

ANNUAL REPORT

1998-99



भारतीय
ICAR

**NATIONAL RESEARCH CENTRE FOR WOMEN IN AGRICULTURE
(INDIAN COUNCIL OF AGRICULTURAL RESEARCH)**

BHUBANESWAR - 751 030

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PREFACE

The National Research Centre for Women in Agriculture (NRCWA) - the only Centre of its kind in the country, was established in 1996 and has the mandates to develop technologies appropriate to farm women of different production systems and to disseminate it backed by increased sensitivity and capability of research and development specialists addressing the issues pertaining to gender implications in agriculture and allied activities.

The farm women are an integral part of traditional farming system. They have been there all along. However, due to feminization and modernization of agriculture, the importance of women's role in adoption of scientific agricultural and allied activities viz. horticulture, animal husbandry, poultry, fisheries, sericulture, apiculture etc. has become significant for agricultural research and extension. Women, in fact, contribute more than their share to agricultural production. Even the available micro-level data grossly underestimates the role of women in farming. In India, there are hardly any rural women who do not participate in one or the other phases of agriculture, either as family worker or as wage worker.

The Annual Report of the Centre highlights its research and training activities carried out during the year 1998-99 as well as infrastructure facilities developed during the period. During the year, the Centre has also formulated the research projects and approach papers. A Brain Storming session on 'Gender Issues in Agriculture' was also organized on August 17, 1998 to prioritize the research activities of the Centre. There has been significant additions in terms of staff and infrastructural facilities in the Centre.

I wish to express my sincere gratitude and immense indebtedness to Dr. P. Das, Deputy Director General (Agricultural Extension), ICAR, for his able guidance and constant encouragement which served as a regular source of inspiration to face the challenges in development of this Centre. The willing support and help of Dr. B.N. Chaudhary ADG, (LLP) and Dr. B.S. Hansra, ADG (AE) are highly acknowledged.

I would also extend my sincere gratitude to my colleague in the Centre who contributed and the editorial committee for their relentless efforts during compilation of the report. My appreciations are also for all scientific, technical and Administrative staff for their support and co-operation in development of the Centre and in bringing out this report. Thanks are due to Shri. D. Karunakaran, Programmer(Computer), Zonal Coordination Unit-II, Calcutta for composing the manuscript.

Bhubaneswar
June, 1999


S.S. Ghosh
Director

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EXECUTIVE SUMMARY

The NRCWA undertook the work on research and training for women in agriculture during 1998-99. In addition, work was undertaken on research projects formulation, selection of village for on-farm research, conduction of PRA, organization of Brain Storming Session on Gender Issues in agriculture, conduction of Staff Research Council meeting and human resource development of scientific and administrative staff of NRCWA. Two experiments on terrace gardening of okra Cv. 'A-4' and chilli variety 'Utkal Ragini' and a selection 'CHB 75' were carried out with women perspective. Pre-treatment of okra seeds with urea (1%) improved seed germination appreciably (30%) over control (16.66%) when sown on February 16, 1999. Similarly, soaking seeds in coconut water for 24 hrs improved germination to the same extent (30%). Urea (1%) in combination with GA3 (100 ppm) gave the maximum seed germination (46.66 %). Seed soaking in urea (5%, 10%) either alone or in combination with GA3 (100 ppm) and coconut water fully inhibited the germination of seeds. Cow urine alone as well in combination with GA3 inhibited seed germination fully. The combined treatment of coconut water + cow urine (25 ml each) gave the tallest plant (46 cm) as against control (10.38 cm) six weeks after sowing. The plants in some of the treatments started bearing during the period under report, which were subjected to organoleptic evaluation. All plants were free from yellow vein mosaic virus.

Chilli variety Utkal Ragini and Selection CHB-75 were sown in pots for studying their performance on terrace. Grape cvs. Pusa Urvashi, Pusa Navrang and Perlette were introduced and planted in the courtyard of NRCWA. Perlette was found more tolerant to termites (45% mortality) than Pusa Urvashi (76.4%) and Pusa Navrang (79.1%).

Surveys were undertaken for horticultural plantations and livestock/poultry production practices in some of the rice growing areas of Orissa; fruit plantation in backyards in Bhubaneswar; gender's participation in horticulture along roads and railway lines; selection of elite mango seedlings; and participation of women in fisheries around Chilika lake. A salt-tolerant mango seedling (NSTMS), a baramasi red mango type (MBRS), a dwarf selection of mango (JDMS) and three regular bearing types (JRBM, DRBM, GRBM) showing characters of regular bearing habit with bearing panicles and leaf shoots together in February – March, 1999 were selected.

There was a variation in women's participation in horticulture depending upon location like Bihar, Delhi, Orissa, U.P. and West Bengal. In rice growing areas comprising of villages Baghmari, Kanpur and Siula Tala Sahi of Khurda and Puri districts of Orissa cattle was found to have been reared by high caste families irrespective of land holding categories as a symbol of prestige, whereas, goats and poultry were reared mostly by lower caste/landless families as their subsidiary means of income. The farm women were involved in major activities related to feeding and management of livestock and poultry, harvesting and collecting fodder, grazing of animals, looking after productive animals and poultry birds, providing drinking water, cleaning sheds, milking and egg collection etc.

Fishery was reported to be practised as secondary occupation by women involved in fishing + processing + farm labour work. These women had been collecting prawn larvae locally called "Sridhar" and processed in the form of "Shridhar feta" for selling in the market. Women involved in prawn culture invested on an average Rs. 7500 in a pond of about 200 sq. metre and get a return of Rs. 15000. Women fish traders were reported to carry head load of fish to a distance of 15-20 km and sell 10-15 kg of fish product per day.

NRCWA sub-centre at Bhopal developed an improved sickle for farm-women which reduced their physiological work load by about 11 percent over indigenous sickle. The improved sickle weighed 180 g as against 375 g in case of indigenous one.

Three trainer's training programmes viz. High density planting of banana with tissue culture plants; gender specific technologies for value-addition in horticultural produce : a blend of indigenous and modern knowledge; and technological empowerment of farm-women for value-addition of milk were organised by the Centre at main campus during the period under report. Scientists/extension specialists from various KVKs of Assam, Bihar, Orissa and West Bengal and Department of Agriculture (Govt. of Orissa) participated in the trainings. The sub-centre at Bhopal conducted 23 training programmes for farm women in different aspects of agriculture and allied activities.

The staff strength of the centre was augmented by appointment of two Principal Scientists, Assistant Finance and Accounts Officer, One Senior Clerk, two Junior Stenographers, One Junior Clerk and one S. S. Grade-I personnel.

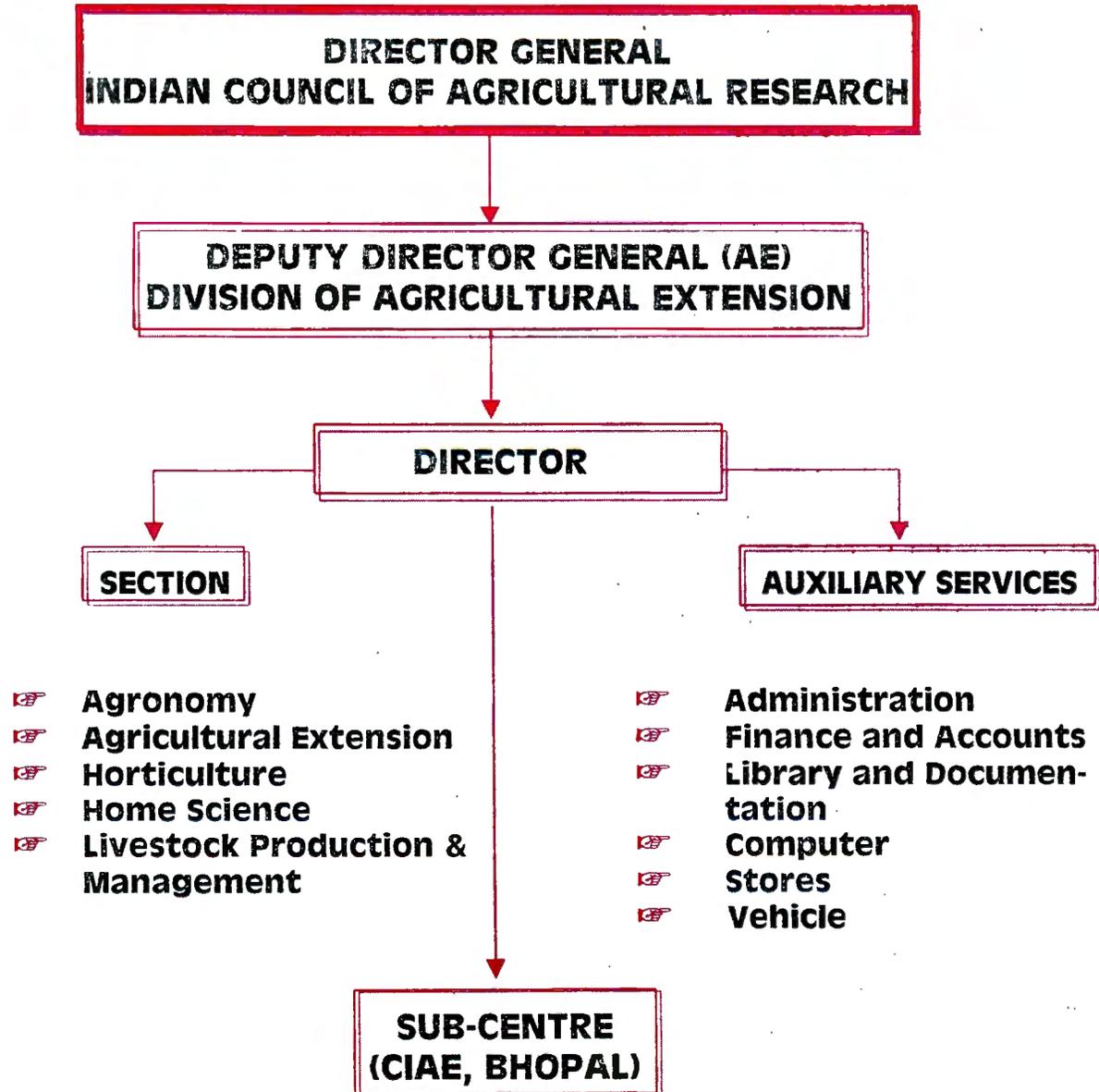
1. INTRODUCTION

The National Research Centre for Women in Agriculture (NRCWA), Bhubaneswar pursued its research and training activities to accomplish the mandate – “To develop technologies appropriate to farm women 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”.

