

Annual Report 2000-2001



National Research Centre for Women in Agriculture
(Indian Council of Agricultural Research)
Bhubaneswar 751 030 (Orissa) INDIA

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NRCWA



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1199, Jagamara, Khandagiri
Bhubaneswar 751 030 (Orissa) INDIA

NRCWA Annual Report 2000-2001

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PREFACE

National Research Centre for Women in Agriculture (NRCWA) has been set up with the mandate of highlighting gender issues in agriculture and undertaking research, extension and training activities that have impact on the life of women involved in agriculture and allied fields.

The institution has launched a number of projects that have implications in the areas of technology generation, refinement and policy formulation.

The Annual Report of the Centre brings out the highlights of its research, training and extension activities carried out during the year 2000-2001 as well as the achievement made towards infrastructural development, faculty development and recruitment of staff.

I would like to express my deep sense of gratitude to Dr R.S. Paroda, Secretary, DARE, Govt. of India and Director General, ICAR for his guidance and sustained support. I sincerely thank Dr P. Das, DDG (AE), Dr B.N. Choudhary, Asstt. Director General (LLP) and Dr B.S. Hansra, ADG (AE) for their kind support.

I wish to compliment my colleagues for making efforts to give their best in the constrained environment of a developing institute. My appreciations are for all the scientific, technical and administrative staff for their co-operation in developing the centre and in bringing out this report. I appreciate the efforts of Dr B.N. Sadangi in compiling this report.

Thanks are due to Dr M.P.S. Arya for Hindi translation, Mr. V. Ganesh Kumar for processing & designing the information and to Miss Rina Das for manuscript typing. The consistent support of Dr G. Singh, Director, CIAE, Bhopal for nurturing the sub-centre of NRCWA, very effectively, is deeply appreciated.

(Dr. Hema Pandey)
Director

EXECUTIVE SUMMARY

National Research Centre for Women in Agriculture (NRCWA) during 2000-2001 has put a strong foundation on research and training for advancing the efforts meant for developing technologies appropriate to farmwomen of different production systems and their dissemination. Besides the above fields, extension programmes in and around the centre have been taken-up for sensitizing and capacity building of the local farmwomen. During the year all the approved research projects which were made operational have started emitting results in the expected lines.

The on-farm research in farming systems has taken up its two important components i.e. identification of farming systems as its 1st step and their improvement in the 2nd step after making due analysis of occupational structure and interest areas of farmwomen. The data generated on nutritional status of farmwomen and dietary patterns of the families from the cross section of the village would help the scientists in testing the food security aspects of various farming systems such as horti-poultry, horti-pulse, horti-fish, horti-groundnut-poultry and horti-pulse-groundnut. Researches in the area of livestock production and management have put forth very strongly the need to revolutionize backyard poultry production and aquaculture through modern strains by involving rural women. Survey conducted to identify and quantify the drudgery of the farmwomen in transplanting of rice under the project entitled "Standardization of women specific field practices in rice for Orissa" may contribute significantly in drawing implications for developing various drudgery reducing technologies. Social science researches, which have focussed on extension for farmwomen and household economy of tribals of Orissa, are expected to highlight meaningful trends and facts useful for the planners and development functionaries. Meticulous planning to study occupational health hazards of farmwomen engaged in distinct occupational structures have been made to expose the severity of physical and mental stresses the women undergoes. As farmwomen has natural interest in seeds and storage of grains, any seed technology, which is blending of ITKs and modern knowledge, would get quick acceptance by the farmwomen. Realizing this NRCWA has implemented a programme of collecting ITKs as an important aspect of project. As an endeavour towards drudgery reduction, our Sub-centre at CIAE, Bhopal has studied the heart rate responses of women in handling the groundnut decorticator and maize sheller of different types.

The centre also organised trainers' training and farmers training programme in important need based areas. The trainers' trainings programmes were "Techniques of improving extension services for farmwomen", "Backyard poultry rearing for economic upliftment of rural women", "Technology for rainfed crops with special reference to women participation", "Motivation management of farm-women" and "Improved technologies of growing roses and gladioli". The sub-centre of NRCWA at CIAE, Bhopal organised one trainer's training programme on women friendly farm technologies. Farmers and farmwomen also got training on mushroom cultivation and vegetable nursery management.

Other achievements of the year included enrichment of library and procurement of important equipment for facilitating research activities. Human resource management and capacity building of the staff members were also given due importance.



1. THE INSTITUTE

1.1. Brief history

The Working Group in Agricultural Research and Education constituted by the Planning Commission for the formulation of the Eighth Five Year Plan (1992-97) in its report has recommended establishing a National Research Centre for Women in Agriculture (NRCWA) during the Eighth Five Year Plan. Accordingly, the Indian Council of Agricultural Research has established the NRCWA in the month of April 1996 at Bhubaneswar. Since then, the NRCWA is functioning in a rented building. The Sub-centre of NRCWA is located at CIAE, Bhopal, which is functioning under the technical and administrative control of Director, CIAE, Bhopal.

1.2. Mandate

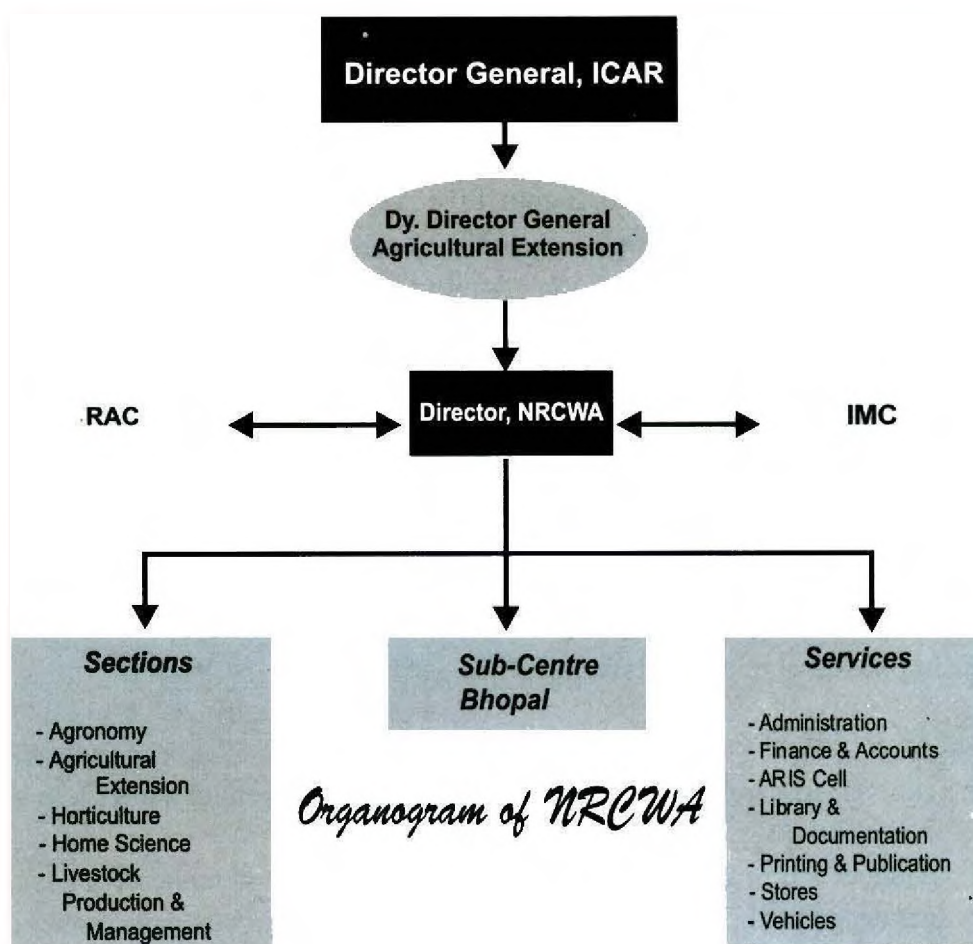
The Mandate of the NRC is “to develop technologies appropriate to farmwomen of different production systems and to disseminate it backed by the increased sensitivity and capability of research and development specialists addressing the issues pertaining to gender implications in agriculture and allied activities”.

The broad objectives of the NRCWA are to-

- conduct research aiming to strengthen the use of gender analysis in research and technology development ;
- conduct training and to develop training modules and manuals for sensitizing gender related issues in research programme and policy development ;
- develop and test women-specific extension models for technology transfer;
- collaborate in women-specific research, education and technology assessment and refinement with relevance to national and international organization;

- act as a repository of information relevant to women in agriculture and provide consultancy services within and outside the country on women-specific research projects and programmes;
- conduct survey to identify and quantify women's roles in various agricultural and allied activities with special reference to agricultural machines, tools and implements;
- create ergonomic database on female workers for use in design of implements/work space;
- identify, assess and refine available agricultural engineering technologies for farmwomen ; and
- assess health hazards in some important crop production/processing

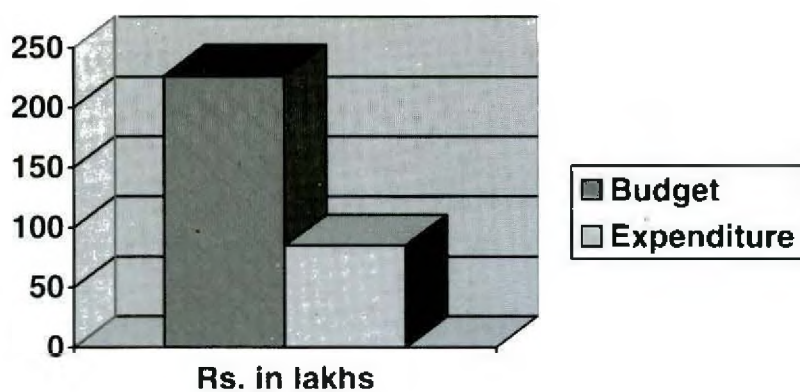
1.3. Organogram



1.4. Budget and Expenditure

Rs. in Lakhs			
Sl.No.	Head of Account	Budget	Expenditure
1.(a)	Estt. Charges including LSP and PF contractual charges	46.00	41.00
(b)	HRD	5.00	-
2.	Traveling Allowances	2.43	2.93
3.	Other charges including equipments	73.00	24.58
4.	Works as per approved EFC		
	Special repairs		
	Major works	100.00	23.44
	Total	226.43	91.95

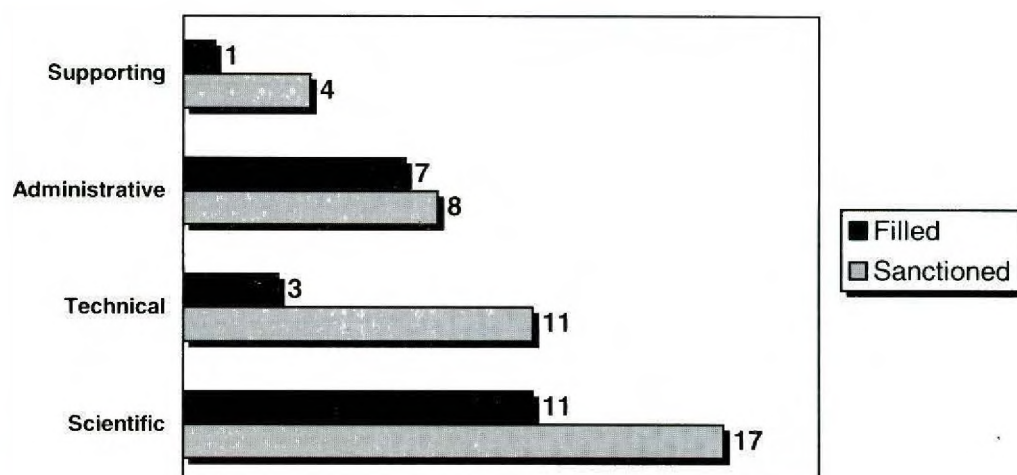
Budget of NRCWA for the year
2000-2001



1.5. Manpower

Category	Sanctioned	Filled	Vacant
Scientific	17	11	6
Technical	11	3	8
Administrative	8	7	1
Supporting	4	1	3
TOTAL	40	22	18

Staff Strength



1.6. Scientific Staff

Sl. No.	Discipline	Sanctioned Strength			In position as on 31.3.2000		
		Scientist	Sr. Scientist	Pr. Scientist	Scientist	Sr. Scientist	Pr. Scientist
1	DIRECTOR	RMP (1)			RMP (1)		
2	Agricultural Economics	1			1	----	
3	Agricultural Entomology		1			----	
4	Agricultural Extension		1	1		----	1
5	Agronomy			1		----	1
6	Farm Machinery and Power		1			----	
7	Food and Nutrition	1			1	----	
8	Child Development		1			----	
9	Home Development Resource Management			1		----	1
10	Livestock Production and Management			1		----	1
11	Dairy Technology		1			----	
12	Fish Processing Technology		1		1*	----	
13	Horticulture	2	1	1	2	----	1
Total		4	7	5	5	----	5

* One scientist (F&F) working against the post of Senior Scientist (Fish Processing Technology)

1.7. Technical Staff

Designation	Sanctioned Post	In position as on 31.3.2001
Technical Assistant (T-II-3)	9	2*
Technical (T-I)	2	1

**One Technical Assistant (T-4) joined on transfer against the post of T-II-3, one T-II-3 has been posted at Sub-centre, CIAE, Bhopal.*

1.8. Administrative Staff Including Supporting Staff

Designation	Sanctioned post	In position as on 31.3.2001
Asstt. Administrative Officer	1	1
Asstt. Finance and Accounts Officer	1	1
Personal Assistant	1	1
Sr. Clerk	2	1
Stenographer, Gr-III	2	2
Jr. Clerk	1	1
S.S.G. I	4	1
Total	12	8





2. RESEARCH ACCOMPLISHMENTS

2.1. Identification and improvement of farming systems suited to farm women in Eastern India

The project was launched in an adopted village Khamang Sasan (District – Khurda) during Kharif season in 1999. Preliminary information was collected on the interest and preference of farm women through P.R.A. Experiments were undertaken on the identification of crops and their varieties and other cultivation practices suited to farmwomen. Introduction of improved strains of poultry and fisheries was also made for sustainability of farming system.

2.1.1. Occupational status and preference of farmwomen of the village

(B.N. Sadangi, H.K. Dash, P.K. Sahoo)

The present study aimed at eliciting facts about different aspects of women's involvement in agriculture and allied sectors and their preferences, which could be of much value to the researchers for farming system research. Complete enumeration procedure was adopted in the village.

Regarding the demographic features of the village, female constituted 46.56 per cent of the total population of the village. Caste-wise, 45 belonged to general categories, 89 belonged to scheduled caste and 232 belonged to moderate caste (OBCs). Out of 366 females, 268 (i.e. 73.22 per cent) were in the age group 15 years and above. Regarding the distribution of these women, 39 (i.e. 14.55 per cent) belonged to the general categories group, 165 (i.e. 61.57 per cent) belonged to moderate caste group and 64 (i.e. 23.88 per cent) belonged to the scheduled caste group. Like any other rural set up, here also, part of the cultural definition of female is her association with the inside, the home and the courtyard where she cares for her family. The definition of inside and the precise boundaries where a woman can operate vary greatly according to economic

status of the household, its place in caste hierarchy and social norms prevailing in the community and the region.

Activities undertaken by village women can be categorized as either primary or secondary. Primary activities are those, which are very important and basic for the family sustenance, and women devote more time to these activities. More than one activity may be primary or secondary for a woman. For example, household and post harvest operations may be primary for some women. Similarly, there is more than one activity, which are secondary for a woman. For example, both Post-harvest Operation (P.H.O.) and livestock rearing may be secondary activities, while household is the primary activity. As to the extent of participation of women in different activities, out of 248 women in the age group of 15 - 60 year. 200 (i.e., 80.64 per cent) performed household work and for 140 (56.45 per cent) women, it was a primary activity. 132 (53.22 per cent) women perform some kind of post harvest operations (P.H.O.) and for 50 (20.16 per cent) women, it was a primary activity. Seventy-four (29.84 per cent) women were in some way related to livestock rearing. But, 12 (5.6 per cent) took up this as primary activity. One hundred forty (56.45 per cent) women are engaged in some agricultural activity of which 78 (31.45 per cent) were involved only in vegetable growing on their own field/homestead. Twenty two (8.87 per cent) women took up vegetable growing as a primary activity. Twenty eight (i.e. 11.29 per cent) were involved in activities related to rice and other crops on their own field. But 10 (4.03 per cent) women took it as a primary activity. Thirty four (13.71 per cent) women were engaged as agricultural labourers. For 24 (9.68 per cent) women, it was a primary activity.

Thus, 56 women (22.58 per cent) took up agriculture as their primary activity or occupation and 82 (33.06 per cent) women took up this as secondary occupation (Table-1). In toto, 55.64 per cent of women in the working age group (15 – 60 years) were involved in some kind of on-farm activities.

Table-1: Extent of involvement of women in different activities

Sl. No.	Activities	No. of women doing these activities		Total
		As primary (Frequency and %)	As secondary (Frequency and %)	
1	Household	140 (56.45)	60 (24.19)	200 (80.64)
2	Post harvest operations (PHO)	50 (20.16)	82 (33.060)	132 (53.22)
3	Livestock rearing	12 (4.84)	62 (25.00)	74 (29.84)
4	Agriculture			
a)	Involved in Vegetable growing in own field/ homestead	22(8.87)	54 (21.77)	76 (30.64)
b)	Involved in rice farming on own field	10 (4.03)	18 (7.26)	28 (11.29)
c)	As wage labour	24 (9.68)	10 (4.03)	34 (13.71)
Total in agriculture		56 (22.58)	82 (33.06)	138 (55.64)

(Figures in the parentheses indicates per cent w.r.t. women in the working age group. 15-60 year)

It may be mentioned here that even though male and female below the age of 15 and above 60 years of age were involved in a variety of activities, while calculating male/female work participation ratio they were excluded and only persons in the age group of 15—60 year were considered.

What they want to do?

