of male at 2-4 months of age were included in the study. 80% pig farmers of NAIP adopted and 50% pig farmers of non adopted village provided paddy straw as bedding material to new born piglets and 80% pig farmers of NAIP

adopted and 40% pig farmers of non-adopted villages castrated male piglets at 2-4 months of age. 20% pig farmers of NAIP adopted and 30% pig farmers of non-adopted were unaware about providing bedding materials to new born piglets. Regarding non- adoption of castrating male piglet 2-4 months, pig farmers of NAIP adopted villages (10%) and non-adopted villages (40%) believed that castration at young age might result in ill health of pigs (Table 2). So there is an urgent need of training to pig farmers on these aspects.

Health Care:

Injection of Infeon to lessen the incidence of piglet anaemia was not used in both NAIP adopted and non adopted villages. Vaccination against swine fever was given to 100% pigs of NAIP adopted villages and 0% pigs of non adopted villages. Deworming of 100% pigs were done in NAIP adopted villages and 20% pigs of non adopted villages. 80% pig farmers of NAIP adopted villages and 50% pig farmers of non adopted villages used Karanj oil/melathion/cythion in ectoparasite infestation. Lack of vaccination and deworming facility were perceived as major constraints in adoption of health care practising pig farmers of non-adopted villages. Whereas in NAIP adopted villages these facilities were made available to farmers free of cost, thus these were not

perceived as constraints. Lack of knowledge about Karanj oil/melathion/cythion to prevent from ectoparasite was constraint in eye of 5% pig farmers of NAIP adopted and 20% pig farmers of non- adopted villages as major constraint by the farmers.

Marketing:

Selling up of grown up pigs on the body weight was adopted by 70% pig farmers of NAIP adopted villages and 40% pig farmers of non-adopted village. Among constraints related to pig marketing 25% pig farmers of NAIP adopted villages and 70% pig farmers of non-adopted villages opined distant location of market, as the major constraints.

Conclusion:

The findings of the study revealed that most of the improved pig rearing practices were adopted by the pig farmers of NAIP adopted village as the technical inputs required for pig production are made available under the project and there by yielding a handsome economic return from pig enterprises.

The farmers of non adopted villages reared desi pigs and were getting a very meagre return from pig enterprise. Therefore there is urgent need to make the technical inputs required for pig production available to the farmers at their door step.

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Perception & Reaction of Farm women for Dehusking-Shelling Maize Cobs

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Maize is a coarse cereal and is the staple food in many developed countries. Globally, maize is grown in more than 146 million ha with production of 791.795 million tones in year 2007 (Anonymous, 2010). It is also one of the most intensively cultivated crops in India. The total area under the crop in India was 7.77 million hectares with total production of 18.96 million tones during the year 2007. India was having 4th ranks in area-wise maize cultivation with 7.77 million ha (4.92 percent) globally (158.034 million ha). Maize is also becoming a versatile crop in India, allowing it to grown across a range of agro-ecological zones. It is grown in all seasons, i.e. *Kharif*, *Rabi* and Summer. Among the maize producing states, Andhra Pradesh tops the list with the contribution of 19.09 per cent to the total Indian maize production. If we consider the area wise, Karnataka tops with 13.67 percent in the country. After harvesting, cob is dried in the sunshine to a moisture content of 15-21 per cent (d.b.) from a

moisture content of about 33 per cent (Gopalan and Ananthram, 1970). Conventionally, dehusking is done by hand and shelling by beating the dehusked cob with wooden stick on a threshing floor made of clay and cow dung (Ali et al. 1986). In some region, shelling is done with the help of sickles & fingers. In traditional practice, due to beating, the grain damage affects germination percentage considerably. These traditional methods of maize dehusking & shelling are labour intensive as well as time consuming. To mechanize shelling of dehusked (without outer sheath) maize cob, hand and power operated maize sheller are commercially available. These, maize shellers are ordinarily not capable of handling unde husked (with its outer sheath) cob. Now a day, 3.7 kW power/engine to tractor operated maize dehusk-sheller are gaining importance due to advantage of handling unde husked cob. Recently, Directorate of Research on Women in Agriculture (DRWA) has developed hand

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operated maize dehusker-sheller for farm women to meet the requirement of marginal, small and hill farmers of the country.

Objective

In the present paper, analysis was made to study the perception and reaction of farmwomen while operating this equipment.

Methodology

The developed equipment (Singh and Singh, 2010) was operated by 10 farm women in sitting and standing postures to dehusk and shell the JM-216 variety of maize cob in year 2010 at CIAE campus, Bhopal (Fig. 1). Experiment was also conducted to know the output capacity in dehusking and shelling the maize cob by hand with five farm women. Discomfort rating of farmwomen was also assessed using ten point Visual Analogue Discomfort (VAD) rating scale for determining the subjective feelings of discomfort during operation (Leg and Mohanty, 1985) which is an adaptation of Corlett and Bishop (1976) technique. Performance results of dehusking-shelling the maize cobs with traditional (hand), octagonal hand maize sheller and hand operated maize dehusker-sheller by farm women was given in Table 1. The perception and reaction of participated farmwomen while operating the equipment in terms of feedback was assessed on 4 point scale ,i.e., No

problem, operable with left/ right hands, shifting of hand relaxed the load during operation and operable time (1.5 and 2 times than present time). The data are given in Table 2. Similar observations were also recorded from farm women about posture (sitting and standing) while operating the equipment on three point scale ,i.e., load (equal or more), ease in operation (sitting or standing) and additional pressure on related body parts in sitting posture (wrist, shoulder, legs and foot). The data are given in Table 3. The respondents were asked about their view regarding the benefit of hand operated maize dehusker-sheller (Table 4)

Result and Discussion

Mean age, stature and weight of the respondents were 33.1yr, 43.3kg and 1.52m respectively. A woman worker could dehusk 61.9 kg un-dehusked (the outer sheath wrapped on cob) maize cob/h by hand for which 5 times hand action was needed (Table 1). Respondent shelled 13.1 kg dehusked cob/h. In shelling dehusked maize cob, respondent had to perform this activity by the nail (19 times), fingers (68 times) and palm (7 times), thus, total hand action for this activity was 94. Using octagonal hand maize sheller, 22 times hand action was needed either for rotating the cob or octagonal maize sheller and 19.33 kg dehusked maize cob could be shelled. If dehusking and shelling both activities

would have to be taken into consideration, then grain from 10.72 kg un-dehusked cob/h could be obtained by hand and 14.56 kg un-dehusked cob/h could be dehusked and shelled using dehusking by hand and shelling by octagonal hand maize sheller. Two workers were required in operation of the equipment, i.e., one for hand cranking and another for feeding one by one cob. The developed hand operated maize dehusker-sheller was found in dehusking-

shelling 83 kg un-dehusked maize cob/h. Thus the developed machine would increase productivity many fold (7.7 times to hand dehusking-shelling and 5.7 times to dehusking by hand & shelling by octagonal maize sheller). If we consider the output of two workers, then also, the developed machine would be increasing productivity of workers by 3.5 times to hand dehusking-shelling and 2.85 times to dehusking by hand & shelling by octagonal maize sheller.

Table 1. Performance results of dehusking-shelling the maize cobs with different methods.

Particulars	Traditional		Shelling by octagonal hand maize sheller	Hand operated Dehusker-sheller	
	Dehusking by hand	Shelling by hand		Standing	Sitting
Un-dehusked cob for dehusking-shelling, kg/h	58.96	-	-	83.59	82.96
Dehusked cob for shelling, kg/h	-	13.1	19.33	-	-
Number of times action of hand for removing leaves from cob	4.75	-	-	-	-
Hand action for shelling (nail, finger, palm)	-	94	-	-	-
Number of times rotation of octagonal maize sheller	-	-	22	-	-
Out put, kg grain/h	-	11.0	16.45	60.33	57.57
Dehusking efficiency, %	99.12	-	-	100.0	100.0
Shelling efficiency	-	100.0	100.0	98.47	97.16
Grain breakage	-	-	-	0.82	0.75

The entire subjects were in view that there was no problem in operating the hand operated maize dehusker-sheller and this could be easily operated with either left or right hand (Table 2). It was also observed that shifting of hand relaxed the subjects while operating the

machine. In response to the continuous operating time, 40 per cent respondents were in view that they could operate it for 50 per cent more than the present operating time while remaining were of view that they could operate it for double the time.

Table 2. Response of respondents while operating hand operated maize dehusker-sheller.

Respondents	Feedback of subjects				
	No problem	Operable with right/left hand	Shifting of hand Relaxed the load	Operable time can be increased	
				1.5 times	Twice
1	✓	✓	✓		✓
2	✓	✓	✓		✓
3	✓	✓	✓		✓
4	✓	✓	✓		✓
5	✓	✓	✓	✓	
6	✓	✓	✓	✓	
7	✓	✓	✓		✓
8	✓	✓	✓	✓	
9	✓	✓	✓		✓
10	✓	✓	✓	✓	

About 60 per cent of respondents were of view that operating the maize dehusker-sheller in standing posture was better than sitting due to feel of less loads in standing than sitting (Table 3). In sitting mode of hand cranking, 40 per cent of subject felt that they observed more pressure either on shoulder or wrist

or legs and foot. The overall discomfort rating (ODR) while operating the maize dehusker-sheller in standing and sitting postures was 6.15 and 6.75 respectively. The ODR was significantly higher in sitting posture than standing. This indicated the better position for operating the maize dehusker-sheller was standing.

Table 3. Reaction of respondents while operating the hand operated maize dehusker-sheller in standing and sitting postures.

Respondents	Load		Reaction of respondents Ease in operation		Additional pressure on related body parts in sitting posture			
	Equal	More	Standing	Sitting	Wrist	Shoulder	Legs	Foot
1	✓			✓				
2	✓			✓				
3	✓			✓				
4		✓	✓			✓		
5		✓	✓			✓		
6		✓	✓					
7		✓	✓		✓			✓
8	✓			✓				
9		✓	✓				✓	
10		✓	✓					

While asking the subjects regarding their views about the benefit of the maize dehusker-sheller, the cent percent subjects viewed that this was the easier to operate and could increase the productivity as two unit operations (dehusking and shelling) were performed with this machine (Table 4).

Table 4. View of respondents regarding the benefit.

Sl. No.	Views	Respondents, N=10	Percentage
1	Increase the output	10	100
2	Easy to operate	8	80
3	Reduce the drudgery	10	100
4	Operable in both posture (sitting & standing)	10	100
5	Easier in standing position	6	60
6	Portable	7	70
7	Operable by both hands	7	70
8	Better than shelling by bare hand & through octagonal hand maize sheller	9	90

Conclusions

The recently developed hand operated maize dehusker-sheller was found to increase the productivity of women worker many fold than traditional method. Standing mode of hand cranking

was assessed the better posture than sitting for operation of maize dehusker-sheller. The operation of this machine seems to be easier as farm women could operate it with right or left hand.

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Technological Innovations for Making Spice Farming Profitable in the Tribal Odisha

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Innovation refers to the use of a novel idea or method or doing something different rather than doing the same way. In the organizational context, innovation brings positive changes in efficiency, productivity, quality, competitiveness and market share etc. Technological Innovation is that determinants of technological changes which are not confined to research institute, but also in a broad social structure in which formal as well as knowledge institutes are embedded. The Technological Innovation system emphasizes the stimulating knowledge flow, which is not sufficient to induce technological change and economic performance. There is a need to exploit this knowledge in order to create new opportunities. This stresses the importance of institutions as sources

of innovation and its system approach often focuses on system dynamics which through viable networks can be transformed into development blocks i.e. synergetic clusters of farms and technologies for the benefit of the stakeholders (Carlsson and Stankiewics,1991).

Technological innovation is the process through which new technologies are developed and brought into widespread use. In the simplest formulation, innovation can be thought of as being composed of research, development, demonstration and deployment.

India is the largest producer, consumer and exporter of spices earning Rs 3500 crore from its export. Odisha occupies the seventh position in terms of production of spices. Odisha's spice account comprises of ginger, turmeric, chilli, coriander, mustard and garlic covering an area of 2.37 lakh ha with a production of 2.17 lakh tones. Ginger has

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been a key spice of the state contributing substantially to the income and employment in the tribal districts of the state viz., Koraput and Kandhamal. The major factors inhibiting increased productivity of ginger in these areas include biotic and abiotic stresses, genetic erosion, poor quality planting material, postharvest loss, lack of well netted value chain and lack of market support. Thus a socio-economic transformation of these regions was required to give direction and associate ginger growers through specialized approach involving public private agencies for their benefit.

This necessitated intervention by the National Agriculture Innovation Project from 2009-2012 to bring the produce to the consumers after necessary value addition at different nodes of the value chain, so that the producers get better price for their produce. The pre-project value chain, practically a supply chain was quite traditional wherein the farmers were selling their produce to the small traders or village middlemen. Thus the role of farmers ended after selling the produce to the local traders and the profit obtained by them was hence the lowest in the chain. The supply chain was as follows.

Moreover, there was scope for reorientation of the existed technology with intensification of efforts for:

Commercial scale cultivation of elite material (high contents of actives) of ginger, (Varieties like Suprava, Suruchi and Suravi)

- Standardising the technique and educating growers about the special post harvest management practices.
- Standardisation of protocols for pest surveillances and adherence of uniform package of practices including manure management need to be hastened for improving quality and quantity of production.

Giving priority to all the above points, the (Project) consortium brought ideas for

- 1) Identification and mass scale cultivation of elite variety of ginger.
- 2) Scientific and technology based post harvest management.
- 3) Processing (washing, grading, chopping, drying, weighing and coarse grinding) at the clustered level by establishing primary processing facility (PPF).
- 4) Development of value added products from ginger.

The proposed value chain aimed to bring in a fundamental change in the existed value chain wherein the farmers upgraded their product in the value chain with some primary processing and as a group sell to the level of secondary processors to increase their income and profitability level. The proposed value chain was as follows:

In recent days new ways of innovation and adoption of technologies have emerged, focusing on new dynamics such as participation, collaboration and joint learning between farmers and other agents. Thus an attempt has been made for successful delivery and adoption of technology through public private partnership in remote tribal districts of Odisha, India.

Project Interventions for Technology Adoption Identification and promotion of elite variety of ginger

Prior to project interventions, the farmers were cultivating local varieties, which had low yield potential. These local cultivars were prone to disease and pest attack and not suitable for value added product derivatives. The elite planting materials are having good yield potential, marketable characteristics and meet industry quality parameters. It is benefiting primary producers and industries with increased profit margin for the producers and processors. It also has scope for wide varieties of product development. Research based on scientific works done on various elite varieties have acknowledged Suprava variety. Comparing all parametric performances, the project decided to promote “Suprabha” among all other elite varieties.

Mass scale cultivation (in clustered) of identified elite variety of ginger

The project had successfully involved 373 farmers; 236 farmers from Kandhamal and 137 farmers from Koraput. All the project beneficiary farmers were reported to be marginal and small farmers in both in Kandhamal and Koraput. Each farmer was given 50kgs of “Suprava” variety seed free of cost. The farmers were also trained for seed treatment so that the incidence of soft rot was checked. These farmers were benefited and motivated to further motivate other farmers in the district. The farmer’s cooperative and local NGO had the lead responsibility to continue the mobilization work and brought more farmers under membership of the cooperative.

Motivation and orientation of farmers for adoption of processing-friendly ginger variety Suprabha

Under the implementation of the project 38 different workshops, training programmes and exposure visits (12 workshops and training at Koraput and 26 in Kandhamal) were organised to aware the farmers regarding good agronomic practices, post harvest techniques, value addition etc. Adequate IEC materials, documentary short films (in CDs on ginger cultivation, Ginger value added products and value chain) and media coverage were made to

motivate farmers to adopt and produce elite ginger which was valued by processing houses to produce quality by-products.

Visit of farmers to demonstration sites and for understanding new practices

To convince the farmers about the performance of the elite ginger varieties, 73 farmers in Kandhamal and 13 farmers in Koraput were taken to see and believe the performance in demonstration sites. The farmers of Kandhamal were taken to Pottangi and farmers of Koraput were taken to Pottangi as field exposure and demonstration sites. To demonstrate the operation of processing facilities, farmers visited the processing centres to see processes like sorting, grading, cleaning, peeling, slicing, etc. They were educated on the quality aspects of the value added products and the precautions taken at every level to maintain the quality of by-product so that its demand and price in national and international markets is not affected.

The functioning and management of farmers cooperative was also a new area for these farmers. The farmers had been exposed to other farmer's cooperatives to understand how the cooperative runs, various documents maintained in the cooperative, need for regular accounting and audit and the responsibilities of its members to take forward the cooperative.

Project, overall, falls short to put forth sincere steps to strengthen institution building objective, which is very crucial and most important along with technological objectives.

Technical support to farmers on the field for growing processing friendly ginger varieties

Training Need Assessment (TNA) study as per requirement of the project was done by CTRAN supported by OUAT. Various training and capacity building needs for farmers, NGO staffs, project personnel and other stakeholders were identifies. As per the finding of TNA assessment study, the training and capacity building materials, as necessary, were developed and trainings were being conducted. Various training manuals were developed to cover topics like Production technologies, selection of suitable varieties, value added products, Producers Cooperative Formation and management. Under the project, various technologies have been adopted by the farmers as follows;

1. Adoption of elite variety of ginger is one aspect for achieving higher yield and better income. Besides, there are other factors, which influence the yield per unit area of any crop. Adoption of entire pack of ginger technology means, using the entire package of innovations for cultivation of improved variety of ginger.

2. The farmers were encouraged to adopt for raised bed method of ginger cultivation that allow the excess water to drain out of the ginger field and helped preventing water logging in and around the ginger field thereby reducing the outbreak of rotting of ginger tubers occurring frequently earlier.
3. Use of lime and neem cake in the field by the farmers has reduced the soft rhizome rot/soft rot which is a soil as well as seed born disease caused mainly by nematodes.
4. As recommended by the project expert personnel, farmers were advised to adopt seed treatment prior to planting.
5. In Daringbadi, all the beneficiary ginger farmers have adopted organic farming and registered under organic certification as per APEDA guidelines.

Modules were also designed to orient farmers on practices like (a) Improved package of practices including IPM/INM, (b) Advantage of elite ginger variety cultivation (Seed Selection, Seed Sowing, Raised bed method of planting ,Manure/Fertilizer application, Mulching, Disease prevention/control, Intercultural operations), (c) Harvesting and Storage techniques (Scientific methods of Harvesting, Grading of ginger rhizomes and Proper Storage techniques), (d) Value added products of ginger, (Production of

value added products of ginger, Preparation of Dry Ginger and other value added products to get more profit), (e) Cooperative Formation, Management and Marketing of Ginger & Ginger Products.

The impact of the project has been evaluated in the year 2012 i.e. after three years of the project implementation with the following objectives.

Objectives:

1. To find out the extent of adoption of technologies among the farmers.
2. To determine the extent of increment in yield and income of the farmers due to project interventions.

Methodology:

Two scheduled and backward districts namely Koraput and Kandhamal of Odisha having adequate potential for ginger cultivation were selected for the project. In each district, one cluster comprising of 100 farmers, mostly small and marginal were taken into consideration for the evaluation. Thus a total of 200 farmers, were studied covering 100 from each district. These farmers were interviewed with regards to the extent to which they adopted the innovations and an increment in their yield and income was witnessed. Necessary data was collected from the project area regarding the adoption of entire pack of ginger technology for cultivation of improved variety of ginger.

Information was also gathered as regards to the impact of the technological innovations on the yield and income of the farmers in the project area.

Technological Adoption Index

The technology adoption index was calculated for individual farmer which include area under elite varieties of ginger, adoption of raised bed for planting, adoption of seed treatment,

three times mulching, recommended dosages of manures and fertilizers etc.

Analytical tools:

1. Technology adoption index: The technology adoption index is a catch-all measure of technology adoption practices of the farmers. The innovation adoption practices include area under elite varieties of ginger, adoption of raised bed method of planting, adoption of seed treatment, three times mulching,

dosages of fertilizers. The technology adoption index has been computed by using the formula:

$$IAI_i = 1/5 (AE_i / TAI) + (RA_i / TRI) + (SA_i / ST_i) + (MA_i / MR_i) + (FA_i / FR_i) \times 100$$

Where,

I = Number of farmers, say 1, 2, 3... n .

IAI_i = Technology adoption index of i^{th} farmer.

AE_i = Area under elite varieties of ginger (ha).

TAI = Total area of ginger (ha).

RA_i = Number of farmers adopting raised bed method.

TRI = Total number of farmers.

SA_i = Number of farmers adopting seed treatment.

ST_i = Total number of farmers.

MA_i = Number of mulching adopted.

MR_i = Recommended doses of mulching.

FA_i = Actual amount of fertilizers used for ginger (kg/ha).

FR_i = Recommended amount of fertilizer for ginger crop (kg/ha)

Results and Discussion

Tabular analysis has been used to access the impact of adoption of technologies on income and

employment. This study seeks to analyze how adoption of technology impact in increasing the yield and reduce the cost by losses due to traditional method of cultivation practices.

Table 1. Technology Adoption Index

Adoption level	Before implementation of project	After implementation of the project
Low adoption (0-33%)	78.11	-
Medium adoption (34-66%)	21.89	43.64
High adoption (67-100%)	-	56.36
Sample size	200	200

The study revealed that majority of farmers during project launching covered in the sub-project were under low technology adoption level .i.e.78 per cent and only 22 per cent under medium adoption i.e. (34-66%) during baseline study in 2009-10.After the implementation of the project, there has been considerable increase in the level of adoption of the technology. The study indicated that due to the implementation of the project the level of technology adoption has improved to the tune of 44 per cent in case of medium adoption

category and 56 per cent in high adoption level. It could be concluded that majority of beneficiary farmers have adopted improved technologies who were continuously contacted by the sub project agencies.

Due to horizontal expansion the technologies have been extended to the fellow farmers in the vicinity of the operational areas. However, the beneficiary farmers due to multiagency approach had higher levels of adoption than their fellow farmers.

Table 2. Impact of technology adoption on yield:

District	Per hectare yield before the project (Quintals)	Per hectare yield after the project (Quintals)	Percentage increase in yield (%)	Value of ginger after (Rs/qt)	Income before (Rs.) 2009-10	Income after (Rs.)20012-13 2012-13	Percentage increase in income (%)
Koraput	69	94	36.23	2000	138000	188000	36.23
Kandhamal	61	80	31.15	2200	134200	176000	31.15
Overall	65	87	33.69	2100	136100	182000	33.69

Before the project was undertaken, the average yield in Pottangi was 69 q/ha, where as in Kandhamal where the cultivation was mostly by organic farming practices by default without use of chemical fertilizers, the yield was 61 q/ha and average of both the areas was 65 q/ha. The survey in 2012-13 indicates that in Potangi area of Koraput, there has

been 36.23 per cent increase in yield from 69 q/ha to 90q/ha. Similarly, in Daringbadi area of Kandhamal district, the average yield has increased from 61qt/ha to 80qt/ha registering an increase of 33.69 per cent. The beneficiary farmers were given the organic technology and registered under organic certification to get better price for their produce.

Impact of Technology Adoption on Income

Table 3. Impact of Technology Adoption on Income

District	Cost before the project (Rs.)2009-10	Cost after the project (Rs.)2012-13	Gross Income before the project (Rs.) 2009-10	Gross Income after the project (Rs.) 2012-13	Net Income before (Rs.) 2009-10	Net Income after (Rs.) 2012-13	Percentage increase in net income (%)
Koraput	56465.76	75950.00	138000	188000	81534.24	112050	37.43
Kandhamal	48922.80	63600.00	134200	176000	85277.20	112400	31.81
Overall	52694.28	69775	136100	182000	83405.72	112225	34.62

In the base year i.e. in 2009-10, the per hectare cost of cultivation was 56465.76 in Koraput and 48922.80 in Kandhamal. The cost of cultivation had increased during project period due to adoption of improved technology and change in prices of other inputs. In Koraput district there has been 34.50 per

cent increase in cost escalation whereas per hectare cost of cultivation increased 30 per cent in Kandhamal. There has been 37 per cent increase in net income in Koraput and 32 per cent increase in net income in Kandhamal. Overall increase in net income was 34 per cent due to project impact.

Table 4. Comparison of household income of the sample households with the base year

Name of District	Number of household	Income from ginger cultivation Before project (2009-10)	After project (2012-13)	Per cent increase from base value	Z value
Koraput	100	85277.20	112400	31.81***	6.56
Kandhamal	100	81534.24	112050	37.43***	11.38
Total	200	166811.44	224450	34.62***	9.85

A significant impact of participation in NAIP was observed (for each of the two areas i.e. Kandhamal and Koraput), Table-1. The income achieved by the beneficiary households was 31.81 per cent higher than the base value for Koraput and 37.43 per cent higher in Kandhamal area, overall increase being 34.62 per cent. This result could be associated with the technology adoption i.e. inorganic cultivation practices, practiced in Koraput and organic way of cultivation in Kandhamal. The present study found strong evidence of income enhancement in households participating in NAIP.

Conclusion

The present study establishes the existence of a statistically significant

positive effect of technology dissemination, intervention on yield and income of the beneficiary households. The yield in the beneficiary households participating in NAIP programme has increased 33.69 per cent from the base year. The technology adoption led to increase in income from ginger farming in both the regions. The income from household was found to be higher for Koraput than Kandhamal farmers. The observed differential effect of income level was probably due to the inorganic and organic technology adoption process for both the regions respectively. Even if the organic practices fetches better price, it was not enough to cover the yield gap that could be obtained from use of recommended dose of fertilizers.

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Potential Diversification towards high value crops: Micro Level Study in Odisha

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The Agricultural scenario in India in the last fifteen years has some distinguishing features compared to earlier phases. India has been adopting the strategic and agricultural policy for the last thirteen years with an exclusive focus on spreading of green revolution for achieving food self sufficiency. Agricultural policies in the present have witnessed series of charges following the economic reforms in the nineties that marked significant departure from past. The problem associated with buffer food stock management and degradation of natural resources in some regions have triggered a debate to redefine the agricultural policies. As remedial measures, it is suggested that India should diversify its agriculture and get a foot hold in the market. The diversified and accelerated agricultural growth would enhance food security by increasing the purchasing power of the poor in the situation of shrinkage in agricultural holding, decline in technological advances in staple crops,

decline in new investment in agriculture and increasing degradation of natural resources. Diversification is an integral part of the process of structural transformation of an economy. Indian economy is also diversifying at the macro level with secondary and tertiary sectors becoming progressively more important in terms of their contribution to national income as well as disposition of workforce. However the factors promoting diversification and the speed with which the changes occur vary in different situations (Vyas, 1996).

Diversification is basically understood as signifying the shift from agricultural and industrial from crop to another, the other type of diversification may involve income enhancing enterprises in addition to existing one. In essence, the diversification to commercial crops/commodities become an essential strategy that can increase in income in agriculture, minimize risk due to failure and above all earn foreign exchange.

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Objective

To identify the diversification pattern of Odisha farmers for high value crops

Methodology

(a) Sample Technique: The study is based on both primary and secondary data. The secondary data for study have been collected from various publication & record from govt. department, named Directorate Agriculture & Food production Horticulture and Directorate of economic and statistics.

(b) Measurement of crop diversification level:- The following diversification measures used in the study:-

(i) Harfindahal Idex (HI):

$$HI = \frac{1}{n} \sum_{i=1}^n P_i^2$$

where P_i is the proportion of the i th crop in the total area

$i = 1, 2, 3, \dots, N$ (Number of crops)

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The value of Harfindahal index varies from zero to one. It takes the value one where it is complete specialization and the value zero when there is perfect diversification.

(ii) Entropy index (EI)-

$$EI = \frac{1}{n} \sum_{i=1}^n P_i \log (1/P_i)$$

Its value varies 1 to $\log n$, but always less than or equal to one. EI approaches 0 when a firm is specialized and takes maximized values but always less than one/equal to one when diversification is perfect.

(iii) Crop planning consideration:- Weighted indices for constraints faced by the farmers were calculated as per the formula

$$CI \text{ or } CPC = \frac{\sum_{i=1}^n W_i F_i}{\sum_{i=1}^n F_i}$$

where CI=Index of constraints

F_i = frequency of i th constraints

W_i = weight assigned to the i th constraints

$i = 1, 2, \dots, 6$.

It may be noted that CI/CPC approaching 10 means most severe constraints and leading to one mean least serve constraints

(iv) Linear Regresssion :- It has been used to quantify the contribution of different factors that triggered the process of diversification.