A typical farm women of India has always a general preference towards crops/farm enterprises/practices which are culturally deep rooted. Secondly, special types of preferences are also seen among the farm women depending on agro-ecology and the demand of the micro-household conditions. In the year under report, the above basic gender considerations were taken into consideration for further processing of technology generation. This has been done keeping an eye on the acceptance of the technologies by the farm women. Efforts were therefore, made on the initiation of experiments on (i) growing okra in pot culture on terrace; (ii) evaluating two chilli varieties in pot culture on terrace as well as in the lawn's beds in the courtyard with flowering plants and grape; (iii) introduction of grape varieties; (iv) survey for horticultural plantations in the rice growing areas of Orissa; (v) survey of fruit plantations in the backyards of Dharma Vihar area, Bhubaneswar; (vi) survey of mango for selecting elite seedlings; (vii) survey of livestock/poultry production practices in rice growing areas of Orissa; (viii) participation of women in fisheries and (ix) comparison of improved and local sickles for harvesting of gram with women workers. Scientists while designing experiments and studies have tried to emphasize the potentiality of household indigenous materials which are close to women in technology development.

The NRCWA contributed significantly in the field of Human Resource Development (HRD) through trainers' training programmes on (i) high density planting of banana with tissue culture plants, (ii) gender-specific technologies for value addition in horticultural produce, (iii) technological empowerment of farm women for value-addition of milk at its head quarters and (iv) trainings for women on various aspects at its sub-centre at CIAE, Bhopal. Training on above subjects were imparted to the scientists/trainers of the KVKs of Assam, Bihar, Orissa and West Bengal. Scientists and staff of NRCWA have also undergone training at different national institutes of the country and participated in workshop, seminars and symposia.

ORGANOGRAM OF NRCWA



2. ACHIEVEMENTS

A. RESEARCH

- (i) Studies on effect of pre-treatment of seeds with growth regulators, coconut water and cow urine and sowing date on seed germination, plant growth, fruiting and fruit quality of ladies finger or okra (*Abelmoschus esculentus*).

Dr. S. N. Pandey, Principal Scientist (Hort.)

Okra (*Abelmoschus esculentus*) is an important vegetable of Orissa which is sown in November for good yield. Occasionally paddy is harvested in late season in January. Sowing of okra after harvest of paddy in January-February produces smaller fruits and lesser yield following hot summer season. Effort was therefore, made to apply some growth regulators and locally available cheap material like coconut water, urea and cow urine as seed pre-treatment (Table 1) for improving germination, plant growth and fruiting to fit it into the late harvested rice cropping system under Bhubaneswar conditions. Experiment was statistically designed in a randomized block design.

Seeds of okra cv. A-4 obtained from IARI, New Delhi were pre-treated with GA3 (25,50,100 ppm), CPPU (0.1%), cow urine (1%), coconut water (5%) and urea (10%) and their various combinations and sown on January 15 and February 6 and 16, 1999.

Effect on seed germination

Seed germination was poor (15.27%) when sown on January 15 as well as on February 6 either unsoaked (21.42%) or soaked in water for 24 hrs (20%) and February 16 with water soaking (16.66%).

The lower concentration of urea (1%), however, improved seed germination appreciably (30%) over control (16.66%) when sown on February 16, 1999. Similarly, soaking seeds in coconut water (50ml) for 24 hrs improved germination to the same extent (30%). Urea (1%) in combination with GA3 (100ppm) gave the maximum seed germination (46.66%).

Seed soaking for 24 hrs in urea (5% and 10%) either alone or in combination with GA3 (100 ppm) and coconut water (25 ml each) fully inhibited seeds to germinate. Cow urine (50ml) either alone or in combination (25 ml each) with GA3 (100ppm) also inhibited seed germination of okra. CPPU (0.1%) either alone (20%) or in combination with 25 ml each of coconut water and cow urine (16.66%) did not alter seed germination in okra.

Seed germination was hastened (4.3-5.8 days) by all treatments over control sown on January 15 (12 days), February 6(6.33 days) and February 16(14.3 days) in this experiment (Table 2).

Thus seed soaking in the combined solution of GA3 (100 ppm) and urea (1%) for 24 hrs appeared an optimum pre-treatment for better seed germination.

Number of picking

Unsoaked seeds sown on January 15 delayed fruiting and gave only 2 pickings by March 31 as against 3 pickings on plants raised from unsoaked and water soaked seeds sown on February 6. Even later sowing of water soaked seeds on February 16 hastened fruiting and gave 4 pickings by March 31 (Table 2).

Fruiting was hastened by urea (1%), coconut water, CPPU and combined treatment with coconut water, cow urine and CPPU gave first picking 39 days after sowing as against 69 days in plants raised from seeds sown on January 15 and control plants raised from seeds sown on February 6 (47 days) and February 16 (49 days).

Plant height

Plants grew smaller (10.38 cm) 6 weeks after germination from untreated seeds sown on January 15 than those of unsoaked (29.10 cm) and soaked (30.72 cm) seeds sown on February 6 and soaked ones (33cm) sown on February 16, 1999 (Table 2). The combined treatment of coconut water (25ml) plus cow urine (25 ml) gave the tallest plant (46 cm). None of the other treatments (26.66 to 33.14 cm) altered plant height much. CPPU (0.1%) recorded the smallest plant (26.66 cm) among all treatments tried on two later dates of sowing.

Fruit growth

Thirteen out of 21 treatments yielded fruits during the period under report. Fruits harvested on March 25 showed more length on plants raised from water soaked seeds sown on February 6 (13.79 cm) followed by GA3 (25 ppm) treated ones (11.46 cm) over unsoaked control (10.28 – 10.62 cm). Also, fruits of more than 7 cm in length in control became hard and non-usable against longer fruits recording tenderness in GA3 treatment. However, fruit weight was lower in GA3 treatment (13.33 to 13.88 g) due to tenderness as against harder fruits in control (13.04 – 15.90 g).

Fruit number

All plants raised from treated and untreated seeds sown on 3 different dates bore fruits except control sown on February 16. Since this was the initial stage of fruiting, the yield (0.5 to 1.3 fruits/plant) was not of any consequence (Table 2).

Organoleptic evaluation

Sufficient fruits were picked up in 5 treatments for organoleptic evaluation. Fruits were cooked immediately after harvest with spices like ginger, garlic, garam masala, cooking oil, turmeric powder and salt. Cooked fruits were evaluated organoleptically for firmness, taste and palatability by a panel of judges belonging to different strata of the society. Scoring was done on 10 marks allotted to each of these 3 characters judged on the basis of (a) liked very much (score more than 8), (b) liked much (7-8), (c) liked (6-7), (d) just-liked(5-6) and



Growing bhindi / okra in pots (25 cm diameter) on terrace freedom from virus.



Women engaged in cattle management.

(e) did not like (less than 5). Fruits of plants raised from seeds pre-treated with GA3 (25 ppm) were adjudged best with overall scoring of 6.33 out of 10.0 scores against unsoaked control seeds sown on January 15 (4.63) and February 6 (4.99). This was so because fruits in control lost their tender character as soon as these reached above 7 cm in length due to hot weather.

Freedom from virus

Okra 'A-4' - yellow vein mosaic resistant variety released from IARI, New Delhi did not show any symptom of this virus under Bhubaneswar conditions.

Table 1. Effect of dates of sowing, growth regulators, coconut water and cow urine on seed germination, fruiting and fruit quality of okra (*Abelmoschus esculentus*) cv. A-4.

