Annual Report

वार्षिक प्रतिवेदन

2002-2003

National Research Centre for Women in Agriculture

कृषि में महिलाओं पर राष्ट्रीय अनुसंधान केन्द्र

(Indian Council of Agricultural Research)

भारतीय कृषि अनुसंधान परिषद

Bhubaneswar 751 003 (Orissa) India

भुवनेश्वर - 751 003 (उड़ीसा) भारत

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NRCWA ANNUAL REPORT 2002-2003

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PREFACE

I have great pleasure in presenting the Annual Report (2002-03) of National Research Centre for Women in Agriculture (NRCWA). The national institute is of great importance for gender mainstreaming of agriculture research, training and extension. The focus of the centre is on creating database on women in agriculture, development of appropriate training modules, developmnet drudgery reducing options for empowerment of women and incresing food security. As a basic step for strong research foundation of centre, the scientists have acquired clarity and precision in designing research projects in women perspective, which would provide implications in the areas of technology refinement and policy formulation.

This Annual Report of the centre brings out the highlights of its research, training and extension activities carried out during the year 2002-2003 as well as the achievement made towards infrastructural and human resource development.

I would like to express my deep sense of gratitude to former DG, Dr Panjab Singh and Dr Mangala Rai, Secretary, DARE, Govt. of India and Director General, ICAR, for their guidance and sustained support. I sincerely thank Dr P. Das, DDE (AE) and Dr B.S. Hansra, ADG (AE) for their kind support, consistent guidance and encouragement.

My appreciations are for all the scientific, technical and administrative staff for contributing material for the Annual Report.

I appreciate the efforts put by Dr B.N. Sadangi, In-charge, Technical Cell for compiling the report, the Editorial Board for editing the report and Dr Suman Agarwal, Principal Scientist (HDRM) for Hindi translation of the Executive Summary. The consistent support of Director, CIAE, Bhopal, for nurturing the sub-centre of NRCWA, very effectively, is deeply appreciated.

(Hema Pandey)
Director

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कार्यकारी सारांश

कृषि में महिलाओं पर राष्ट्रीय अनुसंधान केन्द्र व इसके उप-केन्द्र पर वर्ष 2002-03 में केन्द्र के उद्देश्यों के अनुसार अनुसंधान, प्रशिक्षण व प्रसार कार्यक्रमों को किया गया है । अनुसंधान गतिविधियों में कृषि महिलाओं को ध्यान में रखते हुए, घर के पिछवाडे के तालाब में मछली पालन, प्रसार के तरीके, जन-जातीय परिवारों की अर्थव्यवस्ता, धान की खेती, व्यवसायिक स्वास्थ्य जोखिम, सीखने के माड्यूल, अनाजों व बीजों के भण्डारण का देशी तकनीकी ज्ञान, कृषि जलवायु तन्त्र का प्रबन्धन, लघुउद्योग शुरू करना, पर्यावरण अनुकूल कीट प्रबन्धन व कृषि कार्यो मे महिलाओं की नीरसता कम करना इत्यादि पर कार्य किया गया है ।

ग्रामीण महिलाओं को मछली पालन के तकनीकी ज्ञान की आवश्यकता व सशक्तिकरण से सम्बन्धित अध्ययनो के अनुसंधान के अभी तक प्राप्त आकडों व अवलोकन से निर्ष्कष निकला है कि महिलाओं द्वारा घर के पिछवाड़े के तालाव मे मछली पालन का क्षेत्र व्यापक है । ग्रामीण महिलाओं द्वारा रंगीन मछलियों के पालन के लिए ग्रामीण परिवेश के लिए उपयुक्त देशी सुविधाए विकसित की गई है व महिला समूहों द्वारा सामुदायिक तालाब में मछली पालन व रंगीन मछली पालन को नियमित रूप से करने में आने वाली सम्बन्धित कठिनाईयों के बारे में भी अध्ययन किया गया है ।

चूंकि ग्रामीण महिलाओं की कार्य क्षमता व्यवसायिक स्वास्थ्य जोखिम से प्रभावित होती हैं अत: इसका अध्ययन करने के लिए तटीय उड़ीसा के ग्रामों से 200 महिलाओं का सर्वेक्षण किया गया । जिन व्यवसायों मे पचास प्रतिशत या इससे अधिक महिलायों ने जोखिम अनुभव किये वे हैं - सेला चावल बनाने के लिए धान को हल्का उबालना, पानी भरकर लाना, धान की गहाई (थ्रेशिंग), धान की रोपाई इत्यादि । अन्य व्यवसाय जिन्हें महिलाएं जोखिम भरा सोचती है जैसे ईधन इकट्ठा करना, फसल काटना, फसल सुखाना, चारा इकट्ठा करना, दूध निकालना इत्यादि । कृषि में महिलाओं के लिए विशेष रूप से रेखाकिंत किये गये शिक्षण एवं प्रसार तरीकों के द्वारा खेतिहर महिलाओं से सघन सम्बन्ध स्थापित किये गये हैं । कृषक महिलाओं से नियमित व सघन सम्बन्ध, इस महिलाओं के प्रसार सम्बन्धी आवश्यकताओं को पूर्ण करने में सफल रहें है । ''उड़ीसा के जन-जातीय परिवारों की अर्थव्यवस्था, कृषि व लिंग सम्बन्धी अध्ययन'' परियोजना के अन्तर्गत जन-जातीय परिवारो की अर्थव्यवस्ता, लिंग अनुसार कार्य व पशुधन में आन्तरिक सह-सम्बन्ध पाया गया है । 'उड़ीसा में धान उत्पादन में महिला विशेष प्रक्षेत्र क्रियाओं का मानकीकरण' नामक शोध परियोजना के अन्तर्गत पाया गया कि सम्पूर्ण रूप से धान की खेती में महिलाओं का योगदान 40.15 प्रतिशत है जबकि पुरूषों का 59.85 प्रतिशत है ।

सेलाचावल बनाने के लिए एक अन्योन्या क्रिया द्वारा सीखने का माड्यूल तैयार किया गया है तथा इसके प्रयोग के बारे में पुर्ननिवेश उपेक्षित है । कृषक महिलाओं द्वारा दालों व तरकारियो के बीजों के भण्डारण में प्रयुक्त देशी तकनीकी ज्ञान का अध्ययन, बीजों में नमी व उनके अंकुरण में मानकीकरण को बनाये रखने के सम्बन्ध में अध्ययन किया गया है । देशी उपचार जैसे बेगुनिया पत्तीयों व गाय के गोबर का प्रयोग उतना ही प्रभावकारी पाया गया जैसे कि बीजों का उपयुक्त तरीकों जैसे केप्टान 3 ग्राम प्रति किलोग्राम बीज से उपचार किया हो । देशी तकनीकी ज्ञान से सम्बन्धित कई अन्य प्रयोग 'राष्ट्रीय कृषि तकनीकी परियोजना' के अन्तर्गत शीर्षक 'देशी तकनीकी ज्ञान को इकट्ठा करना, लिखना व वैधीकरण' के अन्तर्गत दालों के भण्डारण के लिए सूखी लाल मिर्च के प्रयोग से सम्बन्धित अनुसंधान किया गया है । राष्ट्रीय कृषि तकनीक परियोजना के अन्तर्गत महाचक्रवात से प्रभावित समुद्र तटीय कृषि पारिस्थितिक तन्त्र प्रबन्धन के अन्तर्गत प्रभावित क्षेत्रों की महिलाओं व बच्चों के पोषण सम्बन्धी सर्वेक्षण करने पर पाया गया कि इनमें पोषण सम्बन्धी अनेक कमियाँ हैं । अतः महिलाओं व बच्चों के पोषण व स्वास्थ्य सम्बन्धी आवश्यकताओं को पूरा करने के लिए परिवारों में पोषण-बगीचे लगायें गये व महिलाओं को पोषक सम्बन्धी जानकारियां दी गई । राष्ट्रीय कृषि तकनीक परियोजना की लक्ष्यबद्ध उपपरियोजना 'कृषि में महिलाओं का सशक्तीकरण' के अन्तर्गत कृषक महिलाओं के 36 स्वंय सहायता समूह बनाए गये है । इन समूहों की महिलाओं को अपने क्षेत्र की बेंकों में खाते खोलने के लिए आवश्यक सहायता दी गई । महिलाओं की कृषि व पशुपालन से सम्बन्धित उन्नत कृषि यन्त्र प्रयोग करने के लिए दिये गये हैं तथा इनके प्रयोग करने के लिए उचित प्रशिक्षणों के द्वारा जानकारी दी गई है । समूह की महिलाओं को परिवार की आय वृद्धि के लिए विभिन्न लघु उद्योग जैसे मछली-पालन, मशरूम उगाना, फल व सब्जियों उगाना, फूल उगाना, घर की पिछवाड़े मुर्गी पालन करना व खाद्य प्रसंस्करण इत्यादि के बारे में प्रशिक्षण दिया गया है । केन्द्रीय कृषि आभियांत्रिकी संस्थान भोपाल स्थित उपकेन्द्र द्वारा बीजों के उपचार, भूंगफली को छीलना, बीजों की बुवाई मे महिलाओं द्वारा अनुभव की जाने वाली नीरसता को कम करने के सम्बन्ध में काफी प्रगति की है । बीजों के उपचार के लिए 40 किलोग्राम की क्षमता का एक यन्त्र बनाया गया है । इसी प्रकार मूंगफली को छिलने के लिए 'एक यंत्र (ग्राउन्डनट डीकोरटीकेटर) बनाया गया है, इसे महिलाएं बैठकर प्रयोग करती है । इसी प्रकार बीजों की बुवाई के लिए विभिन्न प्रकार के डिबलर विकसित किये गये हैं । इन यंत्रों के प्रयोग से महिलाओं की नीरसता में कमी आने के बारे में मूल्यांकन भी किया गया है ।

वर्ष के दौरान तीन प्रशिक्षक प्रशिक्षण कार्यक्रम जैसे दूध से देशी व्यजंनों को बड़े पैमाने पर बनाना, एकीकृत कीट प्रबन्धन एवं प्रशिक्षण का प्रभाव व मूल्याकंन आयोजित किये गये । इसके अतिरिक्त विभिन्न स्वीकृत अनुसंधान परियोजनाओं के अन्तर्गत विभिन्न ग्रामों में 34 प्रशिक्षण कार्यक्रम कृषक महिलाओं के लिए आयोजित किए गये । प्रथम पंचवर्षीय पुनरावलोकन दल द्वारा केन्द्र के विकाश की समीक्षा कर रिपोर्ट प्रस्तुत की गई ।

वर्ष के दौरान प्रशासनिक एवं प्रयोगशाला भवन निर्माण, पुस्तकालय समृद्धिकरण व अनुसंधानों के लिए उपयुक्त सुविधाओं को सृजित करने के लिए नियमित प्रयास किये गये है । मानव संसाधन विकास व कर्मचारियों की दक्षता वृद्धि पर भी उपयुक्त महत्व दिया गया है ।

EXECUTIVE SUMMARY

During the year 2002-03 National Research Centre for Women in Agriculture and its sub-centre had undertaken research, extension and training activities as per the mandate of the Institute. Research activities in the perspective of farm women were undertaken in the areas of aquaculture in backyard pond, extension methods, tribal household economy, rice cultivation, occupational health hazards, learning module, ITK in storage of seeds and grains, agro-eco-system management, enterprise building, eco friendly pest management and drudgery reduction.

The data and observation so far acquired under the project "Studies on technological need for empowering women in rural aquaculture" had clearly brought out the tremendous scope of aquaculture for rural women in backyard ponds. Indigenous facilities suitable to rural situation for ornamental fish production were developed and women groups took up ornamental fish production as income generating activities. Factors for sustainability in ornamental fish production and constrains of the rural women in fish culture in community ponds were also studied. Occupational health hazard being a factor affecting directly the efficiency of farm women was studied by interviewing 200 farm women of coastal Orissa. The hazards, wherein 50% and more of women were affected, were parboiling, fetching water, threshing and transplanting of rice. The other engagements of women as perceived to be hazardous were fuel collection, harvesting, drying, fodder collection and milching. The contact of farm women with change agents has increased significantly through special extension designed for farm women namely, Training and Extension for Women in Agriculture and it was found that the increased assess of women was instrumental in shaping the modern extension needs. The intricate relationship among livestock, tribal household economy and role of gender was brought out under the project "A gender study on agriculture and household economy of tribal of Orissa". Survey conducted under the project "Standardization of women specific field practices in rice for Orissa revealed that the overall contribution of women in different operations of rice cultivation was found to be 40.15% as against 59.85% for men.

An interactive learning module on paddy parboiling was developed and put into use for getting the feed back. The indigenous technological knowledge used by farm women for storage of pulse and vegetable seeds was studied with respect to maintaining the standards in germination and

moisture level. The indigenous treatment i.e. Begunia leaf (Vitex negundo) and cow dung ash was found to be the best and as affective as seeds treated with recommended practices i.e. Captan @3 g per kg of seed. Experiments on more ITKs were also undertaken in the NAT project entitled "Collection, documentation and validation of ITK – Storing pulse grain by using dry chilli". Under the project "Management of coastal agro-eco system affected by Super Cyclone in Orissa", nutritional status assessment (through standard parameters) of the women and children of the Super cyclone affected families was made which revealed poor nutritional status among the target group. Appropriate interventions such as nutritional education, nutrition garden were made to see the changes in the nutritional status of the families affected by Super Cyclone. A MM NATP project entitled "Empowerment of women in agriculture" had facilitated 36 self help groups to open Bank account, acquire knowledge and expertise on agriculture and animal husbandry technologies and establish enterprises in Pisciculture, Mushroom cultivation, Vegetable cultivation, Floriculture, Backyard poultry rearing/ Poultry farming and Agro-processing. The sub-centre at CIAE, Bhopal, had made substantial progress in analyzing drudgery involved in seed treatment, groundnut decortication and seed dibbling. Seed treatment drum of 40 kg capacity, sitting type groundnut decorticator and varieties of dibblers were developed and evaluated/tested for drudgery while operation.

Three trainers' training programmes in the area of commercial manufacture of indigenous milk products, integrated pest management and evaluation of training impact were held. Besides this, 34 farmwomen trainings were conducted in different villages under the approved projects. Further, the first Quinquennial Review Team (QRT) has reviewed the progress of the centre and submitted the report.

Consistent efforts were made for construction of administrative-cum-laboratory building, enrichment of library and creation of facilities for research work during the year. Human resource development and capacity building of the staff was given due importance.

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) recommended for establishment of a National Research Centre for Women in Agriculture (NRCWA) during the Eighth Five Year Plan. Accordingly, the Indian Council of Agricultural Research established the NRCWA in the month of April 1996 at Bhubaneswar. The Sub-centre of NRCWA is located at the campus of CIAE, Bhopal.

Mandate

To develop technologies appropriate to farmwomen of different production systems and to disseminate, it, backed by the increased sensitivity and capability of research, extension and development specialists addressing the issues pertaining to gender implications in agriculture and allied activities.