Even though women of the village were involved in multifarious activities, they had preference for certain enterprises/vocations depending on personal, socio-cultural and economic factors. The most preferred vocation was found to be dairy. As out of 248 women, 70 (28.22 per cent) revealed their preference for dairy, 32 (12.90 per cent) preferred poultry, 30 (12.10 per cent) preferred for fishery, 12(4.84 per cent) preferred goatry and sheep rearing, 28 (11.29 per cent) preferred for vegetable growing , 8 (3.23 per cent) expressed their preference for crop husbandry, 8(4.10 per cent) preferred food processing, preservation and mushroom cultivation and 3 women (1.21 per cent) preferred fodder cultivation. Eight women (3.23 per cent) expressed their preference for tailoring and coir making. Rest of the women (18.8 per cent) did not reveal their preference most of whom are college going students. While dairy as a vocation was preferred by the families across the caste groups, poultry and goatry were preferred by low caste families. Some poor families from moderate caste group also preferred poultry. It was observed that family had shown preference for more than one enterprise.

Table-2 : Enterprises Preferred by Women

Sl. No.	Enterprise/Vocation preferred	Frequency	Percentage
1	Dairy	70	28.22
2	Poultry	32	12.90
3	Fishery	30	12.1
4	Goatry /Sheep rearing	12	4.84
5	Vegetable growing	28	11.29
6	Crop production	8	3.23
7	Processing, preservation, mushroom cultivation	8	4.10
8	Fodder cultivation	3	1.21
9	Tailoring, coir making	8	3.23

The above observations will be used as guidelines to plan farming system research.

2.1.2. Identification of farming systems

Fieldwork was undertaken in this project by initiating the experiment to identify the suitable farming systems and making improvement in them. The following five farming systems were tried in this project in the adopted village.

- Horti-Poultry
- Horti-Pulses
- Horti-Fish
- Horti-Groundnut-poultry
- Horti-Pulse-Groundnut

The progress of on-farm research in different farming systems is mentioned below:

2.1.2.1. Horti-poultry system

(S.N. Pandey, K.S. Risam and L.P. Sahoo)

Vegetable crops

Brinjal var. BB44 showed better survival (54.54 per cent) after transplanting than BB 45C (15 per cent) but the latter variety gave more yields per plant (1.30kg) than the former (0.73 kg). Total yield of brinjal in this farming system was 63.50 kg (Table 3).

In chilli, Sel. 240 recorded the yield of 50g green chillies/plant, which appeared quite low as compared to its yield recorded in pot culture (300g/plant) and on field of a farm woman (400g/plant) in one season and upto one kg/plant in 14 months of plant age, as reported in the foregoing pages. This implied that pilferage might have taken place at the will of consumer and the farmwomen appeared to have ignored it while reporting its yield (Table-12).

Bottlegourd variety Rajendra Chamatkar out yielded (5.8 kg/vine) local type (0.38 kg). Sweet potato variety Sree Nandini yielded 45 kg and Sree Samrat yielded 67 kg on one of the two farmwomen's fields during the period under report. Apparently, Sree Samrat performed better in yield than the former variety considering equal number of plants (200) planted in the field. Data on plant survival was not available, so the yield per plant could not be calculated (Table-4).



Table-3 : Performance of brinjal and chilli in different farming systems (2000-2001)

Farming system	No. of farm families	Brinjal var. BH 44				Brinjal BH 45C				Chilli Selection 240			
		Plants supplied (No.)	Plants survived (No)	Yield (kg)	Mean yield per plant (Kg)	Plants supplied (No.)	Plants survived (No)	Yield (kg)	Mean yield per plant (Kg)	Plants supplied (No.)	Plants survived (No)	Yield (kg)	Mean yield per plant (Kg)
Horti-pulse	3	200	30	2.00		100				200			
		200	60	63.00		100	37	43.00		200			
		200	140	124.00		100	80	32.00		200	60	4.00	
		600	230 (82.1 per cent)	189	0.82	300	11.7 (39.0 per cent)	75	0.64	600	60	4.00	0.06
Horti-groundnut-poultry	3	100	91	198.00	1.51	100	35	238.00	3.52	200	42	1.00	
		100	35	50.50		40	15	31.50		100			
		100	45	15.50		10	6	4.00		100	60	0.50	
		200	50	71.90		100	40	15.00					
		500	221	335.40		250	86	303.5		400	102	1.50	0.014
Horti-poultry	2	60	20	20		100	15	19.50		60	37.00	2.00	
		50	40	24.00						50			
		110	60 (54.54 per cent)	44.00	0.73	100	15	19.50	1.30	110	37.00	2.00	0.05

Poultry production

Under this project a total of 186 chicks (4 week old) were reared in backyards of 19 farmwomen belonging to different castes and land holding categories to study their performance under scavenging conditions . The birds were routinely vaccinated, provided anthelmintic dosing and mineral / vitamin supplementation. The family wise means for body weight ranged from 975.0 ± 0.0 to 1600.0 ± 389.18 g at 40 weeks of age; and 1075.0 ± 0.0 to 1875.0 ± 625.0 g at 50 weeks of age. The male birds weighed higher at all stages in comparison to females.

The hens started laying at the age of 20 weeks. As per the records available average number of eggs layed per bird per month varied between 12 and 17. Out of these, two third of eggs were sold and only one third consumed by the family members. This provided good subsidiary income to the farm families.

2.1.2.2. Horti-groundnut-poultry system

(S.N. Pandey, K.S. Risam, M.P.S. Arya, L.P. Sahoo)

Vegetable crops

Four farmwomen grew vegetable crops like brinjal, chilli and sweet potato. In brinjal, var. BB 45C out yielded (303.5 kg) from 86 plants to BB 44 (335.4) from 221 plants with better mean yield (3.5 kg) per plant than BB 44 (1.51 kg). Chilli Sel. 240, however, gave a poor yield (1.5 kg) from 102 plants in the absence of plant protection

measures against insects affecting the growth and yield adversely during prolonged rainy season (Table-3). Sweet potato var. Sree Samrat out yielded (61.0 kg) Sree Nandini (5.0 kg) keeping in view the equal number of plants (200) provided to each farmwoman in these two cultivars during the period under report (Table-4).

Table-4 : Performance of sweet potato and bottlegourd in different farming system

Farming System	No. of farm families	Sweet Potato		Bottlegourd					
		Sree Nandini		Sree Samrat		Rajendra Chamaikar		Local Selection	
		Plants supplied (No.)	Yield (kg)	Plant supplied (No.)	Yield (kg)	Plant supplied (No.)	Yield (kg)	Plant supplied (No.)	Yield (kg)
Horti-pulses	1	200	37.00	200	6	10	50	25	-
Horti-groundnut	1	200	5.00	200	61	-	-	-	-
poultry									
Horti-poultry	1	200	3	200	9	10	8.00	25	9.5
Total		600	45	600	76	20	58	50	9.5

Groundnut

Groundnut variety AK 12-24 was evaluated in the fields of 14 farmwomen under different farming systems. The crop was raised following all the recommended practices and sowing was done in the second fortnight of December, 1999 and was harvested in April 2000. The number of seedling recorded at germination varied from 6.6 to 10.3/m² (Table 5). Weed population varied from 4.0 to 42.67/m² and pod yield was recorded from 6.67 to 33.33 q/ha. Water logging, attack of white ant and weevils and damage by monkeys were the reasons behind lower yields. However, the highest yield of 33.33 q/ha was recorded at the field of one of the farmwomen under horticulture, groundnut-mung-urd system followed by 26.40 q/ha under horticulture-groundnut-poultry system.

Table-5 : Germination, weed count and yield of groundnut (*Arachis hypogea*) variety AK 12-24 under different farming systems

Sl.No	Particulars of farming system	No. of plants/ m ²	No. of weeds/ m ²	Yield (q/ha)	Remarks
1.	HG 1	7.0	4.00	16.50	White ant and weevil damage
2.	HG 6	10.3	72.00	16.50	-do-
3.	HG 2	8.0	38.67	24.75	-----
4.	HGMU 2	8.4	34.67	33.33	-----
5.	HGMU 1	8.0	34.67	6.67	Monkey damage
6.	HG 5	9.6	8.0	19.80	White ant damage
7.	HGP 1	10.3	2.67	26.40	-----
8.	HG 3	-----	-----	-----	Water logging
9.	HGP 4	7.6	42.67	24.75	-----
10.	HGP 2	9.6	37.33	23.00	-----
11.	HGP 6	9.0	10.67	13.20	White ant damage
12.	G1	6.6	33.33	19.80	White ant damage
13.	HGP 3	9.0	26.33	11.55	White ant damage
14.	HGP 7	7.0	41.67	9.90	White ant damage



Poultry production



Under this programme three scheduled caste farmwomen were provided 10 chicks (4 week old) each to study their performance in scavenging conditions under horti-groundnut-poultry farming system. Two of the families belonged to marginal land holding categories, whereas third one was landless. The birds were routinely vaccinated, provided anthelmintic dosing and mineral/vitamin supplementation. The family wise means for body weight of birds ranged from 1203.57 ± 133.46 to 1460.0 ± 159.02 at 40 weeks of age; and 1100.0 ± 0.0 to 1337.5 ± 243.35 g at 50 weeks of age.

The hens started laying eggs at about 21-22 weeks of age. But due to super cyclone most of the birds and houses of these families were destroyed and, as such, the families could make no proper recording of egg production. However, as per the farmwomen, they received 12 – 15 eggs per bird

2.1.2.3. Horti – Pulses system

(S.N. Pandey, M.P.S. Arya, L.P. Sahoo)

Vegetable crops

Three farmwomen families grew brinjal, chilli, bottle gourd and sweet potato in this system (Table 3 and 4). Brinjal var. BB 44 gave better plant stand (82.1 per cent) than BB 45C (39.9 per cent). BB 44 out yielded (189 kg) to BB 45C (75 kg) with marginally higher yield per plant (0.82 kg) than BB 45C (0.64 kg). Chilli sel. 240 gave 4.0 kg yield with mean yield per plant (60 g) in this system.

Green gram

Green gram (*Vigna radiata* Welczek) variety K 851 was taken under this farming system at the farms of fourteen farmwomen. The sowing was done in the month of February, 2001. The germination and growth were recorded to be the normal. The experiments were in progress for taking further studies.

2.1.2.4. Horti-fish system

(S.N. Pandey, P.K. Sahoo and L.P. Sahoo)

Vegetable crops

Seedlings of tomato cv. Utkal Deepti and Hybrid Pooja, brinjal var. BB 45C and chilli cvs. Utkal Ragini and Utkal Ava and Sel. 240 and 95 were raised on 10 farmwomen's fields under horti-fish farming system on February 13, 2001. The seedlings of tomato were treated with NAA (Planofix) and CPPU to mitigate the adverse effect of hot weather by completing early growth and flowering. Plants of tomato and chilli were tagged with labels of different colours for easy identification during recording of data.

Tomato plants got mixed up by farmwomen during transplanting and variety-wise data on survival and plant growth could therefore, not be recorded.

Plant survival in brinjal BB 45C varied with farmwomen from 20.0 per cent to 80.0 per cent, which indicated the difference in care to plants taken by different persons. Similar situation was noticed in chilli Sel. 240 (10.0 per cent to 35.0 per cent), Sel.95 (40.0 per cent - 75 per cent), Utkal Ava (60.0 per cent - 77.5 per cent) and Utkal Ragini (60 per cent - 84 per cent). There appeared a lack of care in transplanting Sel. 240 by farmwomen because during the last two years of study, this selection had given good plant stand in the pots as well as fields. Brinjal var. BB 45C attained plant height of 20.50 to 34.83 cm recorded 40 days after transplanting on 25.3.2001. Chilli Sel. 240 (10.2 - 29.16cm) showed more variation in plant height than Utkal Ava (13.8 - 29.7 cm) 20 days after transplanting on 25.3.2001. Plants of Sel. 95 and Utkal Ragini could be supplied to 5 farmwomen only, as the plants were pilfered from the nursery beds. However, chilli Sel. 95 and Utkal Ragini could survive with only two farmwomen and each variety recorded almost equal plant height with 18.2 and 18.8 cm and 21.33 and 22.3 cm on two farmwomen's fields (Table-6).

The fruiting and yield of these plants will be reported in the next report.

Fish culture

Ten ponds were selected and fries were released in the month of September, 2000. Since inputs were not provided, pond management activities could not be taken up. However, data on fish production will be available in May - June, 2001 and the same will be published in the next report.

Table-6a : Survival and growth of plants in Horti-Fish farming system (Transplanted in February, 2001)

Farm families	Brinjal var. BB 45C			Chilli					
	Plants provided (No.)	Plants survived (No)	Plant height on 25.3.01 (cm)	Selection 240			Utkal Ava		
				Plants provided (No.)	Plants survived (No)	Plant height on 25.3.01 (cm)	Plants provided (No.)	Plants survived (No)	Plant height on 25.3.01 (cm)
1	60	25 (41.66)	20.5	100	15	19.8	25	19 (76.00)	29.7
2	60	47 (78.33)	20.71	100	23	18.2	40	31 (77.5)	16.16
3	60	40 (66.66)	34.83	100	15	11.8	25	15 (60.00)	21.3
4	60	48 (80.00)	30.8	100	10	24.6	25	18 (72.00)	23.8
5	60	12 (20.00)	23.4	-	-	-	-	-	-
6	60	28 (46.66)	28.5	100	0.00	-	25	0.00	-
7	60	25 (41.66)	26.2	100	30	22.16	40	30 (75.00)	13.8
8	60	29 (48.33)	29.5	100	35	29.16	-	-	-
9	60	48 (80.00)	-	100	27	10.2	-	-	-
10	60	15 (25.00)	-	-	-	-	-	-	-

The figures in parentheses show percentage survival

Table-6b : Survival and growth of plants in Horti-Fish farming system (Transplanted in February, 2001)

Farm families	Chilli					
	Selection 95			Utkal Ragini		
	Plants provided (No.)	Plants survived (No)	Plant height on 25.3.01 (cm)	Plants provided (No.)	Plants survived (No)	Plant height on 25.3.01 (cm)
1	25	10 (40.00)	18.2	25	21 (84.00)	21.33
2	40	30 (75.00)	-	40	27 (67.50)	-
3	25	10(40.00)	18.8	-	-	-
4	-	-	-	25	15 (60.00)	22.3
5	-	-	-	-	-	-
6	25	0.00	-	25	0.00	-
7	25	0.00	-	25	0.00	-
8	-	-	-	-	-	-
9	-	-	-	-	-	-
10	-	-	-	-	-	-

The figures in parentheses show percentage survival

2.1.3. Assessment of new varieties of fruits, vegetables and food crops and their production technology for the improvement in farming systems

2.1.3.1. Performance of grape varieties (S.N. Pandey)

Newly evolved grape varieties from IARI, New Delhi viz. Pusa Urvashi and Pusa Navrang transplanted in 1999 and a wild type of grape family Vitaceae collected by exploring Khandagiri forests on July 16, 2000 were raised in the courtyard of the Centre on bower for studying their performance under Bhubaneswar conditions.

Pusa Navrang (Madeleine Angevine X Rubired) released for making coloured wine and juice, performed extremely well in respect of vine growth. This showed tolerance to anthracnose during rainy season, as the disease could very well be managed with timely application of Blitox. Vines pruned during April put forth adequate growth, which was again pruned on 10.11.2000 for fruiting shoots. One of the vines bore single bunch, which was pilfered and fruit could therefore, not be tested for quality. This variety bore panicle in December and thus suits well for its cultivation under Bhubaneswar condition because grapes will ripe in March-April.

Pusa Urvashi (Hur X Beauty Seedless), suitable for fresh grapes and raisin making, put forth very weak growth and was found very susceptible to anthracnose disease.

Both varieties exhibited a high degree of apical dominance, which is revealed by data presented in Table-7. All cuttings planted in nursery gave rise to plants.

The wild type of Vitaceae showed good growth, although its cuttings were found difficult-to root. Only one of 20 cuttings planted could establish as a plant. Wild material possessed resistance genes for fungal diseases and berry rotting due to rains and will thus prove a useful breeding material for resistance breeding. This wild type came to fruiting during rainy season in its natural habitat and fruits ripened in September. Plants raised in pots in August bore panicles in October in 1999. This wild type needs to be identified and preserved in gene bank.



Table-7 : Nodal position of shoot growth after pruning in grape

Variety	Pruned vines (20.12.2000)			Un-rooted cuttings planted in nursery (19.12.2000)		
	Cane No.	No. of nodes retained on canes	Nodes giving rise to shoots	Cutting No.	No. of nodes retained above ground	Nodes giving rise to shoot
Pusa Navrang	15	13.33	12.65	30	4.03	3.32
Pusa Urvashi	5	11.60	8.9	10	3.2	2.9

Data revealed that there was a pronounced effect of apical dominance and the lower buds therefore, could not sprout. This necessitates application of Hydrogen Cyanamide or any other dormancy breaking chemical for sprouting more number of buds for optimum yield.

2.1.3.2. Evaluation of chilli (*Capsicum annuum* L.) selection-240 (S.N. Pandey)

Refined chilli 'Selection-240', reported previous year, has been featured in the 'Limca Book of Records 2001' for its highest number of chillies per plant(146) in one harvest.

This selection showed very good performance with respect to yield per plant in the pot (300g) as well as on farmwomen's' fields (400g) in one cropping season against commercial variety Utkal Ragini in pot (237.5 g). An added advantage of this selection is that it continued fruiting in the second cropping season and altogether yielded 1.0 kg chillies per plant at 14 months of age. It appeared that this selection has a potential of yielding more than recorded yield of commercial var. Utkal Ragini (175-180 q/ha). Plant of this selection was shorter (49.66 cm.) but showed more spread (33.3 cm E-W, 36.6 cm N-S) than Utkal Ragini (56.0, 28.7, 29.6 cm). In organoleptic evaluation, this selection was liked more with overall score of 8.3 out of 10.0.

2.1.3.3. Effect of off-season sowing on growth and fruiting of tomato (*Lycopersicon esculentum* L.) (S.N. Pandey)

Experiment was conducted to find out the effect of transplanting date on the growth and yield of tomato cv. Utkal Deepti. Since the seeds of Hybrid Pooja were available only in January, 2000, the same was transplanted at a later date along with Utkal Deepti to find out the suitability of variety for late sowing. The results are presented in Tables 8 and 9.

