

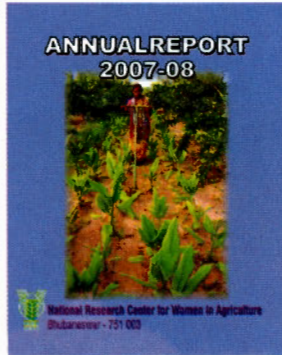
# ANNUAL REPORT 2007-08



National Research Centre for Women in Agriculture  
Bhubaneswar - 751 003



## **NRCWA** **Annual Report 2007-08**



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**NRCWA**

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## *Preface*



Participation, benefit sharing and visibility are the key elements of gender mainstreaming in agriculture. To achieve this, gender sensitization, gender friendly technology development and dissemination supported by gender disaggregated data for informed decision making and capacity building of the stakeholders are critical.

Merger of the All India Co-ordinated Research Project on Home Science having nine centres located in the state agricultural universities has strengthened the activities of NRCWA for realizing the Vision 2025. The research programmes of NRCWA during 2007-08 focused on refinement of farm technologies not only of crop, horticulture and fish production in women perspective but also covered studies on drudgery reduction and gender sensitive extension methods.

The NRCWA Annual Report 2008 provides an account of the achievements under research, training and capacity building of stakeholders in agriculture development.

I express my gratitude to Dr Mangala Rai, Secretary, Department of Agriculture Research and Education and Director General, Indian Council of Agricultural Research, for his guidance in research and generous support in providing various facilities for implementing the mandated activities. I am also grateful to Dr P. Das, Deputy Director General (Agricultural Extension), ICAR, for his keen interest in reorienting the research programmes in order to bring more visibility to the Centre.

I appreciate the efforts taken by the members of the Editorial Board of the Annual Report and all scientific, technical and administrative staff for enabling the achievements of the envisaged targets under research and institution building activities and for contributing material for the Annual Report.

September 2008  
Bhubaneswar

**Krishna Srinath**  
Director

NRCWA

## कार्यकारी सारांश

कृषि में महिलाओं पर राष्ट्रीय अनुसंधान केन्द्र के अधिदेशिक उद्देश्यों के सांमजस्य हेतु इस वर्ष 11 संस्थानिक परियोजनाएं कार्यान्वित की गईं। परियोजनाओं के द्वारा कृषि एवं संबद्ध क्षेत्रों के विभिन्न लैंगिक अनुसंधानयोग्य मामलों को व्यवहारित किया गया। गृह विज्ञान पर अखिल भारतीय समन्वित परियोजना, जो नौ राज्य कृषि विश्वविद्यालयों पर कार्यान्वित है, का कृषि में महिलाओं पर राष्ट्रीय अनुसंधान केन्द्र के साथ विलय किया गया। उड़ीसा के चावल उत्पादक परिवारों से नमूना सर्वेक्षण आधारित लिंग विभक्त आँकड़े एकत्रित किये गये। इस सर्वेक्षण द्वारा लगभग 35.75 प्रतिशत महिलाएं कृषि तथा संबद्ध गतिविधियों में सक्रिय रूप से सम्मिलित पायी गईं। सिंगल विण्डो सूचना वितरण पद्धति विकसित करने के उद्देश्य से मात्र लिंग विभक्त सांख्यिकीय ही नहीं बल्कि कृषि एवं संबद्ध क्षेत्र के लिंगीय शोध पर सूचनाओं को सम्मिलित कर परियोजना क्षेत्र बढ़ाया गया।

खेतीहर महिलाओं के सशक्तिकरण के लिए प्रौद्योगिक मामलों में : (१) प्रक्षेत्र एवं शाकीय फसलों में कीट, (२) कुपोषण, (३) अच्छी गुणवत्ता वाले बीज एवं पौध की अनुपलब्धता, (४) धान फसल का गिरना, (५) धान में खरपतवारों से हानि, (६) सब्जी एवं फलोत्पादन तथा प्रसंस्करण व मूल्यवर्द्धन के ज्ञान का कम स्तर, (७) पशुओं की अच्छी नस्लों की कमी, (८) उसना धान विधि में उबाऊपन, (९) कृषि आधारित उद्यमों जैसे खुम्ब उत्पादन में ज्ञान की कमी, (१०) जलाऊ इंधन की कमी व (११) चरागाह भूमि की कमी, मुख्य पाये गये। तदनुसार प्रौद्योगिक कार्यक्रमों को चयनित करके उन्हें परख एवं शोधन, प्रदर्शन तथा प्रशिक्षण द्वारा कार्यान्वित किया गया।

केले की रोबस्टा व जी - 9 तथा पपीते की पूसा डवार्फ व फार्म सेलेक्शन किस्में कम ऊँचाई, प्रबन्धन में आसानी, शीघ्र फलन तथा उच्च उत्पादन के कारण महिलाओं द्वारा पसन्द की गईं। केले की बन्धल तथा पपीते की पी.वाई.-06-11 किस्म को छोड़कर अन्य किस्में सब्जी बनाने के लिए उपयुक्त पायी गईं। केले में कीट नियंत्रण के लिए कर्पूर की गोलियाँ तथा एरण्ड की खली के प्रपंच महिला हितैषी तकनीक के रूप में प्रयोग किये गये। पपीते की बंकिम, रांची तथा पूसा डवार्फ किस्मों के फलों को पोलीथीन की थैलियों में रखने से भण्डारण अवधि 12 दिन तथा बिना थैली के 9 दिन पायी गईं।

कर्पूर की गोलियाँ लटकाना, नीम की खली तथा आक के पत्तों का चूर्ण मिलाना, पंचगव्य का छिड़काव, तम्बाकू का पानी, नुक्स वॉम तथा राख बुरकना बैंगन डण्ठल तथा फल छेदक द्वारा नुकसान कम करने में प्रभावी पाए गए। ये उपचार आसानी से उपलब्धता, इस्तेमाल में साधारण तथा पर्यावरण हितैषी होने के कारण महिला हितैषी पाए गए।

कृषि के 20 कार्यों में से महिलाओं की सर्वाधिक भागीदारी अन्तरालिक कृषि क्रियाओं (93.9%) में पायी गयी तथा कटाई (93.2%), मूँगफली छीलने (90.2%), सफाई व श्रेणीकरण, खेत तैयार करना (80.3%), गहाई (66.3%), मेढ़ व नाली बनाना (58%) तथा गहाई उपरान्त अन्न का घर ले जाना (54.5%) कमशः तदोपरान्त पाये गए।

उड़ीसा के कटक तथा नयागढ़ जिलों के चार गाँवों की खेतीहर मजदूर महिलाओं के उद्यम विकास हेतु समस्याओं तथा प्रशिक्षण जरूरतों का मूल्यांकन किया गया। कुक्कुट पालन, खुम्ब उत्पादन, चावल प्रसंस्करण, सौर ऊर्जा द्वारा सुखाना व मधुमक्खी पालन उद्यम सूचीबद्ध किये गये।

पिपिली तथा साखीगोपाल गाँवों में पिछले चार वर्षों से विद्यमान लेकिन निष्क्रिय महिला स्वयं सहायता समूहों को खुम्ब उत्पादन एवं कृषि प्रसंस्करण द्वारा सशक्त बनाया गया।

उपग्रामीण स्तरीय विस्तार कर्मियों के माध्यम से सिंचित तथा बारानी स्थिति के अन्तर्गत चार चयनित गाँवों में कृषि में लैंगिक मामलों तथा विस्तार सेवाओं में अन्तरो की पहचान की गयी। दोनों ही स्थितिओं में, विशेषकर अनुसूचित जाति व अनुसूचित जनजाति तथा गरीब महिलाओं का विस्तार स्तर ज्यादा पाया गया। यह भी पाया गया की उपग्रामीण स्तरीय कर्मी महिला स्वयं सहायता समूहों को कृषि उत्पादों के विभिन्न प्रकारों को मजबूत करने में सम्मिलित थे।

गृह विज्ञान

चावल उत्पादन क्रियाओं में यान्त्रिकीकरण द्वारा महिलाओं के लिए नये अतिरिक्त क्षेत्रों का पता चला जिससे लैंगिक भूमिका को पुनर्संरचना करने में मदद मिली। यान्त्रिकीकरण ने महिलाओं को पर्यवेक्षी / प्रबन्ध सम्बन्धी भूमिकाएं लेने के लिए प्रेरित किया। परियोजना क्षेत्र में लगभग 20 प्रतिशत महिलाएं पुरुषों की अनुपस्थिति में मशीनों को किराये पर लेने की प्रथा द्वारा कार्य का प्रबन्ध करती पायी गयीं।