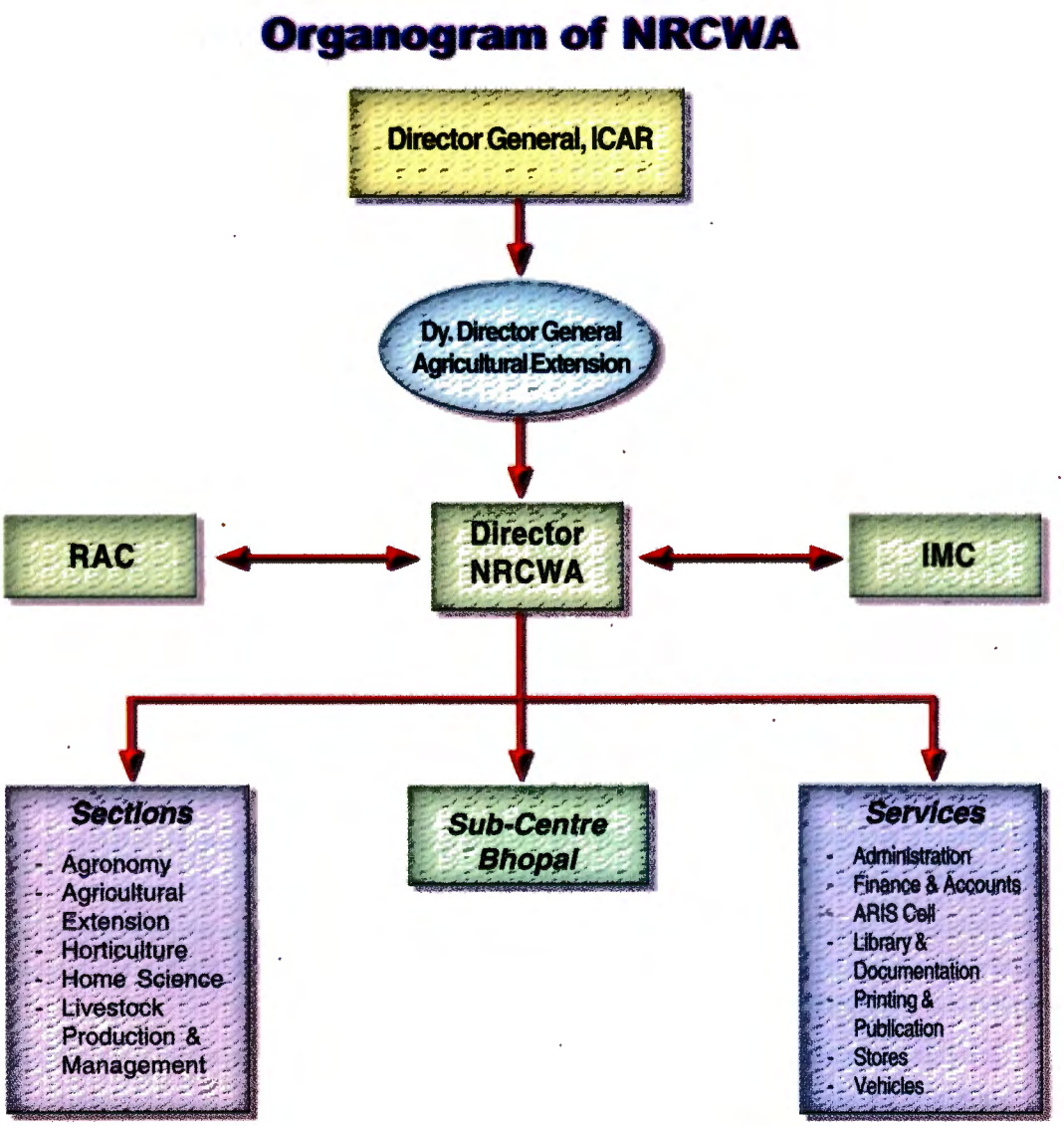
The specific objectives are :-

Main centre

- to create a comprehensive database and act as repository of relevant information on all aspects of women in agriculture;
- to strengthen the use of gender analysis in research and technology development to ensure that women s' as well as men s' agricultural enterprises and operations are fully considered for defining research programmes and setting priorities;
- to collaborate in women-specific research, education and technology assessment and refinement with relevant national and international organizations and promoting these in various situations;
- to develop training modules and imparting training and publication of manuals for sensitizing gender related issues in research/programme/policy development;
- to develop and test women specific models for technology transfer that are to be promoted through regular extension agencies by collaborating with SAUs /ICAR Institutes;
- to promote women specific technology for reducing drudgery on women in farming operations including post harvest and home management;
- to provide leadership and sponsor training programmes in order to strengthen the knowledge and skill related to gender implications in farming systems approach for the researchers and extension personnel; and
- to provide consultancy services within the country on women-specific research/project/ programme development.

Sub-Centre

- to identify and quantify women's contribution in various agricultural and allied activities for measuring drudgery faced by women in agriculture;
- to create an ergonomical data base on women workers for use in design of equipment/work space;
- to identify, assess and refine available agricultural engineering technologies for farm women;
- to assess health hazards in some important crop production/processing and allied activities and suggesting ways to minimize those hazards;
- to prepare video films and other publicity materials on improved equipments/technologies for women in agricultural and allied activities for extension work.



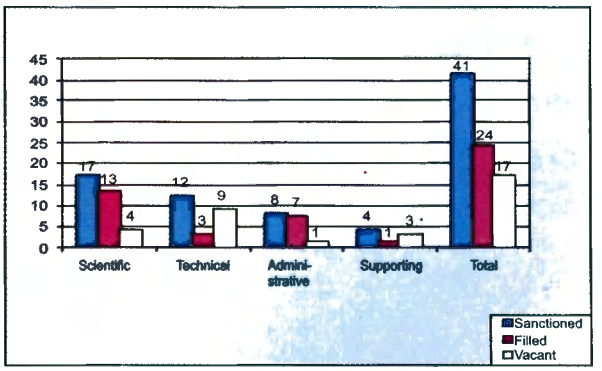
Budget and Expenditure (Main and Sub centre)

(In lakhs)

Sl. No.	Head of Account	Budget		R.E.		Expenditure	
		Non-plan	Plan	Non-plan	Plan	Non-plan	Plan
A.	**Recurring**						
1.	Estt. Charges including LSP and PF contractual charges	30.00	59.39	45.95	0.00	42.36	0.00
2.	Traveling Allowances	0.00	4.00	0.00	4.00	0.00	4.00
3.	HRD	0.00	5.50	0.00	0.70	0.00	0.69
4.	Contingency	10.00	37.50	16.68	0.00	15.24	0.00
Total (A)		**40.00**	**106.39**	**62.63**	**4.70**	**57.60**	**4.69**
B.	**Non-recurring**						
1.	Equipments	0.00	23.00	0.00	2.55	0.00	5.58
2.	Works	0.00	252.00	0.00	253.00	0.00	134.00
3.	Vehicle	0.00	0.00	0.00	0.00	0.00	0.00
4.	Library	0.00	2.25	0.00	0.90	0.00	0.50
5.	Furniture/Livestock	0.00	0.50	0.00	0.50	0.00	0.50
Total (B)		*0.00*	*277.75*	*0.00*	*274.95*	*0.00*	*150.58*
Total (A+B)		**40.00**	**384.14**	**62.63**	**279.65**	**57.60**	**155.27**

Manpower (Main and sub Centre)

Category	Sanctioned	Filled	Vacant
Scientific	17	13	4
Technical	12	3	9
Administrative	8	7	1
Supporting	4	1	3
Total	41	24	17



Scientific Staff (Main and Sub centre)

Sl. No.	Discipline	Sanctioned Strength			In position as on 31.3.2003		
			Sr. Scientist	Pr. Scientist		Sr. Scientist	Pr. Scientist
1	DIRECTOR		RMP (1)			RMP (1)	
Scientific							
2	Agricultural Economics	1	-	-	1	-	-
3	Agricultural Entomology	-	1	-	-	1	-
4	Agricultural Extension	-	1	1	-	1	1
5	Agronomy	-	-	1	-	-	1
6	Farm Machinery and Power	-	1	-	-	1	-
7	Food and Nutrition	1	-	-	1	-	-
8	Child Development	-	1	-	-	-	-
9	Home Development Resource Management	-	-	1	-	-	1
10	Livestock Production and Management	-	-	1	-	-	-
11	Dairy Technology	-	1	-	-	-	-
12	Fish Processing Technology	-	1	-	1*	-	-
13	Horticulture	2	1	1	2	1	-
	Total	**4**	**7**	**5**	**5**	**4**	**3**

* *One scientist (F&F) working against the post of Senior Scientist (Fish Processing Technology) as Scientist, Sr. Scale.,*

Technical Staff

Designation	Sanctioned Post	In position as on 31.3.2003
Technical Assistant (T-II-3)	9	2*
Technical (T-1)	3	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.*

Administrative Staff Including Supporting

Designation	Sanctioned post	In position as on 31.3.2003
Asstt. Administrative Officer	1	1
Asstt. Finance and Accounts Officer	1	0
Personal Assistant	1	1
Sr. Clerk	2	2
Stenographer, Gr-III	2	2
Jr. Clerk	1	1
S.S.G.1	4	1
Total	**12**	**8**

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

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

Data collected from 20 farm women receiving extension services from Lady Village Agricultural Workers (LVAWs) and another 20 farm women receiving extension services from Village Agricultural Workers (VAWs) in coastal district on their preferences for extension methods and associated issues were tabulated and compared (Table 1). The critical ratio (CR) test was employed to find out significance of differences if any in preferences between two different groups of farm women.

Significant differences were observed in certain options under most ideal grass root extension agent, most preferred contact, intensity of contact, most preferred location of group discussion, most preferred boundary of tour. Significantly higher percentage women under LVAW preferred Govt. appointed female grass-root agents, group contact, interval of contact once in a week and conducted tour within district boundary than women under VAWs. The women farmers under VAWs had significantly higher percentages for female para grass-root agent, interval of contact once in a fortnight, conducting discussion in community places and no tours. The pattern of preferences of both the groups were found all most similar on the aspects such as most preferred time of contact, methods of group contact, most suitable place for individual contact, most preferred location for training, who should demonstrate and most preferred way of starting an enterprise.

The LVAWs under the Training and Extension for Women in Agriculture (TEWA) had established more contacts and employed some extension methods particularly training and tours which might have been instrumental for bringing significant variations in certain areas of their preferences.

Farm women's exposure to extension over years would bring changes in their needs for extension methods and approaches. The system should remain sensitive to address the changing extension needs of the farm women.

Table 1 : Difference in preferences of farm women under LVAWs and VAWs for extension methods and associated issues.

Sl. No.	Extension methods/ associated issues	Options	Women under LVAWs (n=20)		Women under VAWs (n=20)		CR value
			f	%	f	%	
1.	Most ideal grass root extension agent for	Male agent (Govt.)	1	5	0	0	0
		Female agent (Govt.)	10	50	4	20	1.90*
		Male para agent	0	0	0	0	-
		Female para agent	6	30	15	75	2.84**
		Any one of the above	3	15	1	5	0.79 NS
		No choice	0	0	0	0	-
2.	Most preferred constact	Individual	0	0	0	0	-
		Group	20	100	15	75	2.39*

Sl. No.	Extension methods/ associated issues	Options	Women under LVAWs (n=20)		Women under VAWs (n=20)		CR value
			f	%	f	%	
		Mass	0	0	0	0	-
		Combined	0	0	5	25	-
		No choice	0	0	0	0	-
3.	Most preferred time of contact	Forenoon	2	10	3	15	0.47 N.S.
		Afternoon	17	85	16	70	1.13 N.S.
		Evening	1	5	0	0	-
		Any time	0	0	0	0	-
4.	Preference for group methods	Group discussion	20	100	20	100	-
		Training	18	90	13	65	1.89 N.S.
		Method demonstration	18	90	18	90	-
		Result demonstration	5	25	3	15	0.79 N.S.
		Conducted tours	15	75	5	25	1.58 N.S.
5.	Interval of contact with agent	Once in a week	17	85	9	45	2.65*
		Once in a fortnight	3	15	10	50	2.36*
		Once in a month	0	0	1	5	-
6.	Most suitable place for individual contact	Home	11	55	15	75	1.32 N.S.
		Farm	9	45	5	25	1.32 N.S.
		Office of the change agent	0	0	0	0	-
7.	Most preferred location for group discussion	Common place of the village	16	80	20	100	2.10*
		House of progressive farmer	4	20	0	0	-
		Neighbouring village	0	0	0	0	-
8.	Most preferred location of training	Off campus	2	10	0	0	-
		On campus	12	60	11	55	0.31 N.S.
		Both type	4	20	2	10	1.20 N.S.
		No training	2	10	7	35	1.50 N.S.
9.	Most preferred boundary of tour	Within block boundary	0	0	3	15	-
		Within district boundary	7	35	2	10	2.50*
		Outside district	6	30	0	0	-
		Any place	3	15	0	0	-
		No tour	4	20	15	75	4.07**
10.	Who should demonstrate	Man	1	5	0	0	-
		Woman	6	30	2	10	1.58 N.S.
		Any one of the above	13	65	18	90	1.89 N.S.
11.	Most preferred way of starting an enterprise	Doing individually	2	10	3	18	0.47 N.S.
		Doing in groups	15	75	14	70	0.38 N.S.
		Doing both ways	3	15	3	15	-

* *Significant at 0.05 level of confidence*

** *Significant at 0.01 level of confidence*

N.S. – Not significant

A gender study on agriculture and household economy of tribal of Orissa

(H.K. Dash, B.N. Sadangi & Hema Pandey)

Livestock is an important asset of tribals of Kandhamal district. Major livestock of the area are cattle and buffalo. These are exclusively meant for draft animals. Even dairy animals such as cows instead of being utilized for milk purpose are used as draft animals.

Table 2 : Major livestock of Kandha tribals

Sl. No.	Category	frequency	No of households with cattle in respective categories *	Distribution of cattle owning households	Cattle population	No. of households with buffaloes*	Distribution of cattle population (%)	Buffalo population	No of households either with cattle or buffaloes	Buffalo and cattle population
1.	Land-less	28 (35.0)	16 (57.14)	36.36	46 (29.49)	2 (7.14)	15.38	4 (7.14)	18 (31.58)	50 (23.58)
2.	< 0.5 ha.	27 (33.75)	15 (55.56)	34.09	58 (37.18)	5 (18.52)	38.46	24 (42.86)	20 (35.09)	82 (38.68)
3.	0.5 – 1.0 ha.	14 (17.50)	7 (50.00)	15.91	32 (20.51)	4 (23.53)	30.77	23 (41.07)	11 (19.30)	55 (25.94)
4.	1.0 ha. or	11 (13.75)	6 (54.54)	13.64	20 (12.82)	2 (18.18)	15.38	5 (8.93)	8 (14.03)	25 (11.79)
	Overall	80 (100)	44 (55.00)	100.00	156 (100.00)	13 (16.25)	100.00	56 (100.00)	57 (100.00)	212 (100.00)

() Figures in parenthesis indicate percentages

** Figures in ( ) of these two columns indicate as % of 'f ' in the respective categories*

- Over 50 per cent of households in each category owned some cattle population
- Distribution of cattle owning households across categories indicated that the highest proportion of such households belonged to landless category i.e. 36.36 per cent of cattle owning households were landless whereas 34.09 per cent of cattle owning household had land holding less than 0.5 ha. The lowest proportion of cattle owning households were concentrated in last category i.e. 1.0 ha. and above.
- Regarding distribution of cattle population across categories of households maximum 37.18 per cent of cattle population were found in case of households with landholding less than 0.5 ha followed by 29.49 per cent of cattle population with landless households.
- The highest proportion of buffalo population was also concentrated in second category of households (i.e. households with landholding less than 0.5 ha)
- Considering both cattle and buffalo population together, the highest proportion of these livestock owning households i.e. 35.09 per cent belonged to the category of households with land holding less than 0.5 ha and 31.58 per cent of livestock owning households were landless.

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- Considering both cattle and buffalo population together, the highest proportion of these livestock owning households i.e. 35.09 per cent belonged to the category of households with land holding less than 0.5 ha and 31.58 per cent of livestock owning households were landless.

- The second category of households did have the highest concentration of livestock population (i.e. 38.68 per cent) followed by the third and the first category.