Seed treatment/ Showing date	No. of seeds sown	Germi- nated (%)	No. of picking	Fruit length (cm)	Fruit Wt. (g) on	Organoleptic score				Mean
						Firm- ness	Taste	Palata- bility		
January 15, 1999										
Control (without soaking)	72	11	15.27	2	10.62	14.28	5.60	4.56	3.75	4.63
February 6, 1999										
Control (without soaking)	70	15	21.42	3	10.28	13.04	5.16	4.83	5.00	4.99
Water soaking	70	14	20.00	3	13.79	15.90	5.83	5.50	5.60	5.64
GA3 (25 ppm)	70	22	31.42	2	11.46	13.88	6.00	6.83	6.16	6.33
GA3(50 ppm)	70	18	25.71	2	10.10	13.46	5.60	6.33	6.00	5.97
GA3 (100 ppm)	70	26	37.14	2	9.38	13.33	---	---	---	---
Cow urine (50 ml.)	70	0	0.00	---	---	---	---	---	---	---
Cow urine(50ml)+GA3(100ppm 25ml)	70	0	0.00	---	---	---	---	---	---	---
February 16, 1999										
Control (water soaking)	30	5	16.66	4	12.05	---	---	---	---	---
Urea (1%)	30	9	30.00	2	9.91	---	---	---	---	---
Urea (5%)	30	0	0.00	---	---	---	---	---	---	---
Urea (10%)	30	0	0.00	---	---	---	---	---	---	---
GA3 (100 ppm) + Urea (1%)	30	14	46.66	2	8.02	---	---	---	---	---
GA3 (100 ppm) + Urea (5%)	30	0	0.00	---	---	---	---	---	---	---
GA3 (100 ppm) + Urea (10%)	30	0	0.00	---	---	---	---	---	---	---
Coconut water (50 ml)	30	9	30.00	2	8.57	---	---	---	---	---
Coconut water(25ml) +cow urine (25ml)	30	2	6.66	1	11.50	---	---	---	---	---
Coconut water+cow urine+CPPU(.1%) (25 ml. each)	30	5	16.66	2	8.37	---	---	---	---	---
Cow urine +CPPU (0.1%) 25ml each	30	7	23.33	1	7.25	---	---	---	---	---
Coconut water + urea (10%) 25ml - each CPPU(0.1%) 25 ml	30	0	0.00	---	---	---	---	---	---	---
CPPU(0.1%)25ml	30	6	20.00	2	8.57	---	---	---	---	---

Table 2. Effect of sowing dates, growth regulators, coconut water and cow urine on growth and fruiting of okra (*Abelmoschus esculentus*) cv. A-4.

Seed treatment/ sowing dates	No. of days from sowing		No. of fruits/plant upto 31.3.99	Plant height (cm) per week after germination					
	Mean seed Germination	First Picking		I	II	III	IV	V	VI
January 15									
Control (without soaking)	12.00	69	0.90	4.27	5.29	7.17	7.77	9.37	10.38
February 6									
Control (without soaking)	6.33	47	1.30	4.52	5.60	12.00	20.20	28.10	29.10
Water soaking	5.30	47	1.30	4.98	7.20	9.55	15.77	24.00	30.72
GA3 (25ppm)	4.30	47	0.90	6.05	7.33	9.64	15.11	23.07	29.00
GA3 (50 ppm)	4.80	47	1.20	6.61	7.92	10.70	15.64	23.16	29.83
GA3 (100 ppm)	4.70	47	0.50	5.49	6.35	8.30	11.70	16.85	29.50
February 16									
Control (water soaking)	14.30	49	0.00	4.40	10.00	14.60	16.30	30.00	33.00
Urea (1%)	5.42	39	0.80	3.85	5.50	10.82	19.75	29.42	33.14
GA3 (100ppm) +Urea (1%)	4.83	39	0.90	3.25	4.75	8.85	17.58	25.66	32.33
Coconut water(50ml)	6.57	39	1.10	3.92	4.95	9.85	18.64	25.64	32.14
Coconut water(25ml)+ cow urine (25ml)	8.00	42	0.20	3.25	6.35	8.60	20.00	34.00	46.00
Coconut water(25ml)+ cow urine (25ml)+ CPPU(0.1%)25ml	4.75	39	0.30	3.00	4.16	7.83	14.33	20.33	27.00
Cow urine (25ml)+ CPPU(0.1%)25ml	5.80	42	0.20	2.37	3.35	5.72	14.16	21.00	29.25
CPPU(0.1%)25ml	5.60	39	0.30	3.50	6.20	10.23	12.66	20.33	26.66

ii) Evaluation of Chilli varieties for growing in pots on terrace

- Dr. S. N. Pandey, Principal Scientist (Hort.)

Chilli (*Solanum annum L.*) cv. Utkal Ragini and a selection 'CHB 75' (Table 3) were sown in pots (25 cm diameter). These two types were evaluated for seed germination, plant growth including branching, tolerant to strong wind and other biotic and abiotic stresses, flowering, fruiting, fruit growth, pungency, yield and fruiting duration. In pot culture, these types were planted for evaluation as seedling *in situ* and transplant. In the lawn's beds of courtyard these were transplanted in partial shades of trees and also in open sun mixed with flower and grape plants for their evaluation as mixed crop. Experiment in pot culture was statistically designed in a randomized block design. The studies are in progress.

Table 3. Evaluation of Chilli varieties in pot culture on terrace and in combination with flower and grape plants in lawn's beds in courtyard.

Sl.No	Chilli variety and crop combination	No.of plant	Remarks
1.	'Utkal Ragini' seedings in pots on terrace	34	The number of chilli plants in lawn's beds depended on availability of space. Other plants already existed there.
2.	'Utkal Ragini' transplanted in pots on terrace	34	
3.	'Utkal Ragini' transplanted in the lawn's bed	16	
	Jasmine	8	
	Chrysanthemum	1	
	Rose	2	
	Marigold	1	
4.	'CHB 75' seeding in pot on terrace	34	
5.	'CHB 75' transplanted in pot on terrace	34	
6.	'CHB 75' transplanted in lawn's bed	11	
	Jasmine	8	
	Rose	2	
	Marigold	1	
	Canna	1	
7.	'CHB 75' transplanted in lawn's bed	14	
	Grape plant	25	
8.	'CHB 75' transplanted in lawn's bed in partial tree shade	13	

iii) Introduction of grape varieties for kitchen/ backyard gardening

- Dr. S. N. Pandey, Principal Scientist (Hort.)

Since grape finds its place in the backyard/kitchen garden and needs to be harvested before the onset of monsoon, early maturing grape varieties Pusa Urvashi (table), Pusa -Navrang (juice, wine) and Perlette (table) which ripen in North India by the 1st week of June were introduced. These varieties were obtained from IARI, New Delhi. Under Bhubaneswar situations, monsoon sets in by June 10. Unrooted cuttings were planted in the nursery beds and observations were recorded on sprouting, plant growth and tolerance to termites.

'Pusa Navrang' was the most susceptible to termites with 79.10% mortality followed by 'Pusa Urvashi' (76.4%). 'Perlette' was found more tolerant to termite with 45% mortality than the former two varieties (Table 4).

Table 4. Performance of grape varieties

Varieties	No. of cuttings		Damaged by termites		Mortality (%)	Plant height(cm) as on 30.3.99
	Planted	Sprouted	Before sprouting	After sprouting		
Pusa Urvashi	17	17	-	13	76.4	6.9
Pusa Navrang	48	26	22	16	79.1	6.5
Perlette	20	12	8	1	45	7.0

iv) **Survey of horticultural plantations in rice growing areas of Orissa**

- Dr. S. N. Pandey, Principal Scientist (Hort.)

Survey of 7 villages viz. Baghmari, Kanpur, Barakuda, Nijgarh- Kurkhi, Sangalei Sasan, Siula Talasahi and Nakhaur in Khurda and Puri districts of Orissa were undertaken during 1998-99 for ascertaining the types of fruits, vegetables and flower plants grown in backyard by women in irrigated and rainfed areas. A number of these crops was found growing in the backyards (Table 5). Bittergourd and banana cv. Patkapura were found most remunerative in some of these villages. In Siula Talasahi and Nakhaur villages, pickle making from fruits and vegetables was found to be income and employment generating home scale industry.

Table 5. Survey of horticultural plantations in rice-growing areas in Orissa

Sl. No.	Village	Crop			Remarks
		Fruit	Vegetable	Flower	
1.	Baghmari	Mango, Banana, Papaya, Guava, Drumstick	Mushroom, Cowpea, Elephant foot yam, Bottle gourd, Luffa, Pumpkin	Marigold	Rainfed Backyard gardening
2.	Kanpur	--do--	----do---	-	A high density plantation of banana cv. Dwarf Caven- dish with tissue culture plants in 1.5 acres
3.	Barakuda	Coconut, Mango, Jackfruit, Papaya, Banana (cv. Champa, Patkapura), Carambola or Kamrakh	Brinjal, Bittergourd, Bottlegourd, Luffa, tomato, Cauliflower, Cabbage, pea, Beans, radish, Cucumber, Cowpea	-	Lift irrigation Village, headed by a lady sarpanch Bitter gourd grown in 0.5 acre was claimed to fetch Rs. 75,000/-. A women organization exists. Patkapura Banana finger sold @ Rs. 3-5/- each.
4.	Nijgarh-Kurkhi	-- do --	Tomato, Radish, Cucumber, Brinjal, Pointed gourd	-	-
5.	Sanghalei Sasan	Coconut, Banana, Papaya, Jack fruit, Mango	Sweet potato, Okra, Brinjal, Radish, Potato, Ridge gourd Cucumber, Pumpkin, Pointed gourd, Colocasia,	Kewara	Irrigated

Sl. No.	Village	Crop			Remarks
		Fruit	Vegetable	Flower	
6.	Siula Talasahi	Mango, Coconut, Guava, Annona, Banana, Papaya,lemon, Cashewnut, Jackfruit, Pummelo	Sweet potato, Yard bean, Pumpkin, Brinjal, Tomato, Pointed gourd	Marigold, tuberose, Rose, Kewara, Jasmine.	Canal irrigation, Kitchen gardening, Pickle making by women from mango Lemon, chillis, bittergourd, ber and kainth.
7.	Nakhaur	Jack fruit, Lemon, Papaya, Coconut, Guava, Annona	Mushroom, Brinjal, Okra, Potato, Amaranth, Tomato(Bt1,2), Beans, Peas, Cucumber	-	Lift irrigation. Cottage industry by women for pickle making using dry ber, tarma- rind, mango with spices and gur (Jagg- ery). Work for 4 hrs a day earning a net saving of Rs. 6000/-.

v) Survey of backyards for fruit plantation in Dharma Vihar Village of Bhubaneswar.