जैव प्रौद्योगिकी विभाग द्वारा प्रायोजित समन्वित मत्स्य पालन द्वारा ग्रामीण महिलाओं का आर्थिक उत्थान परियोजना पूरी तथा कटक जिलों के 8 गाँवों में शुरू की गई। कुल 29 तालाबों जिनका प्रक्षेत्र 4.39 हैक्टेयर था तथा 170 महिलाओं को लक्ष्य बनाकर सम्मिलित किया गया। आधारभूत सर्वेक्षण के पूरा करने के उपरान्त मत्स्य पालन प्रौद्योगिकियाँ जैसे कार्प उत्पादन, वैज्ञानिक विधि से मत्स्य पालन तथा समन्वित मत्स्य पालन सफलता पूर्वक दर्शाए गए। मत्स्य पालन के विभिन्न पहलुओं पर कुल 13 कृषक प्रशिक्षण कार्यक्रम आयोजित किए गये।

गृह विज्ञान पर अखिल भारतीय समन्वित अनुसंधान परियोजना में गृह विज्ञान के पाँचों घटकों जैसे खाद्य एवं पोषण, कपड़ा एवं वस्त्र सम्बन्धी, परिवार संसाधन प्रबन्धन, मानव विकास एवं गृह विज्ञान विस्तार शिक्षा ग्रामीण परिवारों के परिवार जीवन में गुणवत्ता बदलाव लाने के लिए छोटे व बड़े स्तर पर शामिल किया गया है। इस अन्तर्विषयक परियोजना का मुख्य बिन्दु कृषि का परिवार - उद्यम के रूप में स्थापित करना है जिसके द्वारा विभिन्न कृषि स्थितियों में ग्रामीण महिलाओं को कई गतिविधियों में काफी समय तक काम में लगाया जा सके। समन्वित परियोजना की विभिन्न गतिविधियों को कार्यशालाओं तथा बैठक के माध्यम से पहचान कर अन्तिम रूप दिया गया।

केन्द्र ने नुमाइशों, राज्य स्तरीय कृषि मेलों, फोरम इत्यादि में भाग लिया। इस अवधि के दौरान कृषि महिला दिवस, अन्तर्राष्ट्रीय महिला दिवस, हिन्दी चेतना दिवस मनाए गए। संस्थान प्रबन्धन समिति, संस्थान अनुसंधान परिषद, अनुसंधान सलाहकार समिति की बैठकों का आयोजन किया गया। केन्द्र के वैज्ञानिकों ने अपनाए गए गाँवों में कृषि के विभिन्न पहलुओं द्वारा महिलाओं को लाभान्वित किया। कृषि तथा संबद्ध क्षेत्रों में लैंगिक भागीदारी तथा लैंगिक मुख्यधारा के लिए जागरूकता पैदा करने के लिए विभिन्न प्रदेशों से आए किसान भाईयों एवं महिलाओं को बैठकों, प्रदर्शनों, नुमाइशों तथा कार्यशालाओं के द्वारा केन्द्र की गतिविधियों की जानकारी दी गई। कृषि में महिलाओं पर राष्ट्रीय अनुसंधान केन्द्र परिसर के लिए प्रक्षेत्र विकास व प्रबन्धन योजना तैयार की गयी तथा लैंगिक परिपेक्ष में फसल माडल के प्रदर्शन व मूल्यांकन के लिए विभिन्न फसलों को लगाया गया।

\* \* \*

## EXECUTIVE SUMMERY

In tune with the mandated objectives of NRCWA, 11 institutional projects were undertaken during the year. The projects dealt with various gender related researchable issues in agriculture and allied sectors. The All India Coordinated Research Project on Home Science located at 9 State Agricultural Universities was merged with NRCWA.

Gender disaggregated data collected based on a sample survey of rice-growing households in Orissa revealed that an estimated 35.75 per cent of women were actively involved in agriculture and allied activities. Scope of the project was widened with an objective of developing a single window gender knowledge delivery system by incorporating information not only on the gender disaggregated statistics but also the gender studies in agriculture and allied sectors.

The technological issues involved in empowerment of farm women included (i) insects and pests in field and vegetable crops, (ii) malnutrition, (iii) non availability of good quality seed and seedlings, (iv) lodging of rice crop, (v) damage due to weeds in rice, (vi) low level of knowledge on vegetable and fruit cultivation, preservation and value addition, (vii) lack of improved cattle breed, (viii) drudgery in parboiling rice, (ix) inadequate knowledge of farm based enterprises such as mushroom cultivation, (x) scarcity of fuel wood, and (xi) inadequate grazing land. Accordingly, the technological interventions were selected and undertaken for technology testing and refinement, demonstrations and trainings.

Banana varieties Robusta and G-9 and papaya varieties Pusa Dwarf and Farm Selection were preferred by woman due to short height, convenience in handling, earliness and higher yields. Banthal variety of banana and all varieties of papaya except Py-06-11 were suitable for vegetable purpose. Camphor balls and castor cake trap were used as women friendly techniques to control insect-pests in banana. Fruits of Bankim, Ranchi and Pusa Dwarf packed in polyethylene bags reported a shelf life of 12 days as compared to 9 days in unpacked papaya fruits.

Hanging of camphor, application of Neem cake and calotropis leaf powder, spraying of Panchgavya, tobacco soaked water, Nux Vom and ash dusting were found effective to minimise damage from brinjal shoot and fruit borer. These treatments were found women-friendly due to easy accessibility, simplicity in handling and eco-friendly.

Among twenty farm operations, women involvement was found highest in interculture (93.9%) followed by harvesting (93.2%), groundnut decortication (90.2%), cleaning and grading (86%), preparatory work for seed bed (80.3%), threshing (66.3%), ridge and furrow making (58%) and grain carrying after threshing (54.5%). Most of the farm operations were carried out by farmwomen using only the traditional tools.

Problems and training needs of Women Agricultural Labourers (WALs) for enterprise development were assessed in four villages in Cuttack and Nayagarh districts of Orissa. The enterprises short listed included, poultry rearing, mushroom cultivation, rice processing, solar drying and bee keeping.

Women SHGs though existed in villages of Pipili and Sakhigopal for the past four years but were found not carrying income generating activities. These SHGs were empowered by providing training in mushroom cultivation and agro processing.

NRCWA

An extension model was implemented in four selected villages under irrigated and rain fed situations to test its gender responsiveness. Capacity building of Village Para Extension Workers (VPEWs), identification important gender issues in farming and extension through participatory approach and reaching the farm women were important activities undertaken. Mid- term evaluation indicated that in both the situations the level of extension contact with farm women particularly SC, ST and poor women had improved over the pre-project status. It was also found that the VPEWs were more involved in strengthening the women SHGs through various types of farm production. SHGs through crop, horticulture, seed and livestock production.

Mechanization of rice farming operations created additional space for women in new areas and led to restructuring of gender roles. Mechanization has motivated women to take up some kind of supervisory /managerial role. About 20 per cent of women in the project area were found managing the work through custom hiring of machines in the absence of male members,

A project sponsored by Department of Biotechnology on Economic upliftment of rural women through integrated fish farming was launched in 8 villages of Puri and Cuttack districts. A total of 29 ponds with water area of 4.39ha were targeted involving 170 women. Base line survey was completed and aquaculture technologies like carp fry production, scientific fish culture and integrated fish farming were successfully demonstrated. Thirteen training programmes for farmers were conducted on different aspects of aquaculture.

In the All India Coordinated Research Project on Home Science all the five components of Home Science (i) Food and Nutrition, (ii) Clothing and Textile, (iii) Family Resource Management, (iv) Human Development and (v) Home Science Extension Education within the micro and macro ecosystem to bring about qualitative changes in family life of rural households, have been included. The focus of this interdisciplinary project has been on agriculture as family enterprise that engages rural women in varying activities with more work hours in different agro-climatic conditions. The various activities of the coordinating centres were identified and finalized through workshops and meetings. Pilot studies on resource base, traditional knowledge and participation of farm women in livestock production were also undertaken.