Y=

Where a is constraint b_i area regression coefficient Y = the percent area under high value cash crops X_i = independent variables like size of land holding, extent of inaccessibility, availability of family labor U = random term

Cost concept: For assessing the cost and return of major crops, six costs concept were use i.e. cost A2

cost A1 = all actual expenses in cash & kind incurred on production activity by the farmer = cost hired human labors + value of own labor cart + value of hired bullock labor + value of hired machine charges + value of pesticides + value of land revenue
cost A2 = Cost A1 + rent paid for lease in land
cost B1 = cost A1 + interest of value of owned capital assets
cost B2 = imputed rental value of owned land less than revenue paid
cost C1 = Cost B1 + imputed value of family labor
cost C2 = Cost B2 + imputed value of family labor

Fixed cost:

It include following items (i) land revenue (ii) Depreciation on implements & farm houses (iii) rent paid for leased in land (iv) rental value of owned land

Total Cost:

(i) fixed cost (ii) operational cost both taken together. Estimation of working land – For his bullock labor, seed cost,

manures & fertilizers, hired machinery charges, miscellaneous charges are taken

(c) Results and Discussion:

Consistent with the overall pattern of structural changes associated with the process of economic development, the contribution of agriculture to the next states domestic product declined continuously from 35% in 2001-01 to 29.64% in 2006-07. The contribution of primary sector as a whole during the period plummeted for around one half to around one fourth. Consequently the contribution of secondary and tertiary sector increased from 16.54% and 17.03% respectively in 2000-01 to 20.34 and 23.74% in 2007-08. The net state domestic product in agriculture & animal husbandry recorded a growth rate 1.915 per annum. The growth rate is higher in agriculture and related activities were higher during nineties compared to twenties. The growth rate of service sector decreases gradually i.e. from 31.10% to 26.30% growth rate of tertiary sector increases but less than primary sectors It was revealed that area under paddy increased from 129425ha. During 200-01 to 2006-08. Among pulses area under black gram decreased from 10 thousand ha. To 7000ha. From 200-01 to 200-08. Area under ground nut increased from 7853ha. To 382ha. To 11539ha. Among cash crops area under sugarcane decreased

from 325ha. To 382ha. The production of paddy increased from 24 thousand tones to 27 thousand tones the production level of sugar cane decreased from 15 thousands tones to 5 thousand tones. The maximum increase was witnessed in ground nut production from about 8 thousands tones to 14 thousands tones. The yield levels of different crops also increased during the period. The yield of rice increased from 1722kg/ha to 1966kg/ha, and green gram from 241/ha to 248/ha. And black gram decreased from 247kg/ha to 244kg/ha. The yield levels of non food grain crops like sugarcane and oil seeds too registered significant increases. The yield of ground nut yield of sugarcane also increased from 322436kg/ha to 33860kg/ha. Under fruit crops increased from 258.7 thousand ha to 293.1 thousand ha. During 2001-01 to 2007-08 the production has increased from 1074.5lakh tones to 1154.2lakh tones in the corresponding period. The yield levels fluctuated and have declined in recent year mainly because of erratic weather and increased incidence of diseases and insect pest. Further among horticultural crops banana continued to be the most important fruit crops. The fruit production increased at rate of 4.94% per annum.

Process of Agricultural Diversification:

An idea of the extent of agricultural diversification at the state level can be had by looking into the

changing contribution of crop production horticulture and livestock towards the gross value of output originating in agriculture. It has shown that during 1999-2000 to 2007-08 despite fluctuation, crop production contributed nearly half of the total value of output originating in agriculture. Further while the contribution of livestock remain stagnant around 35-36 that the horticultural crop fluctuated sharply, ranging from as high as 22.93% to as low as 4.62% gross value of output originating in agriculture gradually increased from 1555407 lakh during 1999-2000 to 15719 lakh during 2007-08. yet another way to understand the temporal changes in the process of agricultural diversification is to study the temporal changes in the cropping pattern. Among food grain crops the share of area under maize and ragi registered a small and persistent increase. Among the pulse the area under gram, arhar also increases steadily. Total food grain level increased from 90.88 to 92.30 percent. Among the non-food grains the area under oilseeds. Groundnut. Rapeseeds, castor seeds increased over

The period by varying degrees. Among oilseeds the share of area under sesame declined from 0.885 to 0.815. among cash crops the share of area

Under sugarcane gradually increased from 0.19% to 0.33% but the

area under fiber crops level declined steadily. The percent share of area under food grains and non-food grains crops remained practically unchanged. The results have been corroborated by the temporal changes in the Harfindahal

indices. The number of operational holdings increased from 39.66 lakh to 40.67 lakh between the years 1995-96 to 2000-01.

Table-1

Cropping pattern of sample Farmers under different crop scenario in the Sample area.

Sl.No	Crops	FG, CS, VG & FR(35)		FG, CS & VG(25)		PG, CS & PR (13)		PG, CS, VG & other (17)		FG, VG & other (10)	
		No. of growers	% of area	No. of growers	% of area	No. of growers	% of area	No. of growers	% of area	No. of growers	% of area
1	Paddy	21	45.89	13	42.98	4	35.10	5	44.74	5	40.84
2	Groundnut							13	14.42	8	22.84
3	Black gram	2	13.64	3	15.83	1	9.28	1	7.92	1	18.32
4	Green gram	2	2.04	2	6.04			1	0.82	1	12.32
5	Tomato	8	0.90	6	4.86			7	0.09	4	8.00
6	Sugarcane	7	35.53	4	31.19	6	46.62	16	30.84		
7	Lemon	7	1.09			5	4.09				
8	Banana	5	0.91			4	4.81				
		27	100.00	25	100.00	13	100.00	17	100.00	10	100.00

Note: FG= Food Grains,CS= Cash Crops.VG= Vegetables,FR= Fruit crops

From the table 1 it was cleared that 5 types of crops scenario are located(i) FG, CS, VG & FR (S1) (I(ii) FG, CS & VG FG, CS, FR FG CS VG & OTHERS FG, VG & OTHERS where FG = FOOD GRAINS, CS = cash crops, VG = vegetables crops, FR = fruit crops out of 100 sample farmers 35 farmers were undergo the scenario 1 from them 21 growers had grown the paddy where 7

farmers had grown sugar cane. In this scenario 49.28% under paddy followed by 31.19% area of sugarcane, 13 numbers of farmers were undergo the scenario (iii) for this 4 numbers of farmers had grown paddy & 6 number of farmers had grown sugarcane. In scenario 4 & 5 more percentage of area occupied by paddy range between 42 to 45% which followed by sugarcane. The percentage of area under paddy in every scenario is highest followed by sugar cane except FG, VG & others.

Table-2

Scenario wise area under different crops groups indices pf doversofocatopm pf doversification for the year 2007-08 in the sample area.

Sl.No.	Scenario	No. of Farms	GCA	% area under FG	% area under CS	% area under VG	% area under FR	Indices HI	EI
1	FG, CS, VG & FR	35	295.74	61.57	35.53	0.90	2	0.246	0.674
2	FG, CS & VG	25	302.73	64.85	31.19	4.06	-	0.278	0.639
3	FG, CS & FR	13	244.29	35.10	46.62	-	8.81	0.356	0.516
4	FG, CS, VG & other	17	313.91	44.74	30.84	8.66	0.9	0.207	0.736
5	FG, VG & others	10	326.70	40.84	-	8.00	-	0.274	0.629
6	Sample area	100	1483.37	54.01	8.08	0.72	0.65	0.234	0.699

It can be seen from Table 1 & 2 table that paddy crops accounts for about 35.10 to 46.62 percent, vegetables about food grains, cash crops, vegetable crops and fruit crops were putting larger proportion of gross cropped area under fruit grains and cash crops mainly to ensure food security and availability of cash vegetables and fruit crops were finding less proportion of GCA, how ever they are highly paying. Scenario FD, CS and FR indicate that larger proportion of area i.e. 46.62 percent was observed to be under cash crops followed by food grains i.e. 35.10 percent. Under

scenarios FG, CS, VG & others food grain constitute about 44.47 percent and cash crops 30.84 percent of total cropped area with the remaining being accounted by the vegetable and fruit crops. FG, VG, and other crops scenario revealed that food grain formed about 40.84% of GCA with remaining being accounted for pulse, oilseeds, vegetables. The diversification index (HI) ranges from 0.207 for FG, GS, VG & other crops scenario where about six crops are grown to 0.3656 for FG, CS & FR crop scenario where about five crops are grown.

(Crop Diversification Costs and Return)

Table 3

Input use, Cost and Return from major crops

Sl.No.	Particulars	Paddy	Ground nut	Green Gram	Black Gram	Tomato	Sugarcane
1	Seed cist (Rs.)	1200	1600	1225	1125	5875	600
2	FYM (Rs.)	200	500	100	100	69	600
3	Nutrient (Rs.)						
a	N	845	424	286	286	270	1690
b	P	2156	2312	1375	1375	-	5750
c	K	375	375	250	250	-	750
4	Plant Protection (Rs.)	3000	1000	1000	100	3133	1000
5	Human Labour Cost (Rs.)	340	800	520	420	1280	2020
6	Hired labour Cost (Rs.)	6300	2200	1190	1190	-	4240
7	Bullock Labour Cost (Rs.)	3100	1500	1600	1100	440	800
8	Packing/MKG (Rs.)	1040	1770	1180	1180	2068	6760
9	Cost A1 (Rs)	18556	12481	8726	8026	13135	24210
10	Cost A2 (Rs.)	19056	12981	9226	8526	13635	24710
11	Cost B1 (Rs)	19556	13481	9726	9026	14135	25210
12	Cost B2 (Rs)	20756	14481	10726	10026	15135	26710
13	Cost C1 (Rs.)	19896	14281	10526	10056	15415	27230
14	Cost C2 (Rs.)	21096	15281	11526	11056	16515	28730
15	Yield levels (qt/ha)	30	12	6	7	90	700
16	Prices (Rs./qtl)	850	1600	2500	3200	500	90
17	Net Return over						
18	Cost A1 (Rs.)	6944	6719	6274	14374	31865	38790
19	Cost A2 (Rs.)	6944	6219	5774	13874	31365	38790
20	Cost B1 (Rs.)	5944	5719	5274	13374	30865	37790
21	Cost B3 (Rs)	4744	4719	4274	12374	29865	36290
22	Cost C1 (Rs.)	5604	4919	4474	12344	29585	35770
23	Cost C2 (Rs)	4404	3919	3474	11344	28585	34270
24	Net return / qtl. Over cost C2 (Rs.)	147	327	290	1621	318	49

It was found that seed cost from crops to crops its value varies between Rs. 600 to Rs. 5875. But FYM quantity is

more required in sugarcane that is 600 followed by ground nut i.e. 500. The FYM use is comparatively less for paddy and tomato.

In the advanced stage of agricultural transformation. The use of fertilizer was highly imbalanced; the farmers were using higher doses of nitrogenous fertilizer but very low doses of phosphorous and potassium fertilizers in almost all the crops except tomato where the allocation of nitrogenous fertilizers was very low. However, the use of farmyard manure was quite reasonable. The expenditure on plant protection measure was very high in tomato due to very high incidence of diseases but low in sugarcane i.e. Rs. 1000.

Further since the food grain crops are highly labour intensive. The requirement of human labour was highest paddy followed by cash crops particularly sugarcane. The human labour in paddy was 340 and Rs. 6300 per hectares followed by cash crop like sugarcane and groundnut. The cost of bullock labour was more in paddy and less sugarcane. Packing and marketing value is more in sugarcane followed by tomato, groundnut, gram, black gram and paddy. Cost A1 is highest in sugarcane i.e. Rs. 24290.00 followed by paddy i.e.

Rs. 18556.00 Cost A2, Cost B1, cost B2 and cost C1 was more in sugarcane followed by paddy the net return over cost C2 were higher were Rs. 147.00, Rs. 327.00, Rs. 327.00, Rs. 290.00 Rs. 1621.00 Rs. 318.00 and Rs. 49.00 for paddy, groundnut, green gram, black gram, tomato and sugarcane respectively.

Table 3 revealed that under FG, CS, VG, & FR scenario the labour employed and next return per acre is higher in fruit crops followed by sugarcane. Among the cash crops, the net return from the sugarcane was higher 15688 per acre. Among the vegetables the net return of tomato was 8325 per acre. Black gram and green gram are far behind the labour use. Under scenario FG, CS and VG sugarcane crops was found high paying crops. Its net return was 12638 followed by tomato 10476. under FG, CS and FR fruits were found high paying and high labour use crop. Sugarcane and vegetables were high paying as compared to paddy. In FG, CS, VG and FR benefit cost ratio is high in sugarcane followed by Green gram, Black Gram, Among Cash crops benefit cost ratio is highest in sugarcane.

Sl.	FG, CS, VG & FR		FG, CS & VG		FG, CS & FR		FG, CS, VG & others		FG, CS, VG & FR							
	LE	NR (Rs.) B/C	LE	NR (Rs) B/C	LE	NR (Rs) B/C	LE	NR (Rs) B/C	LE	NR (Rs) B/C						
1	Paddy	80	3364	1.37	78	3515	1.31	76	1410	1.23	74	1830	1.99	70	2681	1.21
2	Black gram	30	1200	1.54	32	1705	1.95	33	3375	1.07	30	3000	1.81	35	3250	1.44
3	Green gram	30	2119	1.54	28	3000	1.81	29	2200	1.54	31	1888	1.70	34	1830	1.19
4	Ground nut													70	2359	2.73
5	Sugar cane	262	15688	1.83	261	12638	2.75	269	12500	1.71	270	15680	2.89			
6	Tomato	53	8325	1.17	52	10476	1.05				51	8955	1.89	53	5700	1.77
7	Other fruits	100	20686	1.09				122	24132	1.06	41	16730	1.11			

Crop productivity planning and Crop diversification:

It represents the constraints in cultivation of fruits and vegetables, **Vegetables**

requirement of crops productivity and crop Planning consideration from crop diversification scenario.

Table- 5:Indices of constraints in Cultivation of Cash Crops, Fruits and

Sl.	CROPS	No.of Farmers	SOW	SOL	LTF	PF	LCS	NAC
(A)	Cash crops	54						
	1. Sugar Cane	33	2(6.06)	3(9.09)	7(21.21)	10(30.30)	8(24.24)	3(9.09)
	2. Ground nut	21	7(33.33)	2(9.52)	5(23.80)	3(14.28)	1(4.76)	3(14.28)
(B)	VegetableCrops	25						
	1. Tomato	25	5(20.00)	3(12.00)	2(8.00)	3(12.00)	10(40.00)	2(8.00)
(C)	FruitsCrops	21						
	1.Lemokn	12	1(8.33)	1(8.33)	2(16.66)	2(16.66)	4(33.33)	4(16.66)
	2.Banana	9	2(22.22)	2(22.22)	2(22.22)	1(11.11)	1(11.11)	1(11.11)

Price fluctuation was found most severe constraint in sugarcane cultivation. Above 30 percent growth in the block faced this constraints. Lack of cold storage facilities, scarcity of water

were identified foremost constraints in tomato production . As regards fruits, cold storage for lemon, non availability of credit and scarcity of labors of banana cultivation were the foremost constraints.

Table-6: Requirements for productivity improvement in Cash Crops(Fruits and Vegetable Cultivation)

Sl.No	Crops	No. of Farmers	HYV & DRVS	SIT	AM	AoW	PPM TAOC	TAOC	CI
(a)	Cash crops	54							
	1. Sugar cane	33	15 (45.45)	5 (15.15)	4 (12.12)	3 (9.09)	2 (6.06)	2 (6.06)	2 (6.06)
	2. Ground nut	21	7 (33.33)	2 (9.52)	3 (14.28)	1 (4.76)	3 (14.28)	3 (14.28)	2 (9.52)
(b)	Vegetable Crops	25							
	1. Tomato	25	10 (40.00)	4 (16.00)	1 (4.00)	4 (16.00)	2 (8.00)	3 (12.00)	1 (4.00)
(c)	Fruit Crops	21							
	1. Lemon	12	4 (33.33)	2 (16.66)	1 (8.33)	1 (8.33)	1 (8.33)	2 (16.66)	1 (8.33)
	2. Banana	9	2 (22.22)	1 (11.11)	1 (11.11)	1 (11.11)	2 (22.22)	1 (11.11)	1 (11.11)

During survey, sample farmers were interviewed regarding requirements to improve the productivity level in vegetable cultivation. The high yielding varieties and soil improvement technology were needed by farmers to improve the productivity of tomato. It can be observed from table 6 that the farmers were in desperate need of disease resistant varieties of seed/planting material, assured market to get remunerative prices of their produce, soil improvement technology to increase the productivity of land, availability of water for its economic use, availability of plant protection technology, timely available of inputs on subsidized rates, availability of capital for initial investment and crop insurance.

High yielding varieties and soil improvement technologies were needed for farmers to improve the productivity of cash crops like sugarcane. The

productivity level in fruits could be enhanced by high yielding disease resistant plant materials, subsidized inputs, drip irrigation system, organized markets, timely availability of capital and skilled labor for undertaking specialized operation such as pruning, maturing, chemical application etc.

Productivity level of cash crops can be improved by disease resistant and high yielding varieties followed by soil improvement technology.

From the results presented in table 7 it is clear that the most important consideration of farmers in crop planning was production for self consumption as well as for market for scenario S2 and S4. For scenarios S1, S3 and S5 farmers placed their preference on getting maximum profit v at overall level, production for self consumption as well as market was most important consideration for crop planning.

Table-7: Indicates Crop planning Consideration for Different Diversification Scenarios

Sl.	Consideration	S1	S2 (35)	S3 (25)	S4 (13)	S5 (17)	Jajpur (10) District
1	Food production for self Consumption	6 (17.14)	5 (20.00)	3 (23.07)	2 (11.76)	2 (20.00)	18 (91.97)
2	Production for maximum profit / income	9 (25.71)	6 (24.00)	4 (30.76)	6 (35.29)	3 (30.00)	28 (145.76)
3	Availability of capital /credit for input	5 (14.28)	4 (16.00)	1 (7.69)	3 (17.64)	1 (10.00)	14 (65.61)

4	Vegetable production for self consumption	6 (17.14)	2 (8.00)	1 (7.69)	2 (11.76)	1 (10.00)	12 (54.59)
5	Production for self consumption as well as for market	7 (20.00)	6 (24.00)	3 (23.07)	3 (17.64)	2 (20.00)	21 (104.71)
6	Availability of plant material in time	2(5.71)	2(8.00)	1(7.69)	1(5.58)	1(10.00)	7(37.28)

Out of 100 farmers on different scenario 28 farmers in scenario 2 and 4 considered production for self consumption as well as for market and 21 farmers in scenario 1,3 and 5 considered production for maximizing farm income. This clearly indicates that farmers considered food security as well as cash requirements in area allocation. Food production for self consumption availability of capital for inputs and

vegetable production for self consumption formed other consideration in choosing the crop enterprises.

Factors facilitating crop diversification

It represents the facilitating factors. It is more important to understand the factors that facilitated the process of agricultural development and crop diversification. These factors both at micro and macro level.

Table-8: Farmers willing to shift from food crops to cash crops fruit and vegetable crops if relative profitability is assured

Sl.No	Scenario	No of Farmers	Farmers ready to shift	Percentage
1	FG,CS, VG&FR	35	25	71.42
2	FG, CS & VG	25	12	48.00
3	FG, CS &FR	13	12	84.61
4	FG, CS, VG &Others	17	12	70.58
5	FC, VG & Others	10	3	30.00
6	Sample area	100	63	63.00

Table 8 shows that out of 35 farmers from FG, CS, VG and FR scenario 25 farmers were ready to shift towards high value crops. Farmers of scenario 5 were not ready to shift because of their food requirements. Most of these farmers were marginal and had no land for

growing high value crops. They were growing food grains for their family need under scenario 3,84.61 percent farmers were found interested to shift towards high value crops . Under scenario 570.00 percent farmers were not interested to shift towards high value crops.

TABLE-9: CROP PREFERENCES OF FARMERS FOR SHIFTING TOWARDS HIGH VALUE CROPS UNDER DIFFERENT DIVERSIFICATION SCENARIO

Sl.	Consideration	S1(35)	S3(25)	S3(13)	S4(17)	S5(10)	Jajpur(100)
1	Banana	5(14.28)	4(30.76)	1(10.00)	10(22.44)		
2	Lemon	5(14.28)	4(16.00)	2(20.00)	11(10.75)		
3	Tomato	5(14.28)	4(23.5)	9(18.3)			
4	Groundnut	11(44.00)	3(23.07)	6(35.29)	3(30.00)	23(37.17)	
5	Sugarcane	20(57.14)	10(40.00)	6(46.15)	7(41.11)	4(40.00)	47(48.24)

Table:9 shows the crops preference of farmers shifting towards high value crops under different diversification scenario. Which indicated that is scenario 1, sugarcane was preferred out of 35 farmers 20 farmers were giving preferences for shifting towards high value crops like sugarcane followed by other crops in scenario 2, 16.00 percent farmers gave preferences towards the fruit crops like banana and 44 farmers gave preference to groundnut i.e. 46.15.in scenario 4 farmers preferred groundnut followed by vegetables crops like tomato. In the sample area, 47 farmers preferred sugarcane i.e. 48.24 followed by groundnut 22.44 percent. Farmers are preferred to cultivate sugarcane followed by groundnut.

The analysis of household data on cost and returns denotes the profitability of different high value cash crops in comparison to traditional careal crops in all five study villages. There are a number of factors like size of land holdings, accessibility in terms of

distance of crops from the roadheads, availability of family labour, income from non-farm sources, availability of irrigation facility, farm assets etc. That influence the farmer's decision to bring there crop land under these crops. It is hypothesized that factors like size of land holdings, availability of irrigation facility, family labour and farm assets encourage the farmers to bring in higher percent of their cropland under these crops. However, when all the factors were tried together the regression coefficient associated with some variables like farm assets were neither statistically significant nor had the expected signs. Therefore the regression equation were reestimated by dropping such variables. In all the five villages the distance of crop lands from the roadhead had a negative effect on the percent of cropped area under high value cash crops. In additional the non-farm income had a negative and significant effect on the percent of total cropped area under high value cash crops in village-V.

$$(V1) Y=77.67-11.74^*x_1 +0.64x_2 +x_2 + 6.02x_m -0.85x_4$$

$$R^2=0.07 \quad F=2.12 \quad N=20$$

$$(V2) Y=37.22-1.32x_1+4.37^*x_2++27.07x_3-5.79x_7^{**}$$

$$R^2=0.08 \quad F=2.16 \quad N=20$$

$$(V3) Y+46.48-6.47^{**}x_1+0.25x_2+14.29x_3^{**}-41.64^*x_4$$

$$R^2=0.18 \quad F=3.15 \quad N=20$$

$$(V4) Y=26.38-5.12x_1^*+0.59x_2+21.36x_3^{**}-11.43x_4$$

$$R=0.17 \quad R=2.13 \quad N=20$$

$$(V5) Y=12.33+2.44^*x_1+0.68x_2+13.28^{**}x_3-32.55x_4-11.32^{**}x_5$$

Y= The percent of total cropped area under high value crops.

X1= size of land holding in ha.

X2= Family labour

X3=Takes value 1 if a household had area under irrigation, 0 other wise

X4= The distance of crop land from road head.

X5= Non-farm income (take value 1 if a household had non-farm income, 0 other wise)

Notes: *and** denote significant at 5% and 10% levels of probability respectively

Conclusion:

In an agrarian economy like India, agricultural development is most desirable for economics growth. To meet the food requirement of the increasing population care should be taken to increase the production level. The backwardness of Indian agriculture is one of the reasons for vast populating living below poverty line. The cropping pattern of Indian Agriculture is dominated by traditional and low

productivity crops. Low productivity of Indian Agriculture is attributed to small size of land holding, adoption of poor technology. In India food grains occupy nearly 67.00 percent of the total cultivated area followed by oilseed crops with 4.5 percent area. High value crops like sugarcane, jute, fruits and vegetable occupy 7.5 percent of the total cultivable area.

Farmers of Odisha face the similar situation like their counter parts through out the country. Our cultivation system is bestowed with certain advantages gifted by the nature and at the same time there are issues to be taken care of Production and productivity of

high value cash crops are low because of adoption of poor technology emphasis on food grains like paddy, wheat etc. in order to sustain as well as enhance the production of high value cash in the state of Odisha.

Gender issues in decision making among the small and marginal farmers in plateau ecosystem of Orissa

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India has a pre-dominantly agriculture oriented economy. Though the contribution of this sector to the national GDP is reducing, yet the majority household of the nation depends on agriculture and its allied sectors for their livelihood. Indian women population stands at 496 million out of the total population of 1027 million, accounting 933 women for every 1000 man (census, 2001). It is reported that there are 72 million female workers as compared to 240 million male workers, indicating a smaller work force of women in the economy. Agriculture sector is found to be the highest employer of women's labour to the extent at 84-97% in India. Farm women carry out 75-80% of farm work and more than 90% in live stock (Arunachalam, 2005).

Devi and Reddy (1984) observed that farm woman belonging to low economic categories performed all agricultural activities. In plateau ecosystem, their involvement is more in

strengthening the economic status of the family as they engage themselves both in farming as well as activities related to income earning from forest resources.

Objective

A study was conducted in the North-western plateau zone of Orissa to find out the participation and decision making capacity of farm women in various activities.

Methodology

In the North-western plateau zone of Orissa, Deogarh and Sundargarh districts are present. Deogarh district is purposively selected for the study as 53% of its total geographical area is covered by forests, hills and mountains. The five village adopted by Krishi Vigyan Kendra (KVK), Deogarh were purposely selected as they belong to all the blocks of the district and the investigator found it easy to collect the data from these villages. Twenty farmers belonging to

small and marginal category were randomly selected from each of the five villages. A pre-structured questionnaire involving the probable roles of male and female members of the farm families along with their decision making capacity was made .The data were collected through personal contact method.

Results and discussion

Out at the 66,800ha total cultivated land of Deogarh district, rice occupies 53% of Kharif cultivated area and 37% of total annual gross cropped area. Vegetable cultivation and live stock rearing are the other two major occupations after the rice farming in this district. A study among the responding small and marginal farm families was undertaken to find out participation of men and women farmers in different activities.

Table 1. Gender involvement in various activities of farm families

Sl. No	Activities	Small farmers		Marginal farmers	
		Men	Women	Men	Women
01	Rice cultivation				
1.	Land preparation	✓	×	✓	×
2.	Sowing	✓	✓	✓	✓
3.	Transplantation	✓	✓	✓	✓
4.	Weeding	✓	✓	✓	✓
5.	Fertilizer application	✓	×	✓	×
6.	Pesticide application	✓	×	✓	×
7.	Cutting & bundling		✓	✓	×
8.	Transporting	✓	✓	✓	✓
9.	Harvesting	✓	✓	✓	✓
10.	Parboiling	×	✓	×	✓
11.	Storing	✓	✓	✓	✓
12.	Marketing	✓	×	✓	×
13.	Cash keeping	✓	×	✓	×

02	Vegetable cultivation				
1.	Land preparation		✓	✓	×
2.	Nursery raising	✓	✓	✓	✓
3.	Care & maintenance		✓	✓	✓
4.	Harvesting	✓	✓	✓	✓
5.	Post harvest handling	×	✓	×	✓
6.	Marketing	✓	✓	✓	✓
7.	Value addition	×	✓	×	✓
03	Livestock Production				
1.	Cleaning of cowshed	×	✓	×	✓
2.	Feeding	✓	✓	✓	✓
3.	Grazing	✓	✓	✓	×
4.	Milking	✓	✓	✓	✓
5.	Marketing	✓	×	✓	×
6.	Value addition of milk	×	✓	×	✓
7.	Cash keeping	✓	×	✓	×
04	Off Farm Activities				
1.	Nutritional garden	×	✓	×	✓
2.	Mushroom cultivation	×	✓	×	✓
3.	Backyard poultry	×	✓	×	✓
4.	Leaf plate making	×	✓	×	✓
5.	Bidi making	×	✓	×	✓
05	Household activities				
1.	Cooking	×	✓	×	✓
2.	Cleaning of house		✓	×	✓
3.	Caring of family members	×	✓	×	✓
4.	Collection of fuel	✓	✓	×	✓
5.	Collection of water	×	✓	×	✓
6.	Marketing of goods	✓	✓	✓	×
7.	Sending children to school	✓	×	✓	×
8.	Collection of NTFPs	✓	✓	✓	✓

From the above table it was found that in rice cultivation, land preparation, fertilizer, pesticide application, marketing and cash keeping were completely of mens' domain .In sowing, transplanting, weeding, harvesting, transporting, storing both men and women farmers were involved. Men farmers were never involved in parboiling activity .The same result was reported by the study of All India coordinated research project in Home science (1996-2001). In vegetable cultivation, women involvement was found more than their male counterparts. Their participation is in all the operations related to vegetable cultivation but men were not involved in value addition and post harvest operations. In live stock production, feeding and milking activities were done by both the men and women where as cleaning the cowsheds and value addition were done exclusively by farm women. The cash was kept by males only. Marketing was the only activity

where females usually were not playing any role.