Dr. S. N. Pandey, Principal Scientist (Hort.)

Papaya (mainly for culinary purpose), banana, coconut and drumstick were found growing in backyard in the merit of choice by women in Dharma Vihar area of Bhubaneswar. These crops were also found growing in combinations of two or more fruits of varying age and height (Table 6). Papaya plants were found with several primary (1-17) and secondary (2-12) branches which were mostly either flowering or fruiting.

Table 6. Survey of backyard fruit plantations in Dharma Vihar area of Bhubaneswar city

Sl.No	Fruit crops	No. of backyard growing	Height (m)	No. of branches		No. of fruits/ tree(+)		Remarks
				Primary	Secondary	Main branch	Secondary branch	
1	Papaya x	29	0.60-8.0	1-17	2-12	1-100	2-100	Mostly hermaphrodite but female and male flower were also found flowering
2.	Banana*	8	3.0-5.5	---	---			
3.	Coconut	6	2.5-9.7	---	---			
4.	Drumstick	1	4.0-10.6	1-8	---			
5.	Papaya + Banana	4						
1.	Papaya + Drumstick	3						
2.	Banana + Drumstick	1						
3.	Papaya + Banana + Guava	1	5.50**					
4.	Papaya + Banana + Coconut+ Drumstick	1						

(x) One tree bore at 110 cm. from ground level.

* Cvs. Singapuri, Patkapura and Bental

** Guava tree

(+) Partly harvested

(vi) Survey of livestock production practices in rice growing areas of Orissa

- Dr. K. S. Risam, Principal Scientist (LPM) and Dr. S. S. Ghosh, Director

Survey of four villages viz. Baghmari, Kanpur, Barakuda and Siula Talashahi of Khurda and Puri districts of Orissa was undertaken during 1998-99 to identify the involvement of farm women in various animal husbandry activities and possible research interventions needed to improve their socio-economic status. The livestock species reared by farm-women in the backyard as component of their farming systems are presented below :

Table 7. The livestock/poultry species reared by farm women in different villages of rice growing areas of Orissa

Sl. No.	Village	Livestock species	Breed/type
1.	Baghmari	Cattle Goat Poultry	Indigenous non-descript. Black Bengal and indigenous Indigenous
2.	Kanpur	Cattle Goat Poultry	Indigenous non-descript. Indigenous Indigenous.
3.	Barakuda	Cattle Goat Poultry	Cross breeds. Indigenous Indigenous.
4.	Siula Talasahi	Cattle Goat Sheep Poultry	Indigenous and crossbred. Indigenous and Black Bengal. Indigenous non-hairy Indigenous and broilers

During the survey, it was observed that cattle are reared by high caste families irrespective of land holding as a symbol of prestige, whereas goats and poultry are reared mostly by lower caste / landless families as their subsidiary means of income. Milk produced by the cows is used for home consumption and surplus milk is sold for procuring inputs for other farm activities. The bullocks are used for ploughing. Dung is used for manuring as well as fuel. The goats are reared for meat purpose. The eggs and poultry birds are sold and also used for home consumption and entertaining guests. The farm women are involved in major activities related to feeding and management of livestock and poultry, harvesting and collecting of fodder and grasses, grazing of animals, milking (except for high yielding crossbreeds) and egg collection etc. Preventive measures like vaccination and deworming are not practised. The animals are predominantly fed with paddy straw without any treatment. The availability of green fodder is limited to only a few months. The concentrates are provided to good milch animals only. The

poultry birds are reared in scavenging conditions. Low fertility in cows is mainly due to anestrus and repeat breeding. Poor genetic make up of indigenous cattle, low milk production, high cost of concentrate and non-availability of green fodder throughout the year are main constraints in adopting dairy farming as a commercial venture by the farm women. In case of goat production, slow growth rate and erratic market rates are the limiting factors where as in poultry, low egg production and high mortality of indigenous fowls are risk factors for the farm women to adopt backyard poultry farming as an enterprise.

(viii) Participation of women in fisheries

- Dr. B.N. Sadangi, Principal Scientist (Extn.), Dr. (Mrs.) P.K. Sahoo, Scientist(Fy) and Shri. H.K.Dash, Scientist (Eco.)

The participation of women in fishery was studied in areas where natural eco-system favours fish growing . A study was conducted in the villages around Chilika lake. This is a famous lagoon measuring 1,00,000 ha of water area lying in the south -eastern part of Orissa. It was reported by Zoological Survey of India that about 28 species of crabs, 13 species of prawns and 217 species of fishes are found in Chilika. People of 150 villages are direct beneficiaries of Chilika lake. All the villages are predominantly inhabited by fisherman belonging to schedule caste. The caste itself has a number of sub-castes such as Nolia, Keot, Tiar, Khatia , Katia, Kandara, Niali and Gokha etc. The study further revealed three distinct occupational structures among the fisher-women like (i) fishing + processing + farm labour, (ii) fishing/ aquaculture + fish trading and (iii) fish trading only.

Semi-structural interviews, explorative and case study method were adopted to each occupational structure by selecting one village randomly.

Observation

It was observed that in the first type of occupational structure, fishery is practised as secondary occupation and almost 25% population of women in some selected villages have adopted it. They undertake fishing of prawn larvae (locally known as SRIDHAR) with small pieces of porous cloth material. In the early morning they leave their houses in a company of two for fishing in Chilika lake and return in the mid-day. In the afternoon, fisher women with their family members (mostly girls) prepare "SRIDHAR FETA" - a local processed fishery product. These women have traditional skills in preparing and selling these to their own villagers and middle men who procure these products in wholesale @ Rupee per 25 pieces. It was revealed that on an average a fisher woman gets Rs. 10-12 per day and in most favorable situation, their income per day may go up to Rs. 16 to 18. Further fisher women seek employment in different agricultural operations from the month of July.

Fisher women are fully involved in fishery from 17 to 72 years of age with the maximum involvement in the age group of 35-45 years. The percentage of illiteracy is very high (about 90%) among them. They have high level of credit seeking behaviour and majority of them are

below poverty line. It further indicated that very few women are able to mobilize finance from non-institutional sources like private money lenders against different kinds of mortgages.

Women can do independently fishery activities like pond manuring, pond cleaning, feeding and harvesting, etc. and join with other family members in activities like pond preparation, seed collection, rearing and netting. Women involved in prawn culture invest on an average of Rs. 7,500 in a pond of about 200 sq.m. and get a return of Rs. 15,000 which is much less than expected. Women depending exclusively from fishery even go to Chilika with their husbands for fishing. Fisher women devote 16 hours per day on an average in activities like small fish trading such as fish and ice procurement, packing and storing, selling to different villages with head loads of fish and collection of money and get net return varying from Rs. 60 to 100 per day depending upon the availability and marketability etc. Women fish traders carry head load of fish to a distance of 15-20 km and sale 10-15 kg of fish per day. The fish trading is carried for about 20 days in a month and 6 months in a year.

Constraint

During interrogation the following constraints were identified :-

i) Drudgery in carrying head load of fish, ii) inadequate institutional finance, iii) bad weather, iv) non availability of sufficient fish, v) wastage of time in collection sale proceeds, vi) inadequate assistance through the societies and vii) inadequate Govt. support.

Recommendations

The case study-cum-survey of the fisher women together with constraint analysis led to following implications in the process of empowering fisher women.

1. Formation of registered fisher women's cooperative societies,
2. In the event of declining trend of availability of fish in Chilika lake, the fisher women may be motivated by the agency to practise aquaculture like, pond culture and pen culture in and around Chilika,
3. From their positive mind, set for institutional credit coupled with hard physical work in the enterprise, the best utilization of credit can easily be predicted,
4. In order to make them more enterprising, diversification of their enterprise is possible towards value addition in fisheries and preparation and repairing of nets,
5. Training should be organized especially for the fisher women in aquaculture, value addition and marketing the value added products through cooperatives.
6. Drudgery of the fisher women in fish trading can greatly be reduced by developing low cost, light weight insulated carrying boxes. and

7. Studies on forecasting of fish catches, desirable environment for sustainability of fish production and value addition specially for Chilika fish should be undertaken.