The scientists of the Centre conducted various demonstrations on different aspects of agriculture for the benefit of farm women. The activities of the Centre were explained to the farmers and farm women of various states through meetings, demonstrations, exhibitions and workshops, for creating awareness on gender participation and gender mainstreaming in agriculture and allied sectors. A farm development and management plan was prepared for NRCWA campus and planting of various crops was carried out for demonstration and evaluation of cropping models in gender perspective. The Women in Agriculture Day, International Women's Day, and Hindi *Chetna Diwas* were observed during this period. The meetings of Institute Management Committee, Institute Research Council and Research Advisory Committee were conducted.



# 1. THE CENTRE

## 1.1 BRIEF HISTORY

The Working Group on 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). 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.

## 1.2 MANDATE

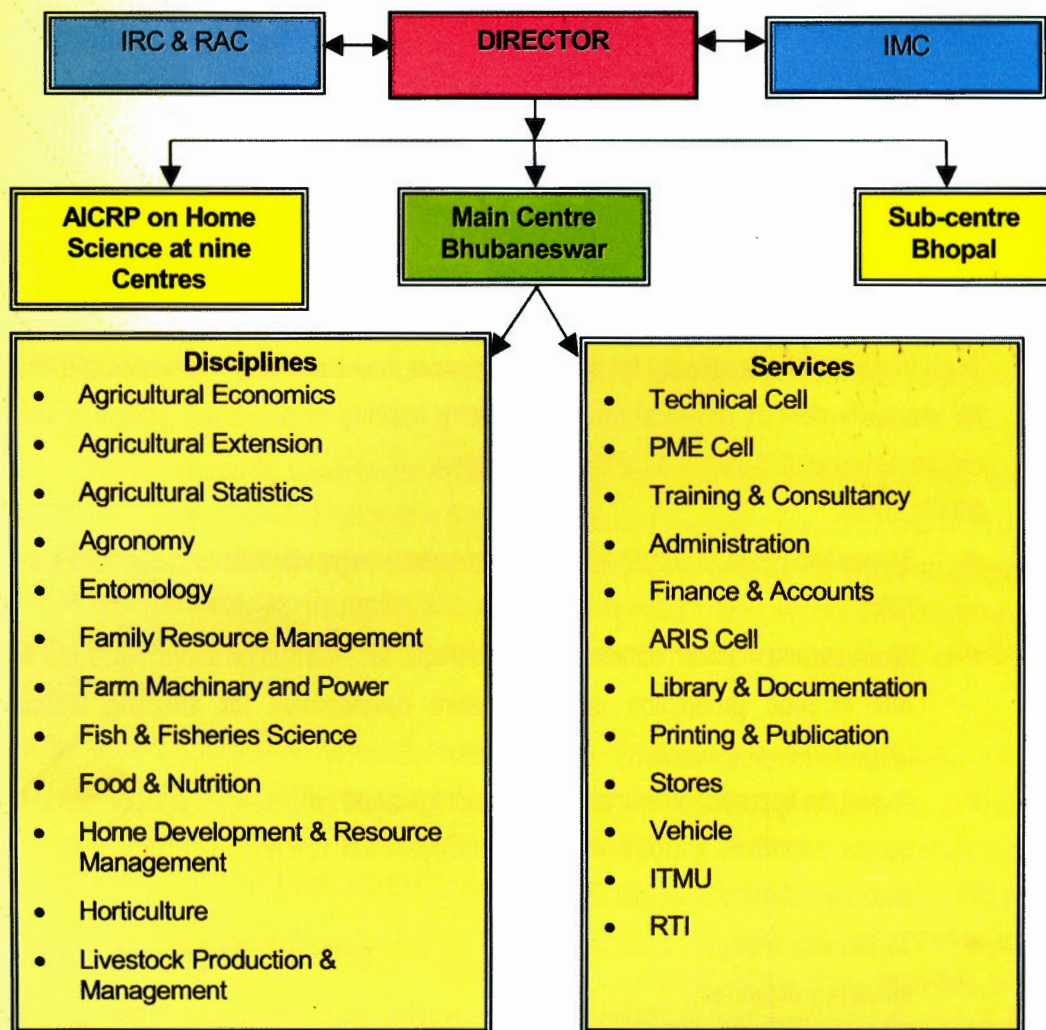
- Carrying out basic, strategic and applied research to identify gender issues and test appropriateness of available farm-technologies/ programmes/policies with women perspective. To do training and consultancy for promoting gender mainstreaming in research and extension for empowerment of farmwomen and capacity building of scientists, planners and policy makers to respond to the needs of the farm women.

## 1.3 OBJECTIVES

- To conduct basic, strategic and applied research on gender issues in agriculture and allied fields.
- To create and maintain database on gender specific information about men's and women's role in food production and agriculture development for effecting technologies, programmes and policies.
- To test the appropriateness of farm technologies and programmes and policies in terms of gender sensitivity in collaboration with relevant national and international organizations and suggest suitable modifications.
- To develop drudgery reducing options for decreasing the workload and increasing the efficiency of women.
- To develop gender sensitive modules and methodologies for transfer of technology.
- To develop gender sensitive training modules and materials and impart trainings, seminars and workshops for capacity building of scientists, researchers, planners and policy makers for gender mainstreaming and practical application of gender related technologies.
- To develop and publish gender sensitive materials, create network linkage through journals and information sharing.
- To develop system of managing and sharing gender related knowledge to support institutions and government in their efforts to mainstream gender in policy and programmes; and
- To develop effective evaluation and monitoring arrangements for gender mainstreaming.

NRCWA

### 1.4 ORGANOGRAM OF NRCWA



NRCWA

## Budget and Expenditure (Main and Sub-centre)

(Rs In lakh)

Sl. No.	Head of Account	Budget		R.E.		Expenditure	
		Non-Plan	Plan	Non-plan	Plan	Non-plan	Plan
<b>A. Recurring</b>							
1.	Establishment charges including LSP and PF contractual charges	73.85	-	95.00	-	93.00	-
2.	OTA	0.05	-	-	-	-	-
3.	Traveling Allowances	0.10	6.50	1.00	6.50	1.00	6.50
4.	HRD	-	2.00	-	2.00	-	2.00
5.	Contingency	10.00	59.00	9.85	45.00	9.85	45.00
	<b>Total</b>	<b>84.00</b>	<b>67.50</b>	<b>105.85</b>	<b>53.50</b>	<b>103.85</b>	<b>53.50</b>
<b>B. Non-recurring</b>							
1.	Equipments	-	-	-	-	-	-
2.	Works	1.00	-	1.15	-	1.15	-
3.	Vehicle	-	-	-	-	-	-
4.	Library	-	7.00	-	7.00	-	7.00
5.	Furniture/ Livestock	-	-	-	-	-	-
	<b>Total</b>	<b>1.00</b>	<b>7.00</b>	<b>1.15</b>	<b>7.00</b>	<b>1.15</b>	<b>7.00</b>
	<b>Total (A+B)</b>	<b>85.00</b>	<b>74.50</b>	<b>107.00</b>	<b>60.50</b>	<b>105.00</b>	<b>60.50</b>

### 1.6 Manpower (Main and Sub-centre)

Category	Sanctioned	Filled	Vacant
Scientific	17	15	02
Technical	07	07	0
Administrative	08	06	02
Supporting	01	01	-
<b>Total</b>	<b>33</b>	<b>29</b>	<b>4</b>

NREGSA

## 1.7 Scientific Staff (Main and Sub-centre)

Sl. No.	Discipline	Sanctioned Strength			In position as on 31.3.2008		
		Scientist	Senior Scientist	Principal Scientist	Scientist	Senior Scientist	Principal Scientist
1	DIRECTOR	RMP (1)			RMP (1)		
Scientific							
2	Agricultural Economics	1	-	-	1	-	-
3.	Agricultural Extension	-	1	1	-	1	1
4.	Agricultural statistics	-	1	-	-	-	-
5.	Agronomy	-	-	1	-	-	1
6.	Entomology	-	1	-	-	1	-
7.	Family Resource Management	-	1	-	-	-	-
8.	Farm Machinery and Power	-	1	-	-	1	-
9.	Fish Processing Technology	-	1	-	-	1	-
10.	Food and Nutrition	1	-	-	1	-	-
11.	Human Development and Resource Management	-	-	1	-	-	1
12.	Horticulture	2	1	1	2	1	1
13.	Livestock Production and Management	-	-	1	-	-	1
	<b>Total</b>	<b>4</b>	<b>7</b>	<b>5</b>	<b>4</b>	<b>5</b>	<b>5</b>