In off-farm activities of the farm family like development and maintenance of nutritional garden, mushroom cultivation, backyard poultry, leaf-plate making and hazardous *bidi* making during leisure hours, the farm women participation was 100 percent. From the study it was found that males were keeping themselves away from these off-form activities. Among the household activities, collection of NTFPs like mahua flowers, sal leaves were done both by men and the women. In small farmer category fire wood collection was done by both where as in marginal farm families, it was done by females only. Likewise is marginal farm families, marketing of goods were done by the males where as in the other category, both the man and women farmers were participating.

Table 2. Gender Involvement in decision making

Activities	Who takes decision		Both
	Men	Women	
1. Farm activities			
1.Variety of seed to be shown	✓		
2. Quantity of produce for storing			✓
3.Sale of produce	✓		
4.Variety to be stored for next season			✓

2 Social activities

1.Purchase of garments		✓
2.Expenditure in functions	✓	
3.Travel to new place	✓	
4.Marriage of son/ daughter		✓
5.Education of children		✓

Decision making refers to a course of action chosen from a number of possible alternatives. From table-2 it was found that out of the four broad areas, in variety selection and sale of produce, the decision was taken by the male members of the family independently where as in the decision of quantity of produce to be stored and variety to be stored, both men and women members of family were taking decision collectively. Women were never taking any step independently. This study confirms the findings of Sharma and Singh (1970) who has reported that larger proportion of women participated in decision making in areas of seed

storage. In social activities of the farm families, women were lack in decision making capacity.

Conclusion

Women are called the better half of the society. In the plateau ecosystem, though farm women's role in various activities in farming is more than the men, yet they lack in decision making. In small and marginal farm families they not only do the most drudgerous works but also contribute the major share in the household and off-farm activities. Thus economic status of these families in this ecosystem depends on the women community.

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Role of Early Childhood Care and Education (ECCE) in Universalisation of Elementary Education in Odisha

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National policy on Education (NPE, 1986) has given great deal of importance to Early Childhood Care and Education (ECCE). ECCE is considered to be very important for the development of young children before they enter formal school. It helps the children to become more independent and confident as well as promoting the all round development of the children. It was ECCE as a feeder and supportive programme for primary education and as a support service for working women of disadvantage sections of the society. It also aims at overall development of child. Since the age span covered by ECCE is from 03 to 06 years, so great emphasis has been given to child centered approach, play way and activity based learning and community involvement. It involves total development of child i.e. physical, motor, cognitive, language, social and skill. ECCE has been envisaged as the holistic intervention for providing better learning health care, physical and nutritional

development of children. The pre-school activity undertaken under ECCE can help the child to get ready for primary school education with adequate skills to perform better in regular attendance. The benefit of ECCE can get translated in improving school enrolment, retention, reducing dropout and relieving the girls from the burden of sibling care so as to encourage them to attend schools regularly. On the whole ECCE prepares the children to adjust to formal schools in a much better way. Thus ECCE is considered to be one of the major components in achieving Universalisation of Elementary Education (UEE).

Objective

Realising the importance of ECCE in the Universalisation of Elementary Education (UEE), the present paper makes an attempt to study the functioning of ECCE in the state of Odisha with the objectives: (i) To study the effectiveness of ECCE interventions in terms of its access, enrolment and

retention (ii) To compare the functioning of ECCE centres and AWCs with ECCE component and (iii) To make a SWOT analysis for ECCE to know its effectiveness and constraints.

Methodology

The present study is based on interaction through personal visits to ECCE centres, AWCs, Officials of ECCE/AWCs and through information from official records and published sources. Twenty preschools of Keonjhar district (10 each from AWC and ECCE) and twenty preschools of Khurda district (10 each from AWC and ECCE) are covered in the present study to make a comparison between AWCs (ICDS) and ECCE.

Results and Discussion:

With a view to delivering ECCE services in an integrated manner, efforts are being made in Government sector, private sector and voluntary sector.

(a) Delivering ECCE Services by Govt. Sector:

(i) ICDS- Integrated Child Development Scheme (ICDS) is the world's largest and most unique community based outreach programme for ECCE. ECCE is an important component of Angan Wadi Centres (AWCs) functioning under ICDS.

(ii) Rajiv Gandhi National Creche Scheme-The scheme serves as a cost effective day care programme for young children of working mothers, women

belonging to poor families who require support and relief from children as they struggle to cope with burden of activities, within and outside the home.

(iii) Sarva Shiksha Abhiyan (SSA)- Under SSA pre-primary units/pre-school education units are attached with primary schools.

(b) **Private Sector:** ECCE facilities are also available through Private nurseries, primary schools and Corporate Initiatives.

(c) **Voluntary Sector:** The NGOs are also involved in providing ECCE services to the children.

In Odisha, on Government sector the area of operation of ECCE under SSA is confined to habitations with no Anganwadi centre (AWC) where more than 20 children of age group of 03-06 years are present. In addition ECCE centres are operational in different geographical areas such as hilly areas, scattered and remote habitations and forest areas. ECCE centres are also functioning under ICDS in AWCs with ECCE component. The interventions undertaken both at AWCs and ECCE centres include (i) capacity building of ECCE Instructors and AWC workers on pre-school education, (ii) Supply of Kit Box to ECCE/AWC children, (iii) Providing reading materials to ECCE/AWC children, (iv) Organization of Sishu Utsav, (v) Providing environment friendly element

to schools where ECCE/AWC are running, (vi) Wall painting on ECCE/AWC, (vii) Workshop on preparation of material, (viii) Provision of ground level wall Black board, (ix) Provision of ARUNIMA books to ECCE/AWC centres.

Pre-school education kits with toys and different types of educational materials are provided to every ECCE/AWC each year at a cost of Rs. 1000/- per kit. During the year 2005-06 to 2010-

11, the enrolment of children in the age group of 03-06 years has increased from 10.6 to 16.8 lakh. The attendance of such children has increased from 9.4 lakh to 15.3 lakh in the corresponding period. In case of ECCE running under SSA, during the year 2008-09, 3626 ECCE centres are operational with enrolment of 87154 children. Whenever new AWC centre is opened in the area, the ECCE under SSA has been merged with AWCs.

Table1. Enrolment of Pre-school children under ICDS in Odisha during 2001-02 to 2008-09

Year	Total child population (03-06) years (in lakh)	Enrolled (in lakh)	Attended (in lakh)	Attended as % to enrolled
2001-02	18.00	9.80	8.40	85.71
2002-03	18.95	10.00	8.50	85.70
2003-04	20.03	10.00	9.30	93.00
2004-05	20.35	11.00	9.40	85.45
2005-06	20.27	10.80	9.40	87.04
2006-07	20.19	10.70	9.70	90.65
2007-08	21.08	13.00	11.30	86.92
2008-09	21.15	14.40	12.90	89.58

Source: Women and Child Development Dept. Govt. of Odisha, 2009

As per 2001 census, the child population in the age group of 0-06 years is 53.58 lakh. The child population in the age group of 03-06 years during the year 2001-02 is 18.00 lakh, out of which 9.8 lakh are enrolled in ICDS and 8.40 lakh have actually attended the pre-schools. The percentage of attended children to the enrolled is 85.71 percent.

The child population has increased from 18.0 lakh to 21.15 lakh during the period 2001-02 to 2008-09. In the corresponding period the increase in enrolment is 9.8 to 14.4 lakh and actually attended increased from 8.4 to 12.9 lakh. As may be seen from the above table, that preschool facilities available under ECCE (SSA & ICDS) excluding private

schools and NGOs are for less than half of the child population, even though the enrolment and attendance have been increased over the years. However there is a considerable gap between preschool children enrolled and attended in the state. Lack of motivation of parents, inadequate coverage of ECCE, lack of basic infrastructure, poor time management, inadequate availability

and use of play and learning materials etc. are the apparent reasons for low enrolment. Again, it is reported that the dropout rate in early primary classes is unacceptably high at 20-21% indicating the existing preschool component in ICDS is very weak (Planning Commission, 2009).

Table -2 Characteristics of Sample AWCs and ECCE centres

Particulars	Sample Districts	
	Khurdha	Keonjhar
i) Sample ECCE & AWC centres	20(10 each)	20(10 each)
ii) Average Annual Income of parents	Rs.12217.30	Rs.9654.40
iii) Distance of ECCE /AWC centres from habitation	0.55Km	0.62Km
iv) Timing of running ECCE/ AWC centres	3.5 hrs	3.5 hrs
v) Trained teachers per centre	01	01
vi) Availability and use of Toy materials in ECCE/AWC centres	16	08

The analysis in Table -2 indicates that on an average the sample parents of AWC and ICDS centres have annual income of Rs.12217.30 in Khurdha District as compared to Rs.9654.40 in Keonjhar District. The distance of sample ECCE/AWC centre from the habitation is 0.55km and 0.62kms in Khurdha and Keonjhar Districts respectively. The

ECCE/AWC centres run mostly during fore noon for three and half hours in both the sample districts.

The enrolment of girls in ECCE is 53.46% as against 51.38% in AWCs in the two sample districts. Thus it lends support to the findings that gender differences in school enrolment are marginal (OPEPA, 2011). However, the

girls enrolment rate in ECCE is slightly higher than AWCs. The third round (2005-06) of National Family Health Survey Data (IIPS,2007) shows that at the national level around 56% of children in preschool are enrolled in Anganwadis (ICDS

centres) for Early Childhood Care and Education. Among them 31% of children are attending the centres regularly. A large variation is also found in access to early childhood care and education across the states.

Table -3 : Correlation coefficient between socio-economic variables and class room indicators of sample pre school children in AWCs and ECCE.

Variables	Enrolment	Attendance	Retention	Dropout
i) Education of parents	0.134* (0.006)	0.179* (0.005)	0.212* (0.012)	0.329* (0.012)
ii) Income of the parents	0.126 (0.001)	0.105 (0.001)	0.098 (0.002)	0.086 (0.002)
iii) Distance of the AWC and ICDS centers	-0.324* (0.051)	-.272* (0.036)	-0.116* (0.001)	-0.098* (0.001)
iv) Timing of running of ECCE Schools	0.183* (0.044)	0.105 (0.001)	0.190* (0.043)	0.114 (0.001)
v) Trained teachers	0.238* (0.030)	0.175* (0.005)	0.118 (0.001)	0.101 (0.001)
vi) Availability of toy materials	0.157* (0.054)	0.139* (0.003)	0.112 (0.002)	0.100 (0.001)

Figure in the parenthesis are probability level of significance. * Indicates value of significant co-relation coefficient.

The analysis in Table – 3 reveals that the educational level of parents, timing of running ECCE/AWC schools, trained teachers and availability and use of toy materials are positive and significantly correlated to enrolment and attendance. The distance of the AWC/ ECCE centres from the habitations is negatively co-related indicating that higher the distance from habitation lower will be the enrolment and attendance of pre- school children.

The majority (72.36%) teachers of ECCEs schools have qualifications up to matriculation. It corroborates with the findings that “The quality of pre primary education for the tribal children in tribal areas is poor due to lack of qualified teachers and supervisory staff (NIPCCD, 1992)”. Availability of free food may be the causes of high enrolment in poor tribal areas. Among the children belonging to Schedule Tribe who attend primary schools, 95% of the children go to AWCs, whereas 45% of children belonging to other castes go to AWCs (NCERT, 2006), children whose father are employed in service sector account for the highest proportion in total enrolment in preschool education followed by children whose fathers are employed as labourers or engaged in family. Those who attend pre primary education regularly, these children are mostly from poor households who can not afford private primary schools even though it is available locally and also because of the

availability of free food in the AWCs centres.

Regarding the functioning of ECCE, it is revealed that ECCE centres are relatively recent compared to AWCs. ECCE Instructors run the centre and get the support from BRCCs, CRCCs, and Gender Co-coordinator appointed in District Project Office (DPO). The AWC workers take help of CDPOs and Supervisors to run the AWCs.

Swot Analysis for ECCE

The SWOT analysis on ECCE has lighted the strengths, weaknesses, opportunities and threat which are as follows:

Strengths

1. Although majority of the children of 03-06 are attending AWC/ECCE centres, a considerable proportion of children are attending private schools. In absence of private schools in the area/locality, almost all children under ECCE/AWCs, tribal dominated villages are enrolled in ECCE/AWCs.
2. A higher proportion of children belonging to Schedule Tribe (ST) are enrolled in pre-primary education (ECCE/ AWCs) followed by Schedule Caste (SC), Other Backward Caste (OBC) and children from other social groups.
3. In pre-primary education (ECCE/AWCs), the enrolment of boys is slightly less than girls. But in private pre-primary schools

the boys enrolled is much higher as compared to girls.

Weaknesses

1. Infrastructure school building, drinking water failing, toilet, outdoor, play materials etc. are not available in the AWC/ECCE centres.
2. Curriculum (ARUNIMA) specified for each day of school activity is not strictly followed. A higher proportion of time is devoted to rhyme, songs and outdoor activities.
3. Limited community awareness, demand and involvement in ECCE/AWC activities lead to more Song, Rhyme, Alphabet and number programme.
4. Lack of qualified and trained teachers and staff as a result children from diverse group and multiple competencies find difficulties in learning.
5. More concentration of ECCE/AWCs is rural and tribal areas. These preschooling facilities are not available to children at risk and deprived in urban areas.

Opportunities

- Dedicated and trained teachers are with appropriate programme design with space for flexibility, creativity and innovation would strengthen the preschool activities.

- Recording the information, the development of child's progress in a systematic manner would help the parents and teachers to monitor school readiness, cognitive and linguistic readiness outcome of the children.
- Promoting educational inclusion by enrolling children across culture, gender, mother tongue and children with disability and other special needs.
- Development of teachers capability and a National Curriculum for children for early primary grades shall ensure smooth transition for ECCE/AWCs to primary schools.
- Children who have been to preprimary schools tend to learn more rapidly through an organized curriculum learning aids and by interacting with other children. ECCE contributes significantly to the improvement in enrolment, retention, participation, self confidence and learning level of children in formal schooling of Universalisation of Education for Children.

Threat

As such there is not direct threat to the children and parents. The linguistic, physical, mental, social and skill development of children shall be

impaired and valuable time will be wasted due to lack of qualified teachers, infrastructure and other support services.

Conclusions and Suggestions:

ECCE is considered to be very important school readiness programme for young children of 03-06 years age in achieving the goals of SSA by improving the school enrolment, retention, reducing dropout rate and relieving the girls from the burden of sibling care so as to encourage them to attend schools regularly. Lack of motivation of parents, inadequate coverage of ECCE, lack of

basic infrastructure, poor time management at school, inadequate availability and use of play and learning materials, etc are the factors responsible for low enrolment of preschool children. Inclusive education is promoted through enrolment of children in ECCE/AWCs across culture, gender, mother tongue and children with disability and other special needs. Efforts are to be made to enroll all children in the age group of 03-06 years in pre schools for preparing those to formal schools to realize the objectives of SSA.

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Productivity Enhancement of Soybean and Wheat Crop through Balance Dose of Fertilizers

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Intensification of Agriculture coupled with higher productivity over the years, there is wide spread deficiency of nutrient in cropping up. This means, the nutrients taken out of the soils are not being replenished. The result is decline in crop response to fertilizer due to sub optimal and imbalance use of fertilizers application and less use of organic manure. It occurs due to change in soil quality /health under any intensified monotomy cropping system (Dhyani et.al. 2007). Under such situation, Fertilizer Association of India decided for the balanced fertilization and conducted demonstration in different part of country through the expert of Krishi Vigyan Kendra under the name "Soil health enhancement programme".

Objective

In this view, the pioneering work being undertaken by Krishi Vigyan Kendra Dist. Sehore at the grass root level for the productivity enhancement through balance dose of fertilizers because,

balanced dose of fertilization reverse the ill effect of soil and promote the supply of nutrient as required by the crop.

Methodology

Considering the criteria of easily mobilization of maximum farmers, village Lasudia Parihar under Vindhyan Plateu in Sehore district of Madhaya Pradesh was selected purposively for conducting demonstration. The village is also linked with the state highway. Control plots by the side of the demonstration plots were also kept where farmer practices carried out. Under demonstration, critical input modules were developed and provided by KVK to the farmer based on soil test value. Representative soil sample (0-15 cm depth) were taken from selected fields were taken, and analyzed for recommendation before sowing of the crop. The selected fields have medium to black soil with pH-7.4, E.C-0.44, OC-0.33, available phosphorus 6 kg/ha and potash 448 kg/ha. The crop soybean and wheat cultivar JS-9305 & H.D-2004 were

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sown during last week of June and IInd week of October with a spacing of 45 X 7 and 20 X 10 cms. respectively. Recommended fertilizers were applied with the dose of 20:60:20 kg N.P.K in soybean and 100:60:40 kg NPK in wheat crops. Full dose of NPK in soybean crop and half dose of N and full dose of P&K applied in wheat crop at the time of sowing. Remaining dose of N applied to wheat crop in two equal split application at standing crop. Plant protection measures and other agronomical practices were followed as per the

recommendation. Data were collected from both the demonstration and farmers practices with the help of personal visit and observations on yield data also recorded at the time of physiological maturity and threshing time.

Result and Discussion

Detail observations on plant population, no. of pods/ear per plant, no. of grains, grain weight and yield were recorded. As observed from Table-1, significant impact were observed on yield and yield attributes.

Table-1. Balanced dose of fertilizers on yield attributes of soybean and wheat crop

Sl. Parameter	Soybean		Increase (%)	Wheat		Increase (%)
	RP	FP		RP	FP	
1 Plant population & tillers/m ²	46	45.2	1.7	208.3	189.3	10.0
2 No.of pods & ear/plant	26.5	22.5	17.7	1	1	00
3 No.of grains/ pods & ears	2.1	1.9	10.5	41.0	38.3	7.0
4 Test weight (g)	96.0	94..0	2.0	37.7	36.6	3.0
5 Yield (q/ha)	23.9	18.5	29.0	32.1	26.6	20.6

RP- Recommended practices, FP- Farmer practices

In soybean demonstration, there was 1.7% increase in plant population per sq.meter. Similarly; there was increase of 17.7% on number of pods per plant, 10.5% on number of grains per pod and 2% on

test weight. In case of wheat demonstration, there was 10% increase on tillers per sq. meter, 7% on number of grains per year and 3% on test weight. The yield attributes had significantly

increase 29% yield on soyabean and 20.6% in wheat. The result of yield attributes confirmed that balance does of fertilizer application had significant impact in increasing productivity in soyabean and wheat.

Further attempt has been made to analyze the economic impact of the demonstration. It is observed from Table-2 that the net return and cost benefit ratio

was found better in both soyabean and wheat crop. The net return and cost benefit ratio on soyabean and wheat crop was found Rs. 27,520.00 and 1:2.8 as well as Rs. 19,520.00 and 1:2.0 in the demonstration plots as compared to Rs. 18,800.00 and 1:2.0 as well as Rs. 14,420.00 and 1:1.8 in the farmers practice respectively which indicate the direct response of balance dose of fertilizers.

Table-2. Impact of balanced dose of fertilizers on economics of soybean and wheat crop

Economics		Soybean	Wheat
Cost of cultivation	RP	15500.0	19000.0
	FP	14500.0	17500.0
Gross return	RP	43020.0	38520.0
	FP	33300.0	31920.0
Net return	RP	27520.0	19520.0
	FP	18800.0	14420.0
Cost benefit ratio	RP	1:2.8	1:2.0
	FP	1:2.2	1:1.8
FUE on economically	RP	277.5	202.7
	FP	229.6	182.4
Percentage return to fertilizers	RP	10.2	5.1
	FP	00	00
Interaction impact on grain yield	RP	29.0	20.6
	FP	-	-

RP- Recommended practices, FP- farmer practices, FUE - Fertilizer use efficiency

Fertilizer use efficiency economically found over 20.86% in soyabean and 11.10% in wheat compared to farmers practice since nutrient use efficiency in crop plant is an important approach to evaluate the applied fertilizers and their role in improving crop yield (Singh & Agrawal 2005). Percentage return to fertilizer in both crop was found 10.2% and 5.10% when use of balance does of fertilizer due to proper availability of nutrient as per crop demand leads to improvement in grain yield and consequently the higher nutrient use efficiency. Similar; results was found by Sharma, 2005, Rajib et. al. 2007, Singh and Agrawal, 2005.

Conclusion

The mean of yield attributes viz. no. of plant/or tiller/m², no. of pod or grains/plant or ears, test weight (1000 grains) and yield q/ha were found more in recommended practice as compared to farmers practices. The enhancement yield of soybean and wheat were 29.0% and 20.6 % more in recommended practices over farmers practices which proves response of balance fertilization as per soil test value. It was resulted consequently with farmers gain of additional profit in term of monetary value of Rs. 12380/ha/years from both crop, which is beneficial in their future life and improve the standard of living as per FAI expectation.

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Assessment of Yield Gap in Chick pea Through Frontier Technology

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India is the largest producer of pulses in the world with 25 per cent share in the global production. The area, production and productivity of the pulses in the country are 23.63 million hectare, 14.56 million tones and 6.25 q/ha, respectively (Masood Ali *et al.* 2007-08). Chickpea (*Cicer arietinum* Linn.) is an important winter-season food legume having extensive geographical distribution and contributing 39 per cent to the total production of pulse in the country. It is a good source of protein (18-22%), carbohydrate (52-70%), fat (4-10%), minerals (calcium, phosphorus, iron) and Vitamins. It is an excellent animal feed. Its straw also had good forage value., Chickpea is the premier pulse crop in India occupying 7.10 million hectares area and contributing 5.75 million tones yield to the national pulse basket. It is grown through out the country excepting on high altitude of northern and North eastern regions and coastal peninsula. The major chickpea producing states are Andhra Pradesh,

Madhya Pradesh, Rajsthan, Uttar Pradesh, Maharashtra, Haryana, Karnataka, Gujrat, Bihar and West Bengal. The area, production and productivity of chickpea in the states of Uttar Pradesh are 674884 hectares, 500799 metric tons and 7.42 q/ha, respectively. Some districts of Uttar Pradesh i.e. Banda and Hamirpur have more than one lakh hectare area under chickpea. Highest productivity has been reported from Azamagarh and Mau (1269 kg/ha). The area, production and productivity of chickpea in the district Ghazipur of Uttar Pradesh are 1277 hectares, 1073 metric tons and 8.40 q/ha, respectively.

Gram pod borer (*Helicoverpa armigera* Hubner), Gram semilooper (*Autographa nigrisigna*), termite (*Odontotermes obesus* Ramb. and *Microtermes obesi* Heomgr), Cut worm (*Agrotis ipsilon* Rott), Aphid (*Aphis craccivora* Koch), Wilt (*Fusarium oxysporum* f. sp. *ciceri*), Collar rot (*Sclerotium rolfsii* Sacc.), Black rot (*Rhizoctonia solani*), Stem rot (*Sclerotinia*

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sclerotiorum(lib.) Mass.), *Ascochyta* blight (*Ascochyta rabiei* Pases Labr) and *Botrytis* grey mould (*Botrytis cinerea* Pers. Ex. Fr.) are major biotic stresses in the region. Among these biotic stresses, the gram pod borer (*Helicoverpa armigera* Hubner) is a major pest accounting for 75per cent pod damage in the crop (Krishna Kant *et al.*, 2007). In spite of these biotic stresses, several other abiotic factors are responsible for declining the yield potential. Though much progress have been made in the field of agriculture research and education, but full benefits of these developments could not be realized by the farming community because of low adoption of technologies at the user's level. Front line demonstration (FLD) is an introduction by the Indian Council of Agricultural Research, New Delhi with inception of technology mission of pulse and oil seed crops during mid eighties. The field demonstrations are conducted under the close supervision of scientist. The basic objectives of FLD are to spread the newly introduced high yielding varieties of chick pea speedily and acquaint extension functionaries and local farmers with front line varietals and management technologies. Front line demonstration (FLD) were undertaken by the Krishi Vigyan Kendra, Post Graduate College, Ghazipur on the improved package of practices of chick pea in the Ghazipur district during 2002-2011.

Objective

Assessment and comparison of yield gap of the demonstration over farmers practice.

Methodology

Front line demonstration (FLD) on chick pea was conducted by Krishi Vigyan Kendra, Post Graduate College, Ghazipur, U.P. during the period from 2002-2011 in twelve villages *viz.* Sabua, Laxmanpur, Chochakpur, Alipur Bangawan, Mahepur, Permeth, Bedauli, Sonaharia, Sauram, Thanicpur, Khijirpur, of Karanda block and Sherpur of Mohammbadabad block of district Ghazipur. All total 156 number of demonstrations were conducted. The component demonstration of front line technology in chick pea i.e. improved variety Pusa 362, Pusa 256, Awarodhi, balanced dose of fertilizer (18 kg Nitrogen+46 kg P₂O₅/ha) and use of *Trichoderma* @ 5 gm/kg of seed as seed treatment were taken. Demonstrations were conducted covering 30.75 ha. in six consecutive years. One control plot was also kept by the side of the demonstration where farmers practices was carried out. All the production and protection technologies other than interventions were applied in similar manner in demonstrated as well as in farmer's practices. The yield gap was calculated between demonstrated and local check and the results are presented herewith.

Results and discussion

The details of the intervention on technology demonstrated along with farmers practice have been presented in Table-1. Latest varieties such as pusa 362, pusa 256 and Awarodhi were

demonstrated over the farmers' traditional varieties. Similarly; seed treatment with Trichoderma powder @ 5gm/kg of seed and recommended fertilizer i.e. 18 kg N and 46 kg P₂O₅ were demonstrated where the farmers are not applying any fertilizer and practised seed

treatment. Further; monocrotophos 1.5lt/ ha at appropriate time were demonstrated against the farmers practice of no use or indiscriminate use of pesticides.

Table 1 : Technical interventions over farmers practice

Sl.No.	Component	Technological intervention	Farmers Practices
1	Variety	Pusa 362, 256 and Awarodhi	Local
2	Seed treatment	Trichoderma powder @ 5 g/kg of seed	No seed treatment
3	Fertilizer dose	18 kg N and 46 kg P ₂ O ₅ per hectare	No use of fertilizer
4.	Plant Protection measure	Monocrotophos @ 1.5 lit./ ha at appropriate time	No use or Indiscriminate use

Common production and protection technologies as demonstrated both in the demonstration and control plot have been presented in Table-2. The technologies were seed rate of 75-100/

ha., line sowing at a spacing of 30 X 10 cms with 6 cm depth, two manual weeding i.e. 30 and 60 days after sowing and need based spraying against pod borer as well as disease management.

Table 2 : Common Production and protection technologies applied

Sl. No.	Component	Production and Protection Technologies
1	Seed rate	75-100 kg /ha on the basis of seed size
2	Sowing method	Line sowing (R x R 30 cm) (P x P 10 cm) and 6 cm deep
3	Situation	Rain fed
4	Soil type	Sandy loam
5	Weed management	Two mechanical weeding, one at 30 days after sowing and another at 60 days after sowing
6	Plant protection	Need based pesticides spray for pod borer and disease management.

Common production and protection technologies were applied to assess the impact of variety, seed treatment and spraying of monocrotophos.

The results obtained during six years are presented in Table-3. It is revealed that an average yield of 18.00q/

ha were obtained in the demonstration plots against the yield of 12.08 q/ha in the farmers practice. The highest yield in the FLD plot as well as control plot was 22.00 q/ha and 14.50 q/ha, respectively during 2010-11 and lowest yield was recorded in 2002-03.