(ix) Comparison of improved and local sickles for harvesting of gram by women workers.

- Dr. L.P. Gite, Sr. Scientist (FP & M)

A study was conducted to compare the workload involved in harvesting of gram with improved and local sickles. The improved sickle has serrated blade made up of special steel. Its weight is 180 g as against 375 g of local sickle. The parameters used for comparison were heart rate (for evaluation of workload) and area harvested per hour (for output). Split plot experimental design was used for this study. The ambient conditions during harvesting period were dry bulb temperature 30 to 36° C and relative humidity 16 to 34%. The results indicated that the improved sickle was at par with local sickle in terms of output. However, the physiological workload was found to be less by about 11% in case of improved sickle. On the whole, workers liked the improved sickle as it was lighter, better cutting edge and involved lower work load as compared to that of local sickle.

B. TRAINING

The Institute organized 3 trainers' trainings at main Centre Bhubaneswar during the period under report. Sub-Centre at CIAE Bhopal also organised training programmes for farm women. The details of these trainings are given below :

(a) High density planting of banana with tissue culture plants

The NRCWA organised one trainers' training programme on "High Density Planting of Banana with Tissue Culture Plants" in collaboration with the Zonal Co-ordination Unit for the Transfer of Technology, Zone-II, Calcutta and co-operation of the Regional Plant Resource Centre, Bhubaneswar in terms of demonstrations on micropropagation technique in the laboratories, field performance of tissue culture banana plants and application of suitable cultural practices for high production and improved productivity. This was organised for Krishi Vigyan Kendras of Assam (Khumtai and Arunachal), Bihar (Sindhri and Ranchi), Orissa (Kendrapara and Gambharipaly) and West Bengal (Nimpith and Shantiniketan). The list of participants is given in table 8.

Training programme was inaugurated by Dr. S. P. Ghosh, DDG(Horticulture) on 25th May, 1998 as Chief Guest, Dr. B. Senapathy, Dean(Research), Orissa University of Agriculture and Technology as presiding officer and Dr. S. Edison, Director, CTCRI as Guest of Honour.

During training the crop production technology for banana and water management in banana under high density planting were discussed in details with participants by resource persons from IIHR, Banaglore.

Tissue culture plants

Dwarf Cavendish, Robusta, Patakapura, Red Banana, Bental and Champa were observed to have successfully been multiplied through micropropagation and field demonstration at the Regional Plant Resource Centre, Bhubaneswar. The following advantages of tissue cultured banana plants were discussed :

- i) Uniform, healthy and disease free planting material.
- ii) Earliness in flowering resulting in early harvest by 3-6 months.
- iii) Synchronous flowering, fruiting and harvesting making market planning easier.
- iv) Saving of time and inputs.
- v) Early recovery of investment.
- vi) Resources can be multiplied in quick succession.

Practical demonstrations were organized on excising tissues from selected rhizome, sterilization of tissues with mercuric chloride, putting tissues in shooting medium, method of shoot proliferation, separation of shootlets, putting shootlets in rooting medium, taking rooted plantlets out from media, washing rooted plantlets in water, transplanting tissue-cultured plants in the nursery at 3-4 leaf stage, raising tissue cultured plants in green house, transferring plants from bed to plastic bags, removing plants from bags and packaging in moss for transportation and cultural operations for growing tissue cultured plants in the field.

Methodology for High density plantation of banana

A spacing of 1.5m x 1.5m (4444 plants/ha) was recommended for 'Robusta' (145 tones /ha) as well as 'Dwarf Cavendish' under Bangalore conditions . The Regional Plant Resources Centre at Bhubaneswar suggested 1.8m x 1.2m as an ideal planting distance for tissue culture plants of banana and planting was recommended to be done in pit dimension of 60x 60 x 60 cm . High density plantation, however, suits for one crop cycle (plant crop) or two crops cycle (plant crop followed by ratoon crop) only. Pit size of 45 x 45 x 45 cm was suggested on the basis of IIHR recommendation . Pits filled with top soil and equal proportion of well rotten FYM should be used for planting. At least one month old hardened plants growing in poly bags should be planted and irrigated to the saturation point of the soil.

After planting tissue culture banana plants, each pit should be added with 100g calcium ammonium nitrate and 100g muriate of potash. Fertilizer should be applied at a monthly intervals for six months with the following fertilizer schedule :-



Measurement of physiological work load (with computerized heart rate monitor) of a woman worker using improved sickle during harvesting of gram crop.



Trainees discussing with expert during training on high density planting of banana with tissue culture plants.

Month	Fertilizer quantity (gm)		
	Growmore	Muriate of Potash	Urea
1 st	100	100	-
2 nd	100	-	-
3 rd	100	100	-
4 th	100	100	-
5 th	-	-	100
6 th	-	100	100

In general, a bearing banana plant requires 100-200g N, 40-100 g P₂O₅ and 200-300g K₂O. The fertilizer application may be completed before flower initiation which normally occurs within 5-6 months after planting.

Drip irrigation

In this method water is applied to the plants through a net work of pipes. The water is allowed to reach the rootzone of the crop in small quantities in order to meet the evapo-transpiration demands of the crop avoiding the plant exposure to stress. The amount of water given to the plants is almost equal to the rate at which the plant is losing water. The crop evaporative demands are met on daily basis through drip irrigation. In addition to economy in water use, the drip irrigation activates the uptake of nutrients. Drip irrigation has several advantages like :

1. Water saving : Due to partial wetting of the soil volume, the surface evaporation is reduced, run off is avoided and deep percolation is controlled.
2. Saving in labour and energy : Labour is required to just switch-on and switch-off the drip system and that too for a short period of time.
3. Possibility of using saline water : Due to high soil moisture content the salt load is pushed downwards.
4. Use of fertilizers : Fertilizers could be used effectively through drip system thus increasing the nutrient use efficiency.
5. Weed control : Due to partial wetting of the soil weed infestation is very less.

The major disadvantages with the drip system is its high initial cost at the time of installation and the problem of clogging. However, 70-90% subsidy can be availed while installing the drip system.

For banana, replenishment of evaporation losses to the tune of 80% was found to be optimum in realizing higher yields. Two emitters should be placed at 25 cm on either side of the plant to meet the water needs of banana plant.

Micro sprinklers can also be used to irrigate the banana crop. Since the discharge rate is very high (30-35 l/h), care should be taken to avoid using micro sprinklers in sandy and porous soils. However, the initial cost on the system can be reduced by using microjets as compared to the drippers. But the quantity of water to be supplied per plant per day remains the same irrespective of the drip of the microjet.

Fertilizer application

Another major advantage with drip irrigation is the possibility of using soluble fertilizers through the irrigation water. Fertigation is the application of nutrients to plants through micro irrigation system. It has vast potential in improving nutrient use efficiency, saving labour and energy in application, reducing the cost of production, reducing the environmental pollution and maintaining the soil health. Besides, fertigation gives a flexibility in application of fertilizers which enable to meet the specific crop requirements at various stages of growth. Easily and completely soluble fertilizers can be injected through the drip irrigation. Nitrogen and potassium application at the rate of 150g per plant per crop was sufficient to meet the N and K requirement of the crop.

Application of N in the form of urea and K in the form of muriate of potash through the system could be advantageous. These fertilizers could be allowed into the system after making a fertilizer solution in the tank. The fertilizers may be supplied into the system either on daily basis or weekly basis and it may be stopped 10-15 days prior to banana harvest.

Apart from the straight fertilizers, there are several formulations of water soluble fertilizers (NPK) available in the market. A specific formulation is needed for banana crop based on the crop growth stage. Some of the private companies supplying water soluble fertilizers include EPC, Jain Irrigation, Nagarjuna Fertilizers and Manusol etc.



Trainees making mango slices for processing.



Training of rural women on agro-processing activities.

Table 8. List of participants at training entitled 'High' density planting of banana with tissue culture plants.

Sl.No.	Name	Designation	KVK Address
1.	Dr. H.K. Sharma	Training Organiser	Khumtai (Assam)
2.	Shri B.N. Hazarika	Training Associate	Arunachal (Assam)
3.	Shri A.N. Azad	Training Associate (H)	R.K. Mission, Ranchi (Bihar)
4.	Shri Y.K. Singh	Training Associate	HFC, Sindri (Bihar)
5.	Dr.D. Ghosal	Training Associate (H)	Gambharipally, Sambalpur (Orissa)
6.	Shri M.R. Satapathy	Training Associate (Agronomy)	Kendrapara (Orissa)
7.	Shri Supratik Mitra	Training Associate (H)	R.K.Ashram, Neempith (W.Bengal)
8.	Shri Prabir Kumar Gangopadhyay	Training Associate	Shantiniketan (West Bengal)

b. Training on "Gender-specific technologies for value-addition in horticultural produce: A blend of indigenous and modern knowledge".

Course Co-ordinator : Dr. S. N. Pandey, Principal Scientist (Hort.)

This training was organized from July 8-13, 1998 for trainers of the Krishi Vigyan Kendras of Bihar and West Bengal and Department of Agriculture, Govt. of Orissa. Training course comprised of the lectures and practical demonstrations of pre- and post-harvest management practices like maturity, harvesting, grading, sorting, pre-cooling, waxing, drying, packaging, storage (including on-farm storage and shelf-life enhancement options in fruits), processing and value-addition in mango, citrus, banana, cashew nut, jackfruit, coconut, chilli and less exploited fruits like custard apple, drumstick, coleus, sakalu, artichok, West Indian arrowroot, Queensland arrowroot and East Indian arrowroot, mushroom and gladiolus.