It may be noted that the first two categories of households i.e. landless and those with land holding < 0.5ha. owned significant proportion of major livestock population. For these two categories, livestock were economically significant for being an important source of livelihood. The draft animals earned as much as a labourer earned per day i.e. Rs. 30/- per day. From gender point of view it was the men that could benefit from the livestock. As only men were involved in ploughing and puddling of lands, cattle and buffaloes apart from being earners for the households created the employment opportunity for male workers. Importantly, men mostly did major livestock-related activities like tending and feeding of animals, cleaning of sheds. All these established economic inter-dependence between livestock and male workers.

In tribal areas, agricultural intensification by way of increasing cropping intensity and bringing more area under cultivation could be an important strategy to strengthen the household economy of tribal. Such a strategy would accessible to more and more demand for draft power and hired labour. As a result, poor (landless and marginal) families which own substantial proportion of draft animals can reap advantages which mean that agricultural development will be more equitable.

Studies on technological need for empowering women in rural aquaculture

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

Ornamental fish production

On-farm trials on production of aquarium fishes in sustainable basis at village level were conducted with involvement of 15 women. Trials were made by 2 groups of women in almost two replicated conditions. The participating women were heterogeneous with respect to age, education, occupation and economic condition. All of them had a strong desire to be economically productive.

Indigenous facilities created

The facilities for the trial created by the women in their homestead included (i) an uncovered space/ room but protected from all sides (ii) temporary shed over the space (iii) Low cost and locally prepared earthen pots of 2' diameter, 1.5'height and 50 lts capacity iv) net cloth for covering tanks. Each group maintained 12 nos. of earthen tanks for breeding and rearing.

Dr A.N. Mukhopadhaya, Chairman, QRT, visiting indigenously developed Ornamental Fish Production Units at Khamang Sasan

The tanks were so designed that the excess water could come out without over flowing. This was achieved by fitting one small piece of PVC pipe just 1" below the brim of the tank. Women siphoned out the faecal matters and dirty material accumulated at the bottom of the tank at weekly interval. During this operation usually 50% water-exchanges were made.

Species selection

Guppy (*Poicilia reticulata*), platy (*Xiphophorus maculatus*), molly (*Poicilia sphenops*) were selected for breeding and production purpose because they are smaller in size and hence compatible to the space available in the tank. They are also life bearer, have easy breeding habit and easy to culture.

Training

Two days off campus training was organized to give a overall exposure to farmwomen on management of ornamental fishes like fry collection, water management, feed management including preparation of pelleted feed , disease management, aquarium maintenance etc. including field visit to ornamental fish farms and meeting with women ornamental fish entrepreneur.

Packaging of ornamental fishes for market.

Breeding and rearing

Brood fishes of guppy, platy and molly were procured from CIFA and stocked @ 10 pairs per tank. Women were oriented about the care, feeding and maintenance of brood fishes. Women were advised to keep close vigilance on the development of brood fishes, and fry production and to scoop out the fries everyday. The fries so collected were reared in separate tanks for four months to attain marketable size.

Success

Table 3 : Production of different species

Group No.	Variety	Month	Number of adult species	Sale (In Rs.)
A (8)	Guppy	August	100	
	(*Poicilia reticulata*)	September	1250*	
		October (40 days old)	650	
	Platy	September	25	790
	(*Xiphophorus maculatus*)	October	40	
		Total	**2065**	
B (7)	Guppy	August	100	
	(*Poicilia reticulata*)	September	1500*	881
		October (40 days old)	840	
	Platy			
	(*Xiphophorus maculatus*)	September	28	
		October	50	
		Total	**2518**	

( ) Parentheses indicate the number of participating women in the group.

** Farm women could not get better rate at the initial stage in the absence of competitive market network.*

This on-farm research has shown increase in the capability of women in learning and adopting the technologies of ornamental fish production in a rural environment. In the first week of August, 2002 first batch of guppy was sent to market and in the first week of September first batch of platy was sold. Women of both the groups were able to sell the ornamental fish as they had been linked to the aquarium fish shops in Bhubaneswar for assured marketing. Success of these units has proved the potential of ornamental fish production as a good source of income for the rural women.

In order to identify and prioritize the factors for sustainable ornamental fish production in rural area. The investigators made preliminary discussions with the participating women and helped them to understand the concept and identify the factors. In the subsequent visits each participating woman ranked the factors according to their own experience and perception. The extent of agreement in responses within the group were analyzed by using co-efficient of concordance (W) and the extent of correlation in ranking between the two groups was analyzed by using rank co-relation co-efficient. Results obtained after analysis revealed the factors and their importance so far as sustainability of ornamental fish production is concerned.

Table 4 : Factors of sustainability

Sl.No.	Factors	Pooled rank	Remarks
1.	Finance	I	
2.	Labour	II	
3.	Scientific guidance	III	'W' of the group 'A' = 0.40*
4.	Technology	IV	'W' of the group 'B' = 0.53**
5.	Water	V	Correlation co-efficient of the
6.	Brood fishes	VI	ranks of the two group = 0.69**
7.	Sale rate	VII	
8.	Marketing place	VIII	
9.	Feeds	IX	

** Significant at 0.05 level of confidence*

*** Significant at 0.01 level of confidence*

Ornamental fish production in the said system is found as an avenue of economic empowerment of farm women. But adoption and continuity of the women in the enterprise are affected by dominant factors such as availability of institutionalized credit, labour for water management and scientific guidance.

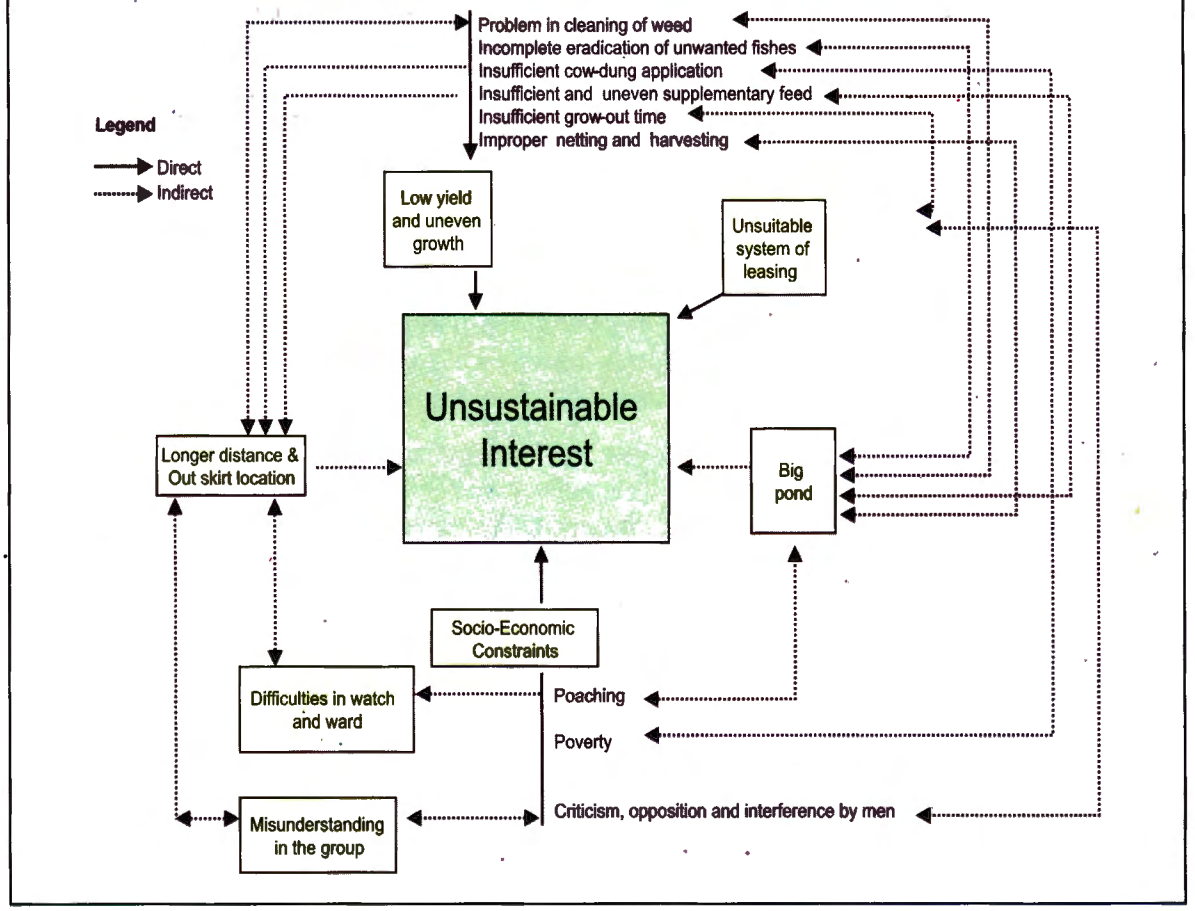
Constraint analysis of women's participation in Community pond

The root-cause analysis for unsustainable interest among the rural women was made through Participatory Rural Appraisal (PRA), which yielded very interesting and worthwhile information. The exercise started from identification of factors directly affecting the interest, then the sub-factors under the main factors and ended in discovering major factors, which were subtle in nature. Inter-connections between the factors and sub factors representing the direct and indirect effects were drawn up to develop a schematic scheme.

From a cursory look at the schematic scheme (Fig 1) , it can be seen that the group at the out set had given the blames on socio-economic constraints, low yield and uneven growth of fishes and unsuitable system of leasing as followed by Govt., but many factors which remained concealed and served as root causes of unsustainable interest were uncovered in course of analysis.

The detail socio-cultural and psychological effects of the above factors are mentioned under the following headings;

Fig.1– Factors affecting interest of women in community pond



(a) *Longer distance and out-skirt location of the pond*

The experimental pond was located in the out skirt. Women in this part of the country are over burdened with household chores and economic activities in and around their homes. Going out frequently from home not only brings dislocation in their routine work but also invites family disapproval and criticism by others for them. The pond not being easily accessible and open to general public had the following drawbacks;

- The women group could not make required number of visits for watching and providing cow-dung and kitchen remains, rice bran etc.
- They faced verbal and non-verbal criticism from men folk while traveling and working in pond.

(b) *Big size pond*

Since the pond was big, women could not manage the problems arising out of poaching, weeds and unwanted fishes, provide supplementary feeds evenly and practised proper netting and harvesting.

(c) *Socio-economic constraints*

Among the socio-economic constraints, poverty among the women and poaching were clearly visible. But another important constraint, which remained hidden, was criticism, opposition and interference by men. The men folk and rivalry groups tried to spread rumors and criticized the women at work place. In many cases husbands of the participating women also created hurdles in sharing costs, feeds, labour etc. This has adversely affected the watch and ward, group solidarity, extension of lease and above all the management of pond.

(d) *Unsuitable system of leasing*

Women were unaware of official formalities and did not possess the skills to persuade the agency for leasing in their favour. Further, Government do not have policy for giving special consideration or reservations for women in leasing community ponds. Doubts and fear of opposition from men folk and litigations did not keep up their interest. More ever in the present system (start-to-termination of lease), the group got limited period which affected adversely the growth of fishes. The group, which has almost no knowledge in aquaculture, could not face all the odds. As a result the participating women did not continue their interest.

The findings of the study have identified some important constraints of women in community pond in a specific situation. This would help agencies implementing pisciculture programmes to be vigilant at various steps of implementation and develop right types of extension approach for pisciculture in community ponds.

Standardization of women specific field practices in rice for Orissa

(M.P.S. Arya & L.P. Sahoo)

The data on participation of women in rice cultivation in relation to varying aspects were collected from 50 farm families belonging to village Basantapedi, Jagamara, Khamang Sasan villages of Khurda district, village Badabelari of Jagatsinghpur district and village Gudubani of Puri district. Ten farm families three each belonging to higher, other backward caste (OBC) and scheduled caste (SC) and one from the village leader (belonging to any of the caste) were selected from each of the five villages. The data were compiled to explain the participation of women and men on different aspects of rice cultivation.

1. Operation-wise participation

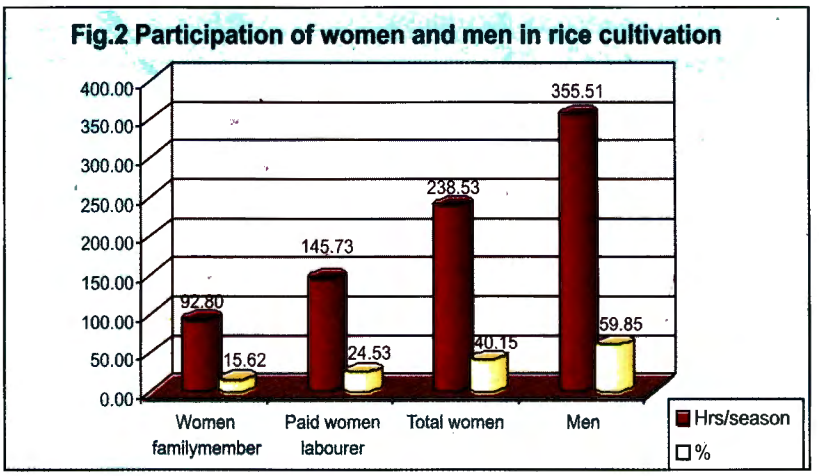
Women family members : Women of the family contributed highest hours (11.72 hrs/season) in storing of seeds (Table 5). This, however, accounted second (86.81%) as far as percentage of total hours is concerned. After care of seeds stood first (98.90%) in this regard. Winnowing found second (9.90 hours) followed by after care of seed (8.90 hours),harvesting (7.46 hours), drying of produce (7.14 hours) and transplanting (6.16 hours). Thus, role of women family members remained mostly with post harvest operations.

Table 5: Participation (hrs/season) of farm women and men in rice operations

Name of operation	Women family members		Paid women labourers		Total women		Men		Total hrs/ operation/ season
	hrs/ season	%	hrs/ season	%	hrs/ season	%	hrs/ season	%	
Seed bed preparation	2.5	11.75	0.72	3.38	3.22	15.13	18.06	84.87	21.28
Nursery manuring	0.44	8.87	0.44	8.87	0.88	17.74	4.08	82.26	4.96
Nursery sowing	1.48	9.04	3.18	19.41	4.66	28.45	11.72	71.55	16.38
Nursery weeding	2.44	12.92	7.6	40.25	10.04	53.18	8.84	46.82	18.88
Nursery watering	2.12	23.3	1.1	12.09	3.22	35.38	5.88	64.62	9.1
Seedling uprooting	3.32	8.45	15.08	38.39	18.4	46.84	20.88	53.16	39.28
Transporting seedling	1.62	9.07	3.3	18.48	4.92	27.55	12.94	72.45	17.86
Main field ploughing	0.3	1.97	0.1	0.66	0.4	2.63	14.82	97.37	15.22
Clod breaking	0.2	5	0.56	14	0.76	19	3.24	81	4
Removal of grasses	1.46	17.8	3.4	41.46	4.86	59.27	3.34	40.73	8.2
FYM application	1.36	9.05	1.1	7.32	2.46	16.38	12.56	83.62	15.02
Fertilizer application	0.16	1.33	0.4	3.32	0.56	4.65	11.48	95.35	12.04
Pre transplant irrigation	0	0	0.2	9.09	0.2	9.09	2	90.91	2.2
Transplanting	6.16	8.26	32.9	44.13	39.06	52.39	35.5	47.61	74.56
Ridge making	0.28	2.25	0	0	0.28	2.25	12.14	97.75	12.42
Irrigation	0.32	2.72	0	0	0.32	2.72	11.44	97.28	11.76
Top dressing	0	0	0	0	0	0	5.06	100	5.06
Weeding	3.78	9.6	15.18	38.57	18.96	48.17	20.4	51.83	39.36
Herbicidal application	0	0	0	0	0	0	1.82	100	1.82
Hoeing	0.3	12.82	0.2	8.55	0.5	21.37	1.84	78.63	2.34
Sprayer handling	0	0	0	0	0	0	1.32	100	1.32
Harvesting	7.46	10.07	22.3	30.09	29.76	40.16	44.34	59.84	74.1
Carrying harvest to threshing floor	1.7	6.36	6.5	24.33	8.2	30.69	18.52	69.31	26.72
Drying harvest	2.92	36.78	2.62	33	5.54	69.77	2.4	30.23	7.94
Threshing	4.06	10.02	10.2	25.19	14.26	35.21	26.24	64.79	40.5
Winnowing	9.9	32.91	7.7	25.6	17.6	58.51	12.48	41.49	30.08
Carrying produce to home	4.5	23.12	2.8	14.39	7.3	37.51	12.16	62.49	19.46
Drying produce	7.14	64.09	2.4	21.54	9.54	85.64	1.6	14.36	11.14
Storing seed	11.72	86.81	0.4	2.96	12.12	89.78	1.38	10.22	13.5
Preparing produce for marking	3.28	33.13	0.8	8.08	4.08	41.21	5.82	58.79	9.9
Aftercare of seed	8.98	98.9	0	0	8.98	98.9	0.1	1.1	9.08
Total	**92.8**	**15.62**	**145.73**	**24.53**	**238.5**	**40.15**	**355.51**	**59.85**	**594.04**

Paid women labourers : It is evident from the table 5 that paid women labourers shared highest hours in transplanting (32.90 hrs/season) showing the highest percentage (44.13%) among all the operations. Harvesting found to be the second (22.30 hours) while uprooting of seedling was third (15.08 hours) so far as participation of paid women labourers is concerned.