Table 3: Gap in grain yield under front line Demonstration during 2002-2011

Year	Under FLD programme		Average yield (qt/ha)		Yield gap qt/ha	Per cent increase in the yield over farmers practice
	No. of Demonstration	Total area (ha)	Demonstrated plot (FLD)	Farmers practice		
2002-03	12	3.25	10.50	8.00	2.50	31.25
2004-05	29	5.00	12.50	9.00	3.50	38.88
2006-07	14	5.00	21.00	16.00	5.00	31.25
2007-08	71	10.00	21.00	12.50	8.50	68.00
2009-10	20	5.00	21.00	12.50	8.50	68.00
2010-11	10	2.50	22.00	14.50	7.50	51.72
Total/ Average	156	30.75	18.00	12.08	5.92	48.18

The result clearly indicated that the higher average grain yield in demonstration plots over the years compare to local check due to knowledge and adoption of full package of practices i.e. appropriate varieties such as Pusa 362, Pusa 256, Awarodhi etc., timely sowing, seed treatment with *Trichoderma* @ 5 g / kg of seed, use of balanced dose of fertilizer (18 kg N and 46 kg P₂O₅ ha⁻¹), method and time of sowing, timely weed management and

need based plant protection. The average yield of chick pea increased 48.18 per cent more over local check while the year wise variation in yield to the tune of 31.25 to 68.00 per cent. The yield of chick pea could be increased over the yield obtained under farmers practices (use of non-descriptive local variety, no use of the balanced dose of fertilizer, untimely sowing and no control measure adopted for pest management) of chick pea cultivation. Thus, the yield gap of 5.92

q/ha was obtained between demonstrated and local check conditions. The above findings are in similarity with the findings of Singh (2002). The farmers were convinced about the benefits of seed treatment, balanced doses of fertilizers for sustainable production, timely sowing, weeding and appropriate plant protection measures.

The FLD produces a significant positive result and provide the researcher an opportunity to demonstrate the productivity potential and profitability of the latest technology (Intervention) under real farming situation, which they have been advocating for long time. This could be circumvent some of the constraints in the existing transfer of technology system in the district Ghazipur of Uttar Pradesh. Similar findings were reported by Kirar *et al.* (2006).

Conclusion

The FLD programme was effective in changing attitude, skill and

knowledge of recent technology for high yielding varieties, balanced dose of the fertilizer and biological disease management of chick pea including their adoption. This also improved the relationship between farmers and scientist and built confidence between them. The demonstration farmers acted as a source of information and pure seeds of wider dissemination of HYV of chick pea for the other farmers. The productivity gain under FLD over conventional practices of chick pea created greater awareness and motivated the other farmers to adopt appropriate recent production and protection technologies in the district. The critical input supplied and farmers participatory approach in planning and conducting the demonstration definitely helped in the transfer of technology to the farmers. Thus, it is concluded that introduction of high yielding varieties can fulfill yield gap and extension agencies can also play a significant role to transfer of improved technologies to farming community for better production.

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Development of Women Friendly Expert Systems in Crop and Animal Enterprises

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The success of the ICT enabled projects in rural areas largely depended on potential for economies of scale, societal acceptance and capacity to use information technologies. ICTs have vast potential in addressing the vulnerable groups and areas, aiding sustainable livelihoods through empowerment of farm women and men by providing knowledge and capacity building. But, the difference in the access of information, especially for women in rural areas, is resulting in widening of the digital and gender divide. There is an urgent and immediate need to address the gender related issues in reducing the inequalities and enhancing the access to use of ICTs as both producers and consumers of knowledge. Therefore, a pro-active gender sensitive ICT strategy is imperative to build the capacities of the women in agriculture to enjoy the fruits of development, sustain their livelihoods and improve their quality

of life. Expert systems (ES) is identified as powerful tool for farmers for transfer of technology and helps to improve the production and productivity of the crops by providing instant technological advisory support with the support of real experts.

Objective

The aim of the project was to develop expert system for agriculture (Paddy, Sugarcane, Banana, Ragi and Coconut) and animal husbandry (Cow and Buffalo, Sheep and Goat and Poultry) for the three states in their respective languages ie., Tamil Nadu (Tamil), Karnataka (Kannada) and Kerala (Malayalam) under the jurisdiction of ICAR Zone-8. The project was implemented from April, 2008 to December, 2012.

Methodology

The Expert Systems were developed through network project mode. The Information System, Decision Support System and Crop doctor are the important components in the expert system. The information system is the web based static and dynamic information where in all the contents and technologies related to concerned crops have been loaded to help the extension workers, scientists, policy makers to get instant information about the crop for their references. Decision Support system is facilitating the farmers to confirm his own experience based decision for day today crop cultivation practices. It was developed by using interrelated or multiple combo box mode using dot net programme. Crop Doctor is main component in the expert system which was developed using if and then rule based programme with help of dot net and SQL server. It is purely image based diagnosis system to diagnosis any pest, diseases, nematode and nutrition disorders. The expert system was developed in English as well as in three local languages viz., Tamil, Kannada and Malayalam for the benefit of the southern state farmers. KVKs are partners for content development and test of expert systems' validity and reliability and C-DAC is partner for the language translation

Results and discussion

How DRWA expert system is different from other expert system developed elsewhere?

01. Comprehensive in nature, will give decision support and doctor like advisory for selected crops from Seed to Seed packages
02. It is purely image based and added number of images (early stage, middle stage and matured stage symptoms or subjects) for diagnosing the field problems.
03. Functionally literate farmers can also use this expert system since it is purely image based.
04. Our expert system is mainly meant for Farmers. Because it is available in Tamil, Malayalam and Kannada languages besides English
05. User friendly navigation and advisory services with support research evidence
06. After getting advisory service based on the issues, instant print out can be generated for further verification and follow up.
07. It is possible to add or delete content at any point and can be updated continuously with help of KVKs.
08. It can be run in any windows version of computer

09. Even computer illiterate can also use this expert system since it is purely image based
10. Written the programme using VB dot net.
11. Almost all issues including pest, diseases, nematode, nutrient deficiency, seed selection, water management, weed management, nutrient management, post harvest, marketing, institutions, schemes are addressed through different mode in our expert system.

Key features of DRWA Expert System

The expert system was designed and developed to serve the farming community, extension workers, scientists and other stakeholders. The home page of the expert system have three important component which are

1. Information System
2. Decision Support System
3. Diagnosing System (Crop Doctor)

01. Information System

Information system is web based static information wherein all the technological information and complementary information about the crop have been loaded in this component. The validated contents and images have organized based on the package of practices. Special feature of the information system is user-friendly

navigation with image based presentation. The static information system is highly useful for the extension officials, scientists, policy makers and administers as ready reference material and bibliography of concerned crop. This contents can be updated dynamically then and there based on the advancement of the technologies.

02. Decision Support System (DSS):

Decision support systems are a class of computer-based information systems including knowledge based systems that support decision making activities. DSS is a computerized system for making decisions. A decision is a choice between alternatives based on estimates of the values of those alternatives. Supporting a decision means helping farmers working alone or in a group gathers intelligence, generate alternatives and make choices.

Accordingly, the DSS has been contemplated and designed to get best possible options and decision by farmer themselves for the day today agriculture operation. Drop down formula or multiple combo boxes have been created using simple dot net programme. Each boxes in the DSS are correlated with each one for retrieving the best possible decision support for crop cultivation.

The Decision Support System is consisting of details about Season, Variety, Soil, Water, Land preparation,

Nursery Management, Cultivation, Irrigation, Nutrient Management, Farm Implements, Post Harvest Technology, Marketing, Institutions and Schemes and FAQ's.

For example it helps the farmers to

- Choose the suitable variety for the particular location based on the soil, climate and water using DSS.
- DSS will give solution whether the particular farm is suitable for crop cultivation or whether soil / water / existing climate is suitable for establishing concerned crop cultivation. Based on the decision given in the DSS, farmers can take further decision or consultation with scientists for further action.
- DSS will also give decision support for better nutrient management. It will also calculate automatically the nutrient requirement with cost based on the type of soil and water.
- It also helps the farmer to adopt the correct crop production technology, how to avail the grants and subsidies from various institution.
- Guides the farmers to sell their commodities to the market through proper channels and so on.

DSS will also help farmers in increasing their productivity by raising yield per hectare, thus leading to their

economic growth. It will keep track of farmer's all type of information related to crops.

Key features of the DSS:

01. User friendly navigation
02. Image and Video based information, so even illiterate can use this system and get image based information.
03. Instant decision support for key information crop production technologies, which can facilitate the farmers to take quick decision in crop cultivation activities.
04. Automatic calculation of nutrient requirement for different stage of crops based on the soil, water and other parameters.
05. Scientific information about the crop, botanical characteristics, varieties characteristics with images are added features in the DSS

03. Crop Doctor:

Crop doctor is a vital component in the expert system which act as artificial intelligence. It is picture and image based 'if and then rule' based programme which has written using dot net programme. It deals with diagnosing the pest, disease and nutritional disorders affecting the selected crops. The first obvious sign is given as thumbnail images in the Key Visual

Symptoms (Primary Symptom) with multiple stages (Secondary Symptoms). Primary and secondary symptoms have been documented in stage by stage and loaded in the expert system shell by using if and then rule based programme. The concerned experts have validated all the symptoms which loaded in the expert system shell.

How to use:

- The first page of the crop doctor will display the key visual affected symptoms of pest or diseases or nutrient deficiency or nematode in the form thumbnail icon.
- The farmers or user can look and feel the key visual affected symptoms as expert system is picture based. The user can compare images with their affected field symptoms and they can choose three images which similar to their field symptom.
- The system will allow to choose only three picture and ask “Is this your symptoms”. If click yes, system will show next frame which will be secondary symptoms of primary symptoms.
- It may be more than two icons. Again farmers can click the relevant symptoms which is similar to their field symptoms and can choose up to three images in each icons.
- Again the system will ask “is this your symptoms”. If click no, again the system frame will go back and show the other symptoms to be selected. If click yes, the system will show all images which were captured by the users and gets reconfirmation. Now the user can click the diagnose button if they are satisfied with the clicked symptoms.
- The system will show the diagnose report, as it may be due to single pest or may be due to pest and disease or may be due combination of pest, disease and nutrient disorders based on the images clicked by the users. The illiterate farmers can also use this symptom since it is purely image and video based programme.
- Then the system will also show the nature of pest / disease / nutrient disorders symptoms, identification of pest / disease / nutrient disorders
- Farmers by selecting the symptoms, they will make a conclusion on the causes for the damage, identification of pest or pathogens, nutritional disorders and control measures to be taken in the field.
- Images / Video based control measures, image based identification of symptoms or

damages will be displayed for the benefit of the users.

Key features of Crop Doctor

- Crop doctor is purely if and then image based programme, so it can be used by all the stakeholders. Even illiterate users can sit in front of the system and use the crop doctor for diagnosing the field related problems and get the suitable solution for managing the field problems.
- Single item diagnosis or two items diagnosis or multiple combination of diagnosis of pests / diseases / nematode / nutrition disorders are possible in the crop doctor
- It is available in English, Tamil, Malayalam and Kannda languages and can be scaled up to all the regional languages of India.
- Voice based image or video integration is possible

- Information with images on nature of damage and identification of symptoms are available in the crop doctor.
- Management practices namely cultural, chemical, biological, mechanical, physical methods are also available in the control measure components.
- It can be updatable then and there, if it needs to be refined any technologies in the crop doctor.
- Most of the then developed expert system across the world were mostly text based which could be use only extension officials, scientists and rarely by innovative farmers.

Perceived Utility of expert system for women in agriculture

An opinion survey about the usefulness of expert system in agriculture was carried out in the month

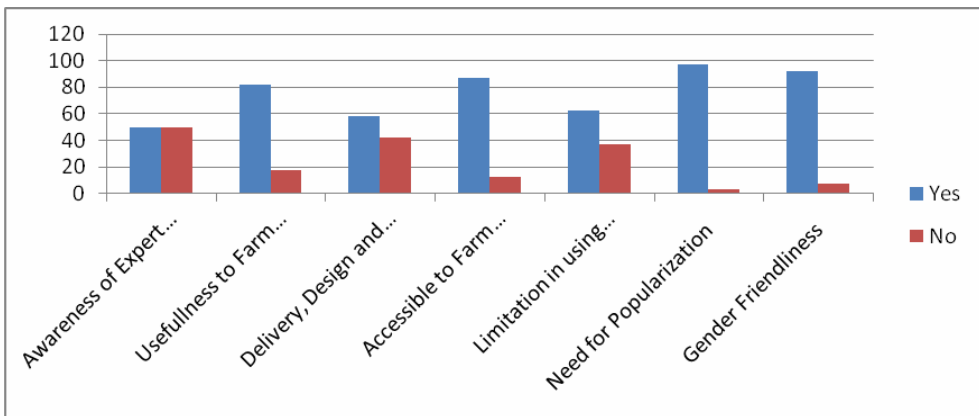


Fig 3. Perceived utility of expert system (%)

of March 2012. The study was done among researchers and academician and from different ICAR institute and agricultural university in Bhubaneswar. The sample size was 30, out of which half of the respondents were female. The study focused on various issues related to the usage of expert system in agriculture. A structured questionnaire consisting of 40 questions was circulated to respondents. The major areas focused during the survey were awareness of expert system, usefulness to farmers, content design and process, accessibility to farmwomen, limitations in using expert system, strategies for popularization and gender friendliness.

The study revealed that out of 30 respondents, 18 percent did not aware of expert system. Many of them were exposed to its usefulness and 78 per cent felt that it can improve technical literacy of farm women if made user friendly by using local languages and images. About 85 per cent of respondent felt that an expert system can be used anywhere anytime for diagnosis of crop and animal problems. From this study, it is concluded that sensitizing the people on expert system will make transfer of technology to farm women easier.

Strategies for efficient utilization of expert system for women in agriculture

- Inculcate confidence in women and security in the use of expert systems
- Promote productive use of the expert system through capacity building
- ICT capacity building in extension organizations to enhance their capability to transfer knowledge to their target groups
- Encourage young girls who can promote positive self-development and computer skills and effective use of expert system in rural areas
- Encourage development of locally relevant content in local languages by and for women, design content to overcome barriers of literacy
- Include gender perspective and coordinate gender activities in all domains of technology transfer and rural development
- Compile best practices of women in ICT and education, and promote their dissemination including through libraries, databases, fora and websites
- Promote awareness of expert system to rural women through broadcasting media and demonstrate the benefits of ICT in exhibitions and other fora
- Provide affordable ICT assets, resources, and bandwidth to rural areas through community access points such as tele-centers

Conclusion

Knowledge networking through ICT has created high expectations in terms of opportunities for women. However, it needs to be realized that information and communication technologies by itself cannot be an answer to all problems standing in the way of farm women empowerment but it does bring new information resources and can open new communication channels for the marginalized communities such as rural women. The eight expert systems developed under

the network project offers new approaches for bridging the information gaps through interaction and dialogue, building new alliances, inter-personal networks, and cross-sectoral links between organizations. Hence, the expert systems has opened a window for lifelong learning for women at their localities. Learning and training continues throughout women's lives as new skills and competencies gain value, and this ensures that avenues for women to expand their roles from household economy to a wider market economy remain forever open.

Socio-Demographic Status of Women SHG Members in Manipur, India

Bhushan Laikangbam¹, N.K. Patra², Sanjoy Das³, A.K Sahu⁴

Rural women constitute an important work force in agriculture and allied sectors and are vital to the well being of farm households in the country. Especially in North Eastern States, women contribute significantly in agriculture and small business in addition to their household works. The women in rural areas are engaged in enormous number of activities like farming, livestock development and production, collecting forest produce, house hold works and so on. Besides, they used to collect firewood, fodder and water both for meeting family's needs and for livestock purposes in addition to the regular household works. A considerable time is spent on food preparation, feeding the family members and its welfare. Women form the backbone of agricultural operations and majority of agricultural labourers in India are women. Women do 70 - 80 percent of the field operations. Most post harvest and

processing tasks are done by women only. About 80 percent of total persons engaged in dairy production in our country are women. National Sample Survey Organisation (NSSO) in their 43rd Report revealed that there is a wide variety of work which rural women can combine with household work. Majority of rural women are illiterates and are below poverty line having poor economic status. Besides, in comparison to urban women, rural women have limited access to all kinds of resources. Hence, there is a need to change their capacity to work, increase knowledge, enrich their skills and improve their economic status.

Self Help Groups are playing vital and significant role towards empowering women in almost all the fields. Mostly, women are mobilized into groups for undertaking mutually beneficial social and economic activities. SHGs can establish relationship between the

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formal institutions and the poor for providing information on credit and other facilities.

Manipur, a small state of North Eastern India with total population of 27.21 lakhs (as per provisional figure of 2011 Census), where 69 % women are rural, is also working in this line for formation SHGs for socio-economic upliftment of rural population specially the rural women. Although concept of micro finance through SHGs came late in Manipur, a number of NGOs and other Govt. Organizations are working continuously in this line.

Objective

Keeping in view all, the present study was designed to study systematically the socio-demographic status of women SHG members in Imphal West district of Manipur.

Methodology

This manuscript was developed based on master's level research work carried out at Nagaland University, Nagaland, India. Study was pertaining to Imphal West District, a district of North Eastern States Manipur, India. In this paper, it was tried to focus on socio-demographic status of women SHG members including their income, experience and knowledge after association with SHGs in Imphal West district of Manipur State.

For conducting of this research study, ten (10) women SHGs were selected randomly from the District. As women constitute a vast majority of users of micro credit and savings in the country through SHGs specially in North Eastern Region of India, study was confined only to the women SHGs. Complete enumeration method was adopted for survey work and as such all members were surveyed pertaining to the above objectives by pre-structured schedules. There were altogether 133 members in all the selected SHGs ranging member strength from the lowest of 8 members to the highest of 17 members in one SHG. Data were collected during the year 2010-11 by the researcher. Collected data were tabulated, processed and analyzed to suit the objectives. To know the socio-demographic status of women SHG members, variables like age, educational qualification, family type, size of family, occupation, media exposure, social participation, material possession, land holding, type of house, number of training attended etc. were considered and income, experience in terms of number of years working as member and over all knowledge level of the women SHG members etc. were considered to know their economic status. Trail had been made here to do some simple analysis in order to interpret the results more meaningfully.

Results and Discussion :

Socio-demographic Characters

This is one of the vital aspects of women specially the women SHG members. Table 1 indicates the socio-demographic character of women SHG members in the district. It is evident from the table that most of the members (46.62 %) belonged to young aged group (upto 35 years), followed by 44.36 % in the middle aged group (35 to 50 years). Only 9.02 % members were in the old age group of above 50 years. It indicated that most of the women members are in young to middle age group. So far family

type is concerned almost half of the members either belonged to nuclear family type or belonged to joint family.

Table also indicates that almost 29 % members recorded as 'just literate' and this is the group where highest number of members were existed in the study area; followed by 24.06 % as 'upto primary standard' and 'above secondary' respectively and 23.30 % as 'upto secondary standard'. Almost 52.63 % members had family size of 5 -7 members, 24.06 % had family size of above 7 members, 23.3 % had family size of less than 5 members.

Table 1: Classification of respondents based on age, family type, educational qualification and size of family (N = 133)

Category	Number of member	Percentage
AGE		
a)	Young (up to 35 years)	62 46.62
b)	Middle age (35 to 50 years)	59 44.36
c) Old age	(> 50 years)	12 9.02
Total	133	100
FAMILY TYPE		
a)	Nuclear family	66 49.62
b)	Joint family	67 50.37
Total	133	100.0
EDUCATIONAL QUALIFICATION		
a)	Just literate	38 28.57
b)	Upto primary standard	32 24.06

c)	Upto secondary standard	31	23.30
d)	Above secondary	32	24.06
Total	133	100.0	

SIZE OF FAMILY

a)	Less than 5 members	31	23.30
b)	5 – 7 members	70	52.63
c)	More than 7 members	32	24.06
Total	133	100.0	

Occupation and Income level

Table 2 indicates that most of the members (51.87 %) had occupation of small scale industry followed by 25.56 % as business and 22.55 % as 'others'. The most interesting fact was that not a single member had occupation as agriculture since in Manipur agriculture was considered primarily as a profession of male only. Out of five different income levels considered for the study, the maximum number of members (39.84 %) had annual income level of Rs. 10000 –

Rs. 20000/, followed by 37.59 % within Rs. 20000 – Rs. 30000/. Almost 15 % members had annual income within the range of Rs. 30000 and above. A very few percentage of members (nearly 4 %) had income level below Rs. 5000/ and a similar percentage of members also had income level within Rs. 5000 – Rs. 10000. This can be concluded that more than 90 % members had income level in the range of medium to high category that is considered for the present study.

Table 2 : Classification of respondents based on occupation and income level (N = 133)

Category	Number of member	Percentage	
OCCUPATION			
a)	Agriculture	0	0.00
b)	Business	34	25.56
c)	Small Scale Industry	69	51.87
d)	Others	30	22.55
Total	133	100.0	

INCOME			
a)	Annual income below Rs. 50005	3.75	
b)	Annual income of Rs. 5000 – 10000	5	3.75
c)	Annual income of Rs. 10000 – 20000	53	39.84
d)	Annual income of Rs. 20000 - 30000	50	37.59
e)	Annual income above Rs. 30000	20	15.03
Total	133	100.00	

Media Exposure and Social Participation

Table 3 reveals that most of the members (67.66 %) had exposed to television, the most common media among the women members in the study area. The second most common media exposed by members was newspaper (18.79 %). Although radio is gradually extinct from the society, still 6.01 % of members were exposed by this media also. And 7.51 % of members had exposure of some other media. For successful and effective performance, SHG members must be mobilized in proper direction and as such study of their level of association with mobiliser is an important part of this study. Almost 48 % members responded as regular association with lady mobiliser and 30.07

% had responded as occasional association with lady mobiliser. A significant percentage i.e 22.55 % had reported as very often association with lady mobiliser.

Trial had been made here to study the level of social participation among the women members. It is evident from the table that 78.19 % members had reported as a member of one organization. On the other hand, 12.78 % reported that they were working as office bearer of any organization. And a few 9.02 % members were occupying as either president or any other distinct position in any organization. The significant is that there was no member in the SHGs without having membership of any organization.

Table 3 : Classification of respondents based on media exposure, association with lady mobilizer and social participation level (N = 133)

Category	Number of member	Percentage
MEDIA EXPOSURE		
a) Radio	8	6.01
b) Television	90	67.66
c) Newspaper	25	18.79
d) Others	10	7.51
Total	133	100.0
LEVEL OF ASSOCIATION WITH LADY MOBILIZER		
a)	Occasional	40 30.07
b)	Very often	30 22.55
c)	Regular	63 47.36
Total	133	100.0
LEVEL OF SOCIAL PARTICIPATION		
a) Member with no membership of any organisation	0.00	0.00
b) Member of one organization	104	78.19
c) Office bearer of any organisation	17	12.78
d) President or distinct position in any organisation	12	9.02
Total	133	100.00

Indicators of economic status of respondent members

Some important indicators of economic status of respondent members is represented by Table 4. Almost 58 % members had television set, 12.78 % had radio and 29.32 % had two wheelers. So far land holding is concerned, maximum number of members (43.60 %) belonged to category of 1 – 2 ha, followed by 40.60 % in the category of below 1 ha. On the

other hand, 8.27 % members had land holding of 3 ha and above and 7.51 % had in the category of 2 – 3 ha. This can concluded that more than 80 % members belonged to marginal to small farmers' category. Type of house is also an important indicator of economic status of a family. It is also observed that 42.10 % and 41.30 % members had kucca house and semi pucca house respectively against 16.54 % as pucca house in the district.

Table 4 : Indicators of economic Status of respondent members

Category	Number of members	Percentage
ASSET		
a) Radio	17	12.78
b) Television	77	57.81
c) Two wheeler	39	29.32
Total	133	100.00
LAND HOLDING (ha)		
a) Below 1 ha	54	40.60
b) 1 -2 ha	58	43.60
c) 2 -3 ha	10	7.51
d) 3 ha and above	11	8.27
Total	133	100.00
TYPE OF HOUSE		
a) Kucca house	56	42.10
b) Semi pucca house	55	41.30
c) Pucca house	22	16.54
Total	133	100.0

Training Exposure

Training is one of the most important extension tools used extensively for capacity building and skill up-gradation. Table 5 indicates the training exposure of SHG members in the

district. Almost 26 % members reported that they had attended training only for one time against 20.30 % for two trainings and 9.77 % for more than two trainings. On the other hand, 44.36 % members did not attend any training in the study area.

Table 5 : Number of training participated by SHG members

Number of training attended	Number of members	Percentage
No training	59	44.36
One training	34	25.56
Two trainings	27	20.30
More than two trainings	13	9.77

Table 6 states the experience in number of years as a member and ultimate level of knowledge of the members. Almost 53 % members had experience of more than 2 years, 33.83 % had 2 years and the rest 13.53 % had experience of 1 year only. It can be concluded that more than 50% members

had good experience of working as member in SHG. So far knowledge level is concerned; it was evident from the table that 53.38 % members had high level of knowledge after working as SHG member, followed by 35.33 % as medium level of knowledge and 11.27 % as low level of knowledge.

Table 6 : Experience in terms of number of years as a member and knowledge level of respondent members

Category	Number of members	Percentage
EXPERIENCE		
a) One year	18	13.53
b) Two years	45	33.83
c) More than 2 years	70	52.63
Total		
KNOWLEDGE LEVEL		
a) Low	15	11.27
b) Medium	47	35.33
c) High	71	53.38

Conclusion :

The data analysis presented in this paper portrays the socio-demographic characters of women SHG members with indication of some economic criteria. As micro finance in the form of SHG is an important aspect for sustaining growth and expanding opportunities for rural poor specially the women in present days, the above issues

certainly give a better idea for policy makers, planners to develop their plans and programmes. In a State like Manipur, where 69% women are staying in rural areas can play a big role in up-lifting rural economy through SHGs. Of course, detail and in-depth study in this direction is required in order to speed up the developmental activities in the State.

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Perception of the Farmers towards contract Farming on Sugarcane Cultivation

S. Paramaguru¹, Dr.(Mrs.) A. Saha² and Prof. R.K. Raj³

Contract farming is an agreement between farmers and processing as well as marketing firms for the production and supply of agricultural products under forward agreements at predetermined price. Well managed contract farming is an effective way to coordinate and promote production and marketing in agriculture. It is an approach that can contribute to both increase in income for farmers and higher profitability for sponsors. When efficiently organized and managed, contract farming reduces risks and uncertainty for both parties as compared to buying and selling of the product in the open market.

However; the farmers many a times faced the potential problems like increased risk, unsuitable technology and crop incompatibility, monopoly, indebtedness etc. for which the farmers very often develop conservative attitude to involve in the system.

Objective

Basing on these hypotheses, a study has been designed to assess the perception of the farmers towards contract farming and specially on sugarcane cultivation.

Masakure and Henson (2005) found four factors motivating contracting namely market assured market, knowledge acquisition, income benefits and increase in social status.

Kumar (2006) stressed that more farmers in India opted for contract farming in late due to positive attitude as a result of price protection on their crops.

Methodology

Sakti Sugar, Dhenkanal and Nayagarh sugar complex, Nayagarh have contract farming system under sugarcane mostly in Dhenkanal, Cuttack and Nayagarh, Khurda districts respectively. The study was undertaken in Daspalla and Nuagan blocks of Nayagarh district

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in Odisha during 2012. Three Gram Panchayats namely Dihagaon, Madhyakhanda and Similisahi of Daspalla block and Sikrida, Korada and Nuagaon of Nuagaon blocks were selected as the respondents making total sample size of 60. Random sampling technique was followed to select the district, blocks gram panchayats and respondents.

Perception of the contracted farmers towards planning, input supply, credit and finance, technical guidance, infrastructure support and harvesting were chosen as the variables for the

study. Data collected on scale point of agree, partially agree and disagree over the statements under each variables had been put under appropriate statistical analysis.

Result and discussion

Proper planning makes effective implementation of any programme. Perception of the contracted farmers towards planning made by the sponsor reveal that (Table-1) majority of the respondents agreed for all aspects of the planning as

Table-1 : Perception towards planning made by the sponsor

Sl. No.	Perception	Agree (%)	Partially agree (%)	Disagree (%)	Mean score	Gap (%)
1.	Participatory decision making	55.00	20.00	25.00	2.30	23.33
2.	Cluster approach	58.33	28.33	13.34	2.45	18.33
3.	Optimum utilization of resources	66.67	8.33	25.00	2.42	18.33
4.	Participatory selection of land	63.34	18.33	18.33	2.45	18.33
5.	Beneficiary selection with common agreement	61.67	15.00	23.33	2.38	20.67
6.	Detail understanding of the objective	58.33	21.67	20.00	2.38	20.67

mentioned in the table. Understanding of the objectives facilitates involvement of the farmers which further facilitate participatory decision making as well as selection of land with cluster approach. But the percentage gap over the mean score indicate the deficiencies and suggested for further improvement on

planning facilitating for sustainability of the contract farming. Timely supply and use of inputs are the pre-conditions for increasing production and productivity. Mixed responses were obtained towards supply of inputs as revealed from Table-2, majority of the respondents agreed for timely

Table -2 : Perception towards supply of inputs

Sl. No.	Perception	Agree (%)	Partially agree (%)	Disagree (%)	Mean score	Gap (%)
1.	Prearrangement of inputs	36.67	46.67	16.66	2.20	26.67
2.	Timely supply of inputs	53.33	25.00	21.67	2.32	22.67
3.	Supply of quality inputs	61.67	21.67	16.66	2.45	18.33
4.	Developing competency in use of inputs	51.67	21.67	26.66	2.25	25.00
5.	Arranging additional inputs	36.67	30.00	33.33	2.03	32.33
6.	Transparency in supply of inputs	55.00	26.67	18.33	2.37	21.00

supply of quality inputs, developing competency in use of inputs and transparency in supply of inputs. Considering the percentage of gap observed, the findings suggested for further improvements in supply of inputs.