**1.8 Technical Staff**

Designation	Sanctioned Post	In position as on 31.3.2008
Technical Assistant (T-3)	5	5
Technical Assistant (T-4)	1	1
Technical Officer (T-5)	1	1

**1.9 Administrative Staff including Supporting**

Designation	Sanctioned post	In position as on 31.3.2008
Asst. Administrative Officer	1	1
Asst. Finance and Accounts Officer	1	1
Personal Assistant	1	1
Senior Clerk	2	2
Stenographer, Gr-III	2	1
Junior Clerk	1	0
S.S.G.1	1	1
<b>Total</b>	<b>9</b>	<b>7</b>

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## 2. RESEARCH ACCOMPLISHMENTS

### 2.1 CREATING A REPOSITORY OF GENDER DISAGGREGATED DATA AND DOCUMENTATION

#### Database on Gender in Agriculture

*H.K. Dash, P.K. Sahoo and B.L. Attri*

In order to create a gender disaggregated database, data were collected based on a sample survey of 200 rice-growing households in Orissa. The survey revealed that an estimated 35.75 per cent of women were actively involved in agriculture and allied activities. In scheduled caste community, 62 per cent women, and in non-scheduled caste communities, 16.5 per cent women were found engaged in on-farm activities. Gender participation was equal in vegetable farming where men and women respectively contributed 52 per cent and 48 per cent of labour. Women contributed up to 62 per cent of per-acre labour requirement. During a year, a working woman was engaged, on an average, for 138 days in crop-related activities including post harvest management as against only 98 days in case of a man in irrigated situation.

Estimated proportion of households owning livestock was highest in non-irrigated situation and lowest in rice-vegetable farming. About 60 per cent of households were estimated to own livestock. About 7.2 per cent women were found actively involved in dairy farming as a major source of income. Women spent about 6.4 hours for household activities and the burden of household activities fell heavily either on married women (young and middle aged) or on unmarried young girls.

### 2.2. TECHNOLOGY TESTING AND REFINEMENT

#### Technological Empowerment of Farmwomen for Family Sustenance

*M.P.S. Arya, S.K. Srivatsva, B.L. Attri, Sabita Mishra, Naresh Babu, L.P. Sahoo and Abha Singh*

#### Study area

The study was taken up in two villages namely Mendhasal and Italanga and PRA was conducted to assess the participation of women in agricultural operations and their knowledge about food and nutrition. The issues related to crop production as perceived by the farm women were prioritized. Accordingly, the technological interventions were selected and undertaken for technology testing and refinement, demonstrations and on and off campus trainings.

#### Issues perceived as important by the farm women

The important issues identified included: (i) insects and pests in field and vegetable crops, (ii) malnutrition, (iii) lack of good quality planting materials, (iv) lodging of rice crop, (v) damage due to weeds in rice, (vi) lack of knowledge of preservation and value addition of the products, (vii) lack of improved cattle breed, (viii) drudgery in parboiling of rice, (ix) lack of knowledge of farm based enterprises like mushroom cultivation, (x) lack of fuel wood, (xi) lack of grazing land, and (xii) lack of knowledge on vegetable and fruit cultivation and the following interventions were implemented

### Evaluation of rice varieties

Three varieties of rice (Uphar, Ghanteswari and Sidhant) were evaluated for yield and quality by women of Mendhasal and Italanga villages. The matrix scoring revealed that rice variety Sidhant was found to be better than other two varieties. A farm women Smt Mamata Samal of Mendhasal village grew early maturing Ghanteswari variety of rice on an area of 150 m<sup>2</sup> with 88 kg harvest during Kharif 2007. The entire produce was used as seed during Rabi 2007. She harvested 1800 kg and sold paddy @Rs. 750 per quintal. The variety was found profitable with good cooking quality.

<b>Table 1: Farmers' score of yield attributes and quality parameters (10 point scale)</b>			
<b>Parameters</b>	<b>Varieties</b>		
	<b>Uphar</b>	<b>Sidhant</b>	<b>Ghanteswari</b>
<b>Yield related</b>			
Yield (1:10 Seed Multiplication Index = 1 point & 1:100 SMI = 10 points)	3.13	5.18	5.66
Resistance to insect and pests (Susceptible to most of the insects & pests = 1 point Highly resistant to most of the insect, pests = 10 points)	6.25	7.50	7.50
Resistance to diseases (Susceptible to most of the insects & pests = 1 point Highly resistant to most of the insect, pests = 10 points)	4.75	7.88	5.00
Plant height (tall: 7-5 points, medium: 7-10, short: 5-1)	6.75	7.00	7.00
Response to fertilizers (high: 7-10, medium: 5-7, low: 1-5)	6.75	5.75	6.50
<b>Quality related</b>			
Grain type (long: 7-10, medium: 5-7, short: 1-5)	5.75	5.50	5.00
Expansion ratio on cooking (high: 7-10, medium: 5-7, low: 1-5)	5.50	5.75	5.50
Fragrance (good: 7-10, normal: 5-7, poor: 1-5)	5.75	6.50	5.50
Time taken in cooking (less: 7-10, medium: 5-7, more: 1-5)	6.00	6.25	5.50
Time taken in parboiling (less: 7-10, average: 5-7, more: 1-5)	5.75	5.75	5.50
Colour of grains after parboiling (good: 7-10, fair: 5-7, dull: 1-5)	6.50	6.00	5.50
Market demand (high: 7-10, medium: 5-7, low: 1-5)	6.50	5.75	6.50
<b>Total</b>	<b>69.38</b>	<b>74.81</b>	<b>70.66</b>

MAMATA

### Evaluation of vegetables

Different varieties of tomato, radish, french bean, okra, palak and amaranths were evaluated by 12 farm women. The tomato variety BT-2 was preferred for its heavy fruiting, small size of fruits, mild acidic taste and uniform colour.

Table 2: Farm Women's perception towards characteristics in tomato varieties

Parameters	Varieties		
	B.T.-2	B.T.-10	Local
Yield	High	Medium	Less
Size of fruit	Medium	Large	Small
Duration of crop	Normal	Normal	Long
Suitable to soil type	Good	Good	Good
Resistance to insect and pest	Resistant	Medium resistant	Susceptible
Resistance to diseases	Resistant	Medium resistant	Susceptible
Plant height	Medium	Tall and spreading	Medium
Market demand	High	Medium	Medium



Family women tending kitchen garden

### IPM in brinjal and tomato

Two IPM modules were assessed in participatory mode with women in on brinjal variety-Green Star and on tomato variety Kumari (BT-10). The modules consisted of (i) fencing with bamboo stick and pheromone trap alone (change of lure monthly)\* + control measures practiced by farm women (Super killer Cypermethrin @ 25 ml/ 12 litre of water and alternatively Chlorpyrifos @ 30 ml / 12 litre of water, with the help of Bucket and *Chhinchra* (a type of Broom made from paddy straw) and (ii) fencing with



bamboo stick and pheromone trap\* + ash dusting (weekly in morning) + local control measures. Ten participatory demonstration modules with pheromone trap, light trap, Imidacloprid, Neem oil and *Trichogramma chilonis* were conducted in Brinjal with gender participation. Seedlings of Green Star grown at the nursery of NRCWA were provided to the farmwomen. Prior to demonstration 20 selected farmwomen were trained for nursery raising of vegetables and different eco-friendly pest management technologies. Pheromone trap with pheromone lure, light trap (plastic body torch having fluorescent light), Imidacloprid and Neem oil and necessary guidance were given to the farmwomen of Mendhasal village to control the insect pests in the crops. *Trichogramma chilonis* (Tricho card) was provided to the farmwomen as and when required. RPW Trap was also tested in Italanga village for the control of coconut red palm weevil with gender participation.



Women practicing IPM in Mendhasal village

#### On campus testing and refinement of technology

Crop diversification and inter cropping are the old age practices that could provide balanced food. In order to refine these practices, trials were undertaken on the research farm of NRCWA with the aim of (i) increase pulses and oil seeds availability at household level for family use by incorporating pulses and oil seed in cropping systems and (ii) efficient utilization of natural resources for increasing productivity level.