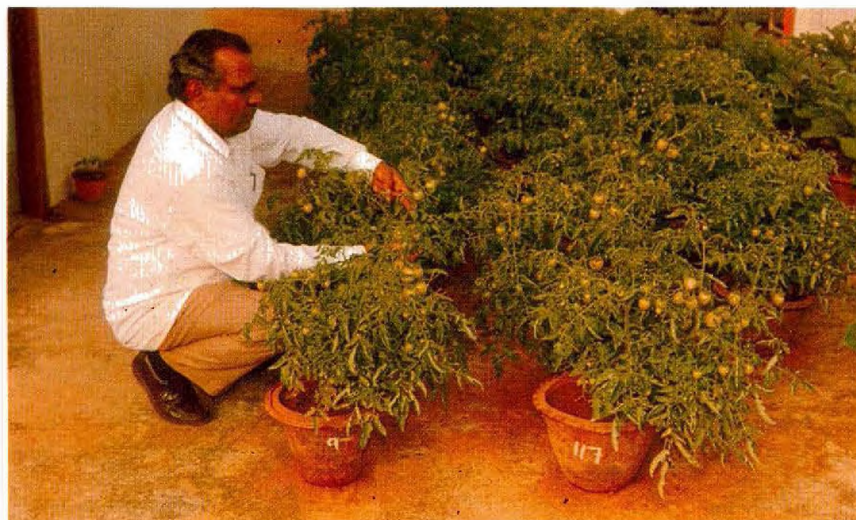


Figure-I:
Performance of
Hybrid tomato variety
Pooja in off-season

Table – 8 : Effect of transplanting date on growth of tomato plant

Variety	Transplanting		Survival		Plant height (cm)	Root growth		Weight (g)	Nature
	Date	No. of plants	No. of plants	per cent		Max. length (cm.)	Max. spread (cm.)		
Utkal Deepti	5.12.1999	50	43	86.00	46.40	28.03	13.41	12.79	Fibrous
	10.1.2000	15	12	80.00	41.07	33.75	13.91	24.91	Fibrous
Hybrid Pooja	10.1.2000	15	12	80.00	41.60	29.81	14.54	29.36	Fibrous

Table- 9 : Effect of transplanting date on yield of tomato

Variety	Transplanting date	Harvesting period		Fruit number		Fruit weight (g)	Yield	
		Date	Duration (days)	Total	Per plant		Per Plant (g)	Total (kg)
Utkal Deepti	05.12.99	21.2.2000 to 03.4.2000	41	1160	26.97	19.20	517.98	22.273
	10.1.2000	3 – 13, April	11	89	7.40	27.24	211.60	2.425
Hybrid Pooja	10.1.2000	3 – 13 April	11	129.00	10.75	40.50	475.00	5.225

Transplanting date affected plant growth and yield in tomato cv. Utkal Deepti markedly. Transplanting in December gave more plant height (46.4 cm.), duration of harvest (41 days) and yield per plant (517.98 g) than January transplanting (41.07 cm, 11 days, 211.6g, respectively). Root growth was, however, lesser in early transplanting in terms of the length, spread and weight of roots. Hybrid Pooja, transplanted on later date only gave the same plant height (41.60 cm) and harvest duration (11 days) to that of Utkal Deepti on the same date of transplanting.

Hybrid Pooja yielded bigger fruit (40.50 g) and more yield (5.225 kg) than Utkal

Figure-II: Tomato variety – Utkal Deepti suitable for pot culture



Deepti and its plants in pots thus needed staking unlike Utkal Deepti, which supported fruits with its own strength. Utkal Deepti was therefore, found to be a suitable variety for growing in pots. Late transplanting, delayed flowering and rising temperatures in April restricted the harvest period to only 11 days as against 41 days in early transplantation in December. Higher temperatures in April also appeared conducive for root growth in both varieties.

Thus, it may be concluded that tomato transplanting should not be delayed beyond December and var. Hybrid Pooja bearing bigger fruit is suitable for table use and needs staking. However, var. Utkal Deepti was found to be suitable for growing in earthen pots.

2.1.3.4. Effect of transplanting date on growth and yield of brinjal (S.N. Pandey)

Super cyclone of October 1999 made field unfit for sowing till December. Brinjal (*Solanum melongena*) cvs. Pusa Uttam was transplanted on December 5 and 27, 1999 and January 10, 2000 to find out the effect of date of transplanting on growth and yield



of brinjal through pot culture experiment, so that the farmwomen could be advised appropriately in this matter under such situation of natural calamity. Pusa Hybrid-5 plants were transplanted on January 10, 2000 to find out the performance of these two varieties under late transplanting condition.

Survival of plants of Pusa Uttam (90 per cent) and Pusa Hybrid-5 (84 per cent) was remarkably high. January transplanting gave more number of fruits (4.07) and yield (378.8 g) per plant than December transplanting (1.70 – 3.43 and 82.5 – 315.21 g) on two different dates. Under late transplanting (January), Pusa Uttam performed better in terms of fruit number/plant (4.07), fruit weight (92.90 g) and yield per plant (378.8 g) than Pusa Hybrid-5 (2.33, 59.52 g, 137.44 g).

Root length and spread did not give any pattern but weight (29.66, 37.93, 40.35 g) increased progressively with later dates of transplanting in Pusa Uttam. Root system of Pusa Hybrid-5 was shorter (29.76 cm) but heavier (64.33 g) than Pusa Uttam (35.64 cm, 40.35 g) in January transplanting (Table-10).

Table-10 : Effect of date of transplanting on yield of brinjal

Variety	Trans-planting date	Fruit No.		Fruit weight (g)	Yield upto 13.4.2000		Root growth			
		Per plant	Total		Per plant (g)	Total (kg)	Max. length (cm)	Max. spread (cm)	Weight (g)	No. of nematode nodules
Pusa Uttam	05.12.99	3.43	79	91.77	315.21	7.250 (24)	36.33	12.72	29.66	150
	27.12.99	1.70	18	68.75	82.50	0.825 (17)	42.68	10.66	37.93	-
	10.1.2000	4.07	53	92.90	378.8	4.925 (18)	35.64	9.29	40.35	-
Pusa Hybrid-5	10.1.2000	2.33	42	59.52	137.44	2.50 (21)	29.76	10.38	64.33	215

Figures in parentheses show number of bearing plants.

Thus January transplanting of brinjal was found more profitable than December transplanting and var. Pusa Uttam performed better than Pusa Hybrid-5 in January transplanting under Bhubaneswar conditions. Both varieties were susceptible to root knot nematode.

2.1.3.5. Improving seed germination and fruit growth in okra (*Abelmoschus esculentus*) cv. A-4 (S.N. Pandey and Bharati Killadi)

Some treatments reported by the senior author in the previous year for improving seed germination, plant growth and yield and escaping plants from root knot nematode infestation, so as to fit it into the late harvested rice-based farming system, were tried during the period under report for confirming the previous results. Cow urine, which inhibited seed germination totally in the previous year, was used for seed pre-treatment in the diluted concentrations and lesser volume (10 ml/treatment) than previous year

(25 ml) to see its effects on seed germination and plant and fruit growth during the period under report. The volume of solution in other selected pre-treatment on the basis of previous results was, however, maintained at the same level (50 ml.).

Experiment with cow urine was undertaken with 8 treatments, 10 replications and 50 seeds per treatment on 14.7.2000. Another experiment with urea and growth regulators included 5 treatments, 14 replications and 70 seeds per treatments. Both experiments were laid out in pots under randomised block design on 19th July, 2000. The results are presented in Table 11.

Interestingly, seed germination in okra cv. A-4 was much better (82 per cent) in water soaking pre-treatment during the period under report than previous year. Unlike the previous year, when water soaking gave only 20 per cent seed germination and some pretreatments like urea (1 per cent) and GA3 (100 ppm) + urea (1 per cent) improved germination markedly over control, the same pre-treatments failed to improve germination over water soaking (control) during the period under report. Germination of seeds in all pre-treatments ranged from 42 per cent to 70 per cent. Good seed germination during the period under report, in general, appears to be the effect of season, as the seeds were sown in January and February in 1999, whereas those during the period under report were sown in July, 2000. Fruit length (9.62 cm) and diameter (1.49 cm) were more with urea (1 per cent) pre-treatment over control (9.08, 1.39 cm). Urea pre-treatment increased plant height marginally (31.50 cm) over control (29.83 cm).



Table-11: Effect of cow urine and urea and their combination with growth regulators on germination growth of plant and fruit of okra cv. A-4

Sl. No.	Treatment	Seed germination (per cent)	Plant height (cm)		Fruit growth		No. of fruits res. Plant	Diameter (cm)	Yield per plant (g)
			9.8.2000	8.9.2000	Weight (g)	Length (cm)			
1.	Whole cow urine (50 ml)	42.00	10.58	28.62	11.68	8.67	3.41	1.16	39.82
2.	Cow urine (25 ml.) + CPPU (0.1 per cent) (25 ml.)	70.00	7.70	29.66	16.63	8.23	3.45	1.28	57.37
3.	Urea (1 per cent)	48.00	10.66	31.50	15.94	9.62	4.18	1.49	66.62
4.	Urea 1 per cent (25 ml.) + GA3 (100 ppm) (25 ml)	50.00	8.45	27.00	11.89	9.48	3.75	1.34	44.58
5.	Water (50 ml.)	82.00	9.83	29.83	17.23	9.08	3.44	1.39	59.27

Urea (1 per cent) pre-treatment also gave the maximum yield (66.62 g per plant) as against 59.27 g in control in pot culture experiment. All other pre-treatments decreased the yield (39.82 and 44.58 g), except cow urine plus CPPU, which did not alter the yield (57.37 g) over control.



Cow urine pre-treatment did not affect germination adversely (44 per cent) over control (44 per cent) during the period under report, as against its inhibitory effect on germination exhibited in the previous year. Instead, cow urine solutions (20 per cent and 50 per cent) improved seed germination (60 per cent, 56 per cent) in this cultivar over control (44 per cent). This result therefore, indicates the role of season-treatment interaction.

The tallest plant (33.44 cm) was obtained with 5 per cent cow urine pre-treatment, which also yielded heavier fruit (14.74 g) than control (11.88 g).

Cow urine (1 per cent) pre-treatment recorded the maximum yield (84.63 g per plant) against control (52.27 g). Yield, in general, was recorded low in all pre-treatments, including control due to the fact that plants were heavily infested with insects and insecticidal application was not fully effective due to incessant rains and prolonged rainy season.

It is concluded from the above study that cow urine (1 per cent) and urea (1 per cent) seed pre-treatments gave encouraging results in improving yield of okra cv. A-4. Cow urine (1 per cent) also gave smallest plant (24.00 cm) recorded in September among all pre-treatments tried. Water soaking for 24 hrs. pre-treatment recorded the maximum seed germination (44.0 per cent-82.0 per cent) in the present two experiments. Cow urine (1 per cent) and urea (1 per cent) pre-treatments also gave good seed germination (42.0 per cent, 48.0 per cent). So, cow urine (1 per cent), which is the easily and locally available material, which does not involve any cost, can be used as seed pre-treatment in okra for improving yield in the July sown crop.

2.1.3.6. Performance of vegetable varieties on farmers field (S.N. Pandey and L.P. Sahoo)

Brinjal (BB 44, BB 45C), chilli (Sel. 240), bottle gourd (Rajendra Chamatkar, local type) and sweet potato (Sree Nandini) were studied on 5 farmwomen's fields for their performance with respect to plant stand and yield. Brinjal var. BB 44 gave better plant stand (48.8 per cent) than BB 45C (36.36 per cent). Both varieties gave equal yield (1.31, 1.27 kg/plant). However, BB 45 C was found to give a continuous yield, even after the first fruiting season was over in one of the farmwomen's fields, who reported the yield of 3.50 kg each alternate day from 35 plants in horti-groundnut farming system. BB 45C was also adjudged much better in cooking quality and taste and was thus liked much by all farmwomen.

Table 12 : Performance of brinjal and chilli on farmwomen fields (2000-2001)

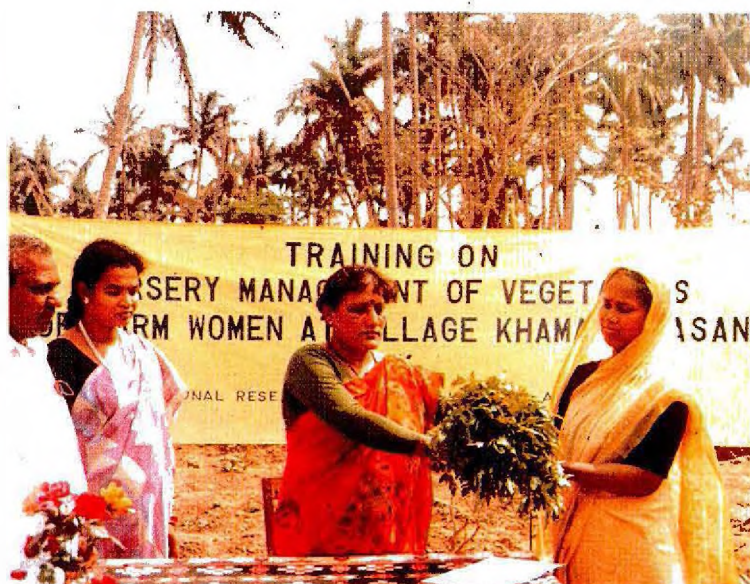
No. of farm families	Brinjal BB 44			Brinjal BB 45 C				Chilli (Sel. 240)			
	Plants supplied (No.)	Plants survived (No.)	Yield (kg)	Plants supplied (No.)	Plants survived (No.)	Yield (kg)	Mean yield (kg)	Plants supplied (No.)	Plants survived (No.)	Yield (kg)	Mean yield (kg)
4	50	30	45.50	60	20	25.50		100	50	0.50	
	50	35	21.00					50	15	0.25	
	50	14	14.00					50	8	0.12	
	100	43	80.50	50	20	25.5		100	21	2.5	
Total	250	122	161	110	40	51	1.27	300	94	3.37	0.03
		(48.8 per cent)			(36.36 per cent)				(31.33 per cent)		

Chilli Sel. 240 showed low plant stand (31.33 per cent) and yielded 30g per plant on the fields of 5 farmwomen. This appeared a case of neglect by farmwomen.

Bottlegourd variety Rajendra Chamatkar gave better yield (3.0 kg/vine) than local (0.72 kg). Sweet potato var. Sree Nandini gave a yield of 1.0 kg/vine.

The performance is expected to improve markedly with application of recommended

Figure-III:
Dr (Mrs) Hema Pandey, Director, NRCWA giving away tomato seedlings to farmwomen for on-farm research



schedule of plant protection measures, fertilizers and irrigation.

In Kharif season, seeds of okra var. Utkal Gaurav were supplied to 12 farmwomen in early July, 2000 but the same could not be sown in the field due to rains and water logging. Bottlegourd seeds of cv. Rajendra Chamatkar, F1 Hybrid Angad and local



most of them did not sow. Plants of brinjal BB44 and BB 45C and chilli selection (Sel. 240) were supplied to 10 farmwomen for their performance studies on 29.8.2000 and 15.9.2000. For summer cropping, tomato vars. Utkal Deepti and Hybrid Pooja were supplied to 28 farmwomen in February 2001 under different farming systems. Ten farmwomen were supplied with brinjal and chilli (Sel. 240, Sel. 95, Utkal Ragini, Utkal Ava) for performance study under Horti-fish farming system with assured irrigation facility. Since the nursery site was not available at NRCWA for raising plants for summer season crop, a farmwomen was persuaded to raise nursery on her farm and the planting time was thus delayed in the process. However, tomato plants were treated with NAA (Planofix) and CPPU to enable plants to complete growth and induce flowering early for mitigating the adverse effect of hot weather on growth and fruiting of plants.

2.1.3.7. Evaluation of groundnut varieties with women perspective (MPS Arya)

Since, groundnut is an economical source of high protein, efforts were made to fit this crop in various farming systems. A field trial to study the response of women on the acceptability and performance of the six varieties of groundnut viz., NEPI01, R.B 46, ICGS 44, Girnar, PBS 8 and AK 12-24 with regard to agronomic characters like competition ability to weeds; easiness in stripping and decortications and yield and biomass production potential was conducted on the farmer's field in Khamang Sasan village. The experiment was laid out in randomized block design with three replications. The sowing was done on 01.3.2000 adopting recommended package of the cultivation practices and was harvested in the middle of June, 2000.

Data recorded on germination 15 days after sowing revealed that variety AK 12-24 showed the maximum germination (11.33 seedlings per running metre). This was followed by RB 46, Girnar, PBS 8, ICGS 44 and NFP 101 (Table 13).

At flower initiation stage the crop was attacked by the aphid. Different varieties, however, showed differential response to the attack of aphid. The attack was recorded using 0-5 scale. Variety AK 12-24 was found the least affected with 0.33 level (Table-13), while NFP 101 and ICGS 44 had the highest level of attack (3.67 level each). Varieties RB 46 (0.67) and PBS 8 (0.67) were found to be resistant to the attack of aphid. The results on pod yield revealed that varieties NFP 101 and ICGS 44 recorded the highest yield of 23.84 q/ha. These were followed by check variety AK 12-24 (22.84 q/ha) and RB 46 (21.17 q/ha) and all of them fallen in the first non significant group of rank. Varieties Girnar (12.87 q/ha) and PBS 8 yielded significantly lower than the other group.

Table – 13 : Pre-sowing quality assessment, plant stand and level of aphid attack on Groundnut

Varieties	Pre-sowing quality assessment				Plant stand/m ²	Level of aphid attack (0-5 scale)	Pod yield (q/ha)
	No. of seeds/pod	Shelling quality	Seed size	Colour of kernel			
NFP-101	2	Hard	Bold	Pinkish white	3.89	3.67	23.84
RB-46	2	Medium	Bold	-do-	9.00	0.67	21.17
ICGS-44	2	Medium	Medium	-do-	4.33	3.67	23.84
PBS-8	2	Hard	Small	-do-	6.33	0.67	11.17
Girnar	3	Soft	Medium	-do-	8.56	1.00	12.87
AK-12-24	2	Medium	Bold	-do-	11.33	0.33	22.84

C.D. at 5 per cent for pod yield :- 3.33

While making pre-sowing assessment of pod and seed quality with women perspective like shelling quality, marketing acceptance for kernel size and colour besides field assessment from production point of view, it was observed that variety AK-12-24 recorded all positive traits (Table-13). As per experience of the farmers of the village variety with 2 seeds/pod was the liking of most of the women farmers.