Sugarcane is a cash crop and requires more investment. The farmers require additional money for cultivation in a sizeable area under contract farming. The

sponsor has to link the growers with credit institutions for financial support. As reveal from Table-3, majority of the respondents agreed that the sugarcane factory had taken attempt for arranging credit towards additional inputs and motivating for credit towards Infrastructure facilities like irrigation, purchasing implements along with arranging subsidy facilities which are essential for the resource poor farmers

Table 3 : Perception towards credit and finance

Sl. No.	Perception	Agree (%)	Partially agree (%)	Disagree (%)	Mean score	Gap (%)
1.	Providing inputs on credit	40.00	26.67	33.33	2.07	31.00
2.	Arranging credit for additional inputs	51.67	18.33	30.00	2.22	28.00
3.	Liaisoning for subsidy facilities	35.00	31.67	33.33	2.02	32.67
4.	Arranging credit for infrastructure	43.33	26.67	30.00	2.13	29.00
5.	Motivating for crop insurance	55.00	15.00	30.00	2.25	25.00

opting for high value sugarcane cultivation. Mixed responses revealed that adequate support were not extended by the sponsor. Moreover, considerable

gap percentage on all aspects concludes that the farmers were not having good perception towards support on credit and finance.

Since, sugarcane is labour intensive crop, farm mechanisation is necessary for reducing cost. Irrigation facilities are also required since it is a long duration crop. The sponsor has to provide all these infrastructure support for timely operation and good crop stand. Mixed responses were obtained on perception towards credit and finance (Table-4)

except providing machinery/implement on custom hiring where 76.67% of the respondents agreed. The mean score value also indicated considerable percentage gap towards infrastructure support. It is therefore suggested that the sugarcane industry has to consider all these aspects and

Table-4. : Perception towards infrastructure support

Sl. No.	Perception	Agree (%)	Partially agree (%)	Disagree (%)	Mean score	Gap (%)
1.	Motivating for mechanisation	48.33	21.67	30.00	2.18	27.33
2.	Providing implements / machinery on custom hiring	76.67	21.67	1.66	2.75	8.33
3.	Developing irrigation facilities	40.00	16.67	43.33	1.97	34.33
4.	Skill competency in use of implements	41.67	23.33	35.00	2.07	31.00
5.	Guidance for risk Management	48.33	25.00	26.67	2.22	26.00
6.	Arranging credit for irrigation and farm implements	36.67	33.33	30.00	2.07	31.00

provide feasible infrastructure support for reducing cost of cultivation as well as better crop management.

Knowledge and skill competency is essentially required for increasing quality production and productivity of sugarcane crop. Data in table-5 reveal that majority of the respondents were

agreed for developing knowledge competency (73.33%), skill competency in use of technology (51.67%), continuous flow of information (68.67%) and proper guidance (58.33%) Though; exposure visit and sharing information with farmers are equally importance, but the respondents were not

Table 5 : Perception towards technological support

Sl. No.	Perception	Agree (%)	Partially agree (%)	Disagree (%)	Mean score	Gap (%)
1.	Developing knowledge competency	73.33	10.00	16.67	2.57	14.33
2.	Skill competency in use of technology	51.67	18.33	30.00	2.22	26.00
3.	Exposure visit for experience	41.67	15.00	43.33	1.98	34.00
4.	Continuous flow of information	61.67	16.67	21.66	2.41	19.67
5.	Proper guidance	58.33	21.67	20.00	2.38	20.67
6.	Sharing information with farmers	38.33	20.00	41.67	1.97	34.33

perceived favourably. But, the mean score value indicating considerable percentage of gaps, it is suggested for further improvement on technological support to develop competency of the contracted growers on management of sugarcane crop.

Timely harvest, immediate lifting and crushing adds to the quality sugar production. Perception of the contracted farmers towards support on harvesting

and post harvesting operations reveal (Table 6) that majority of the respondents had good perception for timely harvest, common decision of the farmers with sugarcane factory officials about harvesting and attention for quality maintenance. But the respondents had reacted for immediate payment. The mean score value and percentage of gap suggested for further improvement on immediate lifting and

Table 6 : Perception towards support on harvesting and post harvesting

Sl. No.	Perception	Agree (%)	Partially agree (%)	Disagree (%)	Mean score	Gap (%)
1.	Motivating for timely harvest	83.33	10.00	6.67	2.77	7.67
2.	Common decision on harvesting	80.00	8.33	11.67	2.68	10.67
3.	Immediate lifting	46.67	23.33	30.00	2.17	27.67
4.	Attention for quality	56.67	25.00	18.33	2.38	20.67
5.	Immediate measurement	43.33	21.67	35.00	2.08	30.67
6.	Immediate payment	28.33	30.300	41.67	1.87	37.67

measurement to minimize weight loss, maintaining transparency in measurement with immediate payment.

Comparative analysis were also made on the perception of various aspects of contract farming studied. It is observed from Table-7 that the

respondents perceived in the same manner for all aspects of contract farming approach on sugarcane crops although perception towards planning made by the sponsor was better than others. It indicates that deficiencies are there in all aspects of the contract farming system which needs further

refinement and improvement. The findings of the study leads to conclude that the respondents had better perception towards cluster approach, participatory selection of land, better use of resources, supply of quality inputs, providing implements / machinery on custom hiring,

Table 7 : Comparative analysis on the perception towards contract farming

Sl.No.	Perception	Mean score	Gap
1.	Planning	2.44	18.67
2.	Supply of inputs	2.27	24.33
3.	Credit & Finance	2.14	28.67
4.	Infrastructure support	2.21	26.33
5.	Technological support	2.25	25.00
6.	Harvesting and post harvesting	2.29	23.67

developing knowledge competency, continuous flow of information, motivating for timely harvest and common decision on date of harvesting of the crop. At the same time, the respondents had poor perception towards arranging additional inputs, providing inputs on credit, liasoning for subsidy facilities, arranging credit for purchase of implements and developing irrigation facilities, skill competency in

use of implements, exposure visit to gain experience, sharing information with farmers, immediate measurement after harvest and payment. The study therefore suggest that the sponsor and policy makers should take appropriate action for all these deficiencies so that contract farming on sugarcane cultivation will definitely a boon to the farmers as well as sponsor.

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Contract Farming on Sugarcane Cultivation and Knowledge of the Growers - An Overview

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Contract farming is generally defined as a farming under an agreement between farmers and a sponsor for the production and supply of agricultural production under forward agreement offer at pre-determined price. The farmers have to produce and supply the specified quantities and in quality standard determined by the purchaser. Sugarcane cultivation is gaining momentum after establishment of sugar factories both at cooperative and private sector in Cuttack, Dhenkanal, Nayagarh, Ganjam, Bolangir and Bargarh districts of Odisha. Scientific knowledge on sugarcane cultivation are very much essential not only for increasing productivity but also quality productions. Farmers are increasingly interested to grow sugarcane cultivation under contract farming system due to remunerative price, credit support, input supply and above all technical guidance arranged by the sugar factory.

Unless, the farmers acquired knowledge and skill competency in sugarcane cultivation, they cannot produce the desired quality and quantity as per the agreement for which the present study has been designed to assess the knowledge of the farmers on sugarcane cultivation under contract farming system.

Review of Literature

D' Silva et. al. (2009) stated that the income of the farmers generated in a more efficient manner under contract farming by utilizing world class agrotechnology and driven by increases in productivity.

Asenso – Okyere et. al. (2008) observed that knowledge plays an important role in agricultural development and increases the possibility of having more perception towards contract farming.

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Objective

To study the knowledge level of sugarcane growers.

Methodology

The study was undertaken in Dhenkanal Sadar and Hindol blocks of Dhenkanal district of Odisha during 2012. The list of sugarcane growers under contract farming in these two blocks were collected from Sakti Sugar, Dhenkanal who involved farmers under contract farming. From the list, 90 sugarcane growers 45 from each blocks were randomly selected. Information were collected personally through a semi-

structured schedule pre-tested earlier. Knowledge about soil, variety, time and method planting, selection and treatment of seed cane, fertilizer management practices were selected as the variables for the study. Data collected on scale point have been analysed with percentage and mean score.

Results and Discussion

Well drained fertile soils particularly silt clay are most suitable for sugarcane crop. Sugarcane can be successfully cultivated in loamy and clay loam soils. As observed from Table-1, majority of 61.11% of the respondents opined that sandy loam

Table – 1 : Knowledge about suitable soil

Sl. No.	Soil	Most suitable(%)	Suitable(%)	Some what suitable (%)	Not suitable(%)
1.	Sandy	0.00	0.00	0.00	100.00
2.	Sandy loam	61.11	38.89	0.00	0.00
3.	Sandy clay	0.00	10.00	90.00	0.00
4.	Loamy	0.00	6.67	0.00	93.33
5.	Clay loam	2.22	21.11	76.67	0.00
6.	Silt clay	0.00	20.00	34.44	45.56

soil are most suitable followed by 90.00% some what agreed. The farmers in the study area are growing sugarcane in river side for which they stated that sandy loam soils are most suitable. Though sugarcane can be cultivated in sandy loam soil but silt clay soils are most suitable. It is therefore

apprehended that the respondents had not much knowledge about suitable soils for sugarcane cultivation.

Good variety is one of the determinant factory for enhancing yield. Lot of high yielding varieties have been developed. Sugarcane Research Station,

Ouat has released varieties suitable to Odisha condition. Sugarcane industry, Dhenkanal has also supplied good varieties and apprised farmers about

good varieties. The respondents were asked to mention three good varieties of sugarcane. It is observed from Table-2 that majority of 80.00 % of the respondents

Table – 2 : Knowledge about variety

Sl. No.	Knowledge	Frequency	Percentage
1.	Fully known	72	80.00
2.	Partially known	18	20.00
3.	Not known	0	0.00

named three good varieties and rest 20.00% could able to reply the name of one or two varieties recommended for Odisha. Hence, sugarcane growers under contract farming had better knowledge about high yielding varieties.

Optimum time of planting regulates growth of the plant. The best planting time is January to February. It can be sown in October. The findings reveal that (Table-3) sugarcane growers under contract farming had good knowledge about time of sowing as all the respondents

Table – 3 : Knowledge about time of planting

Sl. No.	Planting time	Most suitable(%)	Suitable (%)	Some what suitable(%)	Not suitable(%)
1.	January - February	100.00	0.00	0.00	0.00
2.	July	10.00	15.55	74.45	0.00
3.	October	35.55	54.45	10.00	0.00

opined that January-February is the most suitable time for planting sugarcane. Since farmers are growing sugarcane since long, they have accumulated experience in optimum time of planting.

are advocating pit method which gives better yield than other methods. Knowledge on planting method reveal that (Table-4) majority of 92.11% of the respondents had stated that furrow method is most

Sugarcane planted usually in furrow or trench method. Now, scientists

Table – 4 : Knowledge about planting method

Sl. No.	Planting method	Most suitable(%)	Suitable (%)	Some what suitable(%)	Not suitable (%)
1.	Flat method	0.00	0.00	92.22	7.78
2.	Furrow method	92.11	8.88	0.00	0.00
3.	Trench method	24.44	54.44	21.12	0.00
4.	Pit method	0.00	14.44	25.56	60.00

suitable method of planting. Similarly, 54.44% had stated for trench method as suitable. No doubt, furrow method of planting is recommended and farmers are practicing. But, research results reveal that pit method of planting is better than furrow method. Ignorance of 60.00% of the respondents indicate that the farmers were not appraised about pit method of planting. It is therefore suggested that

the farmers should be motivated for pit method of planting and compare the results with their method of planting so that they can adopt the method.

Top portion of the cane usually used as seed cane for planting. The cane selected for seed purpose should be erect, healthy and not more than 12 months old. It has been observed from Table-5 that the respondents had good knowledge on selection of seed

Table – 5 : Knowledge on selection of seed cane

Sl. No.	Seed cane	Strongly agree(%)	Agree(%)	Disagree (%)
1.	Top portion has high viability bud	94.44	5.56	0.00
2.	Top half portion secure higher germination	100.00	0.00	0.00
3.	Bottom portion takes long time for germination	74.44	25.55	0.00
4.	Erect and healthy cane good for planting	100.00	0.00	0.00
5.	Selected cane within 12 months old	100.00	0.00	0.00
6.	Ratoon crop not suitable for seed cane	100.00	0.00	0.00

cane where all the respondents stated that top half portion of the cane secure higher germination, erect and healthy cane good for planting, selected cane to

be within 12 months old and ratoon crop not suitable for seed purpose. Similarly, majority respondents had opined that top portion of the cane has high viability bud

(94.44%) and bottom portion takes long time for germination (74.44%). It is therefore concluded that the sugarcane growers had good knowledge about selection of seed cane for planting.

Since seed cost is high, new method has been called bud chip method developed where only the bud portion from the cane detached, raised in polythene for germination and later on planted in the main field. The sugarcane growers are unknown about the bud chip method. It is therefore suggested that the officials of sugarcane factory may introduce the method with close guidance and supervision and made

participatory evaluation so that the farmers can minimize seed cost if the method found superior.

After selection of cane for planting, it has to be cut into small pieces, treated with fungicide and planted in the main field for disease control. Analysis of data reveals (Table-6) that sugarcane growers under contract farming had good knowledge about seed cane treatment where all the respondents strongly agreed for cutting 3 budded sets of 1.0 to 1.5 ft length. Majority of 67.77% also strongly agreed for removal of dry leaves by hand and 72.22% for

Table – 6 : Knowledge about seed cane treatment

Sl. No.	Seed cane	Strongly agree(%)	Agree(%)	Disagree(%)
1.	Removal of dry leaves by hand	67.78	32.33	0.00
2.	Cutting to 3 budded sets	100.00	0.00	0.00
3.	Cane length to be 1-1.15 ft.	100.00	0.00	0.00
4.	Treated with agallol fungicide	72.22	27.78	0.00
5.	Drying under shade after treatment	30.00	70.00	0.00

seed treatment with agallol fungicide. But drying under shed after treatment is essential and suggested for further motivation as 70.00% of the respondents only agreed. However; the results indicated for better knowledge on seed cane treatment and suggested for further motivation as towards treatment with fungicide, drying under shed after treatment as well as removal of dry leaves only by hand.

Sugarcane requires more nutrients. The recommendation is 250 Kg Nitrogen, 100 Kg P₂O₅, 60 Kg K₂O and 10 tonnes F.Y.M. It has been observed during data collection that the farmers are applying DAP, MOP and Urea. The quantity applied as 250 Kg Urea, 50 Kg DAP and 50 Kg MOP per acre alongwith one cartload of FYM. The dose have been calculated with recommendation and results presented in Table-7. It is

Table – 7 : Knowledge about fertilizers and manure

Sl. No.	Fertiliser	More than recommended (%)	Recommended (%)	Less than recommended (%)	Not apply(%)
1.	Nitrogen	100.00	0.00	0.00	0.00
2.	Phosphorous	0.00	0.00	0.00	100.00
3.	Potash	100.00	0.00	0.00	0.00
4.	FYM	0.00	0.00	67.78	32.23

observed that the respondents are using 625 Kg Urea, 125 Kg DAP and 125 Kg MOP. It indicated that the respondents were applying more nitrogen, Potash and less phosphorous. Similarly, 67.78% of the respondents were applying FYM below recommendation and rest 32.22% not applying at all. It is therefore concluded that the sugarcane growers had poor knowledge about application of fertilizer and manures for which the

sponsors have to sufficiently educate them in use of recommended fertilizer and manures.

Early and top shoot borer, pyrilla, termites and scale insects are the important pests attacking sugarcane. The analysis of data reveal that (Table-8) the respondents had very poor knowledge about the pests attacking sugarcane. Sugarcane pyrilla and scale

Table - 8 : Knowledge about important pests of sugarcane

Sl. No.	Pest	Very serious (%)	Serious (%)	Not serious (%)	No Idea (%)
1.	Early shoot borer	14.44	51.11	34.44	0.00
2.	Top shoot borer	0.00	32.22	67.77	0.00
3.	Pyrilla	0.00	18.88	25.56	55.56
4.	Termites	10.00	37.77	52.22	0.00
5.	Scale insects	0.00	0.00	0.00	100.00
6.	Internode borer	0.00	40.00	60.00	0.00

insects though important pests, but majority of the respondents had no idea. Similarly, 67.77% of the respondents stating top shoot borer not serious,

52.22% about termite attack also indicate low knowledge. Only 51.11% of the respondents stated seriousness of early shoot borer attack. The data in the

table as a whole reveal that sugarcane growers under contract farming had poor knowledge on pest attack.

Similarly, red rot, wilt, grassy stunt, ratoon stunting etc. are the important

diseases of sugarcane. Information collected on knowledge about diseases of sugarcane reveal that (Table-9) the respondents had also very poor knowledge about disease attack.

Table – 9 : Knowledge about diseases of sugarcane

Sl. No.	Disease	Very serious (%)	Serious(%)	Not serious (%)	No Idea (%)
1.	Red rot	25.56	74.44	0.00	0.00
2.	Wilt	4.44	36.67	58.89	0.00
3.	Grassy stunt	0.00	0.00	28.89	71.11
4.	Ratoon stunting	0.00	0.00	67.78	32.22
5.	Yellow leaf spot	0.00	78.89	21.11	0.00

Red rot though very common serious disease of sugarcane, only 25.56% stated very serious. Similarly, 58.89% of the respondents stated that wilt disease is not serious. Grassy stunt though important disease, 71.11% of the respondents are quite ignorant. It could be apprehended that the sugarcane growers under contract farming had not

much knowledge about diseases of sugarcane crop.

Knowledge about other management practices indicate (Table-10) that the sugarcane growers under contract farming systems had good knowledge on important management practices as majority of the respondents opined the most essentialities of all

Table – 10 : Knowledge about management practices

Sl. No.	Practice	Most essential (%)	Essential (%)	Least essential(%)	Not required (%)
1.	Top dressing after 80-90 days of planting	92.22	7.78	0.00	0.00
2.	Irrigating 8-10 times	76.67	23.33	0.00	0.00
3.	Apply herbicides after 25-30 days of planting	21.11	72.22	6.67	0.00
4.	Earthing up after final top dressing	95.55	4.45	0.00	0.00
5.	Tying at 2 mtrs height	78.89	21.11	0.00	0.00
6.	Withering of lower leaves indicate crop maturity	15.56	58.89	25.55	0.00

the practices except herbicide application after 25-30 days of planting and withering of lower leaves indicating maturity where majority of the respondents stated essentialities. Since herbicide application and timely harvest are equally essential, the sugarcane growers need to be sufficiently educated for its adoption.

Further attempt has been made to assess the adoption behaviour of the contract farmers on sugarcane cultivation. As revealed from Table–11, majority of the respondents were regularly adopting good variety, proper planting, maintaining optimum

Table – 11 : Adoption of practices on sugarcane cultivation

Sl. No.	Adoption	Regularly (%)	Occasionally (%)	Never (%)	Mean score	Gap (%)
1.	Use of implements	14.44	51.12	34.44	1.80	40.00
2.	Good variety	100.00	0.00	0.00	3.00	0.00
3.	Seed cane treatment	17.78	76.67	5.55	2.12	29.33
4.	Proper planting	92.22	7.78	0.00	2.92	2.67
5.	Optimum plant population	86.67	13.33	0.00	2.87	4.33
6.	Recommended fertilizers and manure	20.00	56.67	23.33	1.97	34.33
7.	Herbicide application	12.22	75.56	12.22	2.00	33.33
8.	Earthing up	100.00	0.00	0.00	3.00	0.00
9.	Plant protection measures	92.22	7.78	0.00	2.92	2.67
10.	Water management	92.22	7.78	0.00	2.92	2.67
11.	Tying	84.44	15.56	0.00	2.84	5.53
12.	Proper time of harvest	18.89	81.11	0.00	2.19	27.00
13.	Post harvest management	36.67	63.33	0.00	2.37	21.00

population, water management, earthing up and tying. Since, the sugarcane growers had poor knowledge on diseases and pest attack, majority of the respondents regularly adopting plant protection measures are doubtful. Adoption of implements, seed cane treatment, recommended fertilizers application, proper time of harvest, herbicide application, and post harvest management are very poor since the sugarcane growers occasionally adopting.

Conclusion

Analyzing the knowledge level and adoption behaviour, it is concluded that the sugarcane growers under contract farming have to be thoroughly educated and motivated with proper guidance to adopt recommended practices particularly on use of implements, seed cane treatment, recommended fertilizers and manure application, proper time of harvest, herbicide application and post harvest management practices ensuring more and quality production with better income.

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Gender Role in Crop Production - A Study in Bargarh District of Odisha

Suvashree Behera and Anup Dash

According to M S Swaminathan, the eminent agricultural Scientist, Some historians of Agriculture believe that it was women who first domesticated crop plants and there by initiated the art and science of farming. While man went out for hunting in search of food, women started gathering needs from the native flora and began activating those of interest from the point of view of food, fodder, fiber and fuel. This view was strengthened by the fact that women have been traditionally the seed selector. Even today this tradition has continued in many parts of the developing world. Women have played and continued to play a key role in the conservation of basic life support system such as land, water, flora and fauna. They have protected the health of the soil through organic recycling and promoted crop security through the maintenance of varietal diversity and genetic resistance. Therefore, without the total intellectual

and physical participation of women, it will not be possible to popularize alternative systems of land management to shifting cultivation, arrest gene and soil erosion and promote the care of the soil and the health of economic plans & farm animals. That women play a significant and crucial role in agricultural development and allied fields including in the main crop production, livestock production, horticulture, post-harvest operations, agro/ social forestry, fisheries etc. is a fact long taken for granted but also long ignored. The nature and extent of women's involvement in agriculture varies greatly from region to region. Even within a region, their involvement varies systems like castes, classes and stages in the family cycle. But, regardless of these variations there is hardly any activity in agricultural production, except ploughing in which women are not actively involved. In some of the farm activities like processing and

storage, women predominate so strongly than men workers and are numerically insignificant. (Agarwal 2003). Studies on women in agriculture conducted in India and other developing and underdeveloped countries all point to the conclusion that women contribute for more to agricultural production than as generally been acknowledged. Recognition of their crucial role in agriculture should not obscure the fact that farm women continue to be concerned with their primary functions as wives, mothers and home-makers. About 60 per cent of agricultural operations like sowing of seeds transportation of sapling, winnowing, storage of grain etc. are handled exclusively by women, while in other jobs they share the work with men. Apart from participation in actual cultivation, women participate in various forms of processing and marketing of agricultural produce. (Agarwal 2003) According to World Bank, Women are an integral part of farming households. They produce over half the food in many developing countries, bear most responsibility for household food security, and contribute to household well-being through their income-generating activities.

Objective

To study the extent of engagement and degree of participation of farmers and farm women in different farm activities.

Review of Literature

Gautam and Meenakshi (1992) indicated that in Himachal Pradesh in agriculture labour force, the proportion of women was more as compared to men and their contribution in agriculture or farm activities farm activities was also greater. Kumar and Bhalla (1990) stated that farm women plant, cultivate, weed, harvest and process almost all food crops and also play prominent role in national horticultural productivity. Farmers wives, in general spent on an average 13 to 15 hours per day. Khan and Harode (1991) in a study conducted in three adjacent villages of Parbhani district, revealed, that more than 60% of the farm women were fully responsible for most of the agriculture operations.

Verma and Sinha (1991) reported in their study conducted in Hissar, Karnal and Bhiwan District of Haryana state, showed that out of nine major farm activities except preparatory tillage, women's involvement was quite predominant in all the activities, related to wheat, paddy, and pulse cultivation. Women's involvement was relatively more in post-harvest operations.

Methodology

The selected area for study the Lahanda Gram Panchayat comes under Attabira block of Bargarh district. The population of the village is nearly 8000. The village has 21 padas (sahi) and two

revenue villages namely Nileipali and Jogipali. There are total 1556 families with 5565 male and 2445 female population. Out of the total population 4800 (60%) people are literate and 3200 (40%) people are illiterate. There are 5000 farmers and 600 service holders. For the purpose of the present study sampling has been drawn by following simple random sampling without replacement and stratified random sampling. The population for the study has been divided as the farm-men and farm women involved in agriculture and 200 respondents were interviewed dividing it 100 from each gender. As the study is qualitative and quantitative, the methods like non-participant observation, focus group interview, ethnomethodology, ethnography, PRA (participate method), content analysis

(photo, audio, video) were used for collection of primary data. Besides these, Semi-structured interview schedule was also administered to gather the primary data from the selected respondents.

Results and Discussion

In the present study the degree of participation or involvement of farmers and farm women in different farm activities has been examined. This has been analyzed and discussed through various agricultural activities in which both of the gender participated, dividing their role as self-doing, supporting and assisting. Table-1, 2 and 3 depicts the involvement of both of gender in different farm activities like land preparation, Seeds and Seed Sowing, Manures and Manuring, transplanting and Seedling, intercultivation and harvesting.

Table. 1 Degree of participation of farmer and farm women in land preparation and sowing/transplanting.

Sl No.	Participation /Activities	Self doing				Supervising				Assisting			
		Farmer		Farm women		Farmer		Farm women		Farmer		Farm women	
		F	%	F	%	F	%	F	%	F	%	F	%
1	Land Preparation												
	i. Stubble collection	50	50	70	70	23	23	19	19	27	27	11	11
	ii. Land leveling	67	67			19	19			14	14		
	iii. Application of Manures	72	72			13	13			15	15		
	iv. Cleaning field Bunds	78	78			9	9			13	13		
	v. Forming Ridges and Furrows	85	85			10	10			5	5		

2	Seeds and Seed Sowing												
	i. Seed treatment	79	79	75	75	14	14	16	16	7	7	9	9
	ii. Sowing	87	87	28	28	4	4	38	38	9	9	34	34
	iii. Transplanting seeding	11	11	93	93	74	74	3	3	15	15	4	4
3	Manures and Manuring												
	i. Preparation of compost/FYM	56	56	35	35	13	13			31	31	65	65
	ii. Transportation of Manure	77	77			9	9			14	14		

Table .2 Degree of participation of farmer and farm women in input and crop management.

Sl. No.	Participation/ Activities	Self doing				Supervising				Assisting			
		Farmer		Farm women		Farmer		Farm women		Farmer		Farm women	
		F	%	F	%	F	%	F	%	F	%	F	%
1.	Application of fertilizer	60	60	32	32	20	20	8	8	20	20	60	60
2.	Irrigation	42	40	39	39	26	26	13	13	32	32	48	48
3.	Cleaning Irrigation Channel	35	35	10	10	13	13	12	12	52	52	78	78
4.	Thinning and gap feeling	62	62	9	9	25	25	42	42	13	13	49	49
5.	Earthing up	63	63			23	23			14	14		
6.	Detrashing	69	69			11	11			20	20		
7.	Application of herbicide	54	50			6	6			40	40		
8.	Application of pesticide	66	66			20	20			14	14		
9.	Hand weeding	3	3	79	79	86	86	8	8	11	11	13	13

Table.3 Degree of participation of farmer and farm women in harvesting and processing.

Sl No.	Participation / Activities	Self doing				Supervising				Assisting			
		Farmer		Farm women		Farmer		Farm women		Farmer		Farm women	
		F	%	F	%	F	%	F	%	F	%	F	%
1	Harvesting												
	i. Reaping Crops	32	32	49	49	60	60	21	21	8	8	30	30
	ii. Collection and Heaping	26	26	22	22	58	58	43	43	16	16	35	35
	iii. Bundling and Transporting	32	32	15	15	57	57	64	64	11	11	21	21
	iv. Threshing	24	24	57	57	56	56	16	16	20	20	27	27
	v. Winnowing	24	24	49	49	56	56	14	14	20	20	37	37
	vi. Drying and cleaning	0	0	69	69	67	67	14	14	33	33	17	17
	vii. Transporting	78	78			12	12			10	10		
	viii. Storing	23	23	42	42	39	39	42	42	19	19	35	35
	ix. Preserving seed for future use	49	49	88	88	36	36	2	2	15	15	10	10

Land Preparation

Perusal of the Table -1 revealed that in land preparation nearly 50 % of farmers collect stubbles by themselves while around 23 % assist in stubble collection and about 27 % supervise the operation. Among the farm women around 70 % collect stubbles by themselves and around 19 % and 11 %

supervise and assist the operations, respectively.