With regards to total participation of women (family + paid), transplanting shared the highest hours (39.06 hrs/season) which was 52.39% of total participation in this operation. Similarly, harvesting reported to be the second (29.76 hrs/season) having 40.16% participation while weeding was third (18.96 hrs./season having 48.17% participation. Harvesting found to receive highest hours per season for the men (44.34) followed by transplanting (35.50) and threshing (26.24). In fact, three operations attributed higher working hours in rice cultivation. The over all contribution of women and men in different operation was 40.15% and 59.85% (Fig.2), respectively.



2. Community-wise participation of women family members

Table 6 reveals that farm women belonging to higher caste and OBC categories participated highest (8.27 and 14.10 hours/season) in storing seed while that of SC category contributed highest in harvesting (14.60 hrs./season). As far as total participation in rice cultivation is concerned, women belonging to SC contributed highest (27.18%) followed by OBC (12.13%). It is also evident from the Fig. 2 that highest participation of men (63.31%) was recorded in families belonging to OBC while it was lowest (53.72%) in the families belonging to SC community (Fig. 3).

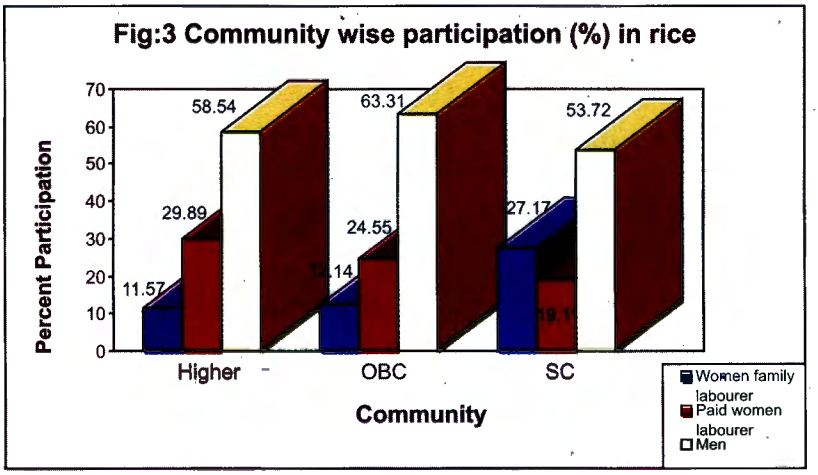


Table 6 : Community wise participation (hrs/season) of farm women in rice operations

Operations	Higher FW	OBC FW	SC FW
Seed bed preparation	1.7	1.4	4.8
Nursery manuring	0	0.05	1.4
Nursery sowing	1.07	0.6	3.07
Nursery weeding	1.4	0.93	5.53
Nursery watering	1.53	1.11	2.87
Seedling uprooting	2.2	1.4	6.97
Transporting seedling	1.93	0.3	3.1
Main field ploughing	0	0	1
Clod breaking	0	0	0.67
Removal of. grasses	2.33	0.85	0.4
FYM application	0.47	0.45	3.47
Fertilizer application	0.07	0	0.47
Pre transplant irrigation	0	0	0
Transplanting	4.87	2.35	12.53
Ridge making	0	0	0.93
Irrigation	0	0	1.07
Top dressing	0	0	0
Weeding	4.87	0.9	6.53
Herbicidal application	0	0	0
Hoeing	0	0.75	0
Sprayer handling	0	0	0
Harvesting	4.7	4.15	14.6
Carrying harvest to threshing floor	0.8	1.9	2.33
Drying harvest	1.07	3.35	4.2
Threshing	3.47	2.2	7.13
Winnowing	5.6	11.9	11.53
Carrying produce to home	2.4	5.95	4.67
Drying produce	7.53	8.05	5.53
Storing seed	8.27	14.1	12
Preparing produce for marking	1.33	6.5	0.93
Aftercare of seed	5.53	12.55	7.67
Total	**2.04**	**2.64**	**4.05**
Percent of total	**11.57**	**12.13**	**27.18**

3. Women participation and the number of family members

The women of farming families belonging to higher caste had the same level (12% to 13%) of participation in rice cultivation up to 5 numbers of family members (Table 6-a). This was, however, reduced (7.08%) when the family members increased beyond five. Almost same trend was reported with OBC category. In case of SC families however, the participation increased with increase in number beyond five.

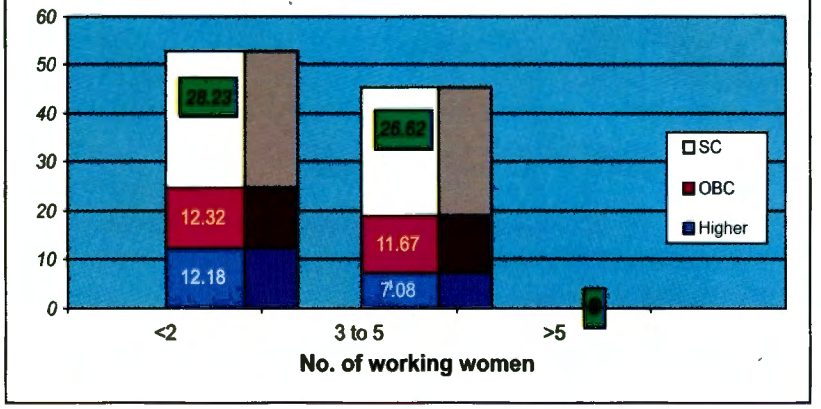
Table 6-a: Participation of women under different socio-economic aspects

Aspects	Higher castes		OBCs		SCs	
	hrs/ season	%	hrs/ season	%	hrs/season	%
Number of family members						
<2	0.15	12.61	0.00	0.00	0.00	0.00
3 -5	1.73	12.11	1.36	14.09	2.67	26.56
>5	0.16	7.08	1.28	11.95	1.36	27.92
Number of working women						
<2	1.88	12.18	2.32	12.32	3.64	28.23
3 -5	0.16	7.08	0.30	11.67	0.41	26.62
>5	0.00	0.00	0.00	0.00	0.00	0.00
Size of land holding						
Land less	0.03	8.11	0.00	0.00	0.69	23.00
Marginal (<1 ha)	1.58	13.78	1.13	16.16	3.06	28.82
Small (1-2 ha)	0.37	7.40	1.54	15.78	0.28	25.68
Farming systems						
Irrigated	0.09	9.38	0.00	0.00	0.00	0.00
Rainfed	0.34	19.65	2.04	13.24	1.68	23.46
Irrigated + Rainfed	1.14	9.53	0.74	7.84	2.03	35.48
Cropping systems						
Rice-pulse	2.00	11.36	2.55	12.40	8.32	26.34
Rice-oilseeds	1.10	13.92	1.43	11.65	0.61	21.94
Rice-Rice	0.00	0.00	0.00	0.00	0.51	21.88
Rice-vegetables	0.10	9.09	0.12	18.18	0.25	34.72
Level of farming						
Mechanized	1.68	11.79	2.32	12.30	2.79	28.18
Traditional	0.33	9.85	0.33	9.85	0.34	10.47

4. Women participation and number of working women in family

Number of working women in the family also affected the participation in rice cultivation (Fig.4) The percent participation and total hours were declined with increase in number of working women from

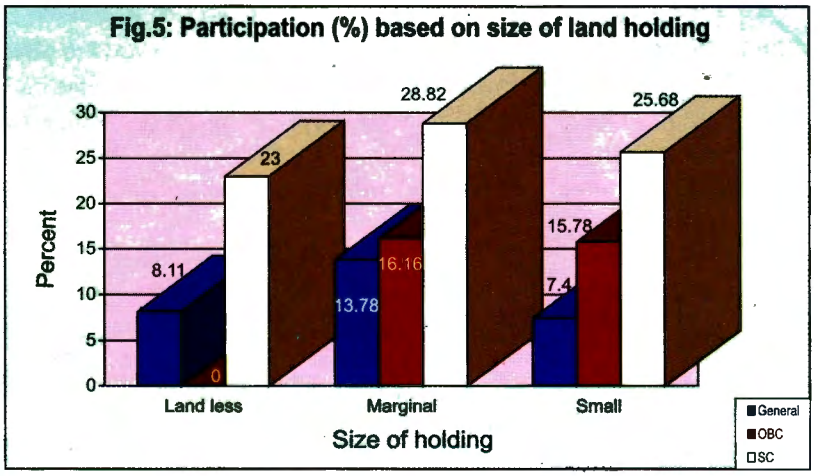
Fig.4 Participation (%) based on No. of working women



two onward. The extent of decline was more with higher caste followed by OBC and SCs. No family was reported having more than 5 working women in this particular survey.

5. Participation of women under different land holdings

The size of land holding influenced the participation of women family members in rice cultivation. Under the land less category the participation of higher caste women was 8.11 per cent, while that of SC category it was 23.00 per cent (Fig. 5). The participation was higher in marginal land holding which declined in small holding size. No family was found having land more than 2 hectares in the reported samples. No family belonging to OBCs was also reported under landless class.



6. Participation of women under irrigated and rainfed situations

A few farm families were found having only irrigated land. Most of the farmers had either only rainfed or both rainfed as well as some irrigated lands. Women participated in rice cultivation (Table 6-a) in all the rice based farming systems of irrigated and rainfed situations. The participation of SC women was higher (23.46% and 35.48%) under both the farming systems followed by and higher castes (19.65% and 9.53%) and OBCs (13.24% and 7.84%).

7. Participation of women under different cropping systems

Rice-pulse, rice-oilseed, rice-rice and rice-vegetable cropping systems were prominent in the villages surveyed under this study. The participation of higher caste women was higher in rice-oilseed (13.92%) cropping system while that of OBCs (18.18%) and SC (34.72%) in rice-vegetables. Only a few families that too belonging to SC categories found adapting rice-rice cropping system where women participation was recorded to an extent of 21.88 per cent.

8. Participation of women under different levels of farming

The participation of women family members reported to be increased under mechanized (i.e. under the use of improved tools and machinery) over traditional (i.e. under no use of implements). Among various categories of farm women the highest participation was reported with women of SC category followed by that of OBCs and higher castes under both the situations.

The study on role of women in rice cultivation revealed that the role of women family members remained mostly with post harvest operations, while paid women labourers shared most of the field

operations i.e. transplanting, harvesting and uprooting of seedlings. Number of family members, number of working women in family, size of land holdings, farming systems, cropping systems and levels of farming also affected the participation behaviour of women. The drudgery in rice transplanting was analyzed so as to develop women friendly tools and cultivation practices. Sebati and Kharvel varieties of rice were identified suitable for direct sowing thus taking out the women from drudgerious job of transplanting.

Occupational health hazards among farmwomen of coastal agro ecosystem

(Hema Pandey, Suman Agarwal & Abha Singh)

Women's involvement in various typical farm operations like transplanting, weeding, harvesting and the use of premature tools and inefficient post-harvest operation leads to various physical health hazards to farm women. Further, farm women used to get exposed to variety of harmful chemicals while performing operations like spraying, dusting, seed treatment, etc. which very much affect their health.

Table 7: Distribution of farm women according to their socio-economic characteristics

Sl.No	Variables	Categories	Frequency (n=200)	Percentage
1.	Age	Less than 25 years	15	7.5
		25-50 years	164	82
		More than 50 Years	21	10.5
2.	Marital status	Married	191	95.5
		Unmarried	1	0.5
		Widow	8	4.0
3.	Caste	General	73	36.5
		Schedule caste	79	39.5
		Backward	48	24
4.	Family type	Nuclear	135	67.5
		Joint	65	32.5
5.	Family size	Small (1-5)	116	58
		Medium (5-10)	72	36
		Large (Above 10)	12	6
6.	Educational status of farm women	Illiterate	91	45.5
		Primary/Middle	67	33.5
		High school	37	18.5
		Graduate	5	2.5
7.	Husband's occupation	Medium farmer (4-10 hact.)	6	3
		Small farmer (1-2 hact.)	44	22
		Marginal farmer (< 1 hact.)	86	36.5
		Landless labourer	64	32
		Business	33	16.5
		Service	7	3.5
8.	Annual family income	Below Rs. 20,000	74	37
		Rs. 20,000 – 40,000	87	43.5
		Above Rs. 40,000	39	19.5
9.	Socio Economic Status (SES)	Low SES	35	17.5
		Medium SES	124	62
		High SES	41	20.5

Besides this, they have to spend a considerable amount of their time and energy to collect fuel wood from long distance and also have to work in smoke-filled kitchen that causes lot of health problems to them. Keeping all these facts in mind, a study was undertaken to assess the health hazards experienced by farmwomen in coastal Orissa.

Table 8 : Status of health hazards reported by farm women in different activities

Sl.No	Activities	Health hazards reported (n=200)	
		f	%
1.	**House hold activities**		
	a. Fetching water	130	65
	b. Fuel collection	73	36.5
	c. Cooking	35	17.5
	d. House cleaning	36	18
	e. Child care	16	8
	f. Washing clothes	103	51.5
2.	**Farm activities**		
	a. Seed bed preparation	30	15
	b. Removal of grasses	1	0.5
	c. Transplanting	100	50
	d. Weeding	2	1
	e. Harvesting	53	26.5
3.	**Post harvest activities**		
	a. Transporting	31	15.5
	b. Grading	28	14
	c. Threshing	100	50
	d. Winnowing	11	5.5
	e. Drying	66	33
	f. Shelling	21	10.5
	g. Dehusking	37	18.5
	h. Parboiling	134	67
	I. Cleaning	21	10.5
	J. Milling	3	1.5
	k. Processing	11	5.5
	l. Storage	21	10.5
4.	**Livestock management**		
	a. Shed cleaning	94	47
	b. Fodder collection	46	23
	c. Feeding	40	20
	d. Milking	55	27.5
	e. Chaff cutting	27	13.5
	f. Fodder mining	10	5
	g. Cattle grazing	25	12.5
	h. Cream separation from milk	2	1
5.	**Fishing**		
	a. Separating fish from net	1	0.5
	b. Separating fish from lot	4	2
	c. Transporting	2	1
	d. Selling	3	1.5
	e. Fish processing	14	7
	f. Net preparation	2	1
	g. Prawn freezing	1	0.5

For this purpose, 200 farm women, who were involved in various agricultural and other related occupations/activities, were selected randomly from five coastal districts of Orissa. Socio-economic characteristics of selected farmwomen have been presented below:

Socio-economic characteristics of farm women

It is observed that majority of farm women (82%) were in the age group of 25-50 years, married (95.5%). Highest percentage belonged to schedule caste (39.5%) followed by general caste (36.5%) and backward caste (24%). Most of the farmwomen were having nuclear families (67.5%) of small size (58%). The majority of the farm women (45.5.%) were illiterate followed by those having education upto primary school (33.5%) and high school (18.5%). Majority of farmwomen belonged to marginal land holdings followed by landless labourers. Their family income was in between Rs. 20,000 – Rs. 40,000 (43.5%) followed by less than Rs. 20,000 (37%). Over all, majority (62%) of farmwomen belonged to medium socio-economic status.