A study based on rice (variety Ghanteswari), black gram (variety PDU1) and maize (variety N51) was carried out to provide balanced food and income for family sustenance. To increase the productivity, these crops were tested in intercropping system designed with three crop canopies in the shape of U, V and N so as to trap maximum sunlight for getting highest yield along with a control (sole crop). The U shape canopy consisted of one row of maize + two rows of rice + two rows of black gram + two rows of rice + one row maize; V shape consisted one row of maize + one row of rice + one row of black gram + one row of rice + one row maize and N shape consisted of one row of maize + two rows of rice + two rows of black gram + one row maize.

NRCWA



Intercropping maize + rice + black gram forming V shape canopy

Sowing was done at 30 cm spacing for all the three crops excepting maize at 60 cm. The study was conducted following RBD with four replications. The maize - equivalent was calculated using minimum support prices (i.e. rice- Rs. 675/-, black gram- Rs. 1700/- and maize- Rs. 620/- per quintal) and it was found that among all the treatments, the sole maize recorded the highest grain yield (4023.61 kg/ha) but the estimated maize equivalent was found highest (4492.30 kg/ha) under V shape canopy. Similarly, the highest yields and income of all the crops in individual of the system were also recorded under V shape intercropping canopy.

Table 3 : Yield, yield equivalent and income from intercropping system under different crop canopies

Canopy	Yield kg/ha				Income (Rs/ha)
	Rice	Maize	Black gram	Maize equivalent	
U Shape	444.79	1825.00	178.13	2797.54	17345
V Shape	498.95	3110.41	306.25	4492.30	27852
N Shape	337.50	2615.28	148.61	3391.53	21028
Pure Maize	-	4023.61	-	4024.00	24949
Pure rice	1162.50	-	-	1266.17	7850
Pure Black gram	-	-	655.56	1798.71	11152

### Evaluation of moisture use efficient cropping systems for family needs under rainfed upland conditions

A study based on a combination of rice (variety Ghanteswari), maize (variety N51), black gram (variety PDU1), sunflower (variety N303) and toria (variety Anuradha) was taken up with a view to fulfilling the basic needs of cereals, pulses and oil seeds of households while efficiently using the available moisture. The crops of rice and maize which have high moisture requirement were taken in furrows, while sunflower (both in Kharif and Rabi) and mustard (in Rabi), the drought tolerant crops, were planted in the middle of the ridge and black gram on the border of the ridge. The planting was done in broad based ridge and furrow method aiming to harvest rain water from ridges to supplement moisture in furrows. The crops on the ridge were aimed to grow on residual moisture. The intercropping treatments were also subjected to the application of plant resin to reduce transpiration and lime to reflect solar heat which otherwise could increase with the use of anti-transpirant resin.



Intercropping maize (in furrow) + sunflower & black gram (over ridge)



Intercropping rice (in furrow) + sunflower & black gram (over ridge)

### Integrated approach in weed management in rainfed varieties of rice

A field trial to find out integrated weed management practice to reduce weed population and workload of women in farming sector and thereby reducing health hazard of the working women due to squat posture while manual weeding, was conducted with seven integrated weed control treatments- (T1) Burning + Vermi compost @ 5 tonnes/ha, (T2) Burning + FYM @ 5 tonnes/ ha, (T3) Deep ploughing + Vermi compost @ 5 tonnes/ ha, (T4), Traditional cultivation + Vermi compost, (T5) T4 + Butachlor @ 2 kg a.i./ ha, (T6) Soil application of Butachlor 2kg a.i./ ha and (T7) Soil application of Butachlor 3kg a.i./ ha.

NREGS/A

Table 4 : Yield of rice varieties under different weed management practices

Treatment	Yield (kg/ha)			
	Ghanteswari	Sidhanta	Upahar	Average
Burning + Vermi compost @ 5 t/ha (T1)	861.11	1350.00	2223.33	1478.15
Burning + FYM @ 5 t/ha (T2)	467.78	1241.11	2713.33	1474.07
Deep ploughing + Vermi compost @ 5 t/ha (T3)	585.55	1438.89	1856.67	1293.70
Traditional cultivation + Vermi compost (T4)	237.78	1306.67	2587.78	1377.41
T4 + Butachlor @ 2 kg/ha (T5)	331.11	2105.56	2010.00	1482.22
Soil application of butachlor @ 2kg/ha (T6)	537.78	1006.67	2430.00	1324.82
Soil application of butachlor @ 3kg/ha (T7)	916.67	1598.89	2222.22	1579.26
Average	562.54	1435.40	2291.90	

These treatments were tested for three varieties of rice of short (Ghanteswari), medium (Sidhant) and long (Upahar) duration. The trial was conducted in factorial RBD with three replications. It was found that the variety Upahar performed consistently superior over the rest of the two varieties.

#### Evaluation of indigenous aromatic rice strains for women's preference

A field trial was conducted to study the perception of farm women about selection of rice varieties for aroma, taste and yield potential. Eighteen varieties were evaluated following RBD with three replications for their yield potential.

Table 5 : Performance of aromatic rice strains

Variety Name	Yield kg/ha	Variety Name	Yield kg/ha
Acharamati	1964.44	Lajakulibadan	917.78
Badasabhoga	1087.78	Nanu	1846.67
Dhanaprasad	533.33	Neelabati	2282.22
Gangabali	371.11	ORS199-5	2166.67
Heerakani	1043.33	Pimpudibasa	1344.44
Jaiphula	3041.11	Sujata	1528.89
Kalajeera	2420.00	Thakurabhoga	2161.11
Kalikati	1120.00	Thakurasuna	1666.67
Khosakani	2377.78	Vasumati	1474.44

Highest grain yield (3041.11 kg/ha) was recorded in Jaiphula variety followed by Kalajeera (2420 kg/ha), Khosakani (2377.78 kg/ha), Neelabati (2282.22 kg/ha), ORS 199-5 (2166.67 kg/ha) and Thakurabhoga (2161.11 kg/ha).

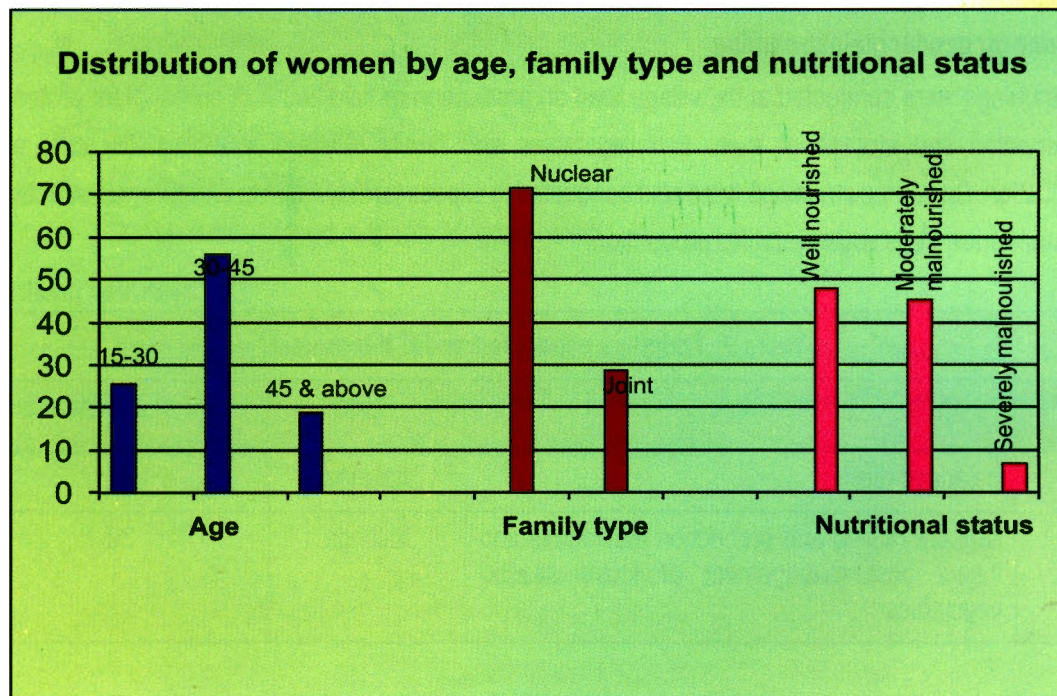
#### Assessment of nutritional status of rural women in coastal Orissa

The data were collected on age, anthropometric measurements and dietary pattern. Nutritional status of farmwomen was assessed through Quelet's index using the formula (Naidu 1991). Among 150 farmwomen majority (56%) belonged to the age group of 30-45 years. Women in the age group of 45 and above were found in least (18.7%) number. Out of the total, 71.3 per cent belonged to nuclear family while, 28.7 per cent to joint family structure.

$$\text{Quelet's Index (Body Mass Index)} = \frac{\text{Wight (kg)}}{\text{Height (m}^2\text{)}}$$

Anthropometric measurements (weight and height) of farmwomen based on data collected from 150 women revealed that there was a considerable variation in weight even among the well-nourished women of the same age group. Relationship between weight and height was found to be a reliable source for detecting under and over nutrition. Therefore, nutritional status of women as defined by their Body Mass Index (BMI, Kg/ M<sup>2</sup>) was calculated and classified into three groups i.e., well nourished, moderately malnourished and severely malnourished. Results indicated that about 50 per cent farm women had poor nutrition and about seven per cent women had BMI less than 17.0, implying that they had chronic nutritional deficiency.