2.1.4. Nutritional Component of farming system

(Suman Agarwal and Abha Singh)

Under nutrition component, knowledge of farmwomen regarding family nutrition and their nutritional status were assessed.

Survey

An interview schedule was developed to collect the information on the following aspects :

- Anthropometric measurement of the women and children.
- Food items consumed by the farm families in their daily diet.
- Farmwomen's knowledge regarding nutrition and balanced diet

Data from 97 families were collected and analysed. The results are as follows :

General Profile of the families

Table-14a reveals that there were about 56 per cent nuclear families and 44 per cent were joint families. Regarding caste, majority of families i.e. about 76 per cent belonged to general caste category and the rest 24 per cent families belonged to scheduled caste.. General caste category included the families with surname Tripathi,



Dash, Mukhi, Swain, Senapati, Das, Pal, Sahu, Gochhayat, and Sunderay. Scheduled caste families had surnames as Bhoi, Mallick and Nayak.

Table- 14a : Distribution of families according to their caste and family type.

Sl No.	Variable	Categories	Frequency	Percentage
1.	Family Type	Nuclear	54	55.67
		Joint	43	44.32
		Total	97	100
2.	Caste	General	74	76.28
		Scheduled caste	23	23.71
		Total	97	100

The families, which were surveyed had 210 women in total. Out of this, 158 women (75.23 per cent) were in the child bearing age group(15 to 45 years) and 52 women (24.77 per cent) were above 45 years of age (Table-14b). Among the child bearing age group of women, 82.91 per cent belonged to general caste category and 17.09 per cent were of scheduled caste. Regarding women who were above 45 years of age, 78.85 per cent were of general caste and 21.15 per cent belonged to scheduled caste. Overall, there were 81.91 per cent women are of general caste and 18.09 per cent belong to scheduled caste as evident from Table-14b.

Table-14 b: Age and caste wise distribution of women.

Sl. No.	Caste category	15-45 years (child bearing age)		Above 45 years of age.		Total	
		f.	Per cent	f.	per cent	f.	per cent
1.	General category	131	82.91	41	78.85	172	81.91
2.	Scheduled caste	27	17.09	11	21.15	38	18.09
Total		158	100.00	52	100.00	210	100.00

It is indicated from Table-15 that the number of children up to 15 years of age was 127. Out of this, 63 were male and 64 were female children. Among female children 37.05 per cent girls were in adolescence age group i.e. 11-15 years of age. About thirty four per cent girls were in between 6-10 years of age and 28.13 per cent girls were below 6 years of age. In case of boys , 31.75 per cent were in between 11-15 years of age, 38.10 per cent were 6-10 years of age and 30.15 were below 6 years of age.

Table-15 : Age and sex wise distribution of children

Sl No.	Age group	Male		Female		Total	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1.	Pre-school age (Below 6 years)	19	30.15	18	28.13	37	29.13
2.	School age (6-10 years)	24	38.10	22	34.37	46	36.22
3.	Adolescence (11-15 years.)	20	31.75	24	37.5	44	34.65
	Total	63	100	64	100	127	100



Assessment of Nutritional Status

The nutritional status of an individual is often the result of many interrelated factors. It is influenced by the adequacy of food intake both in terms of quantity and quality and also by the physical health of the individual. Good nutrition means maintaining a nutritional status that enables individual to grow well and enjoy good health. A balanced diet has become an accepted means to safeguard a population from nutritional deficiencies. Malnutrition has been defined as a pathological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients. It comprises four forms- under nutrition, over nutrition, imbalances and the specific deficiency.

The nutritional status of women and children was assessed through anthropometric measurements. The pattern of growth and the physical state of the body though genetically determined, are profoundly influenced by diet and nutrition. Hence, anthropometric measurements are useful criteria for assessing nutritional status. The human body dimensions viz. height and weight were measured by using anthropometric data measurement kit and the values were recorded. Measurements were taken for 210 farmwomen and 127 children aged upto 15 years of age including both the sex.

Nutritional Status of women

Since there is considerable variation in weight even with in presumably well nourished subjects of the same age group, therefore it is considered desirable to express weight in relation to some fixed parameter rather than in absolute terms. Weight associated with height or body length has been found to be reliable for detecting both under and over nutrition. Therefore, nutritional/Energy Status of Women as defined by their Body Mass Index (BMI, Kg/M^2) was worked out. Based on this, women were classified into three groups :

- The well nourished (BMI > 18.5)
- The first grade or mildly malnourished (BMI 17.0-18.5).
- Moderate to severely malnourished (BMI < 17.0)

Table-16 : Distribution of women according to their body mass Index

Sl No.	Categories	Child bearing age (15-45 years)		Above 45 years		Total	
		F	Per cent	f	per cent	f	per cent
1.	Well nourished BMI(18.5)	84	53.16	24	46.15	107	50.95
2.	Mildly malnourished or First grade BMI (17.0-18.5)	34	21.52	11	21.15	47	22.38
3.	Moderate to severely malnourished BMI< 17.0	40	25.32	17	32.70	56	26.67
Total		158	100	52	100	210	100

Among the women who were in child bearing age, 25.32 per cent were moderate to severely malnourished and 21.52 per cent women were in the first grade category of malnourishment. Only 53.16 per cent women of this age group were found to be well nourished. Similar pattern was observed in case of women who were above 45 years of age as evident from Table-16. The overall picture depicts that only 50.95 per cent women were well nourished. 26.67 per cent women had BMI <17.0 implying that they were having chronic energy deficiency 22.38 per cent women had BMI in between 17.0 to 18.5, indicating that these women were also in the category of first grade malnourishment.

Further, attempts were made to find out the caste-wise nutritional status of farmwomen who were in child bearing age group. The relevant information has been included in Table-17.

Table-17 : Caste wise nutritional status of farmwomen who were in child bearing age group (15-45 years)

Sl. No.	Nutritional status category	General category		Scheduled caste	
		F	per cent	f	Per cent
1.	Well nourished (BMI >18.5)	73	55.73	11	40.74
2.	First grade or mildly malnourished (BMI 17.0 –18.5)	23	17.55	11	40.74
3.	Moderate to severely malnourished (BMI<17.0)	35	26.72	5	18.52
Total		131	100.00	27	100.00

It has been observed that 55.73 per cent women of general caste category had BMI >18.5. Where as in the scheduled caste category only 40.74 per cent women were found well nourished. Rest of the women had denoted chronic energy deficiency as evident from the Table-17 that 26.72 per cent women of general caste and 18.52 per cent of scheduled caste women were in moderate to severely malnourished category. However, about 17.55 per cent of women of general caste and 40.74 per cent scheduled caste were in the category of first grade malnourishment.

Overall it could be concluded therefore, that about 50 per cent women were having poor nutritional status. Caste wise, incidences of malnourishment were higher among the scheduled caste women of child bearing age.



Nutritional Status of Children

Nutritional status

- Nutritional status of pre-school age children (Below 6 years of age)
- Nutritional status of school age children (Above 6 years of age)

Nutritional status of pre-school age children

It is evident from the table 18 & 19 that observed mean weight values of boys as well as girls was less when compared to 50th percentile of NCHS standard. This confirms that majority of the pre-school boys and girls were malnourished.

Table-18 : Distribution of pre-school girls according to their weight for age

Age (months)	NCHS std. (50 th)	Observed	
		Mean	S.D.
0-3	3.2-5.4	-	-
3-6	5.4-7.2	7	-
6-9	7.2-8.6	-	-
9-12	8.6-9.5	7.25	1.76
12-24	9.5-12.4	5	-
24-36	12.4-13.9	12	1.0
36-48	13.9-16.0	9.3	2.08
48-60	16.0-17.7	11	1.14
60-72	17.7-18.6	14.5	2.5

Table-19 : Distribution of pre-school boys according to their weight for age

Age (months)	NCHS std. (50 th)	Observed	
		Mean	S.D.
0-3	3.3-6.00	-	-
3-6	6.00-7.8	-	-
6-9	7.8-9.2	6.66	0.64
9-12	9.2-10.2	9	-
12-24	10.2-12.6	8	-
24-36	12.6-13.7	10.5	2.5
36-48	13.7-15.7	10.2	2.17
48-60	15.7-17.71	13.0	4.24
60-72	17.71-20.7	12.87	1.25

Nutritional status of (School age children 7-15 years old)

Nutritional status of 6 – 15 years old children was assessed separately based on sex because during these periods numerous biological changes occur which have a direct bearing on the nutritional status, especially in case of girls. The relevant data have been incorporated in table below :

Table – 20: Distribution of children (6-15 years) according to their body mass index

Sl.No.	Categories	Male		Female		Total	
1.	Well nourished (BMI>18.5)	1	2.28	1	2.18	2	2.22
2.	Mild malnourished (BMI 17.0 18.5)	4	9.09	3	6.52	7	7.78
3.	Moderate to severely malnourished (BMI>17.0)	39	88.63	42	91.30	81	90.0
Total		44	100	46	100	90	100

Above table indicated that majority of boys i.e. 88.63% and girls i.e. 91.30% were moderate to severely malnourished.

Diet survey of the families

A diet may be defined as the kind of foods on which a person or group lives. The dietary pattern varies widely in different parts of the world. It is generally developed around the kind of food produced depending upon the climatic conditions of the region, economic capacity, religion, customs, taboos, tastes and dietary habits of the people. The diet surveys provide detailed knowledge regarding the diets actually eaten by the

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12-24	10.2-12.6	8	-
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community both for assessing their nutritional adequacy and for taking steps for correcting deficiencies in the diet. Past 24 hours recall interview method was followed for conducting the diet survey of the families. In this method information were collected from the head of the family or housewife regarding the nature and quantities of foods consumed during the past 24 or 48 hours and making necessary entries in the schedule.

Dietary pattern of the families

Table -21: Food items consumed by the families

SL No.	Food items	Morning Tea	Breakfast	Lunch	Afternoon Tea	Dinner
1.	Tea	68	-	-	68	-
2.	Mudi	-	40	-	62	-
3.	Chura	-	19	-	11	-
4.	Pokhal	-	66	-	15	69
5.	Suji upma	-	8	-	2	-
6.	Rice	-	3	97	-	24
7.	Dalma	-	6	68	-	26
8.	Fry sabji	-	24	22	-	31
9.	Saag	-	16	16	-	10
10.	Roti	-	3	-	-	10
11.	Dal	-	-	19	-	4
12.	Mix subji	-	-	26	-	28
13.	Potato boiled and mashed	-	-	-	-	6
14.	Santula	-	-	-	-	17
15.	Fish	-	-	21	-	7
16.	Milk for children	-	-	-	9	-

Multiple responses were obtained

It is revealed from Table-21 that the food items eaten by majority of the families in their breakfast were *pokhal*, *mudhi*, and *chura*. Food items mainly consumed in lunch by most of the families were rice, *dalma*, *mix veg.*, *fry sabji*, *saag*, *dal* and fish. Afternoon tea included tea, *mudhi*, *pokhal* and *chura*. Dinner comprised of food items like *phokal*, *rice*, *dalma*, mix vegetables, *frysubji* and fish..

Thus, dietary pattern of the families included food items like *phokal*, fish, *mudhi*, *chura*, rice, *dalma*, *dal*, *saag*, *fry subji*, *mix subji*. 100 per cent families indicated that they eat both vegetarian as well as non-vegetarian food items, the same has also been confirmed by their dietary pattern .The typical food dishes which are included in daily diet by these families have been described below :

Pokhal: It is typical Oriya staple food dish. It is of two types *chain pokhal* and *simple pokhal*. Cooking parboiled rice and adding cold water to the boiled rice is Chain Pokhal. It is especially considered good for the person suffering from dysentery and





after- delivery-care of the women. To enhance the taste of it, some salt and lemon is also added into it.

By adding cold water to cooked rice and keeping it relatively longer hours is the most common method of pokhal preparation. It is slightly fermented and is ready for consumption. It is believed that it keeps the stomach cool. Therefore, it is frequently consumed especially during summer season as a staple food item of the diet.

Dalma: This is also a typical Oriya dish. It is prepared from *dal*. Traditionally mung *dal* is cooked along with the vegetables viz. potato, papaya, brinjal, and whatever vegetable is available in home at the time. After cooking of *dal*, *Tadaka* is put into it. *Tadaka* is prepared in a very small quantity of ghee/oil and spices like *jeera*, *methi*, *rai*, *sauf* etc. Salt is added while cooking *dalma*. It is eaten with cooked rice.

Santula : It is also a typical Oriya dish. Mixed vegetables are boiled and required quantity of salt and oil is added to prepare the dish.

Nutritional adequacy of the diet consumed by families

In order to ascertain the nutritional adequacy of the diet consumed by the families, a comparison was made with the food items generally included in a diet to be a balanced diet. ICMR has suggested following food items in a balanced diet.

Table-22 : ICMR Balanced diet per adult consumption unit (ACV)

Sl No.	Recommend food items for a balanced diet	Amount (gm)	Food items commonly consumed by the families
1.	Cereals	475	Phokal, rice
2.	Pulses	80	Dalma, Dal
3.	Leafy veg.	125	Saag
4.	Other veg.	75	Mix subji
5.	Root and Tubers	100	Fry subji
6.	Milk	100	Nil
7.	Meat and fish	2=30	Often
8.	Eggs	30	Often
9.	Fruit	30	Sometime
10.	Oils and fats	40	Small quantity
11.	Sugar and Jaggery	40	Small quantity

Above Table indicated that diets of the families were mainly lacking in food items such as, milk and milk products, fruits, oils and fats, sugar and jaggery. Consumption of fish, meat and eggs were also less than the required .It could be concluded therefore that the families were consuming imbalance diets. This has led to malnutrition among

farmwomen and children as has been confirmed that about 50 per cent women and majority of children had denoted mild to severely spread condition of malnourishment.

Farmwomen's knowledge regarding family nutrition

Nutrition knowledge possessed by women has much role to play in providing nutritious food to the family members. Considering this, farmwomen's knowledge regarding balanced diet, cooking methods, nutrition during special conditions viz., pregnancy and lactation was assessed through an especially developed knowledge test. It was observed that majority women (55.67 per cent) had somewhat insufficient knowledge regarding family nutrition followed by 32.99 per cent women who possessed insufficient knowledge as evident from Table-23. Thus it could be said that by and large farmwomen were lacking in knowledge on family nutrition.

Table-23 : Distribution of farmwomen according to their knowledge level of family nutrition

Sl No.	Knowledge categories with score range	Frequency	Percentages
1.	Sufficient (60-80 scores)	2	2.06
2.	Moderately sufficient (40-60 scores)	9	9.28
3.	Somewhat insufficient (20-40 scores)	54	55.67
4.	Insufficient (0-20 scores)	32	32.99
Total		97	100.00

Based on these findings, exposures to the farmwomen regarding nutritional awareness and education have been initiated.

The project will continue in 2001-2002 and studies will be made on the further refinement of farming systems with emphasis on nutritional requirement of farming family and practical and economical feasibility.



2.2. Improvements in backyard poultry farming for farm women of different categories

The project was launched during August 1999 with a total of 206 chicks of RIR breed reared in the backyards of 21 farmwomen of different social castes and land holding categories for evaluating their performance in scavenging conditions. There was a heavy loss due to super cyclone during October 29-30, 1999. Almost half of the birds



*Figure-IV:
Schedule caste
farmwomen
participating in the
backyard poultry
project along with
RIR chicken*

died during this devastating super cyclone. However, in order to keep the morale of farmwomen high and create awareness among them, the rearing of remaining birds was continued. The performance of chicken upto the age of 25 weeks has been reported in last year's Annual Report. The performance after this period is reported as under:

2.2.1. Growth

The body weights of birds at 40 and 50 weeks of age were recorded and are presented in tables (24 and 25). The details are as under:

Forty – week body weight: the overall mean for body weight of RIR chicken at 40 weeks of age was estimated to be 1378.39 ± 41.82 g . The family wise means ranged from 975.0 ± 0.0 to 1937.50 ± 437.50 g. The individual bird weight varied between 800 and 2375 g. The males weighed higher (1744.23 ± 85.65 g) than females (1258.5 ± 27.96 g).

Fifty – week body weight: The average body weight of chickens recorded at 50 week of age was found to be 1330.66 ± 49.66 g, the family wise means varied from 1075.0 ± 0.0 to 1875.0 ± 625.0 g .The individual bird weight ranged between 750 and 2500 g. The weight of Cocks and hens was recorded to be 1993.75 ± 109.66 and 1203.98 ± 31.45 g., respectively.

Table-24 : Category wise means for body weight of RIR children at different ages under backyard conditions

Category of farmwomen		Body weight (Mean $\pm$ S.E.) in g.	
Social caste	Land holding	40 week	50 week
General/Upper caste	Small	1383.33 $\pm$ 79.49	1450.00 $\pm$ 150.69
	Marginal	1407.69 $\pm$ 53.66	1468.18 $\pm$ 27.52
Scheduled caste	Marginal	1235.26 $\pm$ 86.34	1184.52 $\pm$ 65.45
	Landless	1404.76 $\pm$ 90.69	1410.29 $\pm$ 115.52
Overall		1378.39 $\pm$ 41.82	1330.60 $\pm$ 49.66



Table-25 : Sex-wise means for body weight of RIR chicken at different ages under backyard conditions

Age group	Body weight (mean $\pm$ S.E.) in g		
	Male	Female	Pooled
40 week	1744.2 $\pm$ 85.68	1258.5 $\pm$ 27.96	1378.4 $\pm$ 41.82
50 week	1993.8 $\pm$ 109.66	1203.9 $\pm$ 31.45	1330.7 $\pm$ 49.66

2.2.2. Egg Production

The hens started laying at the age of approximately 20 weeks and almost all birds were in laying stage by the age of 24 weeks. Due to the engagement of farmwomen in the rehabilitation programme after super cyclone only few families recorded the egg production of the hens and the consumption pattern in properly designed format. On the basis of records of these families and as reported by other families, the average number of eggs laid per month ranged from 12 to 17. However, most of families reported receiving 14 –15 eggs per month per bird. The home consumption was found to be approximately 40 per cent whereas 60 per cent eggs were sold by the farmwomen. Some farmwomen have also hatched the eggs obtained from these birds using indigenous broody hens. The farmwomen are earning Rs. 100-300 per month by rearing these birds.