This course also included aspects like cooperatives and post-harvest management of horticultural crops. Faculty constituted of scientists from the Indian Institute of Horticultural Research, Bangalore and its centre (CHES) at Bhubaneswar, Central Plantation Crops Research Institute, Kasargod, Central Tuber Crops Research Institute, Trivandrum and its Regional Centre at Bhubaneswar, Bihar Agricultural College, Sabour, Orissa University of Agriculture and Technology and Directorate of Horticulture, Govt. of Orissa, Bhubaneswar.

(C) Training on technological empowerment of farm women for value-addition of milk

Course Co-ordinator : Dr. K. S. Raisam, Principal Scientist (LP & M)

A training on "Technological Empowerment of farm women for value addition of milk" was organized from 24th to 29th July, 1998. Scientists and Extension Specialists from KVK's of West Bengal and Orissa were imparted training on skills and avenues of value addition of milk to empower farm women technologically so as to provide them more employment opportunity and thus augment their income. In addition to NRC and CIFA experts, scientists from OUAT, Bhubaneswar and processing experts from Orissa Milk Federation conducted the training. Lectures and practical demonstration on various aspects *viz.* role of women in dairy development, clean milk product, processing of milk and products and manufacturing for its value addition, quality control of milk and milk production, marketing of milk and milk products and economic analysis of milk and milk products were conducted to update the skill and knowledge of participating scientists with respect to the recent technologies available for preparing indigenous milk products having higher shelf-life as well as economic returns. Further, awareness about gender sensitivity and gender implications in dairy technology were created among participants during the discussion held in the training programme. Visits to the milk processing/product manufacturing plant of OMFED (Bhubaneswar) and nearby Orissa Women's Dairy Co-operative Society units were organized to acquaint the participants with activities/participation of women in dairy development.

d. As many as 23 training programmes were conducted at the Sub-Centre at CIAE, Bhopal. Details are presented below :

S.No.	Training period	Duration (days)	Training particulars	No. of Trainees
1.	23.3.98 to 25.4.98	34	Training of rural girls/women on arts and crafts for income generation	8
2.	30.3.98 to 3.4.98	5	Exposure training for rural women on agro-processing activities	9
3.	14.4.98 to 18.4.98	5	Training of rural women on preparation of nutritious dishes from soybean	5
4.	17.4.98 to 18.4.98	2	Training of rural women on methods of plant propagation	4
5.	17.4.98 to 18.4.98	2	Training of rural women on nutrition gardening	5
6.	17.4.98 to 18.4.98	2	Training of rural women on nursery raising of forestry plants	5

7.	17.4.98 to 18.4.98	2	Training of rural women on processing of fruits and vegetables	10
8.	24.4.98 to 29.4.98	6	Exposure training for rural women on agro-processing activities	8
9.	18.5.98 to 15.6.98	30	Training of rural girls/women on tractor operation, care and maintenance	11
10.	18.5.98 to 19.8.98	90	Training of rural women on sewing, tailoring and use of home waste for income generation	11
11.	1.7.98 to 30.9.98	61	Training of rural women on propagation of fruit plants	2
12.	8.9.98 to 9.10.98	32	Training of rural girl/women on arts and crafts for income generation	10
14.	14.9.98 to 14.10.98	30	Training of rural girl/women on rewinding of electric motors	9
15.	12.10.98 to 16.10.98	5	Training of rural women on preparation of nutritious dishes from soybean	12
16.	4.1.99 to 5.1.99	2	Making of smokeless chulhas	10
17.	6.1.99 to 13.1.99	8	Use of soybean in daily diet-salty and sweet dishes from soybean	10
18.	18.1.99 to 19.1.99	2	Plant protection in vegetable crops	5
19.	25.1.99 to 27.1.99	3	Control of pests and diseases	5
20.	21.1.99 to 8.2.99	19	Nutritional management and processing of fruits and vegetables	10
21.	15.2.99 to 25.2.99	11	Forest nursery raising technique	7

22.	26.3.99 to 27.3.99	2	Harvesting, threshing techniques for wheat and Bengal gram	2
23.	22.3.99 to 23.4.99	2	Handicraft making for thermocol	11

Total No. of training conducted : 23

Girls/women trained : 186

e. BRAIN STORMING SESSION ON GENDER ISSUES

To understand proper thrust, operationalisation and prioritization of research activities at NRCWA, a Brain Storming Session was organized on 17th August, 1998. In all, 43 participants including 15 women scientists from ICAR (HQ / ICAR Institutes), SAUs and NGOs participated in the discussion. The outcome of the session indicated that the NRC should conduct research with (i) inter-disciplinary approach (ii) programme mode (iii) holistic approach (iv) women participatory mode which should be interactive with agencies involved in technology generation and refinement like SAUs/ICAR Institutes and (v) constant evaluation of programme. Multi-disciplinary research will include projects on different commodities/disciplines. Each project will include experiments which could be laboratory oriented, on-station experiments or on-farm experiments.

It was discussed that 98% technologies generated are gender neutral. Technology generation at Research Institutes/SAUs should be gender neutral which can be refined as per women's needs by NRC to make it women-friendly and a module to be developed for this purpose.

It was suggested that the NRC should confine its activities to (i) diagnostic survey to get information on existing farming systems, (ii) natural resource management programme concerning women in agriculture, (iii) commodity management programme, (iv) farming system management programme, (v) socio-economic research programme and (vi) development of training modules and audio-visuals.

C. SURVEY

The NRC undertook the following work related to the formulation of research projects on (i) "Development of appropriate farming system suited to farm women" and (ii) "Improvement in backyard poultry farming for different categories of farm women".

Village selection for adoption by NRCWA

Investigators : S.S Ghosh, S.N. Pandey, K.S. Risam and Mrs. P.K. Sahoo
Surveys were undertaken in the following villages in Khurda and Puri districts of Orissa.

Khurda District

- i) Baghamari located 35 km away from NRCWA on Khurda Road.
- ii) Kanpur located 37 km away from NRCWA on Khurda Road
- (iii) Nakhaur located 15km away from NRCWA on Puri road in Bhubaneswar block.

Puri District

- (iv) Nijgarh – Kurkhi comprising of 4 hamlets located 21 km away from NRC on Jatni road.
- (v) Barakuda located 18 km away from NRC on Jatni road.
- (vi) Sanghalei Sasan located 22 km away from NRC on Puri road in Pipili block.
- (vii) Siula comprising of 3 hamlets located 23 km away from NRC on Puri road in Pipili block.

Baghamari and Kanpur in Khurda district were also visited by Dr. P. Das, DDG(AE) on 16th August, 1998. He however, suggested to select a village nearby to NRCWA.

D. FORMULATION OF RESEARCH PROJECTS

Following research projects were developed.

- i) Development of appropriate farming system suited to farm women and
- ii) Improvement in back-yard poultry farming for different categories of farm women.

These project proposals were discussed in a meeting on 15th & 16th Oct' 1998 which were attended by groups of eminent Scientists. The group discussion/meeting also approved the projects.

- 1. Project Title** : **Development of appropriate farming system suited to farm women**
- Duration of Project : 5 years
- Principal Investigator : Dr. S.N. Pandey, Principal Scientist (Horticulture)



Brain Storming Session on Gender Issues in Agriculture.



Brain Storming Session on Gender Issues in Agriculture.

Co-Investigators :

1. : Dr. S. S. Ghosh
2. : Dr. K.S Risam, Principal Scientist(LP & M)
3. : Dr. B.N. Sadangi, Principal Scientist (Agril. Extension)
4. : Dr. M.P.S. Arya, Principal Scientist (Agronomy)
5. : Dr. (Mrs.) P.K. Sahoo, Scientist (Fish & Fisheries)
6. : Mr. Hemanta Kumar Dash, Scientist (Agril. Economics)

OBJECTIVES

Immediate Objectives

- i) To identify different components in prevailing farming systems.
- ii) To assess the role, participation and decision making by farm women in various components of farming systems
- iii) To create awareness among farm-women about location-specific farming system.
- iv) To identify indigenous and modern technological know-how available with farm women and their adoption.
- v) To find out the feasibility of proposed farming system with farm-women having marginal, small and large holding.

Long Term Objectives

- i) To develop appropriate location-specific farming system suited to different classes of farm-women
- ii) To assess the cost-effectiveness and eco-friendliness of farming system developed through this study.
- iii) To assess the sustainability of such farming system.
- iv) To assess the enhancement in economic status of farm women adopting this farming system.
- v) To identify constraints faced by farm women in adoption of integrated farming for technological refinement.

2. Project Title : Improvements in Back-yard Poultry Farming for Farm Women of Different Categories

Duration of Project : 3 years

Principal Investigator : Dr. K.S Risam, Principal Scientist(LP&M).

Co-Investigator : Dr. S.S. Ghosh, Director.