The diet pattern revealed that energy intake was satisfactory for 84% farmwomen, however, protein intake was only in the range of 20-35 g/ day. The energy, fat and protein values of the diets were calculated.





Women sharing information with scientists in Italanga village

**Table 6: Mean intake of energy, protein and fat of farmwomen**

Nutrientant	RDA	Intake
Energy	2450 kcal	2150 kcal
Protein	50 g	29 g
Fat	15 g	9 g

#### Training for gender mainstreaming

The trainings were conducted at the village level on production of field and fruit crops, plant protection, preservation and storage of fruits and vegetables and family nutrition including low cost water purification. On campus trainings were also conducted to expose farm women to entrepreneurial activities on mushroom, fruits and vegetables production.

**Table 7: Trainings conducted under the project**

Sl. No.	Topic	Place	No. of participants
1.	Balanced diet	Italanga	60
2.	Nursery raising and production techniques and insect pest management of kharif season vegetables	Italanga	30

3.	Production and insect pest management of vegetable nursery and Vermi composting	Mendhasal	39
4.	Home scale Purification of water	Mendhasal	32
5.	Eco-friendly pest management Technologies and Vermi composting	Mendhasal	30
6.	Low cost storage structures for fruits and vegetables	Mendhasal	30
7.	Home scale Purification of water	Italanga	30
8.	Low cost storage structures for fruits and vegetables	Italanga	30
9.	Value addition of fruits and vegetables (lime squash, lime-ginger squash, lime pickle & mixed fruit jam)	Italanga	30
10.	Training-cum-demonstration of oyster mushroom cultivation	Mendhasal	20
11.	Nursery raising and production techniques of kharif season vegetables	Italanga	30
12.	Production technology of winter season vegetables	Mendhasal	30

#### Awareness building through farm literature

Posters in local language (Oriya) on the following were prepared and provided at common points in each of the two adopted villages namely Mendhasal and Italanga.

- Rice cultivation,
- Vegetable cultivation,
- Zero-energy cool chamber,
- Mushroom cultivation and
- Conservation of food nutrients for good health.

#### Organising field days

Scientists- Farmwomen Workshop was held in village Italanga in which ninety farmwomen and twelve scientists including officers of Orissa State Department of Agriculture participated. Discussions were held on various interventions pertaining to gender issues in crop production.

NREGSA

## Standardisation of Gender Specific Technologies in Banana and Papaya

*Naresh Babu, B.L. Attri and S.K. Srivastava*

### **Banana**

Banana (*Musa paradisiaca* L.) is an important fruit crop having religious and economic value as its whole plant is utilised for worship, culinary and ripened fruits for table purpose. It is also a good source of carbohydrate, vitamins and minerals. Banana is gaining popularity in kitchen gardens because of its high returns. In kitchen gardens women maintain local variety with traditional methods of cultivation where, production is very low. Therefore, a study was conducted to find out the cultivar suitable for backyard cultivation. Five varieties of banana viz. Robusta, G-9, Pathakapura, Banthal and Karpuravalli (propagated by tissue culture and suckers) were tested and results showed that tissue cultured and sucker Robusta banana had minimum plant height (157.40 and 179.13cm), plant circumference and early in crop duration suitable for backyard cultivation. Being dwarf and less spreading type it gets easily accommodated in homestead garden without hindrance to sufficient light and creating a barrier for other harmful insects. Moreover, due to earliness in harvesting the women may get higher returns in the market. Maximum suckers/ plant, weight of fruit and yield were observed in G-9. The women also can multiply planting materials and earn additional income by selling it.

### ***Effect of nutrient application on distal end of banana bunch***

A trial was conducted to find out the effect of ammonium sulphate and sulphate of potash blended with fresh cow dung on growth and yield of banana. It was observed that ammonium sulphate (5g) and sulphate of potash (10 g) blended with 500 g of fresh cow dung tied to distal end enhanced yield as well as earliness in Robusta and G-9. This technique was found cost effective and suitable for farm women.

### ***Value addition***

The women used flowers of Banthal variety for vegetable purpose. The cooked flower as a vegetable is very palatable and preferred by them. However, flowers of rest of tested varieties were not suitable for vegetable due to bitterness in taste. Women may include this variety in their production system for income generation and for vegetable purpose.

### ***Shelf life***

Fruits of Robusta stored in polyethylene bag turned black earlier (3 days) as compared to open conditions (6 days). Fruits of G-9 banana turned black early (5 days) in open conditions while fruits became black later (8 days) in polythene bags. In case of Banthal, fruits became yellow and black early in open conditions while fingers turned yellow later (12 days) in polyethylene bags. Fruits of Pathkapura became yellow with white spots in open conditions but no infection was found in those stored in polyethylene bags. It was noticed that banana fruits started drying and turning black early in open conditions but remained fresh and in good condition in polyethylene bags (Table 9).





G-9 high yielder



Banthal a variety suitable for culinary purpose

### Papaya

Papaya (*Carica papaya* L.) produces fruits throughout the year and is suitable for backyard cultivation. Twelve varieties of papaya viz. Farm Selection, Manjil, Madhu, Bankim, Co-5, Ranchi, PY-06-11, Co-2, Pusa Dwarf, Anjil, Honey Dew and Ranchi Dwarf were in order in preference for homestead production. The studies revealed that the lowest plant height was recorded in Pusa Dwarf (97.64 cm) followed by Ranchi Dwarf and Farm Selection. Maximum fruits/ plant (34.27) were recorded in Farm Selection. The women may include these varieties in their backyard cultivation for income generation and nutritional security. The yield was higher (38.59 kg) in Pusa Dwarf followed by Farm Selection. The lowest seed content (3.21 g) was recorded in Pusa Dwarf followed by Ranchi and Co-2. The women preferred these varieties due to higher yield, less seed and peel contents. Based on the feedback collected from women, all varieties were found suitable for vegetable in immature condition and good in taste except PY-06-11. In rainy season maximum storage life (4 days) was observed in all papaya varieties.

### Value addition

Papaya fruit has a high perishability and cannot be stored for longer period. Therefore, it needs quick disposal and utilization. Jam is common product consumed in rural as well as in urban areas in different ways. Jam from papaya variety Co-2 was prepared which was stored at ambient temperature for 3 months without spoilage. The scope of value addition was explained to farm women through trainings and demonstrations.

NIRGWA



Women collecting fruits for consumption



Farm Selection - High yielder

### Incidence of insect pest and diseases in banana

Incidence of brown shiny banana aphid (*Pentalonia nigronervosa*) was recorded in plants grown from suckers however, no incidence of aphids was noticed where camphor balls were hanged from the branches tied in cotton piece. Banana leaf eating caterpillar (*Spodoptera litura* Fab.) was noticed on tender leaves of all varieties grown from suckers at 4 months. Bt @ 3 g / lit was sprayed in the evening to control the insects.

Banana mosaic was noticed in Robusta and Pathkapura varieties grown from suckers. The affected plant was eradicated and Imidacloprid was sprayed @ 0.5 ml/l to check the aphid vectors. In Karpuravalli flower tips and fruits were infested by flower thrips (*Thrips hawaiiensis* Morgan) before bud emergence. *Eulophid* wasp visited the flower tips and fruits before bud emergence for their prey. Hanging of camphor balls and spraying of Bt was found to be an eco-friendly alternative for hazardous effect of chemicals on health of farm women who are engaged in the application of pesticides.