With regard to other operations such as land leveling, application of manures, cleaning field bunds and forming ridges and furrows it was 67%, 72%, 78% and 85% of farmers, respectively who perform the operation by themselves. Around 9 to 10% of

farmers supervise in operations like cleaning field bunds and forming ridges and furrows. About 13 to 19% supervise the application of manures and land leveling. There is no participation of farm women in these activities as these are considered arduous and men dominated tasks. Nataraju and Lovely (1993) in a study conducted in Dovanahalli taluk of Bangalore rural District in Karnataka reached at the same conclusion that in land preparation activities women were less involved compared to other farm activities and these are all male dominated works .

Seeds and Seed Sowing

Table-1 revealed that 79% of farmers carry out seed treatment by themselves while 14% of them supervise and the remaining 7% of farmers assist in the activity. Further, it was found that 75% of farm women do the same by themselves, 16% supervise and remaining 9% assist in the activity.

With regard to sowing activity, nearly 87% of farmers were involved in self doing while only 28% of women were doing the same. About 38 and 34% of women were supervising and assisting in sowing process, respectively.

Seed treatment has a direct effect on the yield of crops and requires utmost care, so most of the farmers and farm women go for self-doing. In contrast to this finding Chaudhary and Ganokar (1992)

revealed that majority of farm women involved in seed treatment, Seed cleaning and seed sowing operations comparison to farm men.

Manures and Manuring

Preparation of compost /FYM, transportation of manures and application of fertilizers are the three activities in which the involvement of farmers and farm women were studied. The result is presented in the Table-1

Self-doing to the extent of 56% among farmers was noticed in preparation of compost /FYM. Again 13% of farmers were found to be involved in supervising while 31% of them played assisting role. So far as participation of farm women in the same job concerned women participation was quite low. Only 35 % of farm women prepare compost by themselves and 65% assist them in doing so but women play no supervising role in this activity.

In transportation of manures nearly 77% of farmers were involved as self doers while 9% played a supervisory role and remaining 14% of them assisted in the work. Women were not involved in these activities.

In practice like applying fertilizer in the field, there is a high level of male participation as 60% of farmers do the job by themselves and only 32% of farm women are involved directly in this activity. So far as supervising and

assisting role is considered 32% and 20% of farmers and 8% and 60% of farmer women are participating respectively. In application of fertilizer farm women play more an assisting role then doing the job directly by themselves. Thus it was found that, all these activities considered under manures and manuring are highly men oriented and women's participation is comparatively less. Sangwan (1990) in his study on gender roles in farming concluded the same.

Transplanting and Seedling

The study area selected had paddy as the principal crop and the task of transplanting was mainly women oriented task. In cultivation of paddy it is generally believed that women have better skill in transplanting in comparison to men. This notion among people in general is also found true in the studied village. Self doing in this activity by farm women ranged up to 93% while 3% of supervise the work and the remaining 4% assist in the operation (Table 1). On the other hand men usually do not involve in self-doing rather most of them accomplish the work by supervising (74%). Few men (14%) involved in assisting job while transplanting. Verma and Sinha (1991) in their study of inter gender sharing of drudgery in cultivation of major crops, concluded that 100% of women labour force was engaged in transplanting of paddy.

Intercultivation

The involvement of farmers and farm women in intercultural operations was studied under eight different practices. They were irrigation, cleaning the irrigation channels, thinning and gap filling, earthing up, detrashing, herbicide and pesticide application and weeding. The details are presented in the Table 2.

In the case of self doing, nearly 42 % of farmers and 39 % of farm women were involved in irrigation, around 35% of farmers in cleaning irrigation channel, 63 % of farmers in earthing-up and 69 % of farmers in detrashing, 54 % of farmers in herbicide application and around 66 % in pesticide application, with regard to thinning and gap filling around 62 % of farmers and only 9% of farm women involved as self doers.

In case of supervising, the farmers were involved to the tune of 26%, 13%, 25%, 23%, 11%, 6% and 20 % in operation like irrigation, cleaning irrigation channel, thinning and gap filling, earthing up, detrashing, herbicide application and pesticide application respectively.

In supervisory role the farm women were involved only in four activities namely irrigation, cleaning irrigation channel, thinning and gap filling and weeding with 13 %, 12 %, 42 and 8% involvement in each activity, respectively.

In assisting, the farmers played a major role with 32%, 52%, 13%, 14%, 40% and 14 % of involvement in irrigation, cleaning irrigation channel, thinning and gap filling, earthing up, detrashing, herbicide and pesticide application, respectively. Women played assisting role only in four activities like irrigation 48%, cleaning irrigation channel with 78%, thinning and gap feeling 49% and weeding 13%.

However, it is interesting to notice that, men usually do not get involved in self doing while weeding, they mainly supervise (86%) in getting the weeding operation done. About 79% of farm women are engaged in weeding operation directly, only 8 % supervise the work and 13 % assist them. It was perceived that women do weeding more carefully and perfectly than men. Not only this, most of the respondents are of the view it is such an easy task to perform that they engage their female counter parts in weeding and they themselves do the other arduous work. Dubey (1988) in his study reported the same conclusion that in majority farm women participated in hand weeding.

Harvesting

The process of harvesting is completed by activities such as reaping, collection and heaping, bundling and transportation, threshing, winnowing, drying and cleaning, transporting for storage and storing. The findings are

presented in Table 2 and discussed below.

In the harvest of paddy involving reaping, making bundles, transporting to threshing floor etc., the women play more important role as compared to men. Men are more involved in supervising work during harvesting whereas farm women participate to a greater extent in self doing work. Farm women were involved in self doing of threshing, winnowing and drying and cleaning operation to the extent of 57%, 49% and 69%, respectively.

Supervisory role was performed mainly by farmers in activities namely reaping crops, collection and heaping, bundling and transportation, transporting for storage and storage wit respectively. The transportation of the threshed and cleaned produces was done solely by men and the participation went to the extent of 78%.

Again in assisting roles farm women played important role and their participation in reaping, collection, heaping and transporting was to the extent of 30, 35 and 21%, respectively. Farm women were found assisting in three activities namely threshing, winnowing, drying and cleaning with 27%, 37% and 17 % respectively.

From the above findings it could be stated that majority of farmers involved themselves in doing strenuous

jobs during harvesting while women folk resorted to less arduous jobs.

While coming to preserving the seed for future use it was found that 49 % of farmers preserve it by self doing, 36 % supervise and the remaining 15 % of farmers assist in the job. It is interesting to notice that regarding the seed preservation activity that there is majority of women participation. About 88 % of women farmers do the job by themselves; only 2 % supervise and rest 10% assist them in doing the work. Singh and Sharma (1991) in their study also reached at the same conclusion that in the plains the highest level of participation of females was in storage of produces.

Conclusion

It can be concluded that women contribute more to the agricultural production than as generally been acknowledged. Recognition of their crucial role in agriculture should not obscure the fact that farm women continue to be concerned with their primary functions as wives, mothers and home-makers. In rural India, the prosperity of the house hold depends on the prosperity of agriculture and allied occupation in any particular point of time vis-a vis the role of women in innumerable activities connected with farming, dairying, sericulture etc. It can be suggested that In the study area the farm women's direct involvement in

farm activities like transplanting and hand weeding has been immense which involve very high drudgery upon farm women. Therefore, the operation can be mechanized through development of women friendly farm machineries for transplanting and weeding thereby, reducing the drudgery upon the farm women. Dissemination of the technology through training and demonstration and support of Govt. in terms of giving appropriate subsidy for those farm equipments could be the measures to make the system viable and sustainable. Similarly, as threshing is a very important activity and majority of farm women were engaged in this sphere it is equally important that the male members of the family should facilitate their female counterparts in these activities to maintain a gender balance in farming sector. Threshing process should be mechanized and women friendly thresher should be developed and made available which can reduce the drudgery.

More number of training programmes should be conducted to increase the skill competency of sample farm women in the areas of fertilizer application, mushroom, apiculture, sericulture as there was vast scope for these vocations in the sample districts. More over as observed that farm women were greatly involved in storage activities, regular training programmes should be conducted to empower them for knowledge and skill development in

management of stored grains. Planners, policy makers, extension functionaries should take necessary steps for the

development of technologies which must lead to development of feminine gender, farm family welfare and ultimate welfare of the country.

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Rural Women's Risk at Household, Farm and Animal Rearing Work

Jyoti Nayak, S P Singh and Gayatri Moharana

As per 2011 Census about 61.3 per cent rural population of the country resides in over 638,000 villages and their livelihood primarily depend on agriculture. In agriculture, men and women are carrying out various activities and roles. In rural parts of the country, men and women, both are engaged in farm activities. Of both, women do the household work in addition to child bearing and nursing to old parents. Thus their job in rural surrounding is more challenging than counter parts. This also reflects that they may be more prone to health hazards as they are involved in household's activities, animal caring, child rearing etc. Thus there is every possible chance to face the hazards, which is something that can cause harm if not controlled. So the outcome is the harm that results from uncontrolled hazards. In favorable circumstances, work contributes to good health and economic achievement. As per population statistics of our country, the female population in agriculture work force increasing (20% in the year 1971 to 41.9% in the year 2007, based on

estimate). This statistics clearly indicates about more involvement of women in agriculture. Rural women perform most of the activities in their own convenient posture like sitting, standing, bending or squatting without realizing the harmful affect on the body. Due to this ignorance, women might be suffering from various health hazards. The present study was under a project titled 'Occupational health hazards of farm women at their workplace in Bhopal district of Madhya Pradesh is taken with following objectives:

Objectives

1. To identify occupational health hazards of farmwomen in households and farm activities as perceived by them to develop database.
2. To suggest ways and means for reducing health hazards among farmwomen

Methodology

Bhopal district in Madhya Pradesh was selected. of 512 villages, such villages were considered from both tehsil (Berasia & Huzur) those had about

100 households. Number of such villages was 232. Using random sample technique, putting the formula =ROUND (Number of cluster x RAND (, 0) in Microsoft Excel, 12 cluster village (having 4 villages in each cluster) were taken from each tehsil. Selection of households was based on land size category i.e. landless, marginal (< 1ha), small (1-2ha), semi-medium (2-4 ha) and large (> 4 ha) and their proportion in villages. Pre-tested structured questionnaires were used for collection of the data as per the developed schedule from 480 households.

Result & Discussion

Study revealed that all respondents involved in house cleaning and water collection activities. Lowest involvement of respondents was in wheat

milling while 58.7 per cent respondents were doing pulse milling with hand stone mill (Table 1). Rest activities such as house cleaning, water collection, washing cloth, spice making, cooking, vegetable peeling & cutting, food grain sorting and utensil cleaning were performed by almost all the respondents. Respondents were adopting mixed (90.2%) posture followed by sitting (5.2%), standing (2.5%) and bending posture, respectively for cleaning activity. Sitting posture was adopted by almost all the respondents for cooking except very few (0.8%). Only 0.2 per cent respondent from marginal category had access of water in her house while 89.4 per cent respondents were collecting water from inside the village and 10.4 per cent respondents from outside the village

Table 1. Farm women involvement in household activities.

Household activities	Category-wise involvement of respondents, %					Average
	Landless (119)	Marginal (102)	Small (129)	Semi (81)	Large (49)	
House cleaning	100.0	100.0	100.0	100.0	100.0	100.0
Water collection	100.0	100.0	100.0	100.0	100.0	100.0
Washing cloth	100.0	100.0	99.2	98.8	100.0	99.6
Spices making	99.2	99.0	99.2	100.0	100.0	99.5
Cooking	99.2	99.0	99.2	100.0	100.0	99.5
Vegetable peeling	100.0	99.0	98.4	98.8	100.0	99.2
Vegetable cutting	100.0	99.0	99.2	97.5	100.0	99.2
Food grain sorting	100.0	99.0	99.2	97.5	100.0	99.2
Utensil cleaning	100.0	99.0	99.2	97.5	100.0	99.2
Milling pulses	42.9	99.0	60.5	48.1	42.9	58.7
Milling wheat	2.5	57.8	4.7	3.7	4.1	14.6

In farm activities it was found that rural women involved in all most all activities starting from carrying dung to marketing the produce (Table 2). The highest involvement was found in cleaning grains

(91.3%) and least was in fertilizer broadcasting (2.5%) operations. Of 21 listed farm activities, involvement of farm women was more than 50 per cent in 10 activities.

Table 2. Involvement of farm women in various farm activities

Farm activities	Category-wise involvement of farm women in various farm activities, %					Total %
	Landless	Marginal	Small	Semi	Large	
Cleaning grains	81.5	92.2	96.1	96.3	91.8	91.3
Grain drying	79.8	93.1	93.8	96.3	87.8	90.0
Harvesting	79.8	95.1	96.1	96.3	69.4	89.2
Storing grain	70.6	95.1	89.9	93.8	89.8	86.9
Winnowing	19.3	76.5	82.9	90.1	85.7	67.3
Weeding	52.1	80.4	76.0	64.2	44.9	65.8
Dehusking maize	5.9	74.5	82.9	82.7	83.7	62.1
Maize cob plucking	6.7	74.5	82.9	80.2	83.7	61.9
Groundnut harvesting	4.2	67.6	79.8	74.1	81.6	57.7
Groundnut decortication	4.2	67.6	79.1	75.3	75.5	57.1
Plucking vegetables	5.0	35.3	25.6	27.2	34.7	23.8
Threshing	5.9	0.0	38.0	19.8	6.1	15.6
Marketing	2.5	24.5	17.8	14.8	8.2	14.0
Seed treatment for sowing	0.0	13.7	21.7	9.9	6.1	11.0
Carrying seeds	0.0	14.7	11.6	7.4	4.1	7.9
Spraying chemical	1.7	12.7	7.8	8.6	4.1	7.1
Preparation of solutions of chemical	0.8	9.8	7.0	9.9	4.1	6.3
Carrying dung to field	0.8	4.9	11.6	6.2	4.1	5.8
Fertilizer carrying	0.8	11.8	7.0	4.9	2.0	5.6
Irrigation to field	0.0	5.9	4.7	2.5	2.0	3.1
Fertilizer broadcasting	0.0	2.9	5.4	1.2	2.0	2.5

Farm women were involved in cleaning animal shed, disposal of dung, carrying of fodder, transportation of fodder, preparation of feed material, milking, selling of milk and chaffing of fodder (Table 3). Of these, highest involvement was cleaning and disposal of dung. It is

observed that farm women carried material on head. Lowest involvement was found in animal grazing. Of ten activities, involvement of farm women was more than 50 per cent in 60 per cent activities related to animal rearing.

Table 3. Involvement of farm women in various animal rearing activities.

Involvement in farm activities	Category-wise involvement of farm women in animal rearing activities, %					Total, %
	Landless	Marginal	Small	Semi	Large	
Cleaning shed	62.2	77.5	92.2	95.1	98.0	82.7
Gathering dung	62.2	77.5	90.7	92.6	95.9	81.7
Use of milk	60.5	78.4	89.9	95.1	93.9	81.5
Fodder collection	52.1	68.6	81.4	85.2	59.2	69.8
Preparation of animal feed	54.6	70.6	76.0	75.3	59.2	67.7
Feeding animal	43.7	96.1	66.7	63.0	38.8	63.8
Buying feed	43.7	28.4	27.1	9.9	10.2	26.9
Chaffing fodder	6.7	15.7	18.6	12.3	14.3	13.5
Milking	9.2	9.8	16.3	6.2	10.2	10.8
Grazing animal	0.0	2.0	3.1	0.0	0.0	1.2

One of the occupational health hazard faced by farm women was observed due to fuel burning while cooking (Table 4) in household activities. Eye itching, irritation, tear, blurred vision were the

problems faced by the farmwomen while cooking in the earthen stove (Chulha). It was mainly due to accumulation of smoke for poor ventilation and working environment. Highest problems cited by the farmwomen while cooking only in cut wood.

Table 4. Hazards faced by farm women during cooking due to fuel burning.

Problems	Cause	Hazards faced by different categories of farm women, per cent					
		Landless (119)	Marginal (102)	Small (129)	Semi (81)	Large (49)	Overall (480)
A. Burning cut wood in earthen Chula for cooking							
Eye itching/ irritation/ pain	Accumulation of smoke due to poor ventilation & working environment	23.5	25.5	20.9	27.2	26.5	24.2
Breathing		7.6	15.7	11.6	12.3	20.4	12.5
Tear		2.5	1.0	4.7	1.2	2.0	2.5
Vision		0.8	0.0	0.0	0.0	0.0	0.2
B. Burning forest wood in earthen Chula for cooking							
Eye itching/ irritation/ pain	Accumulation of smoke due to poor ventilation & working environment	0.8	1.0	-	1.2	-	0.61
Breathing		-	-	-	-	-	
Tear		0.8	-	-	1.2	-	0.61
Vision		-	-	-	-	-	
C. Burning dung cake in earthen chulha for cooking							
Eye itching/ irritation/ pain	Accumulation of smoke due to poor ventilation & working environment	20.2	23.5	20.9	23.5	24.5	22.1
Breathing		5.9	10.8	10.9	2.5	14.3	8.5
Tear			2.0	2.3		2.0	1.3
D. Burning agriculture waste in earthen Chula for cooking							
Eye itching/ irritation/ pain	Accumulation of smoke due to poor ventilation & working environment	2.5	-	-	1.2		0.82
Breathing		2.5	-	-	1.2	-	0.82
Tear		2.5	-	-	1.2	-	0.82
Vision		2.5	-	-	1.2	-	0.82
E. Using kerosene stove for cooking							
Eye itching/ irritation/ pain	Accumulation of smoke due to poor ventilation & working environment	4.2	0.98	2.3	3.7	4.1	2.9
Breathing		4.2	0.98	2.3	3.7	4.1	2.9

Occupational health hazard faced by farm women in the farm activities was observed due to working methods and workload (Table 5). Leg/ foot pain was highest (69.4%) among reported nine discomforts. Lowest was in relation to hearing problem. While performing farm activities 69.4% cited about leg/foot pain. Only 8.5% had hearing problem.

Table 5. Hazards faced by farm women due to working methods and workload in farm activities

Particulars	Hazards faced by different categories of farm women, per cent					Overall (480)
	Land less (119)	Marginal (102)	Small (129)	Semi (81)	Large (49)	
Leg /foot pain	68.1	71.6	62.0	80.2	69.4	69.4
Shoulder pain	60.5	56.9	55.8	75.3	44.9	59.4
Back pain due to load	58.8	55.9	51.9	70.4	42.9	56.7
Headache	51.3	52.0	48.1	56.8	49.0	51.3
Chest pain	32.8	38.2	23.3	37.0	16.3	30.4
Itching	18.5	22.5	15.5	27.2	10.2	19.2
Dust problem	16.0	17.6	14.0	11.1	16.3	15.0
Crushing finger	18.5	13.7	12.4	13.6	10.2	14.2
Hearing problem	10.9	6.9	8.5	8.6	6.1	8.5

Farm women while operating/ using different farm machines were faced problems which lead to hazard. 5.4 per cent farm women reported problem of cloth trapping while working with

power operated machine. This indicates the need of safety device for the machines which is being operated/ assisted by her. A total of 59 per cent women also reported risk due to

vibrations received while traveling on tractor and its trolley

In animal rearing activities farm women also faced hazards. Fodder collection was one of the most hazardous activities as expressed by them. (52.7%) respondents agreed to that. Cleaning

shed, gathering dung, feeding animal, preparing feed were also rated as hazardous activities by the respondents. It was also found that body parts of some of the respondents (leg, eye and hand) injured due to hurt by animal and also occurred to some extent (Table 6).

Table 6. Hazards faced by farm women due to harm by animal while animal caring.

Type of hazard due to animal	Hazards faced by different categories of farm women, per cent					Overall (480)
	Land less (119)	Marginal (102)	Small (129)	Semi (81)	Large (49)	
Injured body parts						
Hand	1.7	0.98	0.77		2.01	0.8
Eyes		0.98				0.21
Leg		0.98	3.1			1.2

Conclusion

It can be concluded that various health hazards were found among farmwomen while involved in household, farm and animal rearing activities. The causes may be due to lower illumination, physical work load, lack of safety device, deprivation of modern technology,

irregular hours. So there is an urgent need to improve the cooking environment, using of safety device in the farm machines and also need to propagate operational and caution tips amongst farmwomen for use of farm related inputs/ technologies/activities.

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Information needs of Livestock Farmers

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The livestock sector is playing a major role in national economy and livelihood of the people. Livestock sector is an integral part of agriculture and contributes substantially to the national economy and also plays a vital role in sustaining livelihood of the people. Contribution of Animal Husbandry, Dairying and Fishery to the national GDP was 4.07 percent during 2008-2009. Although India is highest milk producing country (112.5 Million Tones during 2009-2010) in the world but considering the number of cattle (199 Million, 2007 census), Buffalo (105.3 Million, 2007 census) and livestock farmers involved in it (22.45 million) the performance is not so much satisfactory. At present productivity of almost all animal species in India is less than world average.

Researches have proven that one of the main reasons for low productivity of our animals is the lack of awareness

and knowledge about recommended practices among the livestock owners.

The process of communication plays an important role in the diffusion of innovations. Communication creates awareness in the people, initiates in them an urge to learn, stimulates a drive for action and leads to a change in the outlook of the people. Mass communication has been considered as greater multiplier in development process as it facilitates maximum exposure to farmers and performs awareness and interest among them.

Rural communities, small scale agricultural producers and livestock owners are deeply affected by global, socio-economic, environmental and political forces and find themselves to live in a closed, self sufficient society.

In-fact, appropriate knowledge, strategic planning, low cost inputs, better storage facilities, improved transportation links, negotiations with

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buyers can be performed through information technology thus enabling even the small farmers to have an complete edge over larger operations hence modern information technologies, when systematically applied and adapted to conditions in rural areas, can be used for rural communication to increase participation, disseminate, share knowledge and skills and in development of rural people.

In view of growing importance of information to farmers, the study was carried out to have a content analysis of the radio program being broadcast by the All India Radio, and it's utility as perceived by the livestock owners. The study also resulted, the information needs of livestock farmers as required by them from selected farm broadcasts by direct interview of livestock farmers.

Methodology

The present study consisted of content analysis of programmes on farm information, broadcast by All India Radio, Bareilly named kheti kisani and kisan vaani. All the episodes of kheti kisani and kisan vaani broadcasts from 01/01/2005 To 28/02/2005, formed the universe of the content. The data was collected by recording both the programmes during the above mentioned period and thereafter the recorded cassettes of kheti kisani and

kisan vaani were presented before panel of judges to see various parameters of content analysis.

The programme kisan vaani consisted of a episode named "Prasnottar" in which questions on agriculture and allied subjects were demanded by A.I. R. Bareilly through post and experts were hired to answer them. This episode highlighted the information needs of the livestock farmers.

The utility of the selected radio programmes was measured by analyzing the opinion of the programme listeners, perceived utility regarding the programmes, their listening behavior and the impact of the message broadcast through these programme on the knowledge level of the respondents. The data was collected trough semi-structured interview of livestock farmers selected specially for this purpose.

Results and Discussion

Area wise distribution of information sought by radio programme listeners:

To find out the requirements of the farmers about the livestock and agriculture related information, an analysis was done for the prashnottar programme (Question and Answer programme), which is being broadcast on every Saturday at 7:30 pm. From the **Table 1**, it is evident that maximum number of questions (42) was asked from

Agriculture and related information, and consequently more percentage of time was devoted for agriculture (97.14%), than livestock (2.84%).

Among livestock maximum number of information sought was related to cattle management (2), than poultry (1), but duration spent on answer to the questions was more in poultry (1.42%), than cattle management (1.41%). Regarding agriculture related information maximum number of information was sought for pest control (9 items) mainly for wheat. The reason might be that it was season for wheat production (Jan-Feb) and farmers were suffering from pests in their crop (locally called Genhu ka mama), and accordingly more time was devoted to this topic (21.76%). This was followed by information sought in mango production (5 items), and sugarcane production (5 items). But in terms of time devoted, pest control got the highest (21.76%) time allocation followed by wheat cropping (12.26%) and mango production (12.2%).

From the above results it is obvious that most of the questions included in the programme were related to agriculture and very few questions were from livestock related topics possible due to less proportion of letters related to questions of livestock and related topics, further, the low proportion of livestock items broadcasted in these programmes may be another reason for lower

questions from this area since most of the livestock owners might be feeling that this is basically an agriculture based programme and their queries may not be treated as important enough to be included in the programme.

Type of information required by farmers:

Information, which is given by a source, should be strictly based upon the type of information required by the audience. Thus a study was done to know the information requirements of the farmers. The data obtained were collected and presented in **Table 2**, which shows the distribution of respondents according to type of information required by them. The table clearly indicates that most of the respondents (90.83%) asked for the information on milk production, followed by 67.5 percent respondents who asked for information on indigenous method of treatment of disease, around 64.16 percent asked for information on reproductive problem and its solution, 61.66 percent of respondents asked for information on animal health and prevention of diseases to the animals, 47.5 percent asked for information on feeding of animals, 37.5 percent asked for information on animal breeding and production, 30 percent of respondents asked for information on market to purchase and sell animals and their

products, 15.83 percent asked for care of new born calves and lastly 11.66 percent of the respondents asked for information on deworming of animals.

Thus it was observed that most of the respondents sought information on milk production.

It was found that in Kheti Kisani none of the programme was on this topic while in Kisan Vaani only two programme was broadcast related to milk production and marketing. Therefore, the AIR, Bareilly should incorporate more programme related to milk production, indigenous methods of treatment of diseases and reproductive disorder in animals and their solutions so as to increase effectiveness of the programme.

Conclusion

From the above discussion it can be concluded that information on agriculture is of prime importance for programme listeners and among livestock programmes, livestock management was of main concern.

The direct interview, of livestock farmers resulted that information on milk yield was of prime importance, followed by indigenous method of treatment, reproductive problems and its solution, information on health and hygiene etc.

The relevant and timely information to the livestock owners is a must for overall development of livestock farmers therefore mass Medias like, Radio, Television, Newspaper should be well equipped with information needed by livestock owners in their programmes.

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Marketing Behaviour of Tribal Women in Koraput District of Odisha : A Case Study

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Odisha houses 22.43% of tribal and their number is 8.15 million (ICMR Bulletin, Oct. 2003). In Koraput only tribal population is more than 50% of the district population. Again, the women in tribal community as in other community constitute half of the tribal population. The well-being of the tribal community depends importantly on the status of women. They earn livelihood from farming and forest. They take both farm and forest products to market and face problems created by middlemen and because of perishability. Never they are considered to be included in skill training for capacity building. So, the need of the hour is to enhance and help them in marketing system through training and capacity building. On these considerations, a study was conducted with tribal women to examine their problems in relation to marketing with the following objectives.

Objectives:

1. To document and analyze the involvement of tribal women in marketing process comprising of grading, pricing and selling of selected farm and NTF produce.
2. To study the institutional mechanism available in the rural market for women to operate business and problems encountered there of.
3. To work out suggestions for helping tribal women for efficient marketing and strengthening of marketing system to avoid exploitation from traders if any.

Methodology: The study was carried out in Koraput district of Odisha for the reasons of high percentage of tribal population (more than 50% of total population) and the involvement of tribal women in marketing. Ten important

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markets of the district were selected in ten locations; altogether 100 tribal women are identified to form the sample. In addition, 20 traders/middle men were also identified. After pre-visit to the location, interview schedule was developed, pre-tested and modified as per the feedback from the field. Data collection was done by following three methods like (i) PRA and case studies—at the village level, (ii) Observation—at the market level and (iii) Focused group discussion—at the community level.

Findings and discussion

Market Observations:

The daily markets have no specific place for operation. Only the sellers sit near the road side from 4 pm to 8 pm and about 1000 to 3000 people depend on such marketing. For weekly market, the time duration is 8 am to 2 pm having specific place for marketing activity and around 5000 to 12000 people do marketing. But neither in daily or weekly market, shed are given to them for protection from sun and rain. It was observed that the tribal women are involved in marketing of almost all the agricultural produces like cereals, pulses, vegetables, fruits, spices, value added products, small fish and dry fish, local wine (*handia*), salt, handicrafts and stationeries, etc. In addition to agricultural produce, the tribal women also are involved in collection and marketing of NTFPs like honey, tamarind, mushroom, green leaves, seeds, mahula,

medicines, fruits and nuts, roots and tubers, brooms, tooth brush, khali leaves, fuel wood, tooth brush, etc. They sell the items in share or measure with the help of tin/ aluminum containers and very rarely they use the weighing machines.