OBJECTIVE

Immediate Objectives :

- i) To motivate farm-women of different social categories for backyard poultry farming.
- ii) To assess the performance of native and improved village type chicken under backyard conditions with respect to growth and production traits.
- iii) To find out pattern and causes of mortality among these chicken.
- iv) To study the impact of backyard poultry farming on the economic status of landless, small, marginal and large land holding farm women and
- v) To improve nutritional status of the farm family by utilizing eggs and meat available through backyard poultry farming.

Long term objectives :

- i) To identify location-specific backyard poultry strain/type suited to farm-women.
- ii) To make backyard poultry rearing a commercial venture for farm women through better management practices and health care.

3. CONSTITUTION OF RESEARCH ADVISORY COMMITTEE

The ICAR vide letter no. 20(1/98)–AE-I dtd. 28.10.98 constituted the Research Advisory Committee with the following members.

- | | | |
|-----|---|------------------|
| 1. | Dr. (Mrs.) P. Sundaram,
Former Vice-Chancellor,
Mother Teresa Women's University,
Kodaikanal | Chair-person |
| 2. | Dr. I.C. Mohapatra,
Former VC, OUAT, Bhubaneswar | Member |
| 3. | Dr. B. Panda,
Former Director,
CARI, Izatnagar | Member |
| 4. | Dr. (Mrs.)Tej Verma,
ADG (HS), ICAR | Member |
| 5. | Dr. S. Ayyappan,
Director, CIFA,
Kausalyaganga,
Bhubaneswar | Member |
| 6. | Dr. K.L. Bhowmik,
Former Dean PG,
BCKVV, Mohanpur | Member |
| 7. | Dr. S.S. Ghosh,
Acting Director,
NRCWA | Member |
| 8. | Dr. B.N. Choudhary.
ADG (LLP), ICAR | Member |
| 9. | Dr. (Mrs.)Kamala Singh,
Bhabhua, Kaimur,
Bihar | Member |
| 10. | Mrs. Pratibha Shina,
Rajoun, Banka,
Bihar | Member |
| 11. | Dr. S.N. Pandey,
Principal Scientist,
NRCWA, Bhubaneswar | Member-Secretary |

The terms of nominated members including Member-Secretary and Chair-person will be for a period of 3 years except in case of members at Sl.No.9 and 10 whose tenure will expire as and when they cease to be member of the Institute Management Committee.

Functions of the Research Advisory Committee shall include :

- i) To suggest research programmes based on national and global context of research in the thrust areas.
- ii) To review the research achievements of the Institute and to see that these are consistent with the mandate of the Institute.
- iii) Any other function that may be specifically assigned by the Director-General, ICAR.

4. SYMPOSIA/SEMINARS/TRAINING/COURSE ATTENDED

1. Dr. K.S. Risam, Principal Scientist (LP&M) participated in “Golden Jubilee Seminar on Sheep, Goat and Rabbit Production and Utilization” held at Jaipur during April 24-26, 1998.
2. Dr. S.N. Pandey, Principal Scientist(Horticulture) participated in an advance course on “Agricultural Research – A Vision for 21 st Century” held at Academy of Agricultural Research and Education Management, CCS Haryana Agricultural University, Hisar during june 18-27, 1998.
3. Shri Dilip Kar, Asstt.Adminstrative Officer attended a training on “Improving the Adminstrative Efficiency in Agricultural research, Teaching and Extension Organizations of ICAR” at NAARM, Hyderabad during July 29-August 4, 1998.
4. Dr. (Mrs.) P.K. Sahoo, Scientist (Fish & Fishery Science) attended a Trainers’ Training on Training Methodology at the Krishi Vigyan Kendra, Ramkrishna Mission Ashram, Nimpith during August 25-28, 1998.
5. Dr. (Mrs.) P.K. Sahoo, Scientist (Fish & Fishery Science) attended a training on “Computer Application in Agriculture” at NAARM, Hyderabad during October 6-17,1998.
6. Shri H.K.Dash, Scientist(Agril. Economics)attended Foundation Training (course) at NARRM, Hyderabad during July 21-Novemeber 13,1998.

5. AWARDS AND HONOURS

1. Dr. S.N. Pandey, Principal Scientist (Horticulture) was awarded with the Best Poster Paper Award for the research paper entitled ' Identification and selection of superior clones of mango cv. Dashehari for export' at 4th Agricultural Science Congress on Sustainable Agricultural Export held at Jaipur, February 21-24, 1999. .

6. LIST OF PUBLICATIONS

Book Chapter

1. Pandey, S.N. (1998) Mango Cultivars. In Mango Cultivation . Ed. Ram Prakash Srivastava. Published by International Book Distributing Co., Charbagh, Lucknow. PP 633.
2. Pandey, S.N. and Ghosh, S.S. (1999) : Gender issues in Horticulture. In Plantation Crops of Kerala Challenges and Options Eds K.U.K. Nampoothiri, V.A. Parthasarathy, A.R.S. Menon & H.H. Khan Compendium on Plantation Crops. 11th Kerala Science Congress PP. 173 - 185.

Research Paper

- Sahoo, P.K.; Barat,A. and Poniah,A.G. (1998) In vivo sister Chromatid differentiation and baseline sister chromatid in *Channa punctatus*. Indian J. Exp. Biol. 36 : 1041-1043.

Symposia/Seminars Papers

- 1) Gite L.P. and Usha V. 1998. Modern Agricultural Technologies : Their appropriateness to Rural Women. Paper presented in the International Conference on Food Security and crop Science held at Hissar on November 3 – 6.
- 2) Gite, L.P., Usha, V. and Singh G., 1998. A status paper on Drudgery of women in farm operations. Submitted to the National Task force (National Commission on Women) for Empowerment of Women in Agriculture in their second meeting held on January 25, 1999 at New Delhi.

- 3) Goswami, A.M. ; Pandey, S.N. ; Saxena, S.K. ; Khurdiya, D.S. ; Kaur, Charanjit and Srivastava, G.C. (1999). Identification and selection of superior clones of mango cv. Dushehari for export. 4th Agricultural Science Congress on Sustainable Agricultural Export. Jaipur. February 21-24, 1999. Abstract P. 202.
- 4) Mir, M.Y.; Risam, K.S. and Kismmani, M.A. (1998). Factors affecting Greasy Fleece yield in a closed Flock of Corriedale sheep. Golden Jubilee Seminar on Sheep, Goat and Rabbit Production and Utilization held at Jaipur, from April 24th – 26th, 1998. Abstract P.12
- 5) Pandey, D. and Pandey, S.N. (1998) : Effect of etlrel sprays on physiological changes in floral buds of mango cv. Amrapali. National symposium on Mango Production and Export. Held at CISH, Lucknow .June 25-27,1998. Abstract P.74.
- 6) Pandey, D. and Pandey, S.N. (1998) : Floral bud morphology in relation to malformation in mango (*Mangifera Indica L.*) cv. Dusehari Aman. ouvenir National Seminar on New Horizons in Production and Post Harvest Management of Tropical and Sub-tropical Fruits. IARI, New Delhi. December 8-9,1998. Abstract P.47
- 7) Pandey, S.N. (1998) : Effect of CPPU on fruit retention in mango (*Mangifera indica L.*) cv. Langra. National Seminar on New Horizons in Production and Post-Harvest Management of Tropical and Sub-tropical Fruits. IARI, New Delhi, December 8-9, 1998. Abstract P. 48.
- 8) Pandey, S.N. and Singh, O.P. (1999) : Evolving a red-peeled mango (*Mangifera indica L.*) hybrid for sustainable export. 4th Agricultural Science Congress on Sustainable Agricultural Export. Jaipur. February 21-24,1999. Abstract P. 205.
- 9) Pandey, S.N.; Singh, O.P. and Bhagat, S.K. (1998): Effect of interstocks on growth and fruiting of mango (*Mangifera indica L.*) cv. Amrapali. Abstract National Symposium on Mango Production and Export, held at Lucknow during June 25th – 27th , 1998. Abstract P.28.
- 10) Pandey, S.N.; Singh, O.P. and Bhagat, S.K. (1998) : Effect of parents on fruit setting in mango (*Mangifera indica L.*) Ibid. Abstract P.3

- 11) Risam, K.S.; Mir, M.Y. and Kirmani, M.A. (1998) : Genetic and phenotypic parameters of birth and weaning weights in a closed Flock of Corriedale Sheep; Golden Jubilee Seminar on Sheep, Goat and Rabbit Production and Utilization held at Jaipur, from April 24th – 26th, 1998. Abstract P.4

Popular article (In Hindi)

Pandey, S.N. (1998). "Phalodyan Ki Sthaapanaa Evam Dekhbhal . *Prasar Doot*; April –June, 1998, Year 2, issue 2 : PP. 14,15 and 25.

Pandey, S.N. (1998) . Aam : Ek Vaigyanik Adhyayan ; *Vigyan Garima Sindhu*. Special issue in Agriculture. Scientific and Technical Terminology Commission, New Delhi. PP 180-6.