Putting camphor ball to control aphid

**Table 8: Performance of banana variety propagated by tissue culture and sucker method**

Variety	Plant height (cm)		Plant circumference (cm)		No. of suckers/plant	Crop duration (days)	No. of fruits/bunch	Yield (kg/bunch)	Size of fruit	Taste	Pulp
	EW	NS	EW	NS							
<b>Robusta</b> Tissue culture Suckers	157.40	249.80	256.33	249.80	7.08	296.54	152.68	22.67	Medium	Sweet	Very soft
	179.13	259.23	256.25	259.23	8.46	323.05	116.60	19.13	Medium	Sweet	Very soft
<b>G-9</b> Tissue culture Suckers	223.40	339.71	331.55	339.71	10.42	301.53	147.22	33.12	Large	Sweet	White, soft
	252.56	311.09	312.24	311.09	10.71	340.86	104.56	27.29	Large	Sweet	White, soft
<b>Pathkapura</b> Tissue culture Suckers	253.11	266.31	307.63	266.31	4.78	363.04	141.72	25.84	Medium	Sour-sweet	White, soft
	247.75	252.08	311.61	252.08	5.67	382.27	61.53	16.72	Medium	Sour-sweet	White, soft
<b>Karpuravalli</b> Tissue culture Suckers	271.49	298.67	321.02	298.67	9.62	358.06	124.02	24.06	Small	Very sweet	Soft
	296.97	329.02	355.68	329.02	11.24	383.22	105.72	18.70	Small	Very sweet	Soft
<b>Banthal</b> Tissue culture Suckers	288.62	366.63	365.25	366.63	9.30	324.36	89.64	24.50	Medium	-	Slight hard
	294.74	310.12	274.25	310.12	10.75	348.41	92.70	21.32	Medium	-	Slight hard

# WMSB

# IRGWA

**Table 9 : Shelf life of banana fruit propagated through tissue culture and sucker method at ambient temp**  
Days (%Physiological Loss in Weight)

Variety	2		4		6		8		10		12	
	Open	Packed	Open	Packed	Open	Packed	Open	Packed	Open	Packed	Open	Packed
<b>Robusta</b>												
Tissue culture	6.33	2.02	10.33	3.47-b	16.03-b	5.71	32.26	spoiled	-	-	-	-
Suckers	7.58	2.16	11.40	3.86-b	19.74-b	5.21	30.37	spoiled	-	-	-	-
<b>G-9</b>												
Tissue culture	8.68	2.16	10.37	3.52	17.90-b	5.48	23.32	8.05-b	27.25	10.62	32.84	13.70
Suckers	9.18	2.98	11.67-b	4.17	23.30	6.23	26.52	8.47-b	32.48	12.14	-	-
<b>Pathkapura</b>												
Tissue culture	5.87	2.17	8.10-y	4.36	13.75	6.73	19.73	10.44-y	spoiled	13.21	-	-
Suckers	6.81	3.42	9.70-y	4.82	15.62	7.31-y	20.46	12.02	spoiled	14.69	-	-
<b>Karpuravalli</b>												
Tissue culture	6.29	2.43	9.28	4.31	12.46-b	5.34	18.46	11.34-b	spoiled	12.82	-	14.50
Suckers	6.87	2.84	10.75	4.78	13.21-b	6.46	20.24	11.38-b	spoiled	13.06	-	14.05
<b>Banthal</b>												
Tissue culture	7.40	2.14	11.49	3.78	16.40-y	5.89	21.08	8.21-b	25.40	10.24	-	16.78-y
Suckers	8.67	3.21	12.65	5.47	18.23-y	6.45	23.46	9.10	27.90	12.40	-	16.82-y

Table 10 : Effect of post- harvest treatment on ripening of banana  
(var G- 9) treated with 100 ppm ethrel during storage

Treatment	Days (PLW %)	
	1	2
Polyethylene	0.21	0.42
News paper	1.30	2.49
Paper	1.51	2.91
Plastic bucket	0.32	0.64
Gunny bag	1.37	3.54
Brown paper	1.46	3.04
White cloth	1.45	2.91
Plastic bag	1.35	2.33
Control	2.16	4.33

In the packaging and storage study of banana var. G-9 treated with 100ppm ethrel and packed in different materials the minimum PLW (0.42%) was recorded in polyethylene followed by plastic bucket (0.64%) after 2 days.

Table 11 : Effect of post- harvest treatment on papaya var  
Co-2 treated with ethrel for 5 minutes during storage

Treatment	Days (PLW%)				
	2	4	6	8	10
100ppm	4.85	8.22	12.68	18.00	18.87
200ppm	3.51	7.16	11.56	15.06	16.29
300ppm	4.31	7.75	11.87	Spoiled	-
400ppm	3.41	6.82	10.66	14.40	14.95
500ppm	3.50	6.81	10.70	15.08	15.71
Control	3.83	8.81	12.10	18.40	19.19

In papaya variety Co-2 treated with ethrel in different concentrations for 5 minutes, the minimum PLW (14.95%) was recorded in 400ppm followed by 500ppm after 10 days of storage.

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Table 12: Characteristics of different cultivars of papaya

Cultivars	Plant height (cm)	No. of fruits/plant	Weight of fruit (g)	Seed (%)	Pulp (%)	Peel (%)	Maturity (days)	Yield/ plant (kg)	Suitable for vegetable
Farm Selection	103.10	34.27	1156	4.14 M	91.30	6.16 L	202.45	37.45	Good
Ranchi	133.58	19.56	834	3.26 L	90.04	8.70 M	196.32	25.23	Good
Bankim	122.41	16.43	589	9.65 H	89.58	6.77 L	192.66	26.78	Good
Manjil	112.25	22.56	645	8.69 H	89.75	8.56 M	179.65	34.23	Good
Anjil	138.25	21.40	726	9.79 H	85.16	10.05 H	201.46	32.46	Good
Co-5	119.41	23.08	858	9.69 H	85.76	11.05 H	194.65	35.67	Good
Co-2	116.58	19.43	768	3.28 L	90.02	8.67 M	199.37	29.47	Good
Madhu	144.58	26.18	693	7.16 M	89.70	8.14 M	212.21	32.24	Good
Ranchi Dwarf	102.83	15.46	945	4.76 L	87.30	10.94 H	188.40	28.87	Good
Honey Dew	171.56	31.42	856	3.65 L	90.05	7.29 M	176.64	36.46	Good
Pusa Dwarf	97.64	31.62	1234	3.21 L	91.17	7.62 M	188.24	38.59	Good
PY-06-11	151.45	18.35	945	1.55 L	90.07	8.38 M	220.68	25.57	Not good

L - Low, M - Medium, H - High

Table 13 : Shelf life of different varieties of papaya at room temperature

Variety	Days after storage							
	3 Open Packed		6 Open Packed		9 Open Packed		12 Open Packed	
Anjil	9.33	4.11	17.33	7.45	25.52	10.79	Spoilage 12.59	
Co-5	8.49	3.55	14.28	6.47	20.46	10.03	Spoilage Spoilage	
Ranchi	8.89	3.53	15.60	6.18	21.96	8.65	Spoilage 10.95	
Honey Dew	14.90	5.82	25.10	11.00	Spoilage 15.53		Spoilage Spoilage	
Farm Selection	7.69	3.96	12.55	7.38	18.01	9.90	Spoilage Spoilage	
Co-2	6.87	4.33	11.79	7.05	16.70	11.39	Spoilage 13.92	
Bankim	6.98	2.74	12.00	5.06	16.66	7.07	20.07	9.26
Py-06-11	10.00	3.94	17.40	9.19	Spoilage 11.97		Spoilage Spoilage	
Pusa Dwarf	6.00	3.03	10.44	6.07	14.88	9.51	Spoilage 11.74	

The physiological loss in fruit weight was significantly reduced by covering the fruits with polyethylene bags. On the 9<sup>th</sup> day of the storage, the fruits of Bankim variety of papaya packed in polyethylene bags with 0.2% vents recorded the lowest PLW (7.07%) as compared to unpacked control fruits (16.66%). The fruits of Bankim, Ranchi and Pusa Dwarf packed in polyethylene bags reported 12 days shelf life as compared to 9 days in unpacked fruits. Polyethylene proved highly effective in lowering the PLW of fruits over the control. Polyethylene reduced the evapo- transpiration of fruits, resulting in low PLW and fresh and firm condition.