2.2.3. Egg Weight

The average egg weight at 40 and 50 weeks of age was estimated to be 46.24 $\pm$.764 and 51.10 $\pm$ 1.532 g, respectively. The category wise egg weight is given in table 26 below:

Table-26 : Category wise mean egg weight of RIR Chicken under backyard conditions

Category of farmwomen		Egg weight (Mean $\pm$ S.E.) in g.	
Social caste	Land holding	At 40 week	At 50 week
General/Upper caste	Small	46.00 $\pm$ 1.568	46.80 $\pm$ 0.962
	Marginal	48.09 $\pm$ 1.237	54.13 $\pm$ 1.694
Scheduled caste	Marginal	46.50 $\pm$ 1.672	46.00 $\pm$ 4.082
	Landless	42.20 $\pm$ 0.822	48.00 $\pm$ 1.118
Overall		46.24 $\pm$ 0.764	51.10 $\pm$ 1.532

2.2.4. Survival

The survival rates were not computed after 25 weeks of age because some of farmwomen sold / consumed the birds due to financial stress after super cyclone.

2.2.5. Impact of the Project

At the initiation of the project only a few scheduled caste families of the village had shown the interest for participation in backyard poultry farming due to social taboos and religious restrictions. With great efforts and consistent motivation 21 farmwomen came forward to participate in the project. Out of which only 6 families belonged to



*Figure-V:
Hatching chicks
through indigenous
broody hen*

general / upper caste category. Later observing the benefits of rearing improved village

type birds in the backyard, not only scheduled caste but all other families of the village have developed keen interest in the backyard poultry farming and are enthusiastic to participate in the project. Two farmwomen of the upper caste families viz Mrs. Rangalata Swain and Mrs. Khulana Swain are actively engaged in rearing improved village type poultry birds. Motivated by the economic viability of poultry rearing, one of the farmwomen namely Mrs Badia Mallick has started small scale poultry farm in her house itself and is rearing 300-400 broiler chicken.

The detailed success of these families is given as under :

Case study 1 : Mrs. Khulana Swain, W/o. Padilaba Swain

Village : Khamang Sasan –

An example of successful backyard poultry farmers

Mrs. Khulana Swain belongs to general category. She has two sons and one daughter – all minors. Her family has small land holding. Her husband works as daily wage labourer. She does not own any milking cow, has a young heifer and one bullock (indigenous). She does not rear sheep or goat. She was initially rearing a few indigenous chickens. We motivated her to participate in the backyard poultry farming project and gave her 10 RIR chick (4 weeks old) to rear in her backyard in scavenging condition. Although some of her birds died in super cyclone, she still continued and hatched some eggs from improved village type birds. At present she has about thirty birds in her flock. She gets a monthly income of approximately Rs. 300/- per month, which she spends on her house hold expenditure. As per her version, this is one of the major sources of income for her after the super cyclone and her household expenditure depends to great extent on this income. She had 12 male chicken (4 months) old, which she had hatched from RIR eggs. The weight of these chicken ranges from 1125 to 1375 gm. and she sold them @ Rs. 120/- per birds. She is now planning to have one pucca shed for her birds and continue hatching of eggs from improved village type chick.



*Figure-VI:
Mrs. Khulana Swain
(one of the
progressive
backyard poultry
farmers) with her
birds*



using indigenous broody hens for the purpose of hatching. She will sell the birds after rearing them for 3-4 months. This will be a continuous source of income for her, in addition to sale of eggs and home consumption. She is regularly participating in our meetings and is quite cooperative for recording the performance of data. The egg production per bird per month of her hens is also quite high (17.39 eggs upto August, 2000). She is also giving some grains for feeding in addition to scavenging by birds. She has more preference for improved village type birds because they grow faster, lay eggs at earlier age, have higher egg production and continue laying for longer duration whereas indigenous fowl do not need more care but are more prone to predation because they move to far off places. Further, they cause conflicts among neighbours due to scattering of cow dung and spoilage of vegetables etc. However, she intends to rear few Desi (indigenous) hens for hatching purposes.

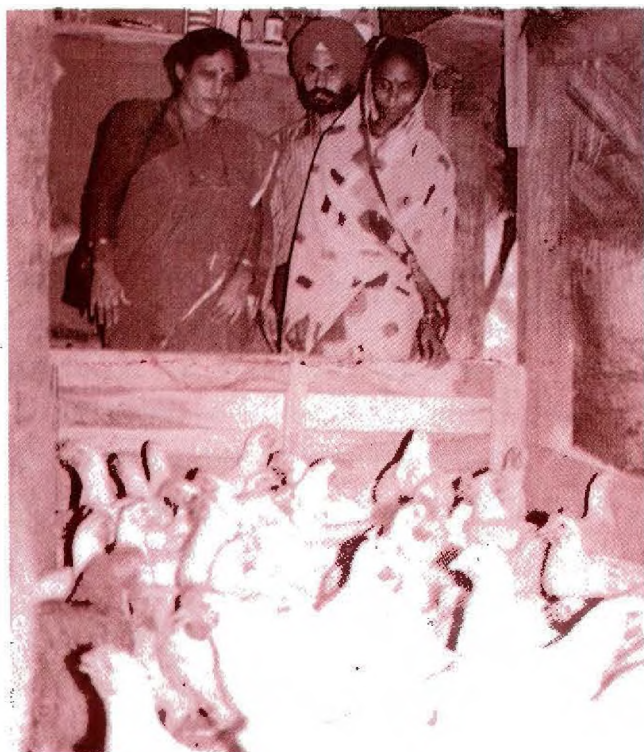
Case study No. 2 : Mrs. Rangelata Swain, W/o. Mr. Krushna Swain
Village – Khamang Sasan

Mrs. Rangelata Swain belongs to general category (upper caste) and has marginal land holding. At the initial stage she was not rearing poultry birds due to social restrictions. However, her daughters who are studying got interested in the poultry farming after the team of our centre awarded them of the benefits of rearing poultry. Therefore, she agreed to participate in the backyard poultry farming project. She was provided 10 RIR chicks (4 week old) for rearing in her backyard in scavenging condition. Although some of her birds died due to super cyclone and predation, none of her birds died due to any disease. She gets 14 – 15 eggs per bird per month. Of the eggs produced she consumes almost 40 per cent eggs for her family and sells remaining 60 per cent. This has provided a good subsidiary income to the family. All female members of the family take care of birds in the spare time. They indicated that they are quite happy with this type of farming. They have procured some Desi (indigenous) chicks so that they can also create hatching facilities. They intend to increase the number of birds in their flock so that it becomes a commercial enterprise for them. They are quite cooperative in maintaining the birds and extend help during data recording.

Case study No. 3 : Mrs. Budhia Mallick, W/o. Upendra Mallick
Village – Khamang Sasan

Mrs. Budhia Mallick belongs to Schedule Caste category and has marginal land holding. Before super cyclone her husband was dealing with small scale rice business. He suffered a heavy loss in his business during the super cyclone. They have three children (two male and one female) who are studying. She was not convinced to participate in backyard poultry farming project in the beginning. However, after super cyclone, she was inclined towards poultry farming on observing the enthusiasm of her neighbourer i.e. Mrs. Khulana Swain. She was explained the benefits of poultry

farming and least investment requirement. She converted half of her residential hut into a poultry farm and started broiler poultry farm with 150 chicks during March, 2000. She has already sold five batches of 200-300 birds per batch. Her husband helps her in procurement of chicks, feed, preventive medicines and supplements. She has made a small additional hut adjacent to her existing hut for brooding of chicks. On an average she gets a benefit of Rs. 10/bird. She intends to double her rearing capacity in near future. They are growing vegetables in their land for home consumption as well as for



*Figure-VII:
Inspiration from
backyard poultry
project*

sale. She does not face any difficulty in marketing of birds in the village. She is getting sufficient income for her domestic needs through poultry farming. Her husband has also developed interest in the enterprise.

The other farmwomen of the village appreciate them and get lured to participate in the project. Now many other villagers are enthusiastic to go for poultry farming. Thus we have been able to create awareness among farm women about benefits of rearing improved village type poultry with scientific management practices so as to enhance the economic status of farm women and increase the nutritional availability for their families.



2.3. Development and Testing of Extension Methods for Farm-women in Eastern India



The 1st phase of the research on exposure of gender to extension and their preferences to extension methods was initiated. Identification of variables for gender analysis and deciding their measurements, development of interview schedule, development of sampling plan, pre-testing of the schedule, finalization of interview schedule after eliminating the errors was completed. The data collection has been taken up partly.

2.3.1.1. Perception of the gender on exposure to extension and their preferences to extension methods

(B.N. Sadangi, H.K. Dash and P.K. Sahoo)

Survey conducted in village Simore, Dist. Khurdha and PRA held in village Kantamalim, Dist. Khurdha brought to light facts on exposure and preference of gender. Since both the villages are under Training and Extension for Women in Agriculture (TEWA) programme where Lady Village Agricultural Worker (LVAW) functions, the results may not hold good to non-TEWA areas and very diverse and socio-cultural situations. The following tables indicate facts and interesting trends with respect to above objectives.

Table-27 : Knowledge of men and women farmers on extension agency and their role (TEWA Village) N= 30

Sl. No.	Name of the Extension Agency	Know the Grass root Worker		Know the Superior Officer		Know the supportive role of grass root worker / supervisor	
		Farmer (n= 15) f	Women Farmer (n= 15) f	Farmer (n= 15) f	Women Farmer (n= 15) f	Farmer (n= 15) f	Women Farmer (n= 15) f
1	Dept. of Agriculture	13 (86)	12 (80)	12 (80)	10 (66)	12 (80)	10 (66)
2	Dept. of A.H.	9 (60)	8 (53)	13 (86)	12 (80)	13 (86)	9 (60)
3	Dept. of Horticulture	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
4	Dept. of Fishery	-	-	8 (53)	3 (20)	7 (46)	2 (13)
5	Health and Family Welfare	12 (80)	14 (93)	0 (0)	0 (0)	12 (80)	13 (86)

(Figures in parenthesis indicate percentages)

Table-28 : Intensity of contact by men and women farmers with extension functionaries (TEWA Village) N = 30

Sl. No.	Name of the Extension Functionaries	Intensity of contact by farmers (n = 15)		Intensity of contact by farm-women (n = 15)	
		Mean score	Rank	Mean score	Rank
1	L.V.A.W.	3.04	I	3.13	I
2	Livestock Inspector	2.66	II	2.06	III
3	Fishery Extension Officer	1.32	IV	0.46	IV
4	Auxiliary Nurse Mid-wife (ANM)	1.67	III	2.83	II

Perceived level of importance and support of men and women about various development agencies in TEWA village (PRA Study)
Village – Kantamalim Exercise – Venn Diagram



Table-29: Results from farmer's group

Sl. No.	Extension/Development agencies known	Perceived level of importance	Perceived level of support received
		(rank)	(rank)
1	Agriculture Department	II	I
2	Health Department	I	XI
3	ATMA	V	V
4	Social Forestry	VI	II
5	Anganwadi	VIII	III
6	Soil Conservation	IV	VII
7	Education	IV	XII
8	Co-operative	VI	IX
9	Block	III	VIII
10	General Post Office	VI	VI
11	Bank	II	XII
12	Youth Club	VII	X
13	NGO	IX	IV

Table – 30 : Result from Women-farmers group

Sl.No.	Extension/Development agencies known	Perceived level of importance (rank)	Perceived level of support received (rank)
1	Anganwadi	VII	V
2	Health Department	II	III
3	Education	I	I
4	Mahila Samiti	III	IV
5	Block	IV	VIII
6	Agriculture Department	III	VII
7	Rice Mill	VII	II
8	NGO	V	VI
9	Soil Conservation	VIII	IX
10	Social Forestry	V	X
11	Animal Husbandry	II	II
12	Fishery	IV	XI
13	Horticulture	III	IV

**Table – 31: Contact Of Farmers With Agriculture And Allied Departments
(PRA Result – Matrix Scoring), Village – Kantamalim**

Sl.No.	Name of the Dept.	Scoring of Individual					Total Score	Rank
		1	2	3	4	5		
1.	Agriculture	xxxx	Xxxxx	0	xxxx	x	14	II
2.	Soil Conservation	xx	X	0	x	0	04	III
3.	Horticulture	x	Xx	0	x	0	04	III
4.	Animal Husbandry	x	X	0	0	0	02	IV
5.	Fishery	0	0	0	0	0	0	-
6.	Social Forestry	xx	xxxx	xxxxx	xxx	xxxxx	19	I

**Table – 32 : Contact Of Farm - women With Agriculture And Allied Departments
(PRA Result – Matrix Scoring) Village – Kantamalim**

Sl. No.	Name of the Dept.	Scoring of Individual					Total Score	Rank
		1	2	3	4	5		
1.	Agriculture	xxxx	xxx	xxxxx	x	xxxxx	18	I
2.	Soil Conservation	0	0	x	x	0	02	IV
3.	Horticulture	xx	0	x	xxx	x	07	II
4.	Animal Husbandry	xxxxx	xxxx	x	xxxxx	xxx	18	I
5.	Fishery	0	0	0	x	x	02	IV
6.	Social Forestry	0	0	x	xx	x	04	III



**Table – 33 : Preferences of gender for extension methods and other related issues
(PRA Study in TEWA village – Kantamalim)**

Sl. No.	Extension Methods/issues	Options	Preference of farmers(N=21)		Preference of farm-women (N = 19)	
			f	Rank	f	Rank
1	Most ideal grass root extension agent	Male agent (Govt.)	14	I	3	III
		Female agent (Govt.)	0	-	8	I
		Male Para-agent	4	II	2	IV
		Female Para-agent	2	III	5	II
		Any one of the above	0	-	1	V
		No choice	1	IV	0	-
2	Most preferred contact	Individual	0	-	0	-
		Group	0	-	12	I
		Mass	0	-	1	III
		Combined	21	I	6	II
		No choice	0	-	0	-
3	Place for contact	In the farm	20	I	12	I
		In the home	11	II	7	II
		In the extn. agent's office	0	-	0	-
4	Time of contact	Morning	20	I	5	II
		Noon	0	-	3	III
		Afternoon	13	II	11	I
		Evening	5	III	0	-
5	Training	In the locality only	0	-	14	I
		Outside the locality	0	-	-	-
		Both the situation	21	I	5	II
6	Boundary of conducted tour	Within district	-	-	15	I
		Outside district	6	II	4	II
		Any place	15	I	0	0
		No tour	0	-	0	0
7	Gap of contact with extension agent	Twice in a week	16	I	5	II
		Once in a week	5	II	12	I
		Once in fortnight	0	-	2	III
8	Location of discussion	Community place	21	I	19	I
		House of progressive farmer / farm-women	0	-	0	-
		Neighboring village	0	-	0	-
		Any place	0	-	0	-

Table-34 : Brief interpretations of the tables (27 to 33)

Sl. No. of the table	Trends
27.	Both farmer and women farmers were almost at same level so far as their knowledge about extension functionaries is concerned. More percentage of farmers knew the supportive role of extension functionaries than women-farmers except that of health and family welfare.
28.	The intensity of contact of farm-women with L.V.A.W. and primary health worker was found to be more than farmers.
29 and 30	Farmers perceived health department (1 st rank), agriculture and bank (jointly 2 nd rank), block (3 rd rank) as important and NGO as least important for their development but received support from agriculture, dept., social forestry, agnanawadi, NGO and Agricultural Technology Management Agency (ATMA) in descending order. On the other hand women-farmers perceived education (1 st rank), health and animal husbandry (jointly 2 nd rank), mahila samiti, agriculture and horticulture (jointly 3 rd rank) as important and soil conservation as least important for their development. There were benefited by education, rice mill, animal husbandry, and health in descending order.
31 and 32	Contacts of farmers and farm-women with agriculture and allied departments, were analyzed by PRA technique. Contact of women-farmers with L.V.A.W. was found to be more than that of farmers and farmers reported to have very good contact with social forestry functionaries. With respect to animal husbandry, women established more contacts with the department.
33	Farmers preferred most the male extension agent, combined contacts in the farm during morning hours, training both inside and outside the locality, conducted tours to any place, two visits per week and community place for discussion. Whereas women farmers preferred most the female extension agent, group contacts in the farm during afternoon hours, training in the locality, conducted tours within the district boundary, one visit per week and community place for discussion. Gender difference in preferences was observed with respect to most ideal extension agent, contact, time of contact, type of training, boundary of tour and gap in contact.

Conclusion

The above finding led to conclude that though the Lady Village Agricultural Workers (LVAW) maintained good contact with the farm-women, it is felt that more needs to be done by them.

In the coming year responses of the farm men and women to extension in the inland district of Orissa would be collected and analyzed separately as well as pooled to get an average picture of the gender. The data would lead to examine the trends as found out currently.

2.4. A gender study on Agriculture and household economy of tribal of Orissa

The study was initiated on the 'Kandha' tribe - a major tribe of Orissa. Accordingly, G.Udaygiri block of Kandhamal district of Orissa where this tribe predominately occurs was selected purposively. Two villages, one at 4 km. and the other at 10 km from block head quarters were randomly selected for the study. Thirty per cent of households from both the villages totaling to 42, were randomly selected. The distribution of households in different land holding status such as landless, below 0.5 ha., 0.5 – 2.1 ha., 1.0 – 2.0 ha. and 2.0 ha and above was 30.95 per cent, 28.57 per cent, 21.43 per cent, 11.90 per cent and 7.15 per cent respectively (Table 35)

Table-35 : Distribution of household in different categories of land holdings

Category of households	Frequency	per cent (per cent)
Landless	13	30.95
Below 0.5 ha.	12	28.57
0.5 – 1.0 ha.	9	21.43
1.0 – 2.0 ha	5	11.90
2.0 ha and above	3	7.15
Total	42	100

The total sample population was 213 out of which 111 were males (52.12 per cent) and 102 were females (47.88 per cent).