Activities reported hazardous by farmwomen

Majority of farmwomen reported health hazards in household activities like, fetching water (65%), fuel collection (36.5%) and washing clothes (51.5%); farm activities like transplanting (50%) and harvesting (26.5%); post harvest operations like threshing (50%), drying (33%) and parboiling (67%) and livestock management activities like, shed cleaning (47%), milking (27.5%) and fodder collection (23%). Only few farm women reported health hazards in fisheries/pisciculture related activities.

Types of health hazards experienced by farm women

The extent of health hazards experienced by farmwomen varies from one activity to another activity as indicated in Table 9. The backache, hand and leg pain and skin infection were found more common.

In household activities

The major discomfort/health hazards reported by the sample group in household activities like, in fetching water were backache (16.55%), hand pain (25.5%) and fatigue (14%). In fuel collection, hazards faced by women were headache (11%), backache (9.5%) and injury (7.5%). Health hazards in washing clothes were waist pain (15%), hand pain (11.5%) and backache (9%). Thus, in household activities, health hazards faced by women were backache, waist pain, hand pain, injury and fatigue.

In farm activities

In transplanting, women experienced mainly backache (16.5%), waist pain (15%), skin infection (7.5%) and hand pain (6%). Similar health hazards were also faced by them in harvesting activity.

In post harvest activities

While performing threshing activity, women experienced hand pain, backache, headache, leg pain, injuries in hand and leg, eye irritation and skin infection as indicated in table 9.

In drying activity, main health hazards faced by women were headache, eye irritation, sneezing and fatigue.

In paddy parboiling activity, main health hazards as reported by women were backache, hand pain, fatigue and eye irritation.

Table 9 : Types of health hazards faced by farm women (N=200)

Sl.No.	Activities	Health Hazards Reported	Types of Hazards Reported	
1.	**Household activities**			
	1. Fetching water	65 %	Backache	(16.5%)
			Hand pain	(25.5%)
			Skin infection	(6%)
			Cough cold	(3%)
			Fatigue	(14%)
	2. Fuel Collection	36.5%	Headache	(11%)
			Backache	(9.5%)
			Leg pain	(3%)
			Injury	(7.5%)
			Fatigue	(5.5%)
	3. Washing clothes	51.5%	Back ache	(9%)
			Waist pain	(15%)
			Hand pain	(11.5%)
			Skin infection	(3%)
			Cough cold	(5%)
			Fatigue	(8%)
2.	**Farm activities**			
	1. Transplanting	50 %	Backache	(16.5%)
			Hand pain	(6 %)
			Skin infection	(7.5%)
			Waist pain	(15%)
			Leg pain	(5%)
	2. Harvesting	26.5%	Headache	(7.5 %)
			Backache	(8.5%)
			Hand pain	(3.5 %)
			Skin infection	(5%)
			Injury	(2%)
3.	**Post Harvest activities**			
	1. Threshing	50%	Headache	(3%)
			Bachache	(5%)
			Waist pain	(4%)
			Hand pain	(19%)
			Eye irritation	(1%)
			Skin infection	(2%)
			Leg pain	(5.5%)
			Injury	(10.5%)
	2. Drying	33%	Headache	(17%)
			Eye irritation	(10.5%)
			Sneezing	(5.5%)
			Fatigue	(5%)
	3. Parbolining	67%	Headache	(4%)
			Backache	(16.5%)
			Waist pain	(12.5%)
			Hand pain	(13.5%)
			Eye irritation	(4%)
			Fatigue	(16.5%)
4.	**Livestock management**			
	1. Shed cleaning	47%	Waist pain	(16%)
			Hand Pain	(24%)
			Fatigue	(7%)
	2. Fodder collection	23%	Waist pain	(10%)
			Leg pain	(13%)
	3. Milching	27.5%	Hand pain	(27.5%)
5.	**Fisheries activities**			
	1. Fish processing	20.89%	Head ache	(11.94%)
			Fatigue	(8.95%)

In livestock management activities

Shed cleaning was found to be the most hazardous activity followed by milching and fodder collection. In shed cleaning activity, women suffered from hand pain (24%), waist pain (16%) and fatigue (7%). In fodder collection, leg pain and waist pain were the main health hazards experienced by women. In milking, the main hazard experienced by women was hand pain (27.5 %). However, in fishery women did not report any kind of major problems. Fish processing was one activity where in the maximum percent of women i.e. 7% faced some physical discomfort. The fishing activity, however, was found mainly limited to men.

The main cause of these health hazards may be attributed to long working hours in uncomfortable position/posture in uncomfortable environment following traditional methods for doing various activities. For these discomfort/health hazards they usually consult older family members of their house and use some local measures like leaves and oils of some medicinal plants. In case of serious injury or physical discomfort they generally preferred to consult doctors of primary health centers.

Future research should examine the perception of the farm women and undertake activities for developing software and hard ware solutions to reduce hazards.

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

(Suman Agarwal, Hema Pandey & Abha Singh)

In order to find out the extent of reduction of drudgery in paddy parboiling, ergonomic assessments were carried out of the traditional and improved method of parboiling activity.

It is evident from the table 10 that the heart rate and energy expenditure were significantly reduced by using improved technology i.e. paddy parboiling unit. The out put in traditional method was 35 kg./ batch while it increased to 75 kg./batch in improved method. For one batch of paddy parboiling the time spent was two days in traditional method, where as it is only six hours in improved method. Thus, there was considerable reduction in time spent in improved method.

The above data indicated that there was significant reduction in drudgery by using paddy parboiling unit in terms of physiological work load, energy expenditure, out put and time spent.

Development of a module on paddy parboiling unit

Keeping in view the considerable reduction of drudgery through the use of improved technology, it was thought imperative to develop a module related to paddy parboiling to be used by the trainers. The script of the module on paddy parboiling unit has been finalized. The first section of the module explains with the meaning and concept of the homestead technology. The second section deals with the traditional method of paddy parboiling, highlighting the elements of drudgery involved in traditional method. The third section of the module describes about the available technology i.e. Paddy Parboiling Unit. This includes structure of the unit, mechanism and method of using parboiling unit, physical and operational parameters of the unit with a focus on advantages and cost effectiveness of the unit. All the relevant photographs were developed/prepared for the inclusion in the module. Besides this, attempts were made to develop a video tape/CD. After editing, this can be used as an aid for sensitization and training farm women for the use of this technology.

Table 10 : Ergonomic assessment of the traditional and improved methods.

Average working heart rate b/min.		Physiological work load		Average energy expenditure K.J/Min.		Physiological work load		Out put Kg./ batch	
Traditional	Improved	Traditional	Improved	Traditional	Improved	Traditional	Improved	Traditional	Improved
107.7	98.6	Moderately heavy	High	8.4	6.95	Moderately heavy	High	35	75

Average resting HR(b/min) : Traditional 86.6, Improved 86.1

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

(L.P. Sahoo & M.P.S. Arya)

Indigenous Technological Knowledge (ITK) used by farm women for storage of pulse and vegetable seeds were collected from farm women. Their efficiency in enhancing the storability and retaintion of germinationability was assessed. Seeds were collected from farmer's field and tested for their initial quality. The germination percentage of the seeds before storage was determined and found above the recommended standard. These seeds were taken for the storage experiment.

The ITKs available in the locality (Table 11) were taken as treatments of the experiment and were compared with the recommended chemical treatment on germination percentage, moisture content and loss of germination percentage.

Green gram seeds treated with begunia leaf and cow dung ash retained higher germination percentage (82%) after one year of storage and the loss in germination percentage was 12.76%. Seeds stored using other ITKs also retained germination above 70%. However, seeds treated with begunia leaves found to be the best and as effective as seeds treated with recommended method i.e. Captan @3 g per kg of seed (81%).

The loss of germination in radish seeds treated with chemlcal (Captan @3 g per kg of seed) was 3.7 per cent. Among the indigenous treatments, seeds treated with neem leaf and stored in steel containers retained higher germination percentage (76%) and was comparable to recommended method (Captan @3 g per kg of seed).

In case of arhar seeds smeared with red earth and stored in ploythene bags the germination percentage was higher than seeds stored in cloth bag. Mustard oil treated seeds retained germination better in cloth bags compared to polythene bag. The germination percentage in cloth bag was found to be 2.5% higher than polythene bag. However, seeds smeared with mustard oil and stored in polythene bags had the highest germination percentage (82%) and loss was only 2.38 %.

From the above findings it can be inferred that though seeds treated with chemicals retained higher germination percentage but the different ITKs for seed storage were also found effective and can be successfully used for safe seed storage.

Table 11 : Comparison of efficacy of different ITKs for storage of Green gram seeds

Treatments	Parameters for testing storability of seed		
	Germination percentage (%)	Moisture content (%)	Loss in germination percentage than the initial storage (%) after one year of storage
Seed + Begunia leaf (*Vitex negundo*)+ Cow dung ash	82 (94)	9.6	12.76
Seed + Neem leaf) (*Azadiracta indica)*	74 (94)	9.7	21.27
Seed + Naguari leaf (*Lantana camara*)	72 (94)	9.68	23.4
Control (Seeds treated with chemical Capton)	81 (94)	9.75	13.8

( ) Figures in parentheses indicate the initial observation on the parameters.

Table 12 : Comparison of efficacy of different ITKs for storage of Radish seeds

Sl. No.	Treatment/ containers	Germination % after 1 year of storage			Loss in germination (%)		
		Seed stored with Neem leaves	Seed stored with cow dung ash	Seed stored with chemical	Seed stored with Neem leaves	Seed stored with cow dung ash	Seed stored with chemical
1.	Steel box	76 (81)	66 (81)	78 (81)	6.17	18.51	3.7
2.	Plastic box	72 (81)	68 (81)	77 (81)	11.11	16.04	4.9
3.	Glass bottle	64 (81)	68 (81)	75 (81)	20.98	23.4	8.6

( ) Figures in parentheses indicate the initial observation on the parameters.

Table 13 : Comparison of efficacy of different ITKs for storage of Arhar seeds

Sl. No.	Treatment/ containers	Germination % after 1 years of storage			Loss in germination (%)		
		Seeds stored with red soil	Seeds stored smeared with mustard oil	Seeds stored without any treatment	Seeds stored with red soil	Seeds stored smeared with mustard oil	Seeds stored without any treatment
1.	Polythene	82 (84)	71 (84)	72 (84)	23.38	15.47	14.28
2.	Cloth bag	73 (84)	75 (84)	70 (84)	13.09	10.71	16.6

( ) Figures in parentheses indicate the initial observation on the parameters.

Popularization of eco-friendly pest management technologies for vegetables among farm women in homestead lands

(S.K. Srivastava, B.L.Attri and L.P. Sahoo)

- The small and marginal women farmers who were involved in vegetable production were interviewed for assessing their status on various parameters related to eco-friendly pest management.
- Various ITKs, eco-friendly technologies were collected and documented.
- Critical inputs and technological gaps were identified in different villages.

Under this project eight farm women trainings were conducted at village level, in which 251 farm women were trained on different aspects of vermicomposting through the wooden model developed by the PI.

The technological gaps in pest management together with ITKs practised having eco-friendly character would enable the scientist to identify and recommend eco-friendly technologies for homestead lands.

PROJECTS UNDER NATIONAL AGRICULTURAL TECHNOLOGY PROJECT

Management of coastal agro eco-system affected by Super Cyclone in Orissa

(Hema Pandey, Suman Agarwal, B.L. Attri, H.K. Dash, Abha Singh, Bharati Killadi)

The project entitled "Management of Coastal Agro-Ecosystem Affected by Super Cyclone in Orissa" implemented with the involvement of all ICAR centres and agricultural university located in the twin city of Bhubaneswar and Cuttack. Central Rice Research Institute (CRRI), Cuttack, was designated as the lead centre for this project. Since, the project came into being as a measure to rehabilitate the people devastated by Super Cyclone, which hit the coastal Orissa on 29th Oct., 1999. Therefore, the objective of the project was to introduce specific technology capsules available with the institution suiting to the ecology of selected locations for restoring the cyclone affected villages and also to conduct need based on farm research under coastal agro eco system.

The project work to be undertaken from NRCWA had three major objectives:

1. Nutritional status assessment of the families and intervention
2. Development of nutritional garden in homestead areas of the families
3. Preparation of material for nutrition education to the farm families

To fulfill the objectives, the following activities were undertaken:

A survey was conducted in the severely cyclone affected village KAKAN in Erasama block of Jagatsinghpur district to assess the nutritional status of farm women and children and to know the farm women's knowledge regarding different aspects of nutrition,

One hundred twenty farm women and children were selected randomly for the study. The data were collected through interview schedule which was developed to elicit information like anthropometric measurements of women and children, clinical examination of children and knowledge of farm women on nutrition. The following results were obtained:-

Nutritional Status of Women

Anthropometric measurements (Weight and Height) of farm women revealed that there was a considerable variation in weight even among the well-nourished women of the same age group. Weight associated with height was found to be reliable source for detecting both under and over nutrition. Therefore, nutritional status of women as defined by their Body Mass Index (BMI, kg/mt^2) was calculated and classified into three groups as indicated in table 14.

Table 14 : Distribution of farm women according to their Body Mass Index

Sl.No.	Category	Frequency	Percentage
1.	Well nourished (BMI > 18.5)	57	47.50
2.	Mild to moderately malnourished (BMI 17.0-18.5)	51	42.50
3.	Severely malnourished (BMI < 17.0)	12	10.00
	Total	**120**	**100.00**

Results indicated that about 50% farm women were having poor nutrition, 10% women had BMI > 17.0 implying that they were having chronic energy deficiency.

Economic condition of the family, nutritional knowledge of the farm women and devastation by super cyclone were found to be crucial factors of prevailing malnutrition. As major part of the family income was diverted towards reconstruction of house and the expenditure on nutrition was found to be at subsistence level.

Nutritional status of children

Anthropometric measurement (Height, weight, mid-upper-arm, head circumference, chest circumference) especially the weight is the simplest measurement of growth and nutritional status. One hundred twenty children between the age group of (1-15 years) were studied for anthropometric measurements and clinical examination.