Profile of Tribal Women: So far as the socio-personal profile of the respondents is concerned, out of the total sample, majority of the tribal women were illiterates (89.00%), acted as head of the family (87.00%) in joint family structure (87.00%) having kacha houses as dwelling place (100.00%) and farming as primary occupation (90.00%). The electricity was available only with 2.00% of the respondents. As education plays an important role in marketing management in taking some vital decisions in critical situations of this competitive market and to operate the skill, government should take care for improvement of the literacy programme in tribal zones. The joint family system provides good scope to manage the marketing activity with good inter-personal relationship.

Involvement in Marketing Process: At the time of interview the tribal women were asked about their extent of involvement in marketing process and the data were analyzed in a three point scale as 'very high', 'high' and 'little' putting the score as 3, 2 and 1 respectively. About seven problems were enlisted which are ranked in rank order analysis in the following table.



Table 1 Extent of involvement (n =100)

Sl. No.	Marketing process	Extent of involvement	
		Average Score	Rank
i)	Harvesting / collection	2.59	I
ii)	Storing	2.13	V
iii)	Grading	2.09	VI
iv)	Transporting	2.32	III
v)	Packing for market	2.23	IV
vi)	Pricing	2.00	VII
vii)	Selling	2.45	II

The extent of involvement of tribal women in marketing process was very high in case of harvesting/collection (2.59) followed by selling (2.45) and transporting (2.32) whereas least involvement was in fixation of price, grading, storing and packing for market. In India, collection of *tendu* leaf (used for manufacturing *bidi*) generates part time employment for 7.5 million people

and they are predominantly tribal women (Arnold 1995). In West Bengal, tribal women gather *sal* leaves for six months of the year to supplement household income (Poffenberger 1990, Rajan 1995). The table proves that the involvement of tribal women is very high in collection activity and less in price fixing. Odisha state has granted monopoly rights for 29 NWFP items to a private company, Utkal

Forest Products Ltd (Prasad and Saxena, 1996; Agramee, 1997; MoEF, 1998) under which the local collectors of NWFPs are required to sell their collected materials to the company's agents at pre-set prices that are lower than those they could have obtained by selling directly to processors. Further, while the women get 1.5 to 3 rupees (US\$0.03 to \$0.06) per kilogram of broomstick grass, the company holding the monopoly (Utkal Forest Products Ltd) is making profits of as much as 600 percent (Prasad and Saxena, 1996; Agramee, 1997). Here,

the government should do justice for the primary collectors by providing them their due price with a check mechanism through government agent.

Constraints faced: During data collection, through focus group discussion and observation the tribal women were asked about their problems faced in marketing. The collected data were analyzed in a three point scale as 'very high', 'high' and 'little' with assigned score of 3, 2 and 1 respectively. The findings of rank order analysis are shown in table below.

Table 2 Constraints in marketing (n=100)

Sl. No.	Areas of constraint	Average Score	Rank
1	No storage facility for unsold goods	2.30	IV
2	No shed facility to sit	2.22	VI
3	No shelter for night halt	2.00	IX
4	No facility for ladies toilet	2.10	VIII
5	Absence of rate fixation by government	2.12	VII
6	Deferred payment	1.65	XII
7	Bargaining of price	2.25	V
8	Distant market places	2.35	III
9	Traders' exploitation	2.45	II
10	Collection and processing of produce	1.85	X
11	Lack of transportation	2.47	I
12	Tax to market management committee	1.80	XI

The table indicates that lack of transportation, exploitation by traders and distant market places are the three major constraints faced by tribal women which are ranked as I, II and III respectively followed by no storage facility (IV), bargaining of price (V), no shed facility for protection from rain and sun (VI) and absence of rate fixation by government (VII). It has conformity with the study that in absence of local market facilities, the middleman dominates which leads to deprivation of the growers of competitive price (Development and Planning Department, Government of West Bengal, 2007). According to

Agrawal and Yadama (1997) distance from markets or roads has been used in many existing studies because of ease in collecting data and because variations in distance from markets can reliably represent the strength of market forces. On the other hand, the deferred payment, tax to market management committee and collection and processing of produce were least ranked constraints.

Selling process: Exploitation by the traders in the tribal areas is a common complain. While interacting with tribal women on this issue, the responses were obtained as depicted in figure 1.

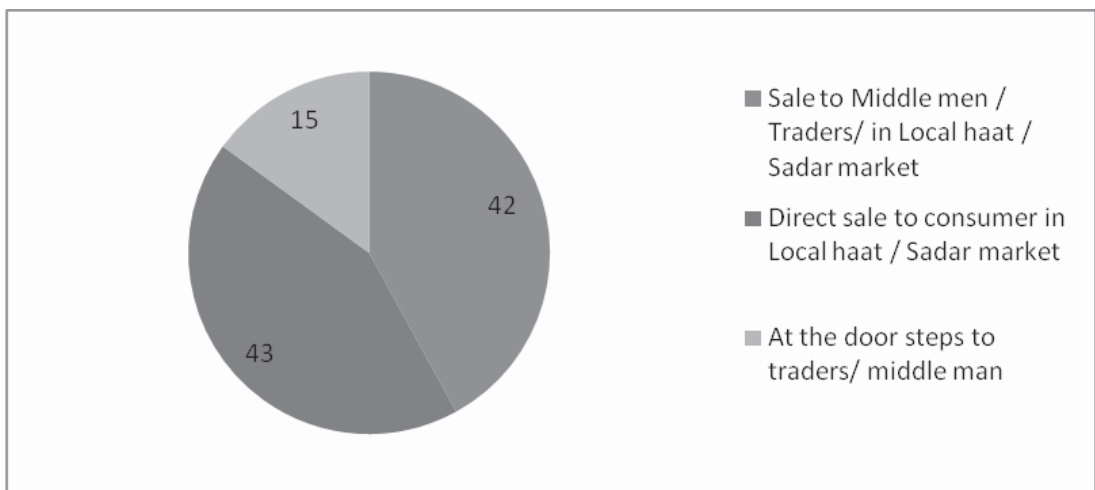
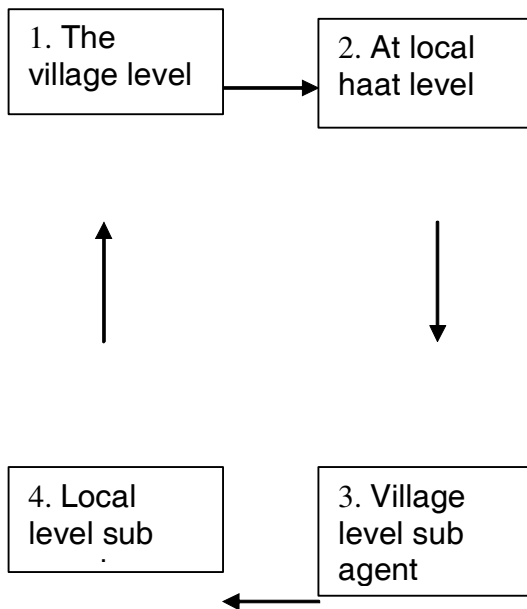


Fig.1 Selling process

The above figure indicates that the tribal women sell their produces directly to traders (42.00%) and 43.00% to consumers in local haat / sadar market and only 15.00% at the door steps.

Therefore, the women need to develop strategy to handle the costumers so as to obtain correct price

Retail chain analysis: The process of sale (The primary collector’s disposal to consumer) is as follows.



Total difference is up to 66.66% in case of NTFPs and agriculture produce up to 10.00%.

Forest products in livelihood

Forest plays a major role in the livelihood of tribal people. They love their forest, enjoy the free nature, depend on its products like fruits, vegetables, green leaves, medicines, tubers and roots, fuels, skins, bones, teeth, wings, lac, etc, Hegde et al. (1996) found that the households living in the periphery of the forest spent 39.25 percent of their time in collection and realized 47.63 percent

of their income from non-wood forest products; and those tribals living closer to the forest spent 54.46 percent of their time in collection and realized 60.44 percent of their income from NTFPs. Women in Uttar Pradesh, derive a substantial proportion of their income from forests and common lands; poor women derive 45 percent of their income from forest and common land compared to 13 percent for men (FAO 1991). Here, data are collected to know the extent of importance of forest products on livelihood system of the tribal women. The result is being indicated in the figure below.

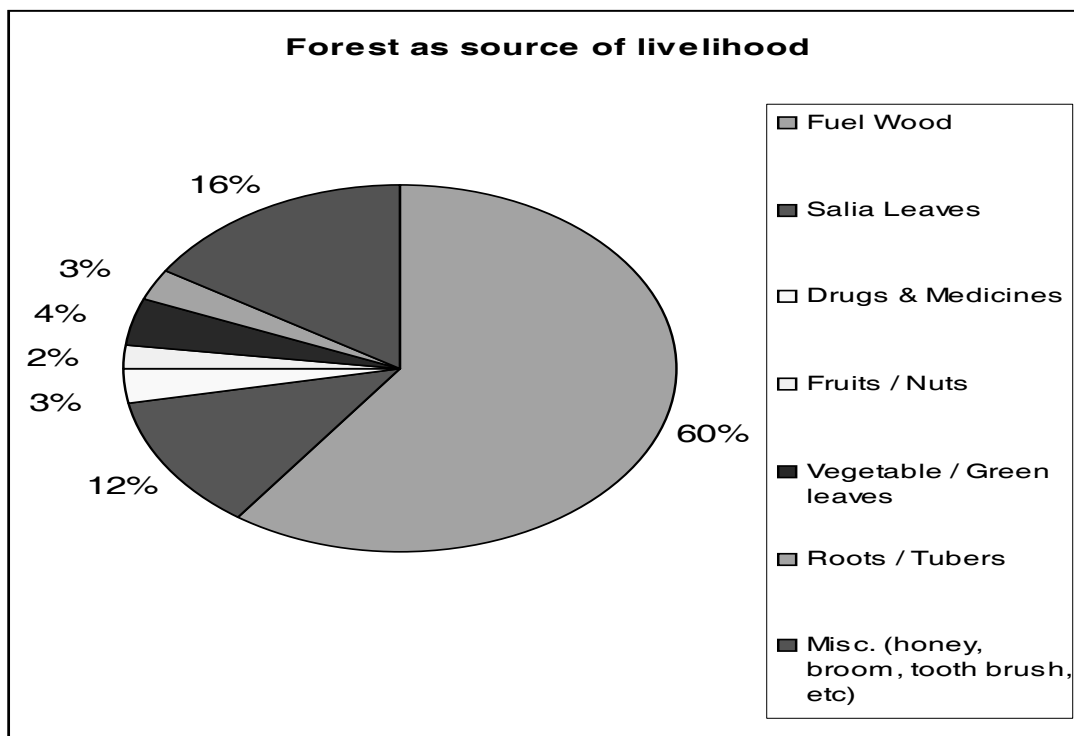


Fig. 2 Forest products in livelihood

The above figure indicates that maximum earning they obtain from fuel wood (60.00%) and *salia* leaves ((12.00%). The minimum source was fruits and nuts (2.00%), drugs and medicines (3.00%), roots and tubers (3.00%), vegetable and green leaves (4.00%) and miscellaneous (16.00%). At the national level over 50 percent of forest revenue and about 70 percent of forest export revenue comes from NWFPs, mostly from unprocessed and raw forms (Tewari and Campbell 1997; Prasad, Shukla and Bhatnagar, 1996). A study conducted by the Indian Institute

of Forest Management in 1996 (MoEF, 1998) observed that an average tribal family drew about one-half of its annual income from forests, 18 percent from agriculture, 13 percent from cattle and 18 percent from other employment. Approximately one-third of the products gathered from forests were traded.

Profile of Traders: During survey, side by side data were collected from the local traders and they opined that their purchase process was directly from producers (90.00%) in negotiation with sellers as the method of procurement (100.00%) as prevailing market price as

the norms for price fixing (100.00%). Their term of payment was immediate payment and cycle/rickshaw/truck was the mode of transport. Among the traders, about 50.00% had experience of 11 to 20 years and 95.00% of them hardly derive profit of 5.00% – 10.00% in procurement and selling.

Suggestions for Better Marketing System:

The tribal women as well as traders and various district departments like: agriculture, horticulture, fishery, forestry, animal husbandry, OTLEP, ORMAS and NGO were consulted for giving suggestions to develop strategies for strengthening marketing system. The following table reflects their suggestions.

Table 3 Differential suggestions for better marketing system

Sl. No.	Suggestions	Traders (n = 20)	Tribal Women (n = 100)	District Officials (n = 08)	Total average
1	Transport facility	45.00	31.00	37.50	37.83
2	Training on marketing	22.00	-	87.50	36.50
3	Storage facility	42.00	25.00	25.00	30.66
4	Creating nearby markets	-	52.00	37.50	29.83
5	Direct selling to consumers	34.00	37.00	-	23.66
6	Credit agency linkage	-	-	25.00	8.33
7	Minimum fixed price	-	7.00	-	2.33
8	Shelter for night halt	-	2.00	-	0.66

The analysis of differential suggestions given by three categories of respondents like traders, tribal women and district officials reveals that on an average 37.83% of them suggested for facility of

better transport, 36.50% for training for enhancing knowledge of tribal women in marketing system, 30.66% for creation of storage facility, 29.83% for creation of market in nearby places and 23.66%

viewed for direct selling to avoid middlemen while least importance was given for linkage development with credit agency (8.33%), minimum rate fixing by government agencies (2.33%) and creation of shelter place for night halt (0.66%). Creation of local markets or proximity to home was the most important suggestion by the tribal women (52.00%) who actually face the constraints of leaving houses for a long time for far away places. In absence of local market facilities, the middleman dominates which leads to deprivation of the growers of competitive price (Development and Planning Department, Government of West Bengal, 2007). The stakeholders from various departments very strongly suggested for capacity building of tribal women in marketing (87.50%) while the most vulnerable women did not show interest for it as they are not sensitized for it. Therefore, training should be imparted along with awareness and motivational programmes.

Policy recommendations

- 1. Capacity Building:** The study indicated that the tribal women play major role for purchasing or selling of own farm products as well as non timber forest products (NTFPs). But, they do not have opportunity to undergo any training for bargaining skill, fixing price and profit-loss. The study suggests that there should be training programme for improving the marketing skill and decision taking power of tribal women as to when, where and in what form to sell the produce to increase income. It should be conducted in their own villages with specific duration, content and provision of little wage during training period.
- 2. Transport facility:** Sufficient means of transportation and surfaced roads are lacking in villages of Odisha and more so in tribal areas. Therefore, majority of the agricultural produce of the tribal areas are still confined to village markets for sale. They face problems in disposing farm products to distant market places. As a result under compulsion they sale their perishable items with a throw away price in the local markets. Here, government should take steps to increase the means of transport and surface roads in tribal zones.
- 3. Storage infrastructure facility:** The trend of production and marketed surplus seems to be higher in our country and the density of existing storage capacity is insufficient. In rural and tribal areas, the availability of storage infrastructure is very rare. Returns on NTFPs such as tamarind,

mahua, etc. can be doubled if stocked in a cold storage for 5–6 months. Therefore, the storage capacity should be enhanced for tribal people to preserve their surplus goods during off season till market demand comes.

- 4. Creating nearby markets:** The absence of the facility of marketing infrastructure in tribal villages is still a great problem for the women entrepreneurs. With other roles traditionally assigned to women within the family, sometimes they are unable to go for far-off markets. The creation of village *haat* will assure the women about the return price for small sized production which is uncertain and risk prone in transporting in to distant markets.

- 5. Direct selling to the consumer:** To address this problem, a strong *Village Committee* should be constituted with at least 50 percent participation of women to monitor the local marketing system by fixing the Minimum Procurement Price and not to allow the gatherers to sell to the unregistered traders. The linkage of traders with village markets should be avoided. The nature of product and interaction with the sellers and buyers should be examined.

Conclusion: The marketing mechanism should be strengthened for the interest of the tribal women as they have a greater contribution in strengthening local economy of vulnerable section. They should get fair wages for their NTFPs having own involvement in committee for forest governance.

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Association of Demographic and Socio-Economic Variables of Vegetable Growers Women with their Utilization of Personal Localite Sources

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Rural Women have played a pivotal role in agricultural production, animal husbandry and other related activities besides their normal domestic responsibilities since time immemorial. The rural women are often 'Physically visible' but conceptually 'Invisible' and remained marginalized. The best way to make optimum use of the human resources is to provide them opportunities for self-development as well as for family and society through personal localite sources, which improves their capability. Communication of new agricultural technologies to the farmers is a matter of paramount importance for the agricultural development of the country. 'Rural development' depends not only on technology generation process but also on dissemination of technology as per the needs of the target groups in a particular farming system (Mettrick, 1993). Zaki and Singh, 1978 has reported

the acceptance and importance of information sources in various process of cultivation.

Today, communication is assuming an important role in every sphere of human life including agriculture. The higher communicational channel source utilization and indulgence in various forms of communication have made a significant impact on agricultural development scenario. The benefits of personal localite sources can, however, be realized only if it is shared by the millions of women vegetable growers who are ultimate users. That the small farmers used & preferred the sources for getting necessary information.

Objectives

Keeping the views in mind this study was conducted with the following specific objectives;

1. Demographic and socio-economic profile of the respondents.

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2. Acceptance of personal localite sources by the respondents according to their independent study variables.

Methodology :

The area of this study was the two blocks selected purposively named as Araziline under CBDS (Community Block Development Scheme) & Chiraigaon under non-CBDS of Varanasi district, U.P., India From each block; five villages were selected purposively which had maximum area and production in vegetable crops as compared to other villages of selected blocks. There after 10 percent of vegetable growers women who were the heads of the family were selected randomly from each village to make a total sample of 400 having the complete and reliable information (fixed purposely).

The data was collected with the help of pre structured and pre tested, uniformed schedule through personal interview method after establishing rapport. The information on age, caste, social participation, education, land possessing, annual income, annual vegetable income along with the use of various personal, mass media, cosmopolite sources were collected from each subject. The collected data was classified, tabulated and statistically processed with the help of computer software SPSS 16.0 version after transferring the entered data in ms excel software. Data has been presented in the

form of number and percentage and X^2 test was used to find out the ossociation of the acceptance of various personal localite sources with their demographic and social-economic variables.

Results and Discussion :

The percentage distribution of the acceptance of personal localite sources according to age, caste, social participation are presented in table 1. The acceptance of the progressive farmers / form women (76.1%), neighbors (90.7%) and input dealers (97.7%) were highest among older age group (Age \geq 51 years). The similar findings were also reported by Amalraj & Parcel (1984) in respect of fertilizer studies. The relatives (54.2%) and friends (83.3%) personal localite sources were highly accepted by the young women whereas the acceptance of panchayat / co-operative society (95.7%) was highly accepted by the middle age-group women. The acceptance percentage distribution of different personal localite sources was observed almost similar in all the age groups and the visual differences were not found statistically significant (Table 1). The caste wise percentage distribution of teh respondent were 12 (3.0%) to SC/ST, 363 (90.8%) to other backward classes and 25 (6.2%) to general caste group. The percentage distribution of the acceptance of PL₁, PL₂, PL₃, PL₄, PL₅ and PL₆ by the SC/ST women were 66.7, 83.3, 58.3, 66.7, 91.7 and 100.0 respectively. The caste-wise

variations observed in the acceptance of various personal localities source were found not statistically significant ($p > 0.05$) (Table 1) 3.8% women had no social participation membership, 70.7% had membership of one organization and 25.5% had membership of more than one organization. The women having no membership were accepting the PL1, PL2, PL3, PL4, PL5 and PL6 as 73.3%, 100%, 53.3%, 80.0%, 100% and 93.3% respectively. The acceptance of personal localities sources according to their social participation was observed statistically insignificant.

The acceptance of personal localities sources amount respondents according to their educational levels and land holding possession are presented in table 2. The percentage distributions of acceptance of PL₁, PL₂, PL₃, PL₄, PL₅ and PL₆ among illiterate women were 81.3, 91.7, 49.0, 81.3, 96.9 and 99.0 respectively and these percentages among women having educational level inter or more were 78.3, 95.7, 60.9, 82.6, 91.3 and 95.7 respectively. Acceptances of input dealers (PL 6) were more than 93% among all educational level groups. The variations in the acceptance of various personal localities sources among different educational levels were found statistically insignificant (Table 2). The percentage distribution of women according to their family land possessing status were 3.5, 64.5, 18.0, 9.7 and 4.3 in the landless, land having less than 1

hectare, land holding between 1 to 4 hectares, land holding between 4 to 10 hectares and land holding greater than 10 hectares respectively. The acceptance of relative's personal localities source was approximately 50% among all land holding groups. The acceptance of panchayat / Co-operative society (PL5) and input dealers (PL6) were more than 90% among the women of all the land holding groups. There was no statistical difference observed in the acceptances of different personal localities sources and the various land holding groups (Table2).

The percentage distribution of acceptance of various personal localities sources among the respondents according to their family annual income and vegetable income groups are presented in table 3. The percentage distribution of vegetable grower's women were 66.3, 24.2 and 9.5 in the annual income group up to Rs. 1,00,000, between Rs. 1,00,001 to 2,00,000 and more than Rs. 2,00,000 respectively. The relatives' personal localities source was acceptable among 50% women of all the annual income groups. Panchayat / Co-operative society and input dealer personal localities sources were accepted by more than 90% of women irrespective of their annual income groups. The acceptance of different personal localities sources was similar in all income groups and there was no evidence of statistically significant difference in the acceptance of personal localities sources among the

annual income groups (Table 3). The vegetable annual income was divided in three groups namely less than Rs. 12,500, between Rs. 12501 to Rs. 75000 and more than Rs. 75000 and their percentage distribution were 66.0, 21.5 and 12.5 respectively. Only half of the women accepted the relatives' personal localite source in all income groups. The input dealers personal localite was accepted by more than 95% of women of all income groups. There was not found any statistically significance difference in the acceptance of various personal localite sources with vegetable annual income of the family.

Conclusion

The relative personal localite source was accepted by half of the women in all age groups, caste, social participation, educational level, land holding, total annual income and vegetable annual income groups. More than ninety percent women accepted the input dealers personal localite source in all socio-demographic and income variables.

Recommendations:

On the basis of observation obtained from this study, it is recommended that personal localite sources have made the applicability of advance technology for vegetable cultivation, thus the development of women vegetable growers has grown up in all their socio-economic, education, standard of life quality of life.

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Table No: 1

Acceptance of personal localite source according to age, caste and social participation

Variable	Progressive Farmers / Farm women (PL ₁)	Neighbours (PL ₂)	Relatives (PL ₃)	Friends (PL ₄)	Panchayat/ Cooperative Society (PL ₅)	Input dealers (PL ₆)
Age group (years)						
Young (20-35) 48 (12%)	34 (70.8)	44 (54.2)	26 (54.2)	49 (83.3)	44 (91.7)	45 (93.8)
Middle (36-50) 93 (23.3%)	71 (76.3)	83 (89.2)	46 (49.5)	74 (79.6)	89 (95.7)	90 (96.8)
Old (≥ 51) 259 (64.7%)	197 (76.1)	235 (90.7)	134 (51.3)	212 (81.9)	239 (92.3)	253 (97.7)
X2- value	0.65	0.26	2.8	0.36	1.38	2.17
P-value	0.72	0.88	0.87	0.84	0.503	0.34
Caste						
SC/ST (1) 12 (3.0%)	8 (66.7)	10 (83.3)	7 (58.3)	8 (66.7)	77 (91.7)	12 (100.0)
OBC (2) 363 (90.8%)	276 (76.0)	330 (90.9)	183 (50.4)	297 (81.8)	338 (93.1)	352 (97.0)
General (3) 25 (6.2%)	18 (72.0)	22 (88.0)	14 (56.0)	21 (84.0)	23 (92.0)	24 (96.0)
X2 Value	0.73	0.97	0.56	1.88	0.078	0.46
P-value	0.695	0.62	0.76	0.39	0.962	0.795
Social Participation (Membership numbers)						
No Membership (0) 15 (3.8%)	11 (73.3)	15 (100.0)	8 (53.3)	12 (80.0)	15 (100.0)	14 (93.3)
Membership of one organisation (1) 283 (70.7%)	214 (75.5)	257 (90.8)	144 (50.9)	229 (80.9)	261 (92.2)	276 (97.5)
Membership of more than one organisation (≥ 2) 102 (25.5%)	77 (75.5)	90 (88.2)	52 (51.0)	85 (83.3)	96 (94.1)	98 (96.1)
x2- value	0.04	2.22	0.034	0.31	1.59	1.26
p- value	0.98	0.33	0.98	0.86	0.45	0.53

Figures in Parentheses show the percentage.

Table No: 2

Acceptance of personal localite source according to education and house hold land holding

Particular	Progressive Farmers / Farm women (PL ₁)	Neighbours (PL ₂)	Relatives (PL ₃)	Friends (PL ₄)	Panchayat/ Cooperative Society (PL ₅)	Input dealers (PL ₆)
Educational level						
Illiterate	78	88	47	78	93	95
96 (24.0%)	(81.3)	(91.7)	(49.0)	(81.3)	(96.9)	(99.0)
Up to Primary level	90	107	59	92	107	114
117 (29.2%)	(76.9)	(91.5)	(50.4)	(78.6)	(91.5)	(97.4)
Up to Middle level	84	105	66	97	110	115
119 (29.8%)	(70.6)	(88.2)	(55.5)	(81.5)	(92.4)	(96.6)
Up to High School	32	40	18	40	41	42
45 (11.3%)	(71.1)	(88.9)	(40.0)	(88.9)	(91.1)	(93.3)
Intermediate and above	18	22	14	19	21	22
23 (5.7%)	(78.3)	(95.7)	(60.9)	(82.6)	(91.3)	(95.7)
X2 - value	3.96	1.83	4.19	2.29	3.05	3.62
P-value	0.412	0.77	0.38	0.68	0.55	0.46
Landholding (hec.)at household level						
Landless	9	14	7	12	13	13
14 (3.5%)	(64.3)	(100.0)	(50.1)	(85.7)	(92.9)	(92.9)
Marginal (<1)	197	232	140	204	239	251
258 (64.5%)	(76.4)	(89.9)	(54.3)	(79.1)	(92.6)	(97.3)
Small (1-4)	53	64	30	63	65	69
72 (18.0%)	(73.6)	(88.9)	(41.7)	(87.5)	(90.3)	(95.8)
Middle (4-10)	30	39	20	32	38	39
39 (9.7%)	(76.9)	(100.0)	(51.3)	(82.1)	(97.4)	(100.0)
Large (>10)	13	13	7	15	17	16
17 (4.3%)	(76.5)	(76.5)	(41.2)	(88.2)	(100.0)	(94.1)
X2- value	1.24	0.64	4.27	3.41	3.33	2.93
p-value	0.87	0.73	0.37	0.49	0.50	0.57

Figures in parentheses show the percentage.

Table No: 3**Acceptance of personal localite source according to their family annual income and vegetable income**

Particular	Progressive Farmers / Farm women (PL ₁)	Neighbours (PL ₂)	Relatives (PL ₃)	Friends (PL ₄)	Panchayat/ Cooperative Society (PL ₅)	Input dealers (PL ₆)
Annual Income of the family (in Rs.)						
< 1,00,000	199	242	136	216	245	257
265 (66.3)%	(75.1)	(91.3)	(51.3)	(81.5)	(92.5)	(97.0)
1,00,000-2,00,000	73	86	50	78	89	94
97 (24.2%)	(75.3)	(88.7)	(51.5)	(80.4)	(91.8)	(96.9)
> 2,00,000	30	34	18	32	38	37
38 (9.5%)	(78.9)	(89.5)	(47.4)	(84.2)	(100.0)	(97.4)
X2-value	0.27	0.646	0.22	26	3.21	0.02
p-value	0.87	0.73	0.89	0.88	0.20	0.99
Intermediate and above	18	22	14	19	21	22
23 (5.7%)	(78.3)	(95.7)	(60.9)	(82.6)	(91.3)	(95.7)
X2 - value	3.96	1.83	4.19	2.29	3.05	3.62
P-value	0.412	0.77	0.38	0.68	0.55	0.46
Vegetable Annual Income of the family (in Rs.)						
<12,500	198	240	135	216	243	256
264(66.0%)	(75.1)	(90.9)	(51.1)	(81.8)	(92.0)	(97.0)
12,501-75,000	65	76	43	69	79	83
86 (21.5%)	(75.6)	(88.4)	(50.0)	(80.2)	(91.9)	(96.5)
> 75,001	39	46	26	41	50	49
50 (12.5%)	(78.0)	(92.0)	(52.0)	(82.0)	(100.0)	(98.0)
x2-value	0.21	0.64	0.06	0.12	4.30	0.24
p-value	0.90	0.73	0.97	0.94	0.12	0.89

Figures in parentheses show the percentage.