7. MEETINGS ORGANISED

1. A meeting was organized in the conference hall of NBSS & LUP, Salt Lake, Calcutta under Chairmanship of Dr.P. Das, DDG (AE) on April 20, 1998 for discussing proposed research and training activities of NRCWA. Dr. S.S. Ghosh, Director, NRCWA and scinetists of NRCWA namely Dr. S.N. Pandey, Principal Scientist (Horticulture), Dr. K.S. Risam, Principal Scientist (LP&M), Dr. (Mrs) P.K. Sahoo, Scientist (F&F) and Shri H.K. Dash, Scientist (Agril Eco.) attended the meeting.
2. A meeting was organized on July 1, 1998 at NRCWA, Bhubaneswar under the Chairmanship of Dr. B.N. Chaudhary, Asstt. Director General (LLP) for discussion on the planning of research and training in this centre. Dr.I.C. Mohapatra, Former Vice-chancellor of OUAT, Dr. S. Ayyapan, Director, CIFA, Dr.S.S. Ghosh, Director, NRCWA, Dr. K.S. Risam, Principal Scientist (LP&M), NRCWA, Dr. S. Sarkar, I/c. KVK & TTC, CIFA and Dr. (Mrs) P.K. Sahoo, Scientist (Fish & Fishery Science), NRCWA participated in the meeting.
3. A Brain Storming Session was organized in the Conference room of CIFA on August 17, 1998 to chalk out research, training and extension strategies of NRCWA. Dr. P. Das, DDG (AE) chaired the session. The distinguished scientists from different disciplines of agriculture and allied fields discussed the subject thoroughly and suggested priority areas in research, training and extension to be undertaken by NRCWA.
4. A meeting was organized on August 18, 1998 in the Conference room of NRCWA under the Chairmanship of Dr.P. Das, DDG (AE) to discuss on-farm research and selection of suitable village in the vicinity of Bhubaneswar for conducting experiments.
5. Group Meetings were convened on October 15 and 16, 1998 under the Chairmanship of Dr.S.S. Ghosh, Director, NRCWA, in the conference room of the Centre to discuss proposed

research projects viz.(a) “Development of appropriate farming system suited to farm women” and (b) ‘Improvement in back-yard poultry farming for farm women of different categories ‘. Eminent scientists namely Dr. R.C. Das, Former Dean (Extension Education), Dr. G.N. Parida, Former Director of Horticulture, Govt. of Orissa, Dr. D.P. Ray, Head, Department of Horticulture, OUAT, Dr. O.P. Vijay, Head, CHES, Dr. S.K. Naskar, Head I/C, CTCRI Regional Station, Bhubaneswar, Dr.B.C. Patanaik, Former Director, CSWRI, Dr. S.C. Mishra, Professor and Head, Department of Poultry Science, OUAT and Dr. S.K. Nanda, Senior Scientist (Poultry Breeding), CARI, Bhubaneswar, Dr.S.N. Pandey, Principal Scientist (Horticulture) and Dr.K.S. Risam, Principal Scientist (LP&M) participated in the discussion. The groups found the projects technically sound and feasible for undertaking by NRCWA.

6. A meeting of the Scientists of NRCWA with Dr. Padmalal, Research Programme Coordinator, Australian Centre for International Agricultural Research (ACIAR) was organised on 08.01.99 in the chairmanship of the Director, NRCWA, Bhubaneswar. The possibilities of research collaboration between two were discussed and are also being explored to organise a national workshop on “Women in Agriculture”.

7. Brick – laying ceremony

The brick – laying ceremony for the boundry wall of NRCWA was performed on December 13, 1998 by Dr. P. Das, Deputy Director General (Agricultural Extension) ICAR, New Delhi. Other distinguished persons present at function were Dr. B.N. Choudhary, ADG (LLP), ICAR, New Delhi, Dr. S. K. Das, Zonal Co ordoinator, Jabalpur, Dr. C . Sathapathy, Dean, Extension Education (OUAT), Dr. P. N. Sharma, Director, Extension Education, JGKV, Raipur and Er. D. N.Tripathy, S. E. , CPWD, Bhubaneswar along with Dr. S. S. Ghosh ,Director and other staff members of NRCWA.

9. Distinguished Visitors

Sl.No.	Name and Designation	Date of visit
1.	Dr. S.P. Ghosh, Deputy Director General (Horticulture) ICAR, Krishi Bhavan New Delhi	25.05.1998
2.	Dr.K.Gopakumar Deputy Director General (Fisheries) ICAR, Krishi Bhavan New Delhi	03.06.1998
3.	Dr.K. Pradhan Vice Chancellor, Rajasthan Agriculture University, Bikaner (Rajasthan)	23.11.1998
4.	Dr. Anwar Alam Deputy Director General, (Agril.Engineering), ICAR, Krishi Bhawan New Delhi	26.11.1998
5.	Dr. Padma Lal Australian Centre for International Agricultural Research (ACIAR), Canberra, Australia	08.01.1999
6.	Dr. S.Edison Director, Central Tuber Crops Research Institute, Trivandrum (Kerala).	25.05.1998
7.	Professor D. Das Gupta, Professor of Agricultural Extension and Co-ordinator of Agricultural Extension Programmes, Vishwa Bharati, Sriniketan – 731 236, (West Bengal)	24.4.1998

10. Personnel

10.1 SCIENTIFIC STAFF

Discipline	Sanctioned Post			In position as on 31.3.99		
	Scientist	Sr. Scientist	Pri. Scientist	Scientist	Sr. Scientist	Pri.. Scientist
Horticulture	1	1	1	--	--	1
Livestock Production and Management	--	--	1	--	--	1
Dairy Technology	--	1	--	--	--	--
Fish Processing Technology	--	1	--	1*	--	--
Agronomy	--	--	1	--	--	1
Agril. Economic Agricultural Entomology	1	--	--	1	--	--
Agril. Extension	--	--	1	--	--	1
Farm Machinery and Power	--	1	--	--	--	--
Food & Nutrition	1	--	--	--	--	--
Home Management/Resource-Management	--	--	1	--	--	--
Child Development	--	1	--	--	--	--
Total						

- One Scientist (Fisheries) working against the post of Senior Scientist (Fish Processing Technology)

10.2. TECHNICAL STAFF

Designation	Sanctioned Post	In position as on 31.3.99
Technical Assistant T-II-3	9	1*
Technical (T-I)	2	1

* One Technical Assistant (T-4) joined on transfer against the post of T-II-3.

10.3. ADMINISTRATION, FINANCE AND ACCOUNTS STAFF INCLUDING SUPPORTING AND AUXILIAR STAFF.

Designation	Sanctioned Post	In position as on 31.3. 99
Asstt. Administrative Officer	1	1
Asstt. Fin. & Accoun. Officer	1	1
Stenographer, Grade – II	1	—
Stenographer, Grade – III	2	2
Senior Clerk	2	1
Junior Clerk	1	1
S.S. Grade-I	4	1
Total	12	7

**10.4 STAFF POSITION AS ON 31.3.1999
Main Centre**

Sl.No.	Name & Designation	Date of Joining
1.	Dr. S.S. Ghosh, Acting Director	23.08.1997
2.	Dr. S.N. Pandey, Principal Scientist (Hort.)	15.01.1998
3.	Dr.K.S. Risam, Principal Scientist (LP&M)	19.02.1998
4.	Dr.B.N. Sadangi, Principal Scientist (AE)	07.12.1998
5.	Dr.M.P.S. Arya, Principal Scientist (Agronomy)	11.03.1999
6.	Dr. (Mrs) P.K. Sahoo, Scientist (F&F)	01.08.1996
7.	Shri H.K. Dash, Scientist (Agril. Eco.)	03.12.1997
8.	Shri Dilip Kar, Asstt. Administrative Officer	18.03.1998
9.	Shri N.V.R.N. Murty, Asstt. Finance and Accounts Officer	14.07.1998

Sl.No.	Name & Designation	Date of Joining
10.	Mrs. Geeta Saha, T-4	15.12.1997
11.	Shri B.C. Sahu, T-1	01.04.1996
12.	Shri E.V.R.K. Nagendra Prasad, Sr. Clerk	03.07.1998
13.	Miss Rina Das, Jr. Steno	21.04.1998
14.	Miss Parisima Sen, Jr. Steno	09.11.1998
15.	Miss Bishnupriya Moharana, Jr. Clerk	26.12.1998
16.	Shri Biswanath Biswal, S.S.G.1	27.07.1998

10.5 Sub-centre CIAE, Bhopal

- i) Requisition (Letter No. 4-4/96-Recdt./2818 dated 13.4.99) has been sent to Director (Personnel), ICAR for two posts viz. Principal Scientist (FMP) and Senior Scientist(ASPE) with a request to forward the same to ASRB.
- ii) A post of T-II-3 has been filled in March 99.

11. BUDGET UTILIZATION (1998-99)

11.1. Main Centre

Sanctioned (Rs. in lakhs)		Expenditure (in lakhs)
Estt. Charges	: 27.00	15,50,378
Wages	: 0.50	Nil
OTA	: 0.50	Nil
T.A.	: 2.50	2,49,994
Other charges	: 11.00	9,18,972 (including 3,03,900 of Bhopal Sub-centre)
Works	: 50.00	Nil
Other Items	: 10.50	Nil
Total	102.00	27,19,344

11.2. CIAE, Bhopal (Sub- centre)

An amount of Rs. 10,97,824/- was available with the sub-centre as on 1.4.98 and no money was received during the year 1998 - 99. An expenditure of Rs. 3,03,900/- was incurred by the sub-centre during 1998-99. Main reason for low utilization of funds has been non-availability of staff in the sub-centre.