Table 15 : Distribution of children according to their age group

Sl. No.	Age group	Frequency (f)	Percentage(%)
1.	1-5 years	25	20.83
2.	6-15 years	95	79.17
	Total	**120**	**100.00**

Anthropometrics measurement of children

Table 16 : Weight and height for age group 1 to 5 years (Boys)

Age in years	Standard weight (Median) (In kg)	Observed Weight (Median) (In kg)	Standard height (Median) (In cm)	Observed height (Median) (In cm)
1	10.2	9.5	76.1	73.6
2	12.4	10.2	85.6	78.7
3	14.6	12.0	94.9	81.2
4	16.7	15.0	102.9	91.4
5	18.7	16.7	109.9	96.4

Table 17 : Weight and height for age group 1 to 5 years (Girls)

Age in years	Standard weight (Median) (In kg)	Observed Weight (Median) (In kg)	Standard height (Median) (In cm)	Observed height (Median) (In cm)
1	9.5	8	74.3	74.1
2	11.8	10	84.5	78.7
3	14.1	9	93.9	79.95
4	16.0	11	101.6	91.4
5	17.7	17	108.4	96.7

Standard weight (source FAO, 1990 C)

The above table shows that the 50th percentile weight and height of boys and girls of FAO 1990 C was higher than the 50th percentile of the present study. This indicates the under nutrition and malnutrition among the sample group.

Table 18 : 50th percentile of height and weight of boys (6 – 15 years)

Age in years	Weight (Kg)		Height (cm)	
	Howard study	Present study	Howard study	Present study
6	21.91	17.80	117.5	110.10
7	24.54	23.55	124.1	127.30
8	27.26	25.90	130.0	129.50
9	29.94	26.10	135.5	132.00
10	32.61	28.15	140.3	136.25
11	35.25	31.17	144.2	138.5
12	38.26	33.10	149.6	144.1
13	42.18	37.5	155.0	150.3
14	48.18	41.8	162.7	153.0
15	54.48	47.15	167.8	155.3

Table 19 : 50th percentile of height and weight of girls (6 – 15 years)

Age in years	Weight (Kg)		Height (cm)	
	Howard study	Present study	Howard study	Present study
6	21.09	15.0	115.9	109.50
7	23.68	19.10	122.3	115.90
8	26.35	21.1	128.0	124.00
9	28.94	22.3	132.9	126.60
10	31.89	24.6	138.6	127.40
11	35.74	29.0	144.7	138.5
12	39.74	32.3	151.9	143.4
13	44.95	35.37	157.1	148.9
14	49.17	37.5	159.6	154.9
15	51.48	42.18	161.2	157.2

The table 19 indicates that the 50th percentile of weight and height of boys and girls of Howard study was higher than the 50th percentile of weight and height of boys and girls of present study. Lower weight and height of boys and girls are the sign of under nutrition and malnutrition among the present sample group.

Clinical examination

Clinical examination is the most essential part of all nutritional surveys, as the level of health of individuals is influenced by the diet they consume. Clinical examination aims at examining a person for the sign and symptoms of any disease. The data on clinical examination are presented from table 20 (a) to 20 (i).

Table 20 (a) : Distribution of children according to their general appearance

Sl.No.	Category	Frequency	Percentage
1.	Good	13	10.83
2.	Fair	13	10.83
3.	Poor	67	55.83
4.	Very Poor	27	22.5
	Total	**120**	**100**

From the above table it reveals that 55.83% children had poor and 22.50% had very poor general appearance. This is an indication of under and mal nutrition among the studied children.

Table 20 (b) : Distribution of children according to presence/absence of night blindness

Sl.No.	Category	Frequency	Percentage
1.	Present	9	7.5
2.	Absent	111	92.5
	Total	**120**	**100**

The above table indicates that 7.5 % children had suffered from night blindness. Presence of night blindness indicates the deficiency of vit. A.

Table 20 (c) : Distribution of children according to their lips condition

Sl.No.	Category	Frequency	Percentage
1.	Normal	92	76.66
2.	Angular stomatitis, mild	21	17.5
3.	Angular stomatitis, severe	7	5.83
	Total	**120**	**100**

From the above table it is noticed that 17.5% children suffered from mild angular stomatitis and 5.83% from severe angular stomatitis. Angular stomatitis is mainly due to the deficiency of vitamin B complex.

Table 20 (d) : Distribution of children according to their tongue condition

Sl.No.	Tongue condition	Frequency	Percentage
1.	Normal	45	37.5
2.	Pale but coated	55	45.83
3.	Red	20	16.66
4.	Red and raw	-	-
	Total	**120**	**100**

The above table reveals that 45.83% children had pale coated tongue and 16.66% had red tongue. Raw tongue is due to the deficiency of vitamin "C".

Table 20 (e) : Distribution of children according to their gum condition

Sl.No.	Gum condition	Frequency	Percentage
1.	Normal	59	49.16
2.	Bleeding	21	17.5
3.	Pyorrhoea	40	33.33
4.	Retracted	-	-
	Total	**120**	**100**

From the above table it is noticed that 17.5% children had bleeding gums and 33.33% children were suffering from pyorrhea. Bleeding gums and pyorrhea is mainly due to the deficiency of vitamin 'C'.

Table 20 (f) : Distribution of children according to their hair condition

Sl.No.	Hair condition	Frequency	Percentage
1.	Normal	56	46.66
2.	Loss of luster	50	41.67
3.	Piscoloured and dry	14	11.67
4.	Spare and brittle	-	-
	Total	**120**	**100**

The above table indicates that 46.66 % children had normal hair and 53.34 % had loss of luster, discolored and dry hair. The hair deformities are generally linked with the deficiency of protein in the meal.

Table 20 (g) ; Distribution of children according to their skin appearance

Sl.No.	Skin appearance	Frequency	Percentage
1.	Normal	60	50
2.	Loss of luster	54	45
3.	Dry and rough	5	4.17
4.	Hyperkeratocis	1	0.83
	Total	**120**	**100**

From the above table it is observed that 50% children had normal skin appearance and 50% had loss of luster, dry and rough and hyperkeratsis skin. Skin deformities are associated with the deficiency of protein and vitamin 'A'

Table 20 (h) : Distribution of children according to their face appearance

Sl.No.	Face appearance	Frequency	Percentage
1.	Normal	60	50
2.	Pigmented	54	45
3.	Nasolabial seborrhoe	5	4.17
4.	Moon face	1	0.83
	Total	**120**	**100**

The above table indicates that 60% children had normal face where as 40% children were suffering from pigmented nasolabid seborrhea and moon face.

Table 20 (i) : Distribution of children according to their Oedema distribution

Sl.No.	Face appearance	Frequency	Percentage
1.	Absent	105	87.5
2.	Oedema on dependent parts	15	12.5
3.	Oedema on face and dependent parts	-	-
4.	General anassance	-	-
	Total	**120**	**100**

The above table reveals that only 12.5 % children had oedema on their dependent parts. Oedema is present in moderate and severe cases of malnutrition especially in severe protein deficiency. Overall clinical examination of children indicated under nutrition and malnutrition among children.

Knowledge test

To know the knowledge of the farm women on nutritional aspects such as balanced diet, cooking methods, nutrition during special conditions viz. pregnancy and lactation a survey was conducted which brought out that majority of the farm women had medium knowledge about balanced diet (47.5%), cooking methods (69.16%) and special stage (51.67%) and very few women had high knowledge in balanced diet (4.16%), cooking methods (1.67%) and special stage (5.0%) (Table 21).

Table 21 : Distribution of farm women according to their knowledge level

(n=120)

Sl. No.	Score Index	Knowledge level	Aspects		
			Knowledge on balance diet (f)	Knowledge on cooking methods (f)	Knowledge on special stage
1.	Below 30%	Low	58 (48.33%)	35 (29.16%)	52 (43.33%)
2.	Between 30% - 60%	Medium	57 (47.5%)	83 (69.16%)	62 (51.67%)
3.	More than 60%	High	5 (4.16%)	2 (1.67%)	6 (5.0%)

It could be concluded that majority of women and children of the super cyclone affected area had poor knowledge on balance diet and special nutritional needs. Women's knowledge on method of cooking was found to be better than other aspects. To improve the nutritional status of these families interventions like nutrition education and laying out nutrition gardens in the homestead areas of the families are considered very useful.

Development of nutritional garden in homestead areas of the families

Nutritional garden in the homestead area of the families provides immediate food and nutrition security to the family. With this intention nutritional gardens were laid down in the courtyard of severely affected families. In the initial phase, 120 families were identified for this purpose. About 100 sq.ft. (10' x 10') area in the homestead of each family was earmarked for the development of nutritional gardens. The layout of the plots had been done for planting of vegetable crops and fruit plants.

So far 120 nutritional gardens had been laid and yearly plan of sowing the vegetable was developed. The following vegetable and fruit crops were planted in the garden (Table 22).

The yield data as shown in table 22 reveals that bottle gourd variety Shambu yielded 30.8kg which was higher than variety Sharada. Likewise bitter gourd variety Priya yielded higher than variety Green long. In brinjal, variety Green Star Long yielded higher (15.4) than variety Maharathi however both the varieties were infected with fruit and shoot borer (Leucinoides arbonalis).The varieties Dhara and Jaipur Long of ridge gourd showed same range of yield however Dhara perfomed better than Jaipur Long.In cucumber the variety Nirmalaya yielded better (4.2 kg) than variety Green long. The radish variety Mino Early yielded higher (8.3 kg) than variety Pusa Chetki. The cowpea variety Maharaja showed higher yield (4.6 kg) than variety Selection-22.

Table 22 : Vegetable Crops performance in Astaranga (July – October 2002)

Crops	Variety	Yield range(kg/plot)	Average yield/plot (kg)
Bottle gourd	Sharada	14-35	25.1
	Shambu	18-40	30.8
Bitter gourd	Green long	1-5	3.8
	Priya	3-8	5.1
Brinjal	Maharathi	10-18	13.0
	Green star long	10-20	15.4
Ridge gourd	Dhara	2-6	4.0
	Jaipur long	2-6	3.6
Cucumber	Greenlong	2-4	2.5
	Nirmalaya	3-6	4.2
Bhindi/okra	MHOK-14	4-10	7.5
	Bhanupriya	3-9	5.3
Radish	Pusa Chetki	3-12	7.1
	Mino Early	6-12	8.3
Cow-Pea	Selection-22	1-5	2.6
	Maharaja	1-8	4.6

Table 23 : Performance of vegetable crops at Erasama (June –September 2002)

Crops	Variety	Yield range (kg/plot)	Average yield/plot (kg)
Radish	Pusa Chetki	7-44	16.45
	Mino Early	3-30	15.38
Cow-Pea	Selection-22	8-33	17.28
	Maharaja	2-21	12.29
Ridge gourd	Dhara	5-42	18.53
	Jaipur Long	2-20	10.32
Bhindi/Okra	MOHK-14	6-40	18.17
	Bhanupriya	5-38	18.26
Pumpkin	Large Red	9-35	20.32
	Yellow Flesh	2-38	65.98
Amaranthus blitium	Local	1-11	4.89
	Local	1-11	5.09

It is indicated from table 23 that the yield of vegetables per plot ranged from 1 kg in Amaranthus to 44 kg in radish. The radish variety Pusa Chetki had shown higher yield than variety Mino Early. In cowpea, variety Selection-22 had shown higher yield (17.28 kg) than variety Maharaja (12.29 kg). The variety Dhara produced higher yield than variety Jaipur Long in ridge gourd. Two cultivars of okra/bhindi exhibited same range of yield. In pumpkin, the variety Yellow flesh showed higher yield (65.98 kg) than variety Large Red. Best of the varieties of Amaranths has same range of yield.

Table 24 : Performance of vegetable crop at Erasama (October 02-January 03)

Crops	Variety	Yield range (kg/plot)	Average yield/plot (kg)
Cauliflower	Hiramate	10-35	21.23
	K.S.B-50	8-38	22.36
Amaranthus	Kanak Red	3-20	9.14
	Desi White	3-15	8.14
Palak	All Green	3-18	8.53
	Local	5-18	8.49
Tomato	Blue star	4 -25	15.36
	Utkal Kumari	10-35	17.60
Radish	Pusa Chetki	2-15	5.96
	Mino Early	1-10	5.79
Bhindi	NOH – 15	2-14	6.17
	BO_2	2-11	5.68
Bitter gourd	Nakhara	1-8	3.40
	Green long	1-5	2.17
Cucumber	Nirmalaya	4-18	9.04
	IL Patta	2-15	7.60

From the table 24, it is observed that the yield in vegetables varied from 1 kg in Radish and Bittergourd to 38 kg in Cauliflower per plot. The variety K.S.B-50 exhibited higher yield than variety Hiramate in cauliflower. In Amaranthus, variety Kanak Red showed higher yield than variety Desi White. In tomato, the variety Utkal Kumari exhibited higher yield (17.6 kg) than variety Blue star. The variety Pusa Chetki showed higher range of yield than Mino Early in radish. The variety MOH - 15 of okra showed higher yield than BO2. Bittergourd variety Nakhara showed higher yield (3.4 kg per plot) than variety Green long (2.1 kg per plot). In cucumber variety Nirmalaya showed higher yield 9.0 kg/plot than IPL patta.

Pumpkin is considered a good border crop in kitchen garden

Tomato variety "Utkal Kumari" performed well in the Super Cyclone affected area

Preparation of material for nutrition education to the farm families

For achieving the third objectives of the project and developing awareness on benefit of a nutrition garden in the backyard of house, trainings were organized for the farm women. For this purpose eight technical bulletins were developed on the selected topics. The training conducted and details of technical bulletins are given in table 25 and 26, respectively.

Table 25 : Farmer's trainings conducted

Sl. No.	Subject	Date	Village	Participants
1.	Extraction and storage of Amaranthus and Cucurbits seed	12th April, 2002	Erasama	52
2.	Demonstration and development of nutrition garden	10th May, 2002	Astaranga	12
3.	Child care and mother's sanitation	16th Sept., 2002	Erasama	29
4.	Value addition of papaya and groundnut	20th Sept., 2002	Erasama	25
5.	Preparation of groundnut chutney and chikki	23rd Sept., 2002	Erasama	27
6.	Training on value addition of mushroom and groundnut pakoda	16th Oct., 2002	Erasama	32
		19th Oct., 2002	Erasama	30
		22nd Oct. 2002	Erasama	28
7.	Vermi-composting for effective utilization of waste of preparation of green manure of kitchen garden	23rd Oct., 2002	Erasama	22
		25th Oct.,2002	Erasama	20
		30th Oct., 2002	Erasama	25
8.	Value addition of potato and groundnut for chips and chikki and pakoda respectively	9th Nov., 2002	Erasama	40
		14th Nov., 2002	Erasama	20
		16th Nov., 2002	Erasama	20
		18th Nov.,2002	Erasama	20
9.	Nutrition education drinking water	20th Nov., 2002	Erasama	20
10.	Value addition of papaya into papaya kheer and papaya jam.	8th Dec., 2002	Astranga	27
		10th Dec., 2002	Erasama	20
11.	Preservation of lemon into items like pickle and squash.	24th Dec., 2002	Erasama	20
		31st Dec., 2002	Erasama	20
12.	Nutrition education on food groups planting	27th Dec., 2002	Erasama	20
13.	Soil preparation and pit making for of fruit plants. Nutrition education on balanced diet	26th March,2003	Astranga	60 (2groups)

Sl. No.	Subject	Date	Village	Participants
14.	Nursery raising of vegetable crops. Food and environmental sanitation.	4th March, 2003	Erasama	80 (2groups)
15.	Soil preparation and pit making for planting of fruit plants and value addition of pulses (Badi making)	11th March, 2003	Erasama	60 (2 groups)
16.	Post harvest handling of fruits and vegetables and demonstration of low cost nutritious receipes (Postik Khichri, Namkeen Dalia, Besan Palak Chilla and sweet potato kheer).	15th March, 2003	Astaranga	80 (2 groups)
17.	Package of practices for vegetable crops and demonstration of low cost nutritious receipes (Postik Khichri, Namkeen Dalia, Besan Palak Chilla and sweet potato kheer)	21st March, 2003	Erasama	80 (2 groups)
18.	Post harvest handling of fruits and vegetables and demonstration of Papaya jam, lemon pickle and squash.	25th March, 2003	Erasama	60 (2 groups)

Table 26 : Details of technical bulletins

Selected topics	Status
• Management and package of practices for nutritional garden • Importance of balanced diet • Low cost nutritive recipes • Food and environmental sanitation • Weaning food • Nursery raising for vegetable crops • Plant protection and after care of fruit and vegetable crops. • Post harvest handling of fruits and vegetables.	The package of practices for crops like sweet potato, cucumber, pumpkin, bitter gourd, watermelon, basella, amaranthus, tomato, okra and chilli were developed.