Constraints in Adoption of Improved Fish Farming

R. Mishra¹, B.P. Mishra² and K.C.Dora³

The study on constraints in adoption of improved fish farming was carried out in Ganjam district of Orissa and constraints on production, technology, economy, social, extension infrastructure and marketing were identified as experienced by the traditional fish farmers in adoption of improved fish farming. The data were collected from 50 fish farmers in rural areas at random during 2011 who were directly or indirectly intervened by the KVK Bhanjanagar, Ganjam by personal interview method through structured interview schedule. The study revealed that (i) in summer scarcity of water and the high cost of human labour are the main production constraints, (ii) the high investment for the improved technology is the main technological constraints

followed by inadequate and untimely advice by Government staff, (iii) the very economic constraints faced is lengthy and cumbersome procedure of getting credit, (iv) Poaching and groupism in the village are the major social constraints, (v) mere or no demonstration and lack of storage facility are the main extension and infrastructural constraints respectively, (vi) lack of special markets as well as transportation to distant markets are the main marketing constraints mostly encountered by the fish farmers. However if the production is increased by improved farming it will certainly need special market and better transport facility for disposal of fish in distant market out of the district.

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Though the state of Orissa has immense fisheries potential, steps have not been taken for its full utilisation. Generally, 80% of the people of the state are habituated to taking fish. Ganjam is one of the coastal districts of Orissa and 80% of its population are small and marginal farmers. The Ganjam district is endowed with several ponds, tanks and rivers including Rushikulya, the major one. Besides, the whole district has many confined and semi-confined water bodies. Looking at it, there is much scope for fish culture in rural areas. However, the fish production in the rural areas by the fish farmers is very poor and most of the farmers adopt this practice in a traditional way. Further, a large part of gains from new improved fish farming technologies are still remaining unrealized due to some constraints. A large number of research recommendations do not find acceptance with the fish farmers. Thus, there is a need for a systematic analysis of the constraints in the adoption of innovations in the said field so as to suggest the ways and means of eliminating them for easy and smooth transfer of technologies.

At attempt, therefore, was made to identify the constraints as experienced by the fish farmers in the adoption of improved fish farming technologies in the Ganjam district of Orissa.

Materials and Methods

The study was conducted in the Ganjam district of Orissa. A direct survey of fifty fish farmers at random was conducted by visiting farmers and personal interview in rural areas of the district during 2011 who were directly or indirectly intervened by the KVK Bhanjanagar, Ganjam. The data were collected personally with the help of well structured interview schedule. An exhaustive list of various constraints relating to adoption of improved fish farming technologies were prepared in consultation with experts, farmers and referring literatures. Each respondent was asked to indicate his degree of agreement to each constraint in a 3 point scale. Then the constraints were ranked on the basis of the mean score calculated for each constraint.

Results and Discussion

The constraints were classified into six broad groups like production constraints, technological constraints, economic constraints, social constraints, extension and infrastructure constraints and marketing constraints. The constraints and their ranks are presented in Table-1.

Production Constraints :

As evident from the table, major production constraint was lack of water source with a mean score of 2.25 followed by scarcity and high cost of

human labour, unavailability of suitable land, unavailability of fish seed, untimely supply of fish seed and other materials and unavailability of balanced fish feeds. In the district of Ganjam though water resources are more, most of the farmers depend on rain water for their culture practice. In summer, scarcity of water creates a serious problem for them. Further, most of rural people are financially poor and those who work as labourer prefer to go to town area to get hard cash. This results in scarcity of human labour in the area. Also the high cost of human labour causes a serious constraint in the field of fish culture. As fish feed is not used by most of the fish farmers, it is given the least importance by the fish farmers as a constraint. Besides, unavailability of suitable land is also seen as an important constraint because of the farmers hesitation to convert their cultivable land to fish ponds for fish culture.

Technological Constraints :

Regarding technological constraints, the fish farmers reported that the technology involved high investment (1.95) and the technical advice during occurrence of disease, poor growth of fish etc., by the technical staff were inadequate and not in proper time (1.60). Besides, the complexity of the new technology (1.35) became another constraint to the fish farmers. This is in agreement with Singh and Laharia (1992).

Economic Constraints :

As evident from the table, the farmers do not want to take credit from bank due to cumbersome procedures, too much documentation and unavailability of credit at the time of requirement. Bhaumik et al. (1992) reported that non-availability of finance was the most important factor for non-adoption of advanced technologies. As the fish farmers are of poor resource base, they do not get sufficient amount to invest in the fish farming practice. Reddy et al. (1986) found that poor economic condition of farmers, high initial cost and untimely supply of inputs were main constraints faced by farmers in adoption of technology. Besides, the fish farmers in the present study also want more of Government assistance in terms of subsidy. At last low price of fish in the market because of high competition with the fish coming from Andhra Pradesh State stood as a constraint to the poor fish farmers of the district.

Social Constraints :

Every society plays an important role in the diffusion and adoption of a new technology. Misconception about the technology among fish farmers may upset the entire programme. But awareness on the advantages of the technology and a positive attitude towards it enhance the rate of its adoption among the fish farmers. From the table it is observed that poaching

(3.0) was considered as the most important and serious problem in fish culture followed by groupism in the village (2.55). Generally fish farmers spend a lot towards watch and ward charges. This is also in agreement with Bhaumik et al. (1992). Besides, there is enough social recognition and family support for fish culture. Religion and caste do not create any barrier against the adoption of the improved technologies.

Extension and Infrastructure Constraints :

The major constraints perceived by the traditional fish farmers were near absence of demonstration (3.0), lack of storage facilities (3.0) and lack of fish cooperative society (3.0). Reddy et al. (1986) identified that lack of knowledge of improved practice was one of the major constraints in adoption of improved technology. Success of improved fish farming technology practice depends on the skill of fish farmers for which first line of demonstration by the technical extension personnel in the ponds of fish farmers is highly desirable. But demonstrations are rarely conducted in rural areas. Co-operative is also an important institution for the betterment of fish farmers as it can help them in getting inputs in an affordable price and can arrange better price for the fishes. In addition to the above constraints lack of training facilities (2.75), inadequate periodical supervision (2.1), inadequate information

to the beneficiaries (2.0) ineffective communication to the beneficiaries (1.85) and irregular visit of the fishery extension officer (1.85) also pose serious constraints by the fish farmers.

Marketing Constraints :

Though there was absence of special market for fish sale, the farmers did not face any problem in marketing. Transportation facilities to distant market were found to be very good. But the fish farmers did not need transport the fishes because of heavy demand in local market.

Conclusion

Thus, the major constraints faced by the farmers can be overtaken by adopting

- A field mechanism to popularise the techniques and to integrate the various phases of fish culture.
- Proper coordination between different departments and financial institutions.
- Provision of training facilities to the fish farmers.
- Enthusiasm among the lessees to develop the resources.

Therefore, the greatest need of the day is to effectively educate and communicate the information to large number of fish farmers who have to adopt this know-how in order to modernise fish culture practice.

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Table – 1: Constraints experienced by the fish farmers in the adoption of improved fish farming technology

Sl. No.	Constraints in Technology	Mean Score	Rank
A.	Production Constraints		
1.	Unavailability of suitable land	1.75	III
2.	Unavailability of fish seed	1.50	IV
3.	Untimely supply of fish seeds & other materials	1.50	IV
4.	Unavailability of balanced fish feeds	1.25	V
5.	Lack of water source	2.25	I
6.	Scarcity and high cost of human labour	1.95	II
B.	Technical Constraints		
1.	Complexity of the new technology	1.35	III
2.	Inadequate and untimely technical advice by the staff	1.60	II
3.	High Cost of Technology	1.95	I

C. Economic Constraints			
1.	Credit is not available as per requirement and when required most	2.0	V
2.	Lengthy and cumbersome procedure of getting credit	2.5	I
3.	High rate of interest	2.05	IV
4.	Stringent recovery procedure	2.3	II
5.	Inadequate subsidy provision	1.95	VI
6.	Lack of investment capacity of fish farmer	2.1	III
7.	Low price of fish	1.5	VII
D. Social Constraints			
1.	Lack of social recognition	1.0	III
2.	Poaching	3.0	I
3.	Groupism in village	2.55	II
4.	Lack of family support	1.0	III
5.	No religious and caste support	1.0	III
E. Extension and Infrastructure Constraints			
1.	Irregular visit of Fishery Extension Officer	1.85	V
2.	Lack of training facility	2.75	II
3.	Inadequate information to the beneficiaries	2.00	IV
4.	Ineffective communication to the beneficiaries	1.85	V
5.	Near absence of demonstration	3.0	I
6.	Lack of storage facilities	3.0	I
7.	Lack of fishery cooperatives	3.0	I
8.	Inadequate periodical supervision	2.1	III
F. Marketing Constraints			
1.	Lack of special market	3.0	I
2.	Lack of transportation facilities to distant market	1.0	II

Women in New Economic Frontiers: The Women Corporate Professionals of Odisha

Prof. Navaneeta Rath

Globalization has swept the world today. Transitions, transplantation and transformations are the necessary outcomes of the process of globalization. Transition of the economy from a pre-modern to a modern one is quite perceptible. Transplantation of ideas, technology from the western hemisphere to this oriental part is rapid and rampant. Transformation in individuals, institutions, roles are spectacular. Time and territory have failed to constraint the process of globalization. Globalization can be defined as “a complex economic, political, cultural, geographic process in which mobility of capital, organizations, ideas, discourses and peoples have taken a global or transnational form (Moghadam, 1999).

One of the most visible outcomes of the process of globalization is the growth in the number of corporate houses because of the taken off character of the developing world (Safadi and Iattimore,

2008). Increasing FDI, technological spill over have significantly contributed towards the mushrooming of corporate which is often termed as the process of corporatization. India has experienced the strategic imperative of globalization to invite more and more multinational corporations. Collaborations and connectivity drive the process of corporatization (Elfrink).

Corporate houses have offered new employment opportunities for women in India. New educational avenues have enabled Indian woman to gravitate towards corporate houses due to lucrative packages, working environments. The recent statistics projects 23 percentage of Indian women are in corporate work force (World Economic Forum, 2010). Corporate houses have put Indian woman in new economic frontiers. The present paper makes an effort to focus on the emerging opportunities and threats for women in this new economic frontier.

Background and Objectives of the Study:

There is a continuous claim about the burgeoning of opportunities for women and betterment of the status of women through her new economic opportunities. Keeping these claims in view, the broad issue was to observe how far women's new economic roles equalize her with her male counterparts and how much they empower the women in reality.

However, the focus of the study hovered around the following specific objectives.

- To trace out the social profile of the women who are integrated into the corporate work force and to note whether there is a linkage between social background and corporate employment of women.
- To assess the opportunities ensured to the women joining corporate workforce.
- To detect the challenges faced by the women corporate professionals.
- To locate their positions in relation to human happiness index.
- Finally to estimate how emancipated, how equal and how empowered the corporate women professionals really are.

Scope of the Study

The geographical scope of the present study is confined to the state of Odisha, one of the bottom ranking states of the country in terms of socio-economic development indicators. The state of Odisha has a rich cultural heritage and its culture is more tradition oriented where gender gap in every sector is quite perceptible. However, the rich mineral deposit of the state, long marine coast, hectares of forest coverage, educational expansion of the state have attracted the flow of FDI since the mid of 1990s, as an aftermath effect of the process of globalization. Technical education has expanded and has cut across the gender gaps resulting in the mainstreaming of women into the new economic frontiers of corporate profession. Today women in the state are making a switch over from traditional stereotyped occupational culture to an upcoming corporate culture. So, the intellectual scope of the study limits itself to make an in depth analysis of gaining and missing elements of life for the women in this process of transition and to note to what extent integration into corporate profession has elevated them by ensuring emancipation, equality and empowerment.

Research Design of The Study

The researcher relied on sampling technique for identifying the respondents for the study. Five categories of corporate

houses were identified for the purpose. They were:

- Software farms
- Manufacturing industries
- Banking sector
- Insurance companies
- Retailing sector

Individual farms in each category were contacted and efforts were geared to give coverage to women professionals from each hierarchy of the corporate. The following table represents the sample coverage pattern of the study.

Table No.1

Sample Coverage Pattern of the Study on Women Corporate Professionals

Name of the Corporate Houses	Nature of the corporate	Total female employees	Location and the Number of women				Sample Total taken	
			Higher/ top level	Middle level	Lower level	Entry level Trainees		
Infosys	Software	204	10	36	128	30	51	56
Wipro	Software	08	-	-	03	05	02	
Satyam	Software	11	-	-	03	08	03	
Jindal	Manufacturing	06	-	-	02	04	02	05
Vedant	Manufacturing	05	-	-	02	03	-	
IMFA	Manufacturing	12	02	02	09	-	03	
Axis Bank	Banking	74	04	22	30	18	19	40
IDBI Bank	Banking	35	-	06	21	08	09	
ICICI Bank	Banking	49	-	08	20	21	12	
Big Bazar	Retailing	42	-	08	14	20	11	16
Reliance Fresh	Retailing	21	-	03	18	-	05	
Alianz Bajaj Insurance	26	-	02	14	10	07	07	
Total Corporate Houses Covered	12	493	15 (3.04%)	87 (17.65%)	264 (53.55%)	127 (25.76%)	124	

- The foregoing table presents an impression that women's participation is spectacularly high in the software sector followed by banking sector and retailing sector. In insurance sector women's share is comparatively lower, the lowest being in the manufacturing sector.
- Further women's share in the higher corporate ladder is very negligible as only 3.04 percent women are in the apex positions and only 17.65 percent are in the middle positions. The bulk of women corporate professionals are located in the lower level of the corporate hierarchy and about a quarter are at the entry level.
- Majority of women corporate professionals covered under the study are in the age group of 21 to 28 years. As age group becomes higher, their share becomes lower. This provides an impression that corporate workforce includes more young aged women which is indicative of the fact that corporate entry and preference for corporate jobs is a post- globalization phenomenon among women in the state.
- The caste wise distribution of the sample corporate women personnel suggests a higher inclusion of higher caste or general caste women in the corporate workforce, their share being 55.65 percent. Progressive culture, economic affluence, better exposure, awareness and access to better education become the supportive elements to integrate higher caste women into corporate employment. The low representation of lower caste women is a reflection of their neglected position in the social hierarchy and the denial of life chances. Further, the reservation norms are not till the date accepted by the corporate recruitment process which does not provide an additional leverage to them.

The study relied on questionnaire method and some personal interactions to elicit the response from the sample corporate professionals and the study was spanned over a period of 8 months from April, 2011 to December, 2011.

Study Outcomes: One of the primary objectives of the study pertained to trace out the social profile of women corporate professionals. The purpose was to detect whether there is a necessary linkage between the social background of the women and their corporate entry. Keeping this objective in view, the study collected information about the social affiliations of the women corporate professionals which is compiled below.

- The predominance of Hindus in the state provides a dominant share to Hindu women in the corporate employment fixing their share at 72.58 percent in the sample studied.
- 54.03 percent unmarried women emerge in the sample which projects an impression that corporate work culture is less conducive to marriage. 18.55 percent sample professionals admit that they are into live-in-relationship which is not culturally accepted. But this syndrome is emerging among them in the corporate culture to derive social security, security to work and adhere to corporate pressure.
- The educational background of the corporate women professionals is perceptibly good as 60.48 percent are B.Tech or M.B.A degree holders and more than a quarter are post graduates. Thus, the study provides a clear cut impression that higher level of education is a pre-condition for entry into corporate sector. Only in the lower rungs of the retailing and insurance sector, the educational level of female workers is low.
- Bulk of corporate women professionals are the natives of urban and semi-urban areas whereas rural women's entry seems to be restricted due to the lack of education, exposure and conservative norms and social taboos.
- Nuclear family background is claimed by 60.48 percent of women professionals in the corporate houses which is suggestive of the fact that nuclear family supports the corporate entry of women.
- Majority of corporate women professionals are from medium sized families having a share of 53.23 percent in the sample.
- 66.13 percent are from moderate family background.
- Almost 55.65 percent of women professionals claim themselves as the first generation women service holders while 38.71 percent are second generation women service holders. But cent percent sample claimed themselves as the first generation of corporate female workers of the family which indicates corporate workforce participation is a recent development in women employment scenario in the state.
- 73.38 percent women professionals have proficiency in multiple languages needed by the corporate employers to cater to the needs of different client across the state and national borders.

Thus, the study results confirmed to the conclusion that there is a “U-shape” relationship between female labour force participation rate and economic development (Fatima and Sultana, 2009). Economic development is no doubt a boon to women’s corporate workforce participation. But the higher aged, lower caste, women belonging to religious minority communities, low educated, married, rural, low economic background women are still in “Purdah” so far as corporate employment is concerned. The exclusion of these categories substantiates the fact that corporate inclusion depends on some definite indicators and the iron curtain is yet to be removed. Social and economic backgrounds necessarily influence women’s corporate workforce integration.

Policy planners and feminist scholars visualize employment as a potent means to empower the women with the logic that it brings forth opportunities and liberate them from gender based role stereotypes. Employment opportunities not only have personal impacts but have many ‘on the job’ and ‘off the job’ positive social consequences (Griffin, 2005). It increases decision making power, ability to exercise choice, enhances bargaining power and provides economic independence (Azad India Foundation). So, in the present study it was one of the prime focus to assess the new

opportunities generated by corporate houses for the women to bring a shift in their status.

It was noted that the opportunities generated through career in corporate houses have social implications and career implications for the women professionals. On the social side, they yield economic self sufficiency, sense of independence, promotion of self esteem and security against odds which together are means to hammer out patriarchy in a conservative state like the Odisha. They are supposed to be the pathways for bringing gender equality by emancipating the women from socio-cultural taboos and empowering them by giving them visibility, voice, bargaining ability and decision making power by exercising choice.

However, the study revealed that these implications are not uniform. Economic self-sufficiency, sense of independence are highly acclaimed to have been delivered by corporate engagement while self-esteem and security against odds are not acclaimed to be received by a spectacular group of women. Sector wise variations bring this differentiation. Particularly in the retailing, insurance and software sector women claim to have least social security and self esteem.

Similarly, from the career perspective, the women corporate personnel claim corporate engagement

contributes towards skill development, exposure to information, creates avenue for innovation and generates an aspiration among them. But, the study noted while skill development and exposure to information are claimed by 42.74 percent and 56.45 percent respondents, scope for innovation and aspiration to reach iconic position are limited to 12.9 and 15.32 percent respondents. Thus the study reached at a conclusion that

- Social opportunities are better for women corporate professionals than career opportunities which establish the fact that corporate employment and work culture are not yet women friendly.
- Location in the corporate hierarchy determines the nature and degree of yield. Higher the position the better is the opportunities and vice versa.
- Opportunities vary sector wise for women depending on the nature of work. Software and banking sectors yield better opportunities than manufacturing, retailing and insurance sector because of their cross national delivery mechanism and adherence to global standards.
- Women corporate professionals have limited scope for innovation which arrests their aspirations to reach iconic positions. Gradual

feminization of corporate jobs has not yet cut across the gender bias.

Corporate employment not only brings opportunities but provides various challenges. Studies of Gold (2004), Hewlett (2002), Nelson and Lips (2009) elaborately point out the basic personal, familial and professional challenges faced by women due to corporate engagement. So, in the present study one of the objectives pertained to locating the challenges faced by women in their corporate work environment. The study noted that women in corporate workforce encounter professional as well as personal challenges.

An impression emerged from the study that professional challenges are multiple for the women corporate workers. Rigidity of time, extended hours of work, rigid target delivery system, uncertain service conditions, career ceiling, voluminous work load, perplex maximum number of women. High rate of command and control, low bargaining capacity and discriminations in terms of assignments, promotions and pay packages dismay them. Their skills, styles and stability are undervalued and their attempt to balance work and family limit their bargaining capacity. Though in many instances, their skills, styles and stability are positive inputs for the corporate houses, yet they remain invisible and undervalued.

A sector wise analysis indicates that in manufacturing sector, target delivery, command and control and uncertain service conditions do not affect the women professionals in a greater intensity while in software, banking and insurance sectors they are quite high.

On the personal side, role conflict is the most important challenge for women as 90.3 percent corporate women professionals are vulnerable to it. Majority of them claim that they have to sacrifice their children for their career. Because, once they are “off the corporate ramp”, getting back “on the corporate ramp” becomes difficult for them as they become stigmatized as “ideal moms, slack employees” or “responsible homemakers, irresponsible corporate leaders”. Till now what Hewlett calls scenic route (part-time work, telecommute method) has not been introduced in the corporate house of the state. Further young girls reported that multiple role playing without adequate sympathy and support paralyze them both at the workplace and home. They either defer their marriage and in many instances they prefer to be lonely without marriage to tune themselves to the corporate pressure. Family entanglement and corporate employment are counter to each other as demand from each front is quite pressing.

Health hazards victimize 67.7 percent corporate women workforce.

High stress, sedentary nature of work bring depression, obesity, eyesight problems, headaches, sodalities, fatigue are reported to be common diseases among them.

54.8 percent women complain about gender stereotyping affecting corporate environments. Women’s caliber, competence are considered as inferior to men. The glass ceiling phenomenon is proved to be peculiarly persistent so far as promotion in the corporate hierarchy is concerned. Job allotments, pay packages, promotions leadership roles are still counted on gender lines as reported by the sample women corporate employees.

One of the basic measures of progress is “Human Happiness”. It is a subjective measure expressed through wellness. Jeremy Bentham in 1789 in his utilitarian philosophy defined happiness in terms of subjective realization or feeling. Veenhoven (2007) proposed self-reports can only spell out happiness. It represents satisfaction an individual derives through well being, quality of life and security index. In the present study, researchers felt it pertinent to make a realistic stock taking of the plights of the corporate women professionals by locating their position in the Human happiness Index through an opinion poll on various indicators that determine their well being, quality of life and security.

The rating made by the corporate women professionals is presented below.

So far as well being is concerned, it is supposed an individual's well being is better when integration with the social milieu is higher and achievement levels are high. But reverse becomes well being situation when integration is low, alienation is high due to the discrepancy between level of aspiration and level of achievement. In the study, the researchers unearthed some pertinent facts from the women corporate professionals. They are:

- Their integration with family, community, neighborhood and society is in decline. But it has not been replaced with by an over integration with the workplace. 51.61 percent (very low and not at all) women corporate workers reveal that their integration with family is not good while 52.06 percent of them admit their integration with community, neighborhood and society is feeble. This is a clear establishment of the fact that corporate engagement brings social and relational disentanglement which in long run may create a great problem for these women leading to social isolation.
- 72.58 percent corporate women professionals have very high

aspirations. They are ambitious. But 77.03 percent of them rate their achievements to be low. This discrepancy brings dissatisfaction. Workplace alienation is reported by cent percent women though the rate and intensity varies. So from the wellbeing angle, corporate women professionals do not seem to be happy. Social integration is declining, isolation is creeping in which is not adequately compensated by workplace achievement. This dismays them and brings workplace alienation which negates human happiness. So far as quality of life is concerned, corporate women professionals claim

- Corporate engagement does not ensure them a life of regularity and relaxation. Excessive work pressure prevents to maintain a daily routine to 66.13 percent sample women professional, while cent percent are devoid of a life of relaxation. A life without regularity and relaxation no doubt degrades their quality of life.
- Dietary intake is qualitatively high for half of the sample women professionals while it is poor for the other half which indicates work pressure occupies overriding importance on diet which may lead to physical impairment in future.

Desire level is high among 80.65 percent of sample corporate women workers which is a healthy sign. The desire is material in character. 66.13 percent of sample respondents complain that they fail to lead a disease free life. Physical strain, mental stress paralyses them. Obesity, migraine, eyesight problems, gastric upsets are the common diseases victimizing these women.

- Diversity of experience adds to the quality of life. In the present study while 59.68 percent corporate women professionals experience diversity 40.32 percent fail to do so. For them life becomes monotonous and mechanical.
- 41.93 percent sample corporate women professionals enjoy dignity and only 24.19 percent report to have autonomy. This clearly indicates that corporate engagement fails to provide adequate autonomy and dignity which are not only basic human rights but supplement to ensure a good quality of life.

Thus, from the perspective of quality of life corporate engagement is not always pro to good quality of life. Though from the surface it seems to be contributing towards a good quality of life, the empirical outcome asserted that its contribution is just monetary and is

quite superficial. From multiple angles, it reduces the quality of life by generating pressure, monotony, physical impairment, loss of autonomy and dignity.

Security entails human happiness. The higher the security level, greater and better is the human happiness and vice-versa. In the study the women corporate workers reported that their corporate engagement is lowering down their physical, emotional and job security. 87.1 percent, 80.64 percent, cent percent and 62.91 percent women corporate workers admitted their physical, emotional, job and cultural security to be poor which makes their position quite endangered. On the other hand, their knowledge, environment (workplace), social security are perceptibly better.

Thus, the study concluded that from the security perspective women corporate professionals are not within a safe ambit. Physical, emotional, job and cultural insecurities persist in corporate engagement. When insecurities loom large, their happiness becomes challenged.

Finally, the study came to a conclusion that corporate engagement seems to open new vistas for ensuring emancipation, equality and empowerment of women. From, the equality angle, its contribution is noteworthy as it has promoted economic

self sufficiency, sense of independence, security against odds, exposure to information and skill development among women without gender considerations. But, till now corporate work culture has not parted with its gender stigmas which is reflected through low bargaining capacity, operation of glass ceiling, operation of gender stereotypes in job allotments, pay packages, allocating leadership roles, integrating women professional in crucial decision making roles. Emancipation from domestic bondages, traditional gender role stereotypes is reflected through the corporate engagement of women. But this emancipation has its own limitations. Emancipation from domestic front and gender considerations have brought new bondages for corporate women professionals. Particularly, the high degree of command and control in the corporate sector, rigidity of time, target delivery, voluminous work load, overtime and extended time of work put them into new bondages. For corporate career, they compromise with their wellbeing, quality of life and insecurities are high for them. Multiple role playing generates role conflict of a high magnitude and they suffer from social exclusion and isolation which brings myriad problems for their inter personal relationship in daily life. Marital discords and subsequent collapse of marriages threaten them.

Empowerment without equality and emancipation has no meaning for them. They become economically empowered but socially and psychologically disempowered. Their voice becomes limited both at the workplace and home due to their lower position in the corporate hierarchy and lack of proper time devotion for the family respectively. Alienation from family, neighborhood and community, lack of autonomy and dignity and absence of physical, emotional, job, cultural and social security contribute towards their disempowerment. Their conceitization, access increases but control decreases making them powerless. Thus corporate women professionals are empowered in letters not in spirit.

Thus, from the suggestions rendered by the women corporate professionals, it emerged corporate work environment in the state needs a revamping to become pro-women in character. The strategic interventions needed to make corporate sector more women friendly in character and to solicit more women integration include

- Flexi time provisions to be introduced for the women to enable them to bring a sound balance between work life and family life and avoid role conflict.
- Home based or work from home culture can enable corporate

houses to avoid its clash with healthy family, a must requirement for a healthy society.

- Women workforce temporarily withdrawing from corporate workforce should not be stigmatized by the creation of “career gaps” rather should be adequately compensated by the evolution of “pro-family or family supportive leaves” for women.
- Glass ceiling should be stopped. Corporate houses should shed with their gender stereotypes. Evaluation should be performance based but not grounded on preferences in gender lines.
- Service conditions are to be clear and defined to reduce the rate of vulnerability of women.
- Women’s skill, style and craze for stability or continuity should be adequately compensated by corporate enterprises by providing

better positions, higher pay packages, higher responsibility allocation and regular promotions. This can increase their productivity, achievement level and can reduce alienation.

- Corporate environment should shed with its rigidity, stress creation to ensure relaxation, promote desire, ensure a disease-free life, give diversity of experience, autonomy and dignity to the women which can elevate her in the human happiness index.

If such revamping can be introduced in the corporate work environment, women can be the maximum beneficiaries of this new economic frontier. Challenges will give way to opportunities, the missing elements will be replaced by economic, social, and psychological gains to put women in an elevated position in the social hierarchy.

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