Table-36: Distribution of population and workers into different age groups

Gender	Parameters	Frequency			
		Below 15 year	15-60 years	Above 60 years	Total
	Population	35 (31.53)	70(63.06)	6(5.41)	111 (100)
Male	Economically active	5 (7.14)	62(88.57)	3(4.29)	70 (100)
	Population	32(31.37)	64(62.75)	6(5.88)	102 (100)
Female	Economically active	8(11.11)	60(83.34)	4(5.55)	72 (100)

(Figures in parentheses indicates percentage of total)

Table-36 revealed that 63.06 per cent male and 62.75 per cent of female was under working age group i.e. between 15-60 years. Work Participation Rate (WPR) is an important indicator of the size of labour force and extent of involvement of population in various economic activities. It is the proportion of working population to total population. While estimating the WPR, it is customary to exclude persons below

15 years and above 60 years. However, such persons make economic contribution in varying degree depending upon situation and type of activities.

Table-37: Population and Work force participation

Gender	Population	Designated workers (15-60 years)	All workers
Male	111	62 (55.86)	70 (63.06)
Female	102	60 (58.82)	72 (70.58)
Total	213	122 (57.28)	142 (66.66)

(Figures in parentheses indicate per cent of corresponding population)

The overall WPR in the sample was 57.28 per cent. While WPR for male was 55.86 percent, in case of female it was 58.82 per cent (considering workers 15-60 years). However, if the working persons below 15 years and above 60 years were considered overall WPR came to 66.66 percent. For males it was 63.06 percent and for female it was 71.56 percent. Thus it was found that, while at all India level WPR for male is higher than female, in case of 'Kandha' tribes WPR for female is higher than that of male. This indicates that proportionately more number of tribal women are involved in various economic activities as compared to male.

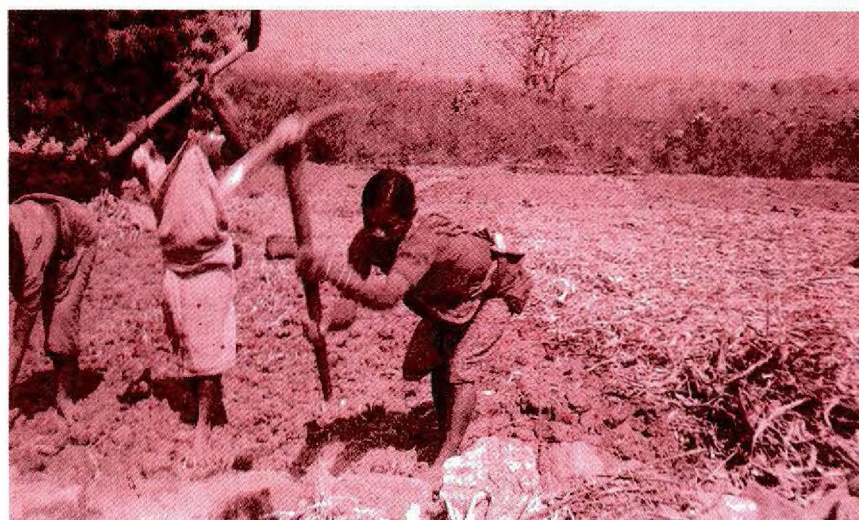


Figure-VIII: Higher work participation rate among "Kandha" tribal women- Needs policy consideration

The gap between WPR for male and female widens when workers from all age groups are considered. These are due to the fact that proportionately more number of female below 15 years and above 60 years are engaged in economic activities. While 25 percent of female below 15 years are economically active, the corresponding figure for

male is 14.29 percent. This gives the indication that female at all age group level are relatively more burdened with the responsibility of caring for the family.

While at all India level WPR for female is below 30 percent, it is 58.82 percent (considering workers in the age group of 15-60 years) in case of tribal women.

Table-38 : Occupational distribution of working population

Sector	Occupation	Gender involvement	
		Male	Female
Primary	Cultivator	21(33.87)	20 (33.34)
	Agril. labour	30(48.39)	34 (56.66)
Secondary	Construction and brick making, Stone cutting	5 (8.06)	3 (5.0)
Tertiary	Service, trade	6 (9.68)	3 (5.0)
Total		62(100)	60(100)

Occupational distributional of tribal workers shown in the table indicates that 33.87 per cent of designated male workers and 33.34 percent of female workers were cultivators. Agricultural labourers constituted 48.39 percent of male workers and 56.66 percent of female workers.

While cultivators are having some land and they work as family labour or manager, agricultural labourers are either landless or having marginal land holding or having some leased-in land earning major part of income from wage labour. Depending upon the respondents revelation whether they work on their own land or work as wage labourer, they have been categorized as cultivators or agricultural labourers. Thus 82.26 percent of designated male workers derive most part of their from agriculture and allied sectors, while 90.0 percent of female workers earn their livelihood from agriculture and allied sectors. The following were the observations:

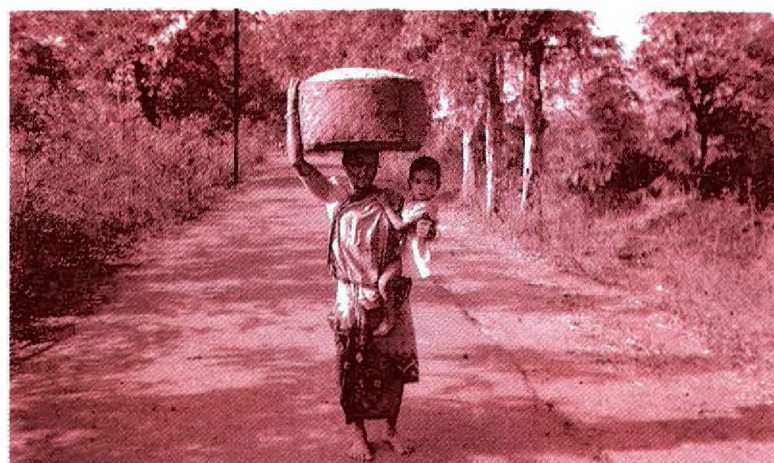


Figure-IX:
*"Kandha" woman
in marketing of
farm products*

In agriculture – Arrangement of inputs and land preparation are the exclusive domain of tribal men, while female exclusively does transplanting and weeding. In rest of farm-based work both male and female are partners with varying degree of gender participation.

During February – March, collection of Mahua (*Madhuka indica*) flower and seeds is an important activity of many tribal women. They leave their home at 5.00 a.m. and come back by 1.00 p.m.

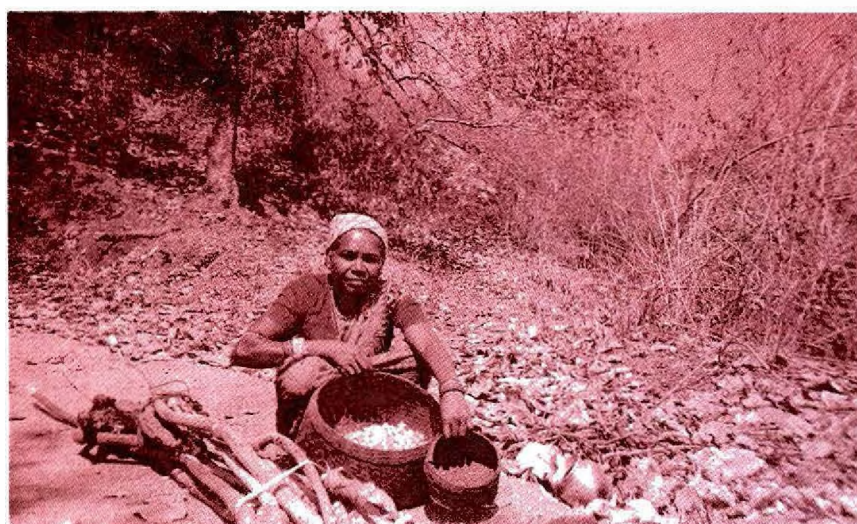
During transplanting of paddy as a family labour, tribal women put up on an average 12 hrs. of work a day (both in uprooting of seedling and transplanting) starting from 4.00 a.m. to 5.00 p.m. with one hour rest for taking lunch from 10 to 11 a.m. while tribal men put up on an average 6 hrs. of work (from 4 a.m. to 10 a.m.) for puddling the paddy field.

As wage labour tribal women put up 8 – 9 hrs. of work and earn Rs. 25/- (or 12 kgs. of paddy) per day whereas tribal men earn Rs. 10/- more for same hours of work.

Through an interactive discussion with tribal men and women it was observed that women's work contribution in agriculture always exceeded men's contribution. Important crops being grown by tribal are paddy, vegetables (like potato, cabbage, Cauli flower) spices (like Turmeric and Ginger). Turmeric is the crop mostly grown for market. After processing (i.e. boiling and drying) they sell it in the market.

An important pulse being used by tribal is 'Kandula' as locally known (similar to Arhar). This 'Kandula' collected from forest and occasionally grown by tribal forms rich source of protein for tribal.

Most widely used edible oil by tribal is Gara oil. This is prepared from Mahua seeds. This costs almost nothing except some labour in collection and processing of seeds.



*Figure-X: Collection of Mahua (*Madhuka Indica*) flowers and seeds- an economic domain of "Kandha" women*

Tribal in general and poor tribal in particular widely use some leafy vegetables naturally grown in forests. These are 'Siti kusa' (as known to Kandha) during Feb.- March and Kaupu kusa and Barada Sag (*Bauhinia purpea*) during April – May.

These two leafy vegetables are the prime supplement to the rice. Tribal women move deep into the forest early morning for collection of these leafy vegetables and come back by 8 to 9 a.m.

At the time of financial adversity, tribal mortgage their land and ornaments to local Sahukars and well-to-do person and borrow money, where institutional credit facilities are available it is mostly the tribal women who get the borrowed money for certain income generating purposes. Tribal men are kept out of such a deal as they are well known for the 'get money and take drinks' nature.

In lean agricultural seasons, tribal men and women move here and there and to towns to get some work in road development, construction etc.



2.5. Studies on technological need for empowering women in rural aquaculture

In rural Orissa two types of pond ownership are generally seen wherein aquaculture can be promoted through the participation of rural women. These two types are :

Small backyard ponds owned by farm families: These ponds have multi purpose uses including traditional fish culture. Such ponds are found more in coastal areas and less in number in interior district/hill region of Orissa .

Community Panchayat Ponds : These are large sized ponds generally owned by Panchayat and are leased out for aquaculture purpose. These types of ponds are found both in coastal as well as interior district of Orissa .

Keeping this situation in mind an attempt was made in the present project to study the possibilities of empowering women in aquaculture by making use of the available water resources.

Selection of village

Two villages namely Khamang Sasan of Baliana Block and Simore of Begunia Block were selected purposefully. Khamang Sasan is situated in the irrigated coastal ecosystem which is characterized by availability of small backyard private ponds where as Simore belongs to rain fed area and away from coastal plain. In the latter location, the rocky sub-surface soil has made the digging of ponds more costly, which is not affordable on the part of farm families. Big ponds are dug and maintained by Department of Panhayatiraj, Government of Orissa.

2.5.1. Pilot Study

Before launching the participatory research, it was felt essential to take up a pilot study in both the villages to understand the profile of women who are either (partly) involved or have interest in aquaculture, scope of aquaculture for them and their decision making behaviour in aquaculture. Altogether 40 women in Khamang Sasan (for individual backyard aquaculture) and 10 women (group activity in community pond) in Simore village were identified and included for the survey.

Table-39 : Background of the women

Variable	Class	Frequency N = 50	Percentage	Average
Age	15 – 25	8	16	37
	25 – 35	10	20	
	35 – 45	20	40	
	45 – 55	12	24	
Education	Illiterate	6	44	
	Primary	22	44	
	Middle School	10	20	
	High School	10	4	
	Graduate and above	2	4	
Training attended on aquaculture	Nil training	50	100	
Marital status	Unmarried	7	14	
	Married	41	82	
	Widow	2	4	
Land holding status of the women's family	Land poor	5	10	1.26 acre.
	Marginal	6	12	
	Small	30	60	
	Big	9	18	

It was found from the survey that middle-aged women between 35 – 45 years were more willing to take up aquaculture (40 %). Forty percent of the respondents were illiterate yet due to exposure with developmental agency they had a lot of awareness. Majority (44 per cent) of the respondents had primary level of education and none of the respondents were exposed to any type of training in aquaculture so far. The proportion of married women among the willing/practicing women were found to be very high i.e. 82 per cent. Women belonging to different land holding status were found interested/doing aquaculture. Families of those women belonging to small land holdings were found more prone towards aquaculture.



Table-40 : Scope of aquaculture for rural women

Sl. No.	Predictor variable of scope	Class	Frequency N = 50	Percentage
1.	Aquaculture background	Yes	12	24
		No	38	76
2.	No. of ponds per family	No. ponds	20	40
		1 ponds	26	56
		2 pond	4	8
3.	Pond size	Less than 0.1 acre	16	32
		0.1 – 0.2 acre	8	16
		0.2 – 0.3 acre	5	10
		< 0.3 acre	1	2
4.	* No. of Panchayat ponds/village	Three ponds	1	50
		Four ponds	1	50
5.	Fish consumption habit/fortnight	Nil consumption	0	0
		Upto 1 kg	4	8
		1 – 3 kg	22	44
		3 – 6 kg	16	32
		6 kg and above	8	16
6.	Additional demand/fort night	No additional demand	15	30
		Upto 1 kg	5	10
		1 – 3 kg	26	52
		3 – 6 kg	4	8
7.	Awareness knowledge on aquaculture	Very high (16 and above)	12	24
		High (12 – 16)	24	48
		Medium (8-12)	4	8
		Low (4 – 8)	3	6
		Very low (below 4)	7	14
8.	Attitude towards aquaculture	Very favourable (4 and above)	18	36
		Favourable (3 – 4)	29	58
		Unfavourable (2-3)	3	6
		Very unfavourable (less than 2)	-	-

* Shows no. of Panchayat ponds available in two purposively selected villages which are insufficient to generalize.

The study considered eight different predictor variables to assess the scope of aquaculture for women and develop relevant research programmes on aquaculture. A sizeable proportion (24 per cent) of fishery women had some past background in aquaculture, which would be treated as a fairly good background to start aquaculture. The scope of aquaculture for women may be to a great extent is decided by the possession of backyard ponds by rural women. In this context it was found 60 per cent

of the women fulfill this requirement. Small to moderate sized ponds in backyard situation are liked by the women. All most 50 per cent of the total ponds were found in the above group. Although Panchayat/Community ponds are big enough for individual women but collective efforts of women group may yield fruitful results. In this context result showed that by and large community ponds in all the village is a possibility but adequate secondary data may focus more on this point. The quantity of fishes taken by the family of the women together with additional demand if any were analyzed which brought out that 70 per cent of the farmwomen need additional fish supplies for these families. Awareness-knowledge of the fishery women on aquaculture showed very interesting result i.e. 72 per cent of them possessing high and very high level of knowledge. Attitude of the fishery women towards aquaculture tested through likert technique also identified very favourable and favourable attitude in 36 per cent and 58 per cent cases respectively.



Table-41 : Decision making behaviour

Sl. No.	Areas of decision making	Ability to influence (Total weighted score)	Mean score	Rank
1.	Pond preparation	4	0.7	V
2.	Pond cleaning	6	1.0	IV
3.	Selection of frics/fingerlings	10	1.7	III
4.	Sulp. Feeding	14	2.3	I
5.	Harvesting	13	2.1	II

In order to study decision making behaviour of women in aquaculture question was asked whether they had practiced aquaculture or not. It was found that out of 50 women taken for the pilot study only 12 women were found involved in aquaculture. Decision-making behaviour of those 24 per cent practicing women were analyzed and presented in the table 41.

This study brought out 5 different areas of decision making by women. It can be inferred that women have their influence on aquaculture not only as worker, but also as manager of the pond. Different educational and training programme on the important area of decision making may enable them to make judicious decision for a very productive aquaculture enterprise. The results obtained from the pilot study have provided clear cut basis and direction to launch the project.

The on-farm research on technology preference and need for refinement with women perspective was taken up by selecting randomly 20 women for backyard aquaculture and 10 women of Simore village for community aquaculture.

Follow up of the training on aquaculture held on 12th Feb., 2000

Eighty six percent of the trainees were highly encouraged to undertake aquaculture in their backyard ponds. All the women farmers suggested arranging aquaculture training programmes at least once in a year.

Induced Carp Breeding

During the year training on induced carp breeding was conducted by following interactive demonstration method. Twenty women participated in the programme. In the first phase, the women farmers were taken to Central Institute of Freshwater Aquaculture where the basic theory behind induced breeding of rohu was demonstrated. The areas covered in the training were:

- Species for the breeding.
- Special care of the brood fishes
- Identification of the male and female and method of selection of the proper brood fish for the breeding.
- Role of pituitary and synthetic hormones, method and doses of injection.

In addition, the hapa breeding, which they could practise in their own pond was demonstrated and explained.

In the second phase of the programme the trainees were taught method of collection of pituitary gland and preparation of pituitary extract. Participants were encouraged to practise each step of the fish breeding procedure by them selves.



*Figure-XI:
Women learn even
complex carp
breeding
techniques*

During the evaluation of the programme 85 per cent of the women highly appreciated the course content of the programme. All the participants were highly satisfied on the practical demonstration. Sixty four percent of the women showed their willingness to undertake carp breeding in their backyard ponds.

2.6. Standardization of women specific field practices in rice for Orissa

The project was initiated in Rabi 2000 and the basic information was collected. An appropriate format was, however, developed for quantitative and qualitative assessment of operational drudgery in rice and formulation of research modules for testing in future during 2000-2001.

Assessment of different components of transplanting was made with a view to identify and quantify the drudgery in this operation. A survey was made on 28 women of two villages namely, Khamang Sasan and Baramunda both in Khurdha District of Orissa. The women were randomly selected on the field in-situ while performing transplanting. The survey continued for eleven days from July 24, 2000 to August 3, 2000. Ten observations were made per woman on the numerical values of important components i.e. (I) number of hills planted out of seedlings in a bundle, (ii) time taken in planting one bundle, (iii) number of bundles planted per bending, (iv) number of seedlings planted in a single row at each step, (v) number of rows planted in a single backward step and (vi) spacing between rows to rows and plant to plant. Thus, a total of 280 observations were made on each of the six components. Besides, general information was also recorded on each woman on number of bundles planted per day, age of women, number of women workers working on the same field of working hours per day and duration of major breaks for tea, lunch etc. The values recorded were then analysed or transformed to get valuable observations i.e. number of bending/hour/day, backward and lateral movements etc. (Table-42), which contribute significantly to the drudgery in transplanting operation.