The impact assessment of the project revealed that continuous availability of the fresh vegetables from the kitchen garden created motivation for exploitation of available homestead land, household waste and family labour for deriving maximum benefit from kitchen garden. Awareness was created about packages of practices for growing non-traditional vegetables including hybrid and improved varieties in their regular schedules of production. Farm women also understood the value of balanced diet and importance of vegetables in providing necessary nutrients.

Empowerment of women in agriculture

(Suman Agarwal & Laxmipriya Sahoo)

The following activities were undertaken to help the 36 SHGs to establish their enterprises:

(a) **Opening of bank account :** All the groups were assisted to open their bank account in the nearby branches of Puri Grameen Bank and State Bank of India.

(b) **Link worker's training :** Link workers for each SHGs were identified and trained to carry out the group activities. These workers were also trained to use different agricultural technologies namely, manual four row rice transplanter, twin wheel hoe, grubber weeder, drum seeder/line sower, improved sickle and paddy parboiling unit. During the training programme workers were also oriented to manage the micro level enterprises viz., Mushroom cultivation, Aquaculture, Nursery raising, Fruits and vegetable growing for their economic empowerment.

(c) **Technology identification and intervention:** Keeping in view the involvement of farm women in agriculture operations and animal care related activities in the selected locale, appropriate technologies were also identified. The following agricultural implements were provided to the beneficiaries of the project. Farm women were trained to make use of the agriculture and animal husbandry technologies.

Farm women learning the operation of grubber weeder

1. Pedal thresher for paddy
2. Rake
3. Shovel
4. Wheel barrow
5. Chaff cutter
6. Spraying safety kit
7. Seed treatment drum
8. Manual rice transplanter
9. Paddy parboiling unit
10. Bhindi plucker
11. Fertilizer broadcaster
12. Improved sickle
13. Twin wheel hoe
14. Grubber weeder
15. Manual bund former
16. Groundnut decorticator
17. Groundnut stripper
18. Hanging type cleaner cum grader with sac holder
19. Pedal operated cleaner-cum-grader

Drudgery reduction and efficiency in rice threshing through pedal thresher

(d) **Training on entrepreneurship development :** Based on the needs and preferences of farm women and resources available in the selected area, entrepreneurial activities were identified and trainings were organized on the following areas for capacity building of farm women of different SHGs:

- Pisciculture
- Mushroom cultivation
- Vegetable cultivation
- Floriculture
- Backyard poultry rearing/ Poultry farming
- Agro-processing

All the SHGs started their enterprises.

(e) Training on fruits and vegetable preservation : Under the additional component of the project, a five days training on "Fruits and Vegetable Preservation and Preparation of Low Cost Nutritious Recipes" was organized in Pipli block of district Puri from 20th to 24th January 2003. A group of 30 farm women participated in the training programme. During the five days training, demonstrations were held for preparation of lemon squash, orange squash, lemon syrup, gingerol, guava jelly, mixed jam, papaya jam, rose syrup, pickle of brinjal, lemon and mixed vegetables and preparation of low cost nutritious recipes. Nutrition education was also imparted to the rural women with a special emphasis on preparation of oral dehydration solution (ORS) for the management of diarrhoea among infants and children.

Documentation of project data

Data related to the following aspects were collected, analyzed and documented:

- Profile of selected villages
- Profiles of the respondents and SHGs
- Participation of women in agriculture and animal husbandry activities
- Identification and prioritization of drudgery tasks in agriculture and animal husbandry
- Knowledge of improved technologies of agriculture and animal husbandry
- Skill levels of women related to agricultural and animal care technologies
- Attitude of farm women towards agriculture and animal husbandry technologies
- Management of enterprises
- Perceived attributes and problems of innovations.

Collection, documentation and validation of ITK - Storing pulse grain by using dry chilli

(M.P.S. Arya and L.P. Sahoo)

Field validation of ITK

The field validation of the ITK was done at the site of validation i.e. village Benakunda, district Ganjam (Orissa) by Qulk (Quantifying Indigenous Knowledge) method using matrix scoring from a total of 10 farmers. The farmers practicing and having sufficient knowledge on the ITK were selected for the validation. The evaluation was made on 10 points scale. General information collected from the farmers

through group discussion revealed that mung PDM 57 was popularly being grown by the farmers during summers. The crop is harvested in the month of May. The produce is stored using different methods of storage based on the purpose such as for sale, home consumption or for seed.

The major problem of storage pests in mung and urd is an insect named bruchid borer (Callosobruchus chienensis). The infestation starts from the field and intensified in the storage. It causes heavy loss by reducing the dry matter of seed and germination. Sometimes it results in total loss of seed. Use of chemical in the form of fumigants is recommended for reducing the infestation. The farmers used to store mung and urd both for seed and grain purposes. The farmers use dry chillies as traditional method for storage of pulse seeds which is safe, effective and eco-friendly.

Results and discussion

As per disclosure there were three components of ITK -

(i) Pest control agents : Chilli and other options (Begunia and neem leaves)

(ii) Containers: Earthen pot, metal bin, tin/plastic container and gunny bags

(iii) Fillers: Sand at the bottom and top of the container

Field validation on use of chilli and its options

The matrix scoring of the practitioners (Table 27), revealed that the storage with chemical treatment scored highest (8.25) average points. Aluminum phosphide (Cel-Phos) powder was the chief insecticide used by most of the farmers. The effectiveness (9.5), longevity of storage (8.75), easy in application (9.0) and lower cost (8.5) of the chemical were some of the factors in favour of chemical use. Safety factor in chemical use recorded the lowest score (6.75). Mustard oil (Fig 2) recorded the second rank with 8.19 points followed by Neem leaves (8.12) and dry chillies (8.00). The difference in the score of all the four treatments was, however marginal. Begunia (Vitex negundi) leaves scored the lowest (7.06). The practicener also reported that dried red chillies (Fig 1) are mixed with one quintal of properly dried mung at 400g/q and kept in the containers. The easy availability were most important factors in favour of the use of Neem leaves and chilli. Cooking quality was highest under mustard oil followed by chilli. It was also reported that chilli treated seeds caused irritation in fingers while sowing in the field.

Table 27: Matrix scoring of different components of ITK by quik method

Factors	Dry chilli	Begunia leaves	Neem leaves	Mustard oil	Chemical
Availability	9.00	6.00	10.00	8.00	8.00
Application	8.25	8.00	9.00	8.50	9.00
Effectiveness	8.00	6.00	8.00	9.50	9.50
Safety	8.00	7.00	8.00	8.00	6.75
Cost effectiveness	8.00	8.50	8.00	7.00	8.50
Longevity of storage	7.25	7.50	7.00	7.50	8.75
Seed quality	7.25	6.50	7.00	8.50	8.50
Cooking quality	8.00	7.00	8.00	8.50	7.00
Total	**64.00**	**56.50**	**65.00**	**65.50**	**66.00**
Average	**8.00**	**7.06**	**8.12**	**8.19**	**8.25**

The mustard oil is applied at 0.5 l/qtl. seeds/grains and mixed thoroughly. While neem leaves, chillies or begunia leaves are dried and mixed with the produce before keeping it in the containers.

The validation of different containers of storage was made through matrix scoring and presented in table 28. The result revealed that plastic containers recorded the highest score of 8.61 followed by gunny bags (7.56) and earthen pots (7.14). However, use of gunny bags was reported to be the most popular. Storing more quantity of produce, easy availability and ease in handling were the factors in favour of gunny bags. Earthen pots, tin or plastic containers were reported for storing small quantities specifically that of oil crops or vegetable seeds.

Table 28: Matrix scoring of different factors considered by farmers in selecting containers

Factors	Earthen pot	Metal bin	Tin container	Plastic container	Gunny bag
Easy availability	7.4	4.5	10.0	10.0	10.0
Easiness to use	6.7	7.5	7.0	9.0	9.0
Effectiveness	8.1	7.0	5.0	8.5	8.0
Safety in using	6.7	6.5	4.5	9.0	8.0
Cost effectiveness	6.1	2.5	6.0	9.0	7.0
Reusability	7.8	6.0	8.0	7.0	5.0
Longevity of storage	-	-	-	8.0	6.0
Seed quality	-	-	-	9.0	7.0
Cooking quality	-	-	-	8.0	8.0
Family tradition	7.2	1.0	4.0	-	-
Total	**50**	**35**	**44.5**	**72.0**	**63.0**
Average	**7.14**	**5.00**	**6.36**	**8.61**	**7.56**

Laboratory analysis

In order to study the effect of chilli along with other methods of ITK being practiced in the village, 20 samples were collected randomly on almost 5 months of storage. The samples for seed analysis were sent to State Seed Testing Laboratory Bhubaneswar. Out of a total of 20 samples, one sample was rejected on some technical ground. The results of seed analysis revealed that the seeds treated with mustard oil found in best condition in respect of lowest moisture (9.80%), highest purity (99.64%), germination (90.0%) and good seed health (lowest infection-4.0%). Treatment of ITK i.e. mixed with dry chilli stood second best with respect to purity (99.60%) and seed health (infection-4.72%) and third in moisture (10.49%) and germination (66.0%). Seeds without any treatment resulted in lowest germination (55.0%) and purity (99.54%) and highest moisture (10.88%). Fusarium spp. was the dominant fungus affecting the moong seeds from 3-7% to almost all the seed samples. Rhizaphus, Alternaria, Penicillium, and Selorotium were among the other fungus species reported in the samples.

Table 29 : Status of stored grains/seeds under different treatments at farmer's level in the month of January, 2003

Sl. No.	Treatments	Moisture (%)	Purity (%)	Germi-nation (%)	Infected seeds (%)
1.	Mixed with dry chillies (ITK), n=11	10.49	99.60	66.00	4.72
2.	Treated with chemical, n=4	10.27	99.56	73.60	7.50
3.	Treated with mustard oil, n=1	9.80	99.64	90.00	4.00
4.	No treatment (control), n=3	10.88	99.54	55.00	5.33

The ITK of using dry chillies in storing pulses has been validated. However, the farmers also found using alternate methods like use of chemicals (Aluminum Phosphide) mustard oil, neem leaves and begunia leaves. Use of gunny bag in storing seeds found more popular than metal/tin containers. The analysis of seeds stored using ITK revealed that the treatments of dry chillies and mustard oil were effective in storing the seeds/grains of pulses like greengram.

Drudgery reduction of farm implements

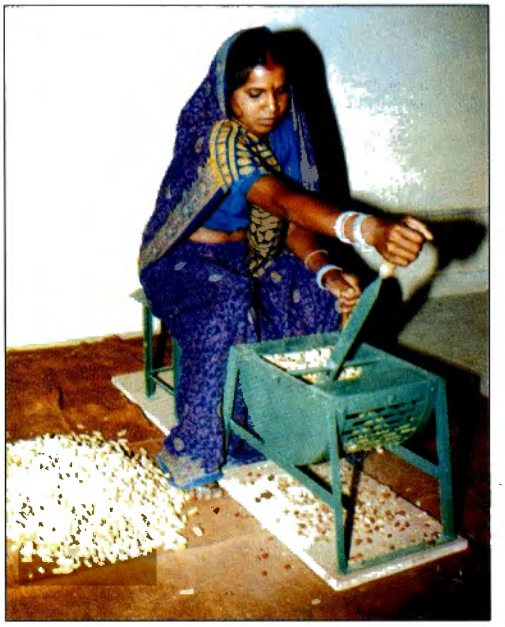
Measurement of physiological cost during operation of seed treatment drum

A 40 kg capacity seed treatment drum was operated by three women workers and data on heart rates of workers were taken. During the operation, seeds of soybean and pigeon pea were treated with Thiram. Each time 25 kg of the seeds were filled. The subject was allowed to operate the drum for six minutes and then heart rate data were recorded. The trial duration was six minutes as this was the time required for mixing the seeds properly with the chemical. The value for mean working heart rate and increase in heart rate over the rest were 114.7 beats/min and 26.7 beats/min, respectively. The women workers felt the equipment comfortable and easy for operation.

Measurement of heart rate during operation of seed treatment drum

Design refinement in sitting type Groundnut Decorticator for women workers

Based on the data generated in the experiment conducted on sitting type groundnut decorticator, the design refinements were carried out in the prototype of sitting type decorticator for better ergonomic performance. These refinements included increase in handle length from 32 to 37 cm, increase in sitting stool height from 20 to 32 cm and change in wooden base design for easy packing and transport. The design has been finalized and 5 prototypes of the improved design were fabricated in the Prototype Workshop. The refined unit was evaluated in laboratory as well as in villages and the output was observed to be 30 kg/h. Equipment was liked by farm women for decortications of groundnut pods.



Modified Sitting Groundnut Decorticator.

Assessment of drudgery of women workers while working with manually operated dibblers

A study was conducted to compare the heart rate responses of three women workers while working with three types of dibbling methods for maize i.e. traditional method, with Naveen dibbler and with Rotary dibbler. The parameter used for comparison were heart rate (for evaluation of work load), increase in heart rate in beats/m2 of area dibbled and output in m2/h. Two replications were carried out for each method. During working, the mean heart rates were 103.7, 104.4 and 141.7 beats/min for traditional method, Naveen dibbler and Rotary dibbler, respectively whereas the corresponding increase in heart rates over the rest were 15.5, 17.1 and 49.7 beats/min, respectively. The output recorded for traditional methods, Naveen dibbler and Rotary dibbler were 117.2, 148.1 and 1057.0 m2/h, respectively whereas the increases in heart rate in beats/m2 of area dibbled were 7.9, 7.1 and 2.8, respectively. The output with Rotary dibbler was found highest i.e. about 9 times greater than traditional method and Naveen dibbler. The heart rate data showed no significant difference in the dibbling with traditional method and with Naveen dibbler. But the women workers liked the Naveen dibbler as the workers carried out the dibbling in standing posture and discomfort caused due to the bending was avoided. In Rotary dibbler though the output was 9 times higher, the mean working heart rate was 141.7 beats/min (Δ HR 49.7 beats/min) thus necessitating the subject to have frequent rest pauses.

Measurement of heart rate during dibbling maize with Rotary Dibbler

Measurement of heart rate during dibbling maize with Naveen Dibbler

Trainers' Trainings

The centre organized trainers' training programmes for the Scientists/ Extension functionaries of the ICAR Institutes/SAUs/ State Departments of Agriculture, Horticulture, Animal Husbandry and Fishery to sensitize them on the productive roles of women farmers and to train them on application of appropriate technologies in agriculture and allied fields. The details are given in table 30.

Table 30 : List of trainer's trainings conducted.

Title of the training	Days	Duration
Main Centre		
Commercial manufacture of indigenous milk products and their marketing potential	3	29th - 31st July, 2002
Integrated pest management with women perspective	3	10th - 12th Dec., 2002
Evaluation of training impact	4	25th - 28th March, 2003

Farmers/farm women trainings

Under the research projects the centre organized 34 trainings in 27 need based areas and trained 1210 farm women/farmers.