#### Refinement and Development of Eco-friendly Management Technology of Brinjal Shoot and Fruit Borer (*Leucinodes orbonalis*, Guence) Appropriate for Farmwomen

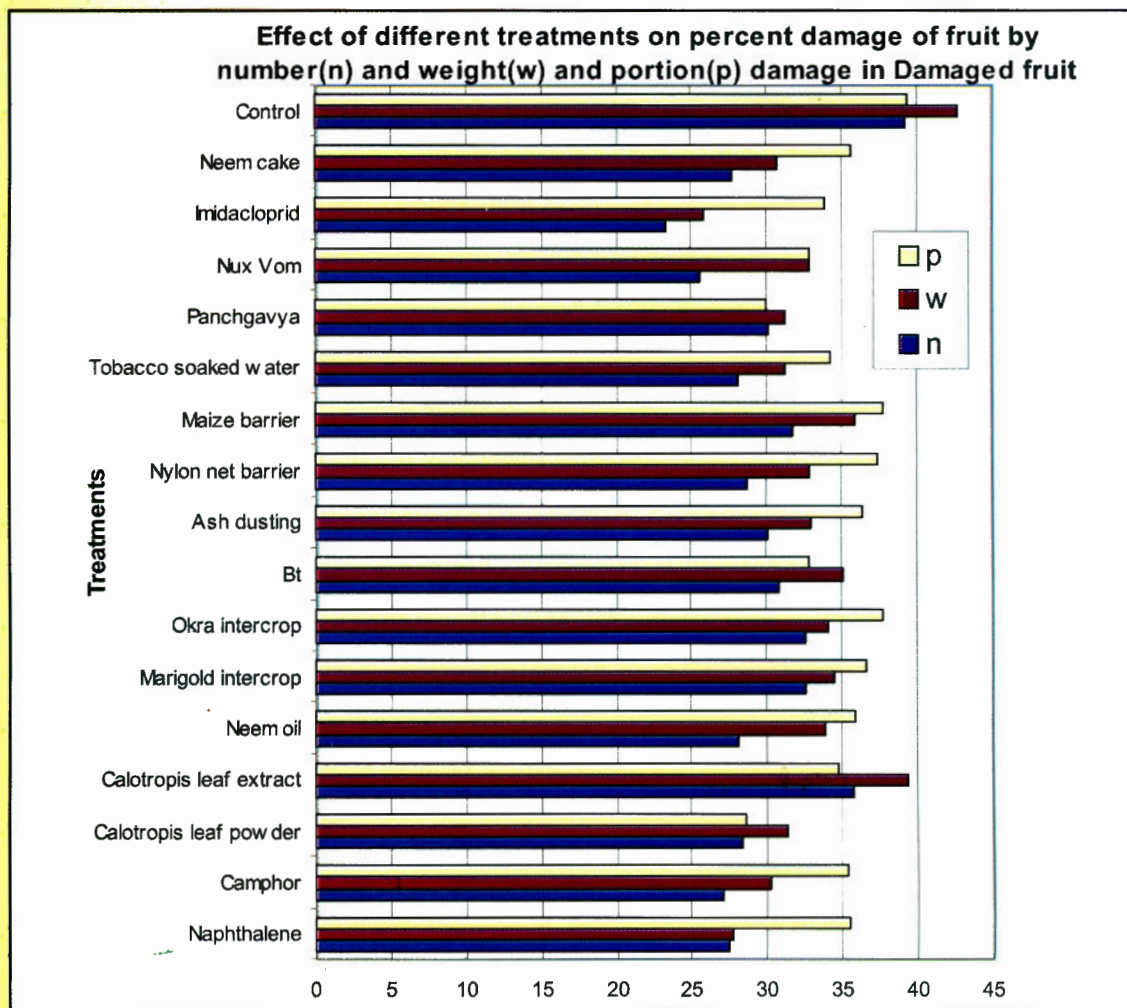
*S.K. Srivastava and Naresh Babu*

Different eco-friendly technologies (Neem oil, Marigold intercrop, Okra intercrop, Bt, Nylon net barrier, Maize barrier, Nux Vom and Neem cake) and ITKs (Naphthalene ball, Camphor ball, Calotropis leaf powder, Calotropis leaf extract, Ash dusting, Tobacco soaked water and Panchagavya )were evaluated at farm level.

Minimum per cent brinjal fruit damage (23.37) was recorded in Imidacloprid treated plots followed by Nux Vom (25.54), camphor (27.04), naphthalene (27.40), neem cake (27.68), tobacco soaked water (28.11), neem oil (28.14) and calotropis leaf powder (28.33). Minimum percent of fruit damage by weight was recorded in Imidacloprid treated plot (25.83) followed by naphthalene (27.68), camphor (30.16), neem cake (30.66), panchgavya (31.23), tobacco soaked water (31.24), calotropis

MRGWA

leaf powder (31.34), nylon net barrier (32.81), nux vom (32.9) and ash dusting (32.98). Minimum per cent fruit part damage by weight was recorded in calotropis leaf powder (28.61) followed by panchgavya (29.95), Nux Vom & Bt (32.89), tobacco soaked water (34.18), calotropis leaf extract (34.72), camphor (35.35), naphthalene (35.44), neem cake (35.64) and neem oil (35.85). This observation indicated that in spite of the damage of the fruit, maximum portion of fruit (64.15 to 71.39%) by weight was fit for consumption.

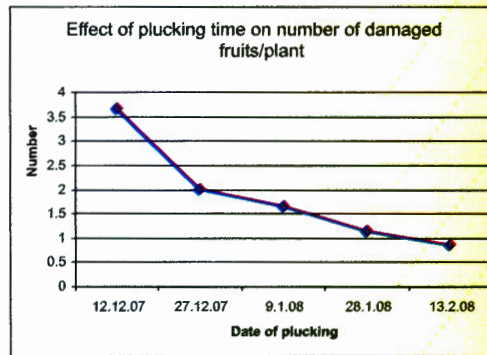
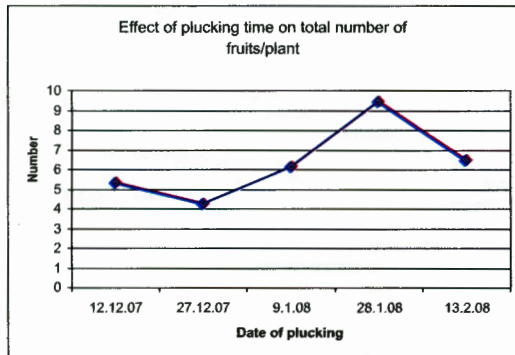


**Percent Damaged**

Maximum number of fruit were harvested in the last week of January followed by second week of February. Although, the yield was higher during last week of January to second week of February the price of brinjal was less. A minimum number of fruits were harvested in December and during this time price of brinjal was higher; therefore, farm women could get higher realization.

Maximum number of damaged fruits were found in 2nd week of December. This observation indicated that December was the crucial period for the management of brinjal fruit borer.





### Conclusion

Hanging of camphor, application of neem cake and calotropis leaf powder, spraying of panchgavya, tobacco soaked water, Nux Vom and ash dusting were women-friendly due to easy accessibility, simple in handling and eco-friendly in nature. Predatory spiders were also seen in these treatments, which indicated that these treatments are helpful in biodiversity conservation. Farm women were sensitised on different aspects of eco-friendly pest management technologies of brinjal through a farm visit to Institute and were shown the effect of various treatments.

### Trainers' training

Training was provided to village level para extension workers on mechanical, biological and chemical methods of insect pest control for summer season vegetables.

### Farmers' training

Sl. No.	Name of Training	Location	No. of participants
1.	Training and demonstration on the release of <i>Trichogramma</i> in brinjal field	Pada Sahi	10 farmers and 5 farmwomen
2.	Vermi composting	Tangibanta	20 farmwomen
3.	Eco-friendly pest management technologies	Tangibanta	47 farmwomen and 5 farmers
4.	Eco-friendly pest management technologies	Pada Sahi	25 farmwomen and 30 farmers
5.	Field visit of farmwomen on different aspects of eco-friendly pest management technologies of brinjal showing the effect of various treatments	NRCWA	150 farmwomen
6.	Eco-friendly pest management technologies	Kantamalim	30 farmwomen and 