Survey conducted for quantitative assessment of the components of transplanting in rice revealed that on an average a woman planted 1375.15 hills per hour and bent 10.40 times per hour for about 5.5 minutes each time while performing transplanting operation. The side movement toward left and right side each was estimated to be 77.24 cm. A woman took 108.75 backward steps per hour covering on an average 28.21 cm distance at each step. The total area covered per woman per hour was estimated to be 43.02 m². It is worth mentioning here that though the systematic rows were not made throughout the field, the line transplanting was followed at step basis. The number of hills per row planted at 17.63 cm was found to be 8.74. The plant-to-plant distance was also maintained and was recorded to be 17.67cm. However, while changing the step (backward movement) the alignment of the lines was found changed. Thus all the lines seemed to be broken and unsystematic. The total time devoted per women per day was 6.11 hours out of which 5.37 hours found working in standing water.





The highest standard deviation (182.48) and standard error (35.12) was recorded in the data on number of hills/hour, while these were found to be the lowest (0.47 and 0.09) on number of rows per step followed by time taken in planting per bundle (0.76 and 0.51). A significantly negative correlation was also observed on age of the woman V/S number of hills planted/women/hour (-0.7091), number of hills/bending (-0.4469), backward movements/hr. (-0.3855) and area covered/hr. (-0.5496) (Table-42). Size of working group did not show any correlation with any of the observations. It was also observed that women rarely took any rest during transplanting. Even while changing the plot, they started the work of transplanting immediately after entering making bundles, transporting them to the main field and spreading the bundles in the main field.

Table-42 : Quantitative assessment of components of transplanting operation in rice

Sl. No.	Component of transplanting operation	Mean value	Standard deviation	SE
1	Number of hills planted/bundle	120.45	19.40	3.73
2	Number of hills planted/hr.	1375.15	182.48	35.12
3	Time taken/bundle in planting(minutes)	5.17	0.76	0.15
4	Number of hills planted/bending	139.37	34.99	6.73
5	Number of bending/hr)	10.40	2.66	0.51
6	Number of hills/row	8.74	1.06	0.20
7	Number of rows/step	1.60	0.47	0.09
8	Lateral(left and right) body movement (cm)	77.24	11.50	2.21
9	Number of hills/step	13.99	4.27	0.82
10	Number of backward steps /hr.	108.75	35.19	6.77
11	Distance covered/ backward step (cm)	28.21	8.54	1.64
12	Distance covered in backward movement/hr.	28.15	6.11	1.18
13	Area covered/woman/hr (M ²)	43.02	9.14	1.76
14.	Total working hours	6.11	1.06	0.21
15.	Net working hour in the field	5.37	1.24	0.24

Table-43 : Correlation of different components of transplanting with age of women and size of women working group

Sl. No.	Observations	Age of women	Size of group
1.	No. of hills planted/hr/women	(-) 0.7091 **	(-) 0.0894
2.	No. of hills planted/bending	(-) 0.4469 *	(+) 0.2504
3.	No. of bending/hr.	(+) 0.1129	(+) 0.0830
4.	No. of rows/step	(-) 0.0663	(-) 0.2460
5.	Lateral movement	(-) 0.2418	(-) 0.1133
6.	No. of backward steps/hr.	0.2876	(+) 0.0318
7.	Distance covered/step	(-) 0.2665	(-) 0.9995
8.	Backward movement/hr.	(-) 0.3855*	(-) 0.0127
9.	Area covered/hrs.	(-) 0.5496**	(-) 0.1796

* significant at 5% level of significance; ** significant at 1% level of significance

The field experiments will be conducted on the practices and technological options aiming to reduce operational drudgery in rice cultivation with particular emphasis on transplanting under irrigated low land and weed control in upland conditions. The survey work would also continue in the selected districts and villages as per technical programme.



2.7. Occupational health hazards among farmwomen of coastal agro ecosystem



Preparation of interview schedule

Exhaustive efforts were made for preparing interview schedule for identification of operation specific health hazards amongst farmwomen. The prepared schedule was discussed with occupational health hazards experts at National Institute of Occupational Health (NIOF), Ahmedabad. The schedule was recasted including the suggestions of experts. The prepared schedule was pretested on a sample of 30 farmwomen and suitable modifications were incorporated

Sampling plan

Detailed sampling plan was drawn. Five coastal districts of Orissa i.e. Puri, Bhadrak, Kendrapara, Jagatsingpur and Ganjam have been identified for drawing sample for the project. From each district two blocks will be selected and from each block two villages will be selected randomly keeping in mind the cropping pattern and involvement of women in various farming operation, so that a complete picture of the health hazards associated with different field operation and enterprise could be established. The sample size will be 500.

Data collection

So far, data has been collected from 30 respondents from the village of Kendrapara District.

The data will be collected relating to occupational health hazards of farm women from the districts which have already been identified viz. Ganjam, Puri, Jagatsinghpur, Kendrapara, Bhadrak and efforts will be made to codify, computerize and analyze the data collected from the above mentioned districts.

2.8. Identification and evaluation of interactive learning modules for dissemination of homestead technologies

Homestead activities performed by farmwomen

In order to find out the involvement of farmwomen in homestead activities, a base line survey was conducted in the village 'Khamang Sasan'. Thirty farmwomen were interviewed randomly to gather the required information. The responses of the farmwomen were substantiated with the personal observations. Qualitative analysis of the collected information revealed that beside the household and on farm activities, farmwomen were involved in various homestead activities. Details of activities performed by farmwomen have been given in table below :

Table-44 : Different activities performed by farmwomen

Sl. No.	Household activities	Farm activities	Homestead activities	
			Activities related to care of animals	Other homestead activities
1.	House cleaning	Weeding and hoeing	Fodder collection	Vegetable growing
2.	Utensil cleaning	Transplanting	Feeding animals	Parboiling of rice
3.	Fetching water	Harvesting	Shed cleaning	Other post harvest
4.	Child care	Threshing	Animal bathing/ cleaning	Operations
5.	Cooking food	Winnowing	Milching	Poultry
6.	Washing cloths	-	-	Pisciculture
7.	Fuel collections	-	-	Bee keeping

The main homestead activities in which farmwomen involved are:

- Care and maintenance of animals
- Home gardening or vegetable growing
- Par-boiling of rice
- Other post harvest operations like dehusking/pounding, decorticating, drying, storage etc.
- Poultry or bird raising
- Pisciculture
- Bee-keeping



Farmwomen's interest for homestead occupations

Based on the activities performed by the farmwomen, their interest for homestead occupations were identified through verbal discussions. The expressed interests of the farmwomen in order of preference have been listed below :



- Dairying
- Poultry
- Fishery
- Vegetable growing
- Floriculture
- Processing of food
- Fruits and vegetable preservation

Based on the modular structure, which has been already developed, modules namely nutrition and health of mother and child and sensitization of women in economic empowerment will be developed. Besides, relevant audio visual aids will be identified/collected/prepared for the above mentioned modules.

2.9. Improvement in storage practices of seeds and grains of important crops with women perspective

During the period under report (20th Jan., 2000 to 31st March, 2001) the following work was done under the project “Improvement in storage practices of seeds and grains of important crops with women perspective”

Literature related to projects was collected.

Survey was undertaken in the village Khamang Sasan, Dist. Khurda, Orissa for understanding the seed production and storage practices followed by farm women and based on the information a semi structured interview schedule was developed for eliciting information regarding seed production, its processing and storage practices used by farmwomen and the ITKs used by them for storage of pulse and vegetable seeds and the gender issues in distribution of work in seed production and storage.

Methodology

Later using the interview schedule survey was done in 5 villages from 2 districts of Orissa state i.e. Ganjam and Khurda as in these districts vegetables and pulses are predominantly grown

Traditional method of seed storage

For storing pulse seeds, farmwomen use different locally available materials, which include inert materials, leaves of plants/whole plants or plant parts. Either a single material or materials in different combinations is used to store the seeds. The materials mainly used are : (a) inert material such as woodash, cowdung ash, waste from blacksmith, charcoal, dried cowdung (b) leaves of different plants/whole plant such as naguari leaf, polang leaf, begunia leaf, nandabaguli leaf, neem leaf, citrus leaf and (c) plant products such as Dried red chilli, Garlic, Paper, Mustard oil, Neem oil.

STRUCTURES USED FOR STORAGE OF PULSE SEEDS

After treating the seeds with the locally available materials they are stored in specific storage structures. Some of these structures are mentioned below :

Straw Puduga or Ollia

This is a structure made up of straw ropes. Straw ropes are prepared and a spherical structure is made out of that. Inside this the pulse seeds are kept. Then it is tightly tied with ropes and beaten with wooden plank to make it airtight.





*Figure-XII:
PUDUGA/
OLLIA- Made of
straw used for
storing cereals
and pulses
(Locality-
Darmagada,
Kalahandi)*

Earthen pot

Seeds are kept in big earthen pots with wide mouth. There is an earthen lid to cover the pot. The pots are mostly hanged from the roof tied with jute ropes.

Bamboo doli

It is a structure made up of bamboo. A big bamboo basket with narrow mouth is



*Figure-XIII:
Kerosene drums and
wooden boxes used
by women for
storing seeds
(locality-
Kukukakhandi,
Ganjam, Orissa)*

prepared. It is plastered with cow dung on both outer and inner side. It is kept over an elevated platform to protect it from moisture. Seeds are kept inside the 'Doli' after required treatment and covered with straw and plastered on the top either with cow dung or soil.

Metal drums

The drums used for storing kerosene are cleaned and seeds are stored inside it after proper drying and treatment. It is as good as metal bins in controlling moisture and pest infestation.

China clay pots

Big size China clay pots with narrow mouth are used for storing pulse seeds. These are either hanged from the roof with ropes or sometimes kept on an elevated place to avoid any contact with moisture. These pots have tightly fitting lids to prevent entrance of rats and big insects.

The efficiency of the Indigenous Technological Knowledge (ITKs) so collected from different localities for storing vegetable and pulse seeds by women will be examined with appropriate scientific explanations. The important factors contributing to higher efficiency would be pooled to develop low cost seed storage materials.

CONTAINERS FOR STORING VEGETABLE SEEDS

Glass bottle

Long and narrow mouthed glass bottles are mostly used to store vegetable seeds. The bottles are either kept in a safe place free from moisture or sometimes in boxes or in Almirahs.

Tin boxes and plastic containers are also used for storing vegetable seeds in small quantities. Most of the vegetable seeds are stored in the fruit itself. Whole fruits are dried properly (after fruits matured and ripened) and clipped it in the bamboos of the thatched house. Sometimes the whole fruits are tied in a cloth and just hanged from the thatched roof above the chullah. It comes in direct contact with smoke. This practice is used mostly for the following crops:

- Okra (*Abelmoschus esculentus*)
- Cowpea (*Vigna unguiculata*)
- Ridge gourd (*Lagenaria siceraria*)
- Clustre bean (*Cyamopsis tetragonoloba*)
- Sem (*Dolichos lablab*)

Among the indigenous technological knowledge collected a few were selected for taking further study. Seeds will be treated using these ITKs and will be stored in different containers.

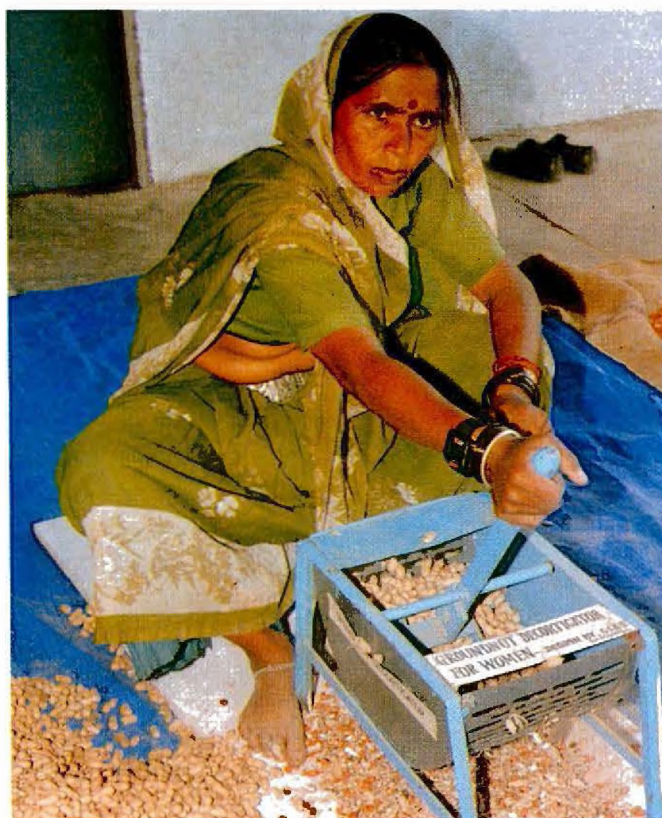


SUB-CENTRE, BHOPAL

Research

2.10. Comparison of heart rate responses of groundnut decorticators using improved (seating and standing type groundnut decorticators) and local method

A study was conducted to compare the heart rate responses of women workers while working with groundnut decorticators. Groundnut decorticators of CIAE design were used for the study. The parameters used for comparison were heart rate (for evaluation of work load), output (kg/h) and the muscular effort required for handle operation



*Figure-XIV:
Testing the
sitting type
groundnut
decorticator for
women*

(kg.). Split plot design was used for the experiment. Four women subjects participated in the experiment and three replications were done for each trial. The ambient conditions during experiment were dry bulb temperature 26°C to 31°C and relative humidity 55 per cent to 90 per cent. Each trial was of 30 min. duration. After the

completion of each trial, a rest of 15 min. was given to the subject. Data on heart rate were taken with the help of polar heart rate monitor during each trial. Data on strokes/min., force applied, quantity of groundnuts/ batch, broken, unshelled/partially-shelled pods, damaged, foreign matter were also noted. During decortication, the outputs with sitting and standing type decorticators were 26.3 kg/h and 33.1 kg/h as against 1.1 kg/h for traditional method. The mean working heart rate was 85.5, 111.0 and 121.8 beats/min. for traditional method, sitting type decorticator and standing type decorticator respectively. The corresponding Δ HR (heart rate increase over rest) values were 6.6, 26.9 and 41.7 beats/min. The mean values of force required to operate the handle at the start of batch were 4.8 kgf and 7.3 kgf for sitting and standing type groundnut decorticators, respectively.

2.11. Comparison of heart rate responses of women workers during maize shelling using different hand operated maize shellers and local method

A study was conducted to compare the heart rate responses of women workers while working with different hand operated maize shellers viz. rotary disc type maize sheller and tubular maize sheller with local method of maize shelling. The parameter used for



*Figure-XV:
Heart rate
measurement of
the subject while
working maize
sheller*



comparison was heart rate. Data on output (kg/h) were also noted. Five women subjects participated in the experiment. Four replications were carried out for each subject. Data on number of cobs shelled/min. and hand movement /min. were also noted. The ambient conditions during the experiment were dry bulb temperature 18° C to 29°C and relative humidity 21 per cent to 90 per cent. Each trial was of one hour duration. For rotary disc type maize sheller trial duration was 30 min. The results indicated that the working heart rate for rotary disc type sheller, tubular seller, and traditional method (with sickle) were 113.7, 93.4 and 87.6 beats per minute respectively. The differences in heart rate (increasing heart rate over rest) were 36.3, 15.7 and 11.6 beat per minute for rotary disc type seller, tubular seller, traditional method (sickle) respectively. The rotary disc type maize seller had the maximum output of 73.2 kg/h followed by tubular maize seller (27.1 kg/h) and traditional method with sickle (17.1 kg/h). The increase in heartbeat per kg of maize shelled had the maximum value of 43.8 beats per kg of maize shelled by traditional method. The hand operated rotary disc type sheller could not be operated beyond 30 minutes due to muscular fatigue involved in the operation. After every 30 min. a rest of 15 min. is a must to restart the work.



3. TRAININGS/DEMONSTRATIONS

3.1. Trainers' Trainings

The centre organized the following trainers' training programmes for the scientists/extension functionaries of the ICAR Institutes/SAUs/State Departments of



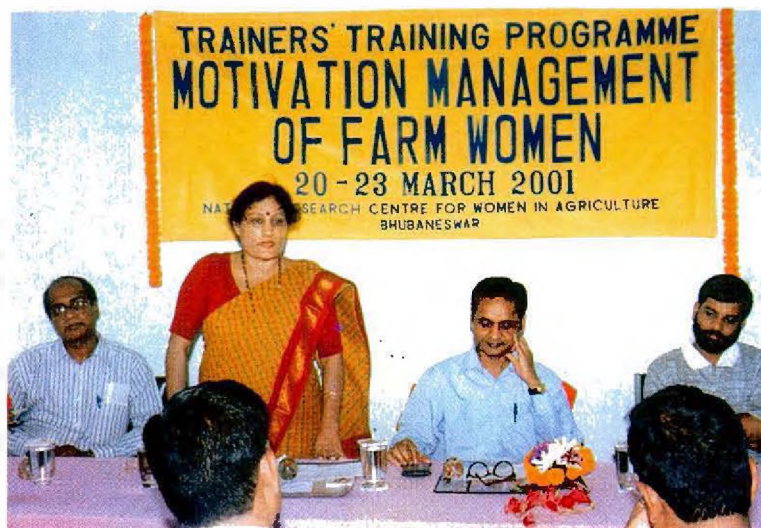
*Figure-XVI, XVII:
Few Training
activities by NRCWA*

Agriculture, Horticulture, Animal Husbandry and Fishery to sensitize them on the productive roles of women farmers and train them on application of appropriate technologies in agriculture and allied fields.