PUBLICATIONS

Research papers

- Arya, M.P.S., Singh, R.V. and Murty, N.S. (2003). Standardization of soil moisture and sowing techniques for higher germination and yield of wheat under rain fed conditions. ***Indian J. Soil Conservation, 31*** (1) : 25-29.
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- Singh, D.R., Nair, Sujatha and Attri, B.L. (2002). Effect of fertilizer application on African Marigold. ***J. Ornamental Hort., 4*** : 336-337.
- Srivastava, S.K.(2002). Summer Groundnut work recognized. ***International Arachis Newsletter***, (22) :1-2.
- Srivastava,S.K.(2002). On-farm and Participatory Evaluation of Groundnut varieties for Summer Cultivation in Uttar Pradesh India. ***International Arachis Newsletter, 22*** : 26 -28.
- Swaroop, K., Sharma, T.V.R.S. and Attri, B.L. (2001). Effect of alpha-napthalene acetic acid and 2,4-D on growth, quality and yield of tomato cultivars. ***Madras Agril. J. 88*** (10-12): 723-726.

Popular Article/Technical Bulletin

- श्रीवास्तव, सन्तोष कुमार (2003). कृषिजीवी महिलाओं के लिए बहुउद्देशीय वानस्पतिक फसल सुरक्षा हेतु एक सशक्त पूँजी। ***अष्टम राष्ट्रीय वैज्ञानिक संगोष्ठी,*** 17-19 जनवरी, जबलपुर ।
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- Singh, D.R., Attri, B.L., Medhi, R.P. and Pandey, V.B. (2002). Wild cashew (Anacardium sp.) as promising root-stock for commercial variety. ***SAIC Newsletter, 12*** (3): 5.
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- Singh, D.R., Medhi, R.P., Attri, B.L. and Pandey, V.B. (2003). Seed germination of carambola in Bay Islands. ***Monthly Udyaniki Jeevan, 9*** (8): 2.
- Srivastava, S.K.(2003). Reduction of Pesticidal Hazards Among Farm Women - Useful Tips. ***Sabujima, 11***: 62-65.

Compendium developed for trainers' training programme

1. Jha, Alok, Attri, B.L., Srivastava, S.K., Sahoo, P.K. and Singh, Abha "Commercial manufacture of indigenous milk products and their commercial importance".
2. Sadangi, B.N., Dash, H.K. and Sahoo, P.K. "Evaluation of training impact".
3. Srivastava, S.K. and Attri, B.L. "Integrated pest management with women perspective".

Congress /Conference /Seminar Papers

1. Dr Hema Pandey, Director, presented papers on Role of women in agriculture- A Perspective" and Role of financial institutions to empower women through income generation and agriculture activities" in the Women Farmer's Krishi Mela Exhibition-cum-meeting at Central Institute for Dryland Agriculture, Hyderabad during 25th - 27th April 2002 organised by Youth for Action in collaboration with NRCWA, Rockefeller Foundation, ROID, India, FES, NABARD, CRIDA.
2. Dr Hema Pandey, Director, presented the papers "Indian Experience potential - Benefit of Green and Organic Farming for Women in Agriculture" and "Role of Rural Women in Agriculture and Strategies for Empowerment" in the "Workshop-cum-field-training on Green Food and Sustainable Agriculture" at Xian, China, during 25th - 29th June 2002, organised by Economic and Social Commission for Asia and the Pacific (ESCAP) of United Nations.

Folder

1. A folder on "Improved tools and equipment for farm women" has been prepared and published by sub-centre of NRCWA.

Radio Talks

1. Dr B.N. Sadangi, Principal Scientist (AE) delivered a talk on "Mahilamananka Pain Kutira Silpa" on 17.8.2002 in All India Radio, Cuttack.
2. Mrs L.P. Sahoo, Scientist (Seed Technology), delivered a talk on "Pakasala Bagicha" on 21.12.2002 in All India Radio, Cuttack.

ONGOING RESEARCH PROJECTS

Sl. No.	Name of the Project	Date of launching	Investigators
	MAIN CENTRE		
	Institute Projects		
1.	Development and testing of extension methods for farmwomen in Eastern India	August, 99	Dr B.N. Sadangi, Dr Hema Pandey Dr M.P.S. Arya, Dr P.K. Sahoo, Dr H.K. Dash
2.	A gender study on agriculture and household economy of tribal of Orissa	August, 99	Dr H.K. Dash, Dr B.N. Sadangi
3.	Studies on technological need for empowering women in rural aquaculture	August, 99	Dr P.K. Sahoo; Dr B.N. Sadangi
4.	Standardization of women specific field practices in rice in Orissa	May, 2000	Dr M.P.S. Arya Mrs Laxmi Priya Sahoo
5.	Occupational health hazards of farm-women in coastal Orissa	May, 2000	Dr Hema Pandey, Dr Suman Agarwal Mrs Abha Singh
6.	Identification and evaluation of inter-active learning modules for dissemi-nation of homestead technologies	May, 2000	Dr Suman Agarwal, Dr Hema Pandey Mrs Abha Singh
7.	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
8.	Popularization of eco-friendly pest management technologies for vegetables among farm women in homestead lands	Dec., 2002	Dr S.K. Srivastava, Dr B.L. Attri Mrs Laxmi Priya Sahoo
9.	Survey on post-harvest handling of vegetables in rural areas	Dec., 2002	Dr B.L. Attri, Mrs Abha Singh
	NATP		
10.	Management of coastal agro-eco system affected by Super Cyclone	June, 2001	Dr Hema Pandey, Dr Suman Agarwal Dr B.L. Attrl, Dr H.K. Dash Mrs Abha Singh, Dr Bharati Killadi
11.	Empowerment of women in agriculture	Oct., 2001	Dr Suman Agarwal, Mrs. L.P. Sahoo
12.	Collection, documentation and validation of ITK- Storing of pulse grains by using dry chillies	Aprll, 2002	Dr M.P.S. Arya Mrs Laxmi Priya Sahoo
	AP Cess Project		
13.	Studies of women in agriculture in India with special reference on crop production technologies	Oct., 2001	Dr M.P.S. Arya
	SUB-CENTRE		
14.	Comparison of heart rate responses of groundnut decortications using improved (seating and standing type groundnut decorticators) and local method		Dr. L.P. Gite/ Er. S.P. Singh

PARTICIPATION IN SEMINARS/ WORKSHOPS / CONFERENCES

1. Dr Hema Pandey, Director, attended the "Women Farmer's Krishi Mela Exhibition-cum-meeting" at Central Institute for Dryland Agriculture, Hyderabad during 25th - 27th April 2002 organised by Youth for Action in collaboration with NRCWA, Rockefeller Foundation, ROID_India, FES, NABARD, CRIDA.
2. Dr Hema Pandey, Director, attended the "Workshop-cum-field-training on Green Food and Sustainable Agriculture" during 25th - 29th June 2002, organised by Economic and Social Commission for Asia and the Pacific (ESCAP) of United Nations at Xian, China.
3. Dr Hema Pandey, Director, attended "All India Women Farmers', Agricultural labourers and cultivators federation meeting" at Hyderabad on 30th August 2002 organised by Youth for Action KVK.
4. Dr B.L. Attri, Sr. Scientist (Hort.) attended State level seminar on "Advances in Production of Quality Planting Materials of Horticultural Crops" organized by Orissa Horticultural Society, Bhubaneswar on 6th -7th September, 2002.
5. Dr Suman Agarwal, Principal Scientist (HDRM), attended training on "Multimedia as an educational tool" organized by Chandra Sekhar Azad University of Agricultural and Technology, Kanpur, from 19th - 28th October, 2002.

RECOGNITION/ AWARDS

1. Dr Suman Agarwal, Principal Scientist (HDRM), has been nominated by Central Agricultural University (CAU) as a member of Technical Committee for the establishment of College of Home Science under CAU.

A. LIBRARY AND DOCUMENTATION SERVICE

The library of the centre played an important role for providing literature and information related to the women. The library serves and fulfills the need of the gender experts of this institute as well as other scientist, research workers and students from local research and educational institute. The library has been consistently enriched through the addition of more current, important, scientific and technical books. It has a collection of resource material in the field of Home Science, Nutrition, Agronomy, Extension, Entomology, Economics, Horticulture, Animal Science and related areas. One hundred five books were procured and seven journals were subscribed during this year. The library has a user-friendly reference collection system like CR-ROM discs of ARGIS databases. Besides, efforts have been made to acquire technical reports and annual report from various sources.

B. OFFICIAL LANGUAGE ACTIVITIES

Two technical bulletins entitled "Krishi Mahilayen bhi Janey Karbanik Kheti ke Vibhinn Pahlu" and "Karyalaya me Upyog Hone wali Tippadiyan" (bilingual) were prepared for the benefit of women farmers and official staff. Hindi Day was celebrated to encourage the staff of the centre for maximum use of Hindi for official works. Various programmes like essay competition, Hindi word making competition for members of NRCWA were conducted. Kaumi Ekta Diwas was celebrated during the year. For encouraging original noting and drafting in Hindi, the incentive scheme was implemented. Hindi books have been purchased for the Library. "Hindi Soochna Patt" programme was taken up for promoting Hindi word learning among the staff and visitors. The following articles were published in daily Hindi news paper "Sanmarg".

1. Karbanik kheti ka prashichchan on 22nd August 2002.
2. Paryavaron ke anukul rasal utpadon jaruri on 30th August 2002.
3. Ek sasakt sampark sutra ka kam ker sakati hei - Hindu on 14th September 2002.
4. Bharatiya khadya padarthon mein keetnoshakan ki matra viksit deshon se kai guna adhik on 13th December 2002.
5. Krishi kshetra mein mahilaon ke utthan ke liye vaigyanikon ka sahyog.

C. CELEBRATION OF KISAN DIWAS

Kisan Diwas was celebrated on the occasion of Birth Centenary of Late Choudhary Charan Singh Ji, Former Prime Minister of India, on 23rd Dec. 2002 at selected village. The Kisan Diwas was open to farm women and farmers. On this occasion, exhibition, mahila gosthi and quiz were organized and farm women were honoured. The details of the programme held on the occasion are as follows:

(a) Exhibition

An exhibition was organized wherein various farm implements, agro inputs, aquariums, handicrafts and relevant information appropriate for farm women were displayed.

(b) Mahila Gosthi

The Mahila Gosthi programme was attended by 150 farm women. The various topics in the Gosthi were crop insurance, kisan credit card, storage of agricultural products, use of zero tillage seed drill, integrated nutrient management, IPM etc.

(c) Quiz competition

Quiz competition was organized to create awareness among farm women on balanced nutrition, natural resource management, agriculture and allied fields.

(d) Honouring farm women

On this occasion, four farm women individually and two women groups were honoured. The farm women so honoured shared their successful experiences with the participants.

Farm woman honoured on the occasion of Kisan Diwas

Impact of the programme

The programme was very effective in bringing awareness among the farm women on various opportunities and avenues of income generation. Farm women of the locality were found interested to start income generation activities by using technical guidance of the centre.

D. VISITS OF FARM WOMEN, FARMERS AND STUDENTS

During the year farm women and farmers groups from the nearby states visited the centre as part of their field visits and tours to gain first hand experience from the scientists on technology/enterprise appropriate for farm women. Besides farm women, students also visited the centre.

Staff Research Council

The first Staff Research Council meeting was held on 7th October 2002 to discuss and evaluate new research projects.

Research Advisory Committee

The fourth Research Advisory Committee meeting was held on 12th - 13th November 2002 under the Chair-personship of Dr (Mrs) Pankajam Sundaram. The committee reviewed the progress of the research projects of the centre and gave suggestions for improving the research output.

Institute Management Committee

The Institute Management Committee meeting was held on 15th November 2002 and considered various proposals and took decisions for efficient management of the centre.

Institute Management Committee Meeting

QRT Visit

Meeting of Quinquennial Review Team (QRT) with Heads of ICAR Institutes, OUAT and State Govt. Agencies

The first Quinquennial Review Team, chaired by Prof. A.N. Mukhopadhyay, visited the centre during 19th - 24th May 2002 and 23rd - 28th September 2002 to review the progress and achievements of the centre from 1996 to 2001.

HUMAN RESOURCE DEVELOPMENT

1. Dr S.K. Srivastava, Senior Scientist (Entomology) attended "Gahan Hindi Prashikshan" during 18th - 22nd June 2002 at NAARM, Hyderabad.

2. Shri Babu R.K., Sr. Clerk, attended a training on "Financial Management System on NATP" held at CIFA, Bhubaneswar, from 2nd -3rd Sept. 2002.

3. Dr (Mrs) P.K. Sahoo, Scientist (Sr. Scale) Fish & Fishery Sc., attended winter school on "Computational statistic in agriculture" from 7th -28th November 2002 sponsored by ICAR at Bidhan Chandra Krishi Viswavidyala, Mohanpur, Nadia,W.B.

4. Dr H.K.Dash, Scientist (Agril. Eco.) attended winter school on "Recent Advances in Participatory Extension Methodology in Agriculture and Rural Development" sponsored by ICAR during 2nd - 31st December 2002 at Directorate of Extension Education, Bidhan Chandra Krishi Viswavidyala, Mohanpur, Nadia,W.B..

5. Miss Rina Das, Stenographer, Gr-III, completed Hindi Stenography training at Office of the Accountant General, Bhubaneswar .

6. Mrs Bishnupriya Moharana, Jr. Clerk, attended Hindi Typing training at Office of the Accountant General, Bhubaneswar from 27th March 2003 - 15th June, 2003.

PERSONNEL

As on 31.3.2003

Sl.No.	Name	Designation
1.	Dr Hema Pandey	Director
2.	Dr B.N. Sadangi	Principal Scientist (Agril Extn.)
3.	Dr M.P.S Arya	Principal Scientist (Agronomy)
4.	Dr Suman Agarwal	Principal Scientist (HDRM)
5.	Dr S.K. Shrivastava	Senior Scientist (Entomology)
6.	Dr B.L. Attri	Senior Scientist (Horticulture)
7.	Er.S.P.Singh	Senior Scientist (FMP) *
8.	Dr Sabita Mishra	Senior Scientist (Agril Extn.)
9.	Dr P.K. Sahoo	Scientist (Fish & Fishery)
10.	Dr H.K. Dash	Scientist (Agril. Economics)
11.	Mrs.L.P. Sahoo	Scientist (Seed Technology)
12.	Mrs. Abha Singh	Scientist (Food & Nutrition)
13.	Dr Bharati Killadi	Scientist (Horticulture)
14.	Mrs. Geeta Saha	Technical Officer (T-5)
15.	Ms. Nidhi Agarwal	T-II-3*
16.	Shri B.C. Sahu	T-2
17.	Shri Mata Prasad	Asstt. Administrative Officer
18.	Shri V. Ganesh Kumar	Personal Assistant
19.	Mr. M. Radhakrishnan	Sr. Clerk
20.	Mr. Babu R.K.	Sr. Clerk
21.	Ms. Rina Das	Stenographer Gr-III
22.	Mrs. Parisima Sen	Stenographer Gr-III
23.	Mrs. Bishnupriya Moharana	Jr. Clerk
24.	Mr. Biswanath Biswala	S.S.G.1

* Working at sub centre of NRCWA located at CIAE, Bhopal.

Our New Colleagues

Sl.No.	Name and Designation	Date of joining
1.	Shri Mata Prasad, Asstt. Administrative Officer	01.03.2003
2.	Dr Sabita Mishra, Senior Scientist (Agril. Extn.)	26.03.2003
3.	Er.S.P.Singh, Senior Scientist (FMP)	17.03. 2003

Farewell

Sl.No.	Name	Date of relief
1.	Dr Alok Jha, Senior Scientist (Dairy Tech.)	07.9.2002
2.	Shri Dilip Kar, AAO	10.2.2003

National Research Centre for Women in Agriculture

कृषि में महिलाओं पर राष्ट्रीय अनुसंधान केन्द्र

(Indian Council of Agricultural Research)

भारतीय कृषि अनुसंधान परिषद

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