Trainers' Trainings

Sl. No.	Title of the training	Training coordinator(s)	Duration	Participants belonged to
A. MAIN CENTRE				
1.	Techniques of improving extension services for farmwomen	Dr B.N. Sadangi, Principal Scientist (AE)	20 th -23 rd Sept., 2000	Orissa, Andaman and Nicobar and Rajasthan
2.	Improved technologies of growing roses and gladioli	Dr S.N. Pandey, Principal Scientist (Hort.)	27 th – 29 th Nov., 2001	Rajasthan and Orissa
3.	Backyard poultry rearing for economic upliftment of Rural Women	Dr. K.S. Risam, Pri. Sci. (LP and M), Dr. (Miss.) Suman Agrawal, PS (HDRM) and Dr. B.N. Sadangi, PS (AE)	12 th – 14 th December, 2000	Andhra Pradesh, Madhya Pradesh, Bihar, Orissa, Jharkhand, Kerala, Maharashtra
4.	Technology for rainfed crops with special reference to women participation	Dr M.P.S. Arya, Principal Scientist (Agronomy)	10 th – 12 th January, 2001	Orissa, Maharashtra
5.	Motivation management of farmwomen	Dr B.N. Sadangi, Principal Scientist (AE) and Shri H.K. Dash, Scientist (Agril. Eco.)	20 th – 23 rd March, 2001	Assam, Orissa, West Bengal, Maharashtra, Tamil Nadu, Karnataka
B. SUB-CENTRE				
1.	Women friendly farm technologies	Sub-centre of NRCWA, Bhopal	October, 19 – 21, 2000	Pantnagar, Jorhat, Hissar, Parabhani, Ludhiana, Udaipur, Palampur, Dharwad and Hyderabad

*Figure-XVIII:
Dr. Hema Pandey,
Director, NRCWA,
inaugurating a
training
programme at
NRCWA,
Dr. HN Verma,
Director, WTCER
is also seen in the
picture*





*Figure-XIX:
Dr. Hema Pandey,
Director, NRCWA,
giving away
certificates to
trainees*



3.2. Farmers/Farmwomen Training

Sl. No.	Title of the training	Duration	Location	No. of participants	Remarks
1.	Mushroom cultivation	Nov. 17-19, 2000	Pallahara, Angul, Orissa	50	In collaboration with NRCM and CRRI. Hon'ble Union Minister of State for agriculture, Dr Devendra Pradhan inaugurated the programme
2.	Vegetable nursery management for farm-women	13 th Feb., 2001	Vill. - Khamang Sasan, Khurda, Orissa	30	

*Figure-XX:
Dr. Debendra
Pradhan, Hon'ble
Minister of State for
Agriculture, Govt. of
India inaugurating the
training programme
on Mushroom
cultivation. Also seen
on the occasion,
Shri Dharmendra
Pradhan, MLA,
Pallahara and Dr
(Mrs) Hema Pandey,
Director, NRCWA*



4. PUBLICATIONS

a. Research papers :

- Mir, M.Y.; Risam, K.S. ; and Ganai , T.A.S. (2000): genetic and Environmental factors influencing greasy fleece yield in a closed flock of Corriedale sheep. *Indian J.Anim.Sc.* 70(5): 540-542.
- Pandey, D. and Pandey, S.N. (2000). Effect of growth regulators and zinc sulphate on floral malformation in mango (*Mangifera indica* L.) *Ann. Agric. Res.* 21 (1) : 129-32
- Risam, K.S.; Sandhu, J.S.; Brah, G.S. and Chaudhary M.L. (2000) : A genetic study on reproductive organ traits in white Leghorn chicken. Proceedings : Annual Conference and Symposium of Indian Poultry Science Association "Challenges to Poultry Industry in New Millenium" , October 12 – 14, 2000 : 39.
- Singh, R.V., Arya, M.P.S. and Dwivedi, G.K. (2000). Response of barnyard millet varieties to nitrogen. *Bharatiya Krishi Anusandhan Patrika* 15(182) : 42-47.
- Sahoo, Laxmipriya, Dadlani, Malavika, Singh, D.P. and Sharma, S.P. (2000). Characterization of sunflower (*Helianthus annus* L.) genotypes using laboratory techniques, *Plant Varieties and Seeds*. 13: 31 – 43.

b. Congress papers/conference papers

- Pandey, S.N., (2000). Effect of seed pre-treatment on germination, yield and nematode in okra (*Abelmoschus esculentus*) cv. A-4, 3rd International Crop Science Congress 2000. Hamburg (Germany). Aug. 17-22, 2000.
- Pandey, S.N. and Singh, O.P. (2000). Improvement in mango (*Mangifera indica* L.) by hybridization. 3rd International Crop Science Congress 2000. Hamburg (Germany). Aug 17 – 22, 2000.
- Risam, K.S. (2000) : Performance of Rhode Island Red chicken reared in backyard conditions by farmwomen in Orissa Proceedings : Annual Conference and Symposium of Indian Poultry Science Association "Challenges to Poultry Industry in New Millenium" , October 12 – 14 , 2000 : 168 .
- Risam, K.S.; Sandhu, J.S.; Brah, G.S. and Chaudhary M.L. (2000) : Relationship among various economic and egg quality traits in white Leghorn layers. Proceedings: Annual Conference and Symposium of Indian Poultry Science Association "Challenges to Poultry Industry in New Millenium", October 12 – 14, 2000: 33.
- Risam, K.S. ; Sandhu, J.S. ; Brah , G.S. and Chaudhry M.L. (2000) : Strain comparison of egg quality traits at different stages of laying in white

Leghorn layers . Proceedings : Annual Conference and Symposium of Indian Poultry Science Association "Challenges to Poultry Industry in New Millenium" , October 12 – 14 , 2000 : 33 .

c. Report

- A report on "Tools and equipment for use of women in rural areas" was prepared by sub-centre of NRCWA, Bhopal and presented to "Expert Committee on Women in Agriculture", Department of Science and Technology, Govt. of India, on July 4, 2000 at Technology Bhawan, New Delhi.
- Arya MPS and Pandey H submitted a report on "Transplanting of rice by women- an assessment of drudgery components" to D.G., ICAR.

d. Popular Articles

- Sadangi, B.N. (2000) "My experience in Indonesia through an international course" Weekly, "The SAMAJ (The Oriya daily), 81(35) : 18 – 23.
- Arya, M.P.S. and Singh, R.V. (2000). *Kalabansa Aur iska niyantaran. Pahari Kheti Bari* 7(2) : 20 – 22.
- Singh, R.V. and Arya, M.P.S. (2000). "Paravatiya Chhetraun Mein Jau Ki Kheti" *Pahari Kheti Bari* 8(1) : 14 – 18.
- Saha, Geeta and G.S.Saha (2000). *Mahilao Ke liya Swarojgar --- Murgi Palan Kaise Kare, Kheti*, December, 9: 31 – 33.



5. ONGOING RESEARCH PROJECTS



Sl. No.	Name of the Project	Date of launching	Investigators
1.	Identification and improvement of farming systems suited to farmwomen in Eastern India	August, 99	Dr S.N. Pandey, Dr KS. Risam, Dr B.N. Sadangi, Dr M.P.S. Arya, Dr Suman Agarwal, Dr P.K. Sahoo, Shri H.K. Dash, Mrs L.P. Sahoo, Mrs Abha Singh
2.	Improvement in backyard poultry farming for farmwomen of different categories	August, 99	Dr K.S. Risam, Dr P.K. Dehuri (OUAT)
3.	A gender study on agriculture and household economy of tribal of Orissa	August, 99	Dr B.N. Sadangi, Shri H.K. Dash
4.	Development and testing of extension methods for farmwomen in Eastern India	August, 99	Dr B.N. Sadangi, Dr Hema Pandey, Dr S.N. Pandey, Dr KS. Risam, Dr M.P.S. Arya, Dr P.K. Sahoo, Shri H.K. Dash
5.	Studies on technological need for empowering women in rural aquaculture	August, 99	Dr P.K. Sahoo, Dr B.N. Sadangi
6.	Occupational health hazards of farmwomen in coastal Orissa	May, 2000	Dr Hema Pandey, Dr Suman Agarwal, Mrs Abha Singh
7.	Standardization of women specific field practices in rice in Orissa	May, 2000	Dr M.P.S. Arya, Mrs Laxmi Priya Sahoo
8.	Identification and evaluation of interactive learning modules for dissemination of homestead technologies	May, 2000	Dr Suman Agarwal, Dr Hema Pandey, Mrs Abha Singh
9.	Improvement in storage practices of seeds and grains of important crops with women perspective	May, 2000	Mrs Laxmi Priya Sahoo, Dr M.P.S. Arya

6. PARTICIPATION IN SEMINARS/WORKSHOPS

- Dr Hema Pandey, Director participated in a workshop on “Role of women in livestock and fishery sectors”, held at West Bengal University of Animal and Fishery Sciences, Calcutta, 12-13 September 2000 and presented a paper on “Future trends in effective participation of women in the livestock and fisheries sector for income generation of the family”.
- Dr. Hema Pandey, Director, participated in the Workshop on “Gender Analysis in Agriculture” in Faculty of Kerala Agricultural University, September 2000.
- Dr Hema Pandey presented a paper on “Income generating avenues for farmwomen of dryland areas” in the workshop on Dryland agriculture for KBK districts organized by D.A. and F.P., Bhubaneswar, 22-23 September 2000.
- Dr B.N. Sadangi, Principal Scientist (AE) participated in two days workshop on “Research Extension Linkages” from 8th – 9th January 2001 sponsored by Directorate of Extension, Govt. of India and IMAGE, Govt. of Orissa held at Bhubaneswar.
- Dr B.N. Sadangi, Principal Scientist (AE) participated in the skill upgradation workshop on “Training Management on HRD and HRM” and worked as facilitator for assessing the training needs of extension functionaries of Govt. of Orissa from 12th – 14th February 2001 sponsored by Directorate of Extension, Govt. of Orissa and Orissa University of Agriculture and Technology, Bhubaneswar.
- Dr Hema Pandey, Director and Dr. B.N. Sadangi, Principal Scientist (AE) participated in the workshop on “Determinants of male out migration and its impact on gender roles in major rice production areas” held at India International Centre, New Delhi on March 12-13, 2001.



7. OTHER ACTIVITIES

World Food Day

'World Food Day' was celebrated on 16th Oct. 2000 in the adopted village 'Khamang Sasan'. Fifty farmwomen and adolescent girls participated in the programme. 'Food security, environmental sanitation and nutritious diet for mother and children' were the main areas of focus.

*Figure-XXI:
World Food Day
celebrated by
NRCWA with
farmwomen*



International Women's Day

On 8th March 2001 International Women's day was celebrated in the adopted village of NRCWA. The theme of the day was awareness generation among farmwomen regarding health and nutrition. Farmwomen were made conscious about family health



*Figure-XXII:
International
Women's Day
celebrated.*

and nutrition. Saplings of guava and seedless lime were provided to 30 farmwomen for rising in their nutrition. A lady doctor conducted health check-up of farmwomen and adolescent girls. Women identified as having nutritional deficiency problems were educated regarding enriching their diet through locally available food material and those having other health problems were prescribed required medication.

Participation in the Animal Fair (Pashu Mela)

The Director and Scientists of the Centre participated in the Pashu mela, which was held at Parajanga, Dist. Dhenkanal, Orissa on 27.1.2001 jointly sponsored by Department of Animal Husbandry and Diary, Govt. of India and ICAR. The Institute had the responsibility of conducting quiz competition for the farmers.

The sub-centre of NRCWA at Bhopal assisted the Mahila Arthik Vikas Nigam (MP) and organised three training programmes for farmwomen.



8. HUMAN RESOURCE DEVELOPMENT



- Dr S.N. Pandey, Principal Scientist (Hort.) has entered into the Limca Book of Records released on January 30, 2001, for achieving one time highest yield in Chilli 'Selection 240'.
- Shri H.K. Dash, Scientist (Agril. Eco.) attended a training programme on "Impact Assessment of Agricultural R & D" from 25th to 30th September 2000 at NAARM, Hyderabad.
- Dr (Mrs.) Bharati Killadi, Scientist (Hort.) attended 72nd Foundation course (FOCARS) from 1st December 2000 to 30th March 2001.
- Mrs Geeta Saha, T-4 (Home Sc.) and Mrs. Parisima Sen, Stenographer, Gr-III, attended 10 day ICAR-KAU Information Technology course entitled "Managing Digital Libraries in Agriculture" sponsored by ICAR, New Delhi held at Kerala Agricultural University, Trissur from 1.4.2000 to 10.4.2000.
- Shri M. Radhakrishnan, Sr.Clerk and Smt. Bishnupriya Moharana, Jr. Clerk attended a training course on "Administrative Procedures and Financial Rules" from 21st to 28th June 2000 at CICR, Nagpur.
- Miss Rina Das, Stenographer, Gr-III- is attending training on Hindi Typing and Stenography at AG Office, Bhubaneswar.

9. DISTINGUISHED VISITORS

Sl.No.	Name and Designation
1.	Dr. RS Paroda, Director General, ICAR & Secretary, DARE
2.	Dr. MN Reddy, Director (Agricultural Extension and Communications), Consultant, NATP
3.	Dr. G. Singh, Director, CIAE, Bhopal
4.	Dr. Mina Swaminathan, MSSRF
5.	Mr. SP Samuel, Director (Works)
6.	Dr. BM Bhandarkar, Head of Dept., CIAE, Bhopal
7.	Dr. HN Verma, Director, WTCER, Bhubaneswar
8.	Dr. G. Kalloo, Director, PD on Vegetables, Varanasi
9.	Dr. P. Das, DDG (AE), ICAR
10.	Dr. BN Singh, Director, CRRI, Cuttack
11.	Dr. Amerika Singh, Director, NRC of IPM
12.	Ms. Joyce s. Luis, Assistant Scientist, IRRI, Philippines



10. PERSONNEL

Personnel as on 31.3.2001

Sl. No.	Name	Designation
1	Dr Hema Pandey	Director
2	Dr S.N. Pandey	Principal Scientist (Hort.)
3	Dr K.S. Risam	Principal Scientist (LP&M)
4	Dr B.N. Sadangi	Principal Scientist (AE)
5	Dr M.P.S. Arya	Principal Scientist (Agronomy)
6	Dr Suman Agarwal	Principal Scientist (HDRM)
7	Dr P.K. Sahoo	Scientist (F&F)
8	Shri H.K.Dash	Scientist (Agril. Eco.)
9	Mrs. L.P. Sahoo	Scientist (Seed Technology)
10	Mrs. Abha Singh	Scientist (Food and Nutrition)
11	Dr Bharati Killadi	Scientist (Hort.-Veg.)
12	Mrs. Geeta Saha	T-4
13	Ms Nidhi Agarwal	T-II-3 (Bhopal Sub-Centre)
14	Shri B.C. Sahu	T-2
15	Shri D. Kar	Asstt. Administrative Officer
16	Shri N.V.R.N. Murty	Asstt. Finance and Accounts Officer
17	Shri V. Ganesh Kumar	Personal Assistant
18	Mr. M. Radha krishnan	Sr. Clerk
19	Ms Rina Das	Stenographer, Gr-III-
20	Mrs Parisima Sen	Stenographer, Gr-III-
21	Mrs Bishnupriya Moharana	Jr. Clerk
22	Mr. Biswanath Biswala	S.S.G.I

New appointments

Dr (Mrs) Bharati Killadi has joined NRCWA as Scientist (Hort.) on 12.07.2000.

कार्यकारी सारांश

कृषि में महिलाओं पर राष्ट्रीय अनुसंधान केन्द्र पर वर्ष 2000-2001 के अन्तर्गत कृषि की विभिन्न उत्पादन पद्धतियों में कार्यरत महिलाओं के लिए उपयुक्त तकनीकी के विकास एवं इसके प्रसार हेतु किये गये प्रयासों को और आगे बढ़ाने के लिए ठोस नींव डाली गई। इसके अतिरिक्त केन्द्र के आसपास की कृषि महिलाओं की संवेदनशीलता व कार्य दक्षता को बढ़ाने हेतु प्रसार कार्य किया गया। इस वर्ष से अनुमोदित परियोजनायें जिनमें कार्य आरम्भ किया गया था उपयुक्त दिशा में आँकड़े देना प्रारम्भ कर दी हैं।

कृषि महिलाओं के कार्यकलापों व अभिरुचि क्षेत्रों का उपयुक्त आँकलन करने के पश्चात् 'कृषि पद्धतियाँ' सम्बन्धि परियोजना के अन्तर्गत दो मुख्य घटकों - प्रथम कृषि पद्धतियों की पहचान व द्वितीय चिन्हित फसल पद्धति में सुधार करने के लिए प्रक्षेत्र शोध किया गया। परिवारों के ग्राम अनुप्रस्थ अध्ययन से कृषि महिलाओं के पोषण स्तर एवं भोजन व्यवस्था से प्राप्त आँकड़ों से वैज्ञानिकों की कृषि पद्धतियों जैसे - उद्यान, कुकुट, उद्यान-दलहन, उद्यान-मत्स्य, उद्यान-मूँगफली आदि में खाद्य-सुरक्षा के परीक्षणों में सुविधा होगी। पशुधन उत्पादन एवं प्रबन्ध क्षेत्र में कृषि महिलाओं के परिपेक्ष नवीन प्रजातियों पर शोध से 'घर पिछवाड़े' कुकुट एवं मत्स्य पालन की आवश्यकता को बढ़ावा मिला है। "धान उत्पादन में महिला विशेष प्रक्षेत्र क्रियाओं का मानकीकरण" नामक शोध परियोजना के अन्तर्गत कृषिरत् महिलाओं की पौध रोपाई में पीडा के पारिमाणिक एवं गुणात्मक अध्ययन पीडाहारी तकनीकी के विकास में विशेष सहायक सिद्ध होगा। घरेलू आमदनी को ध्यान में रखते हुए सामाजिक विज्ञान में किये गये अध्ययन से उड़ीसा के व्यवस्थापकों व विकास कार्यकर्ताओं के लिए महत्वपूर्ण दिशाधार प्रदान करने की आशा है। औद्योगिक स्वास्थ्य बाधाओं के अध्ययन से इनके द्वारा होने वाले महिलाओं के शारीरिक व मानसिक दबाव की प्रचंडता का पता चलता है। कृषि महिलाओं की खाद्य एवं बीज संचयन व रख-रखाव में रुचि एवं स्थानीय एवं आधुनिक ज्ञान के आधार पर विकसित तकनीकी को शीघ्र अपनाये जाने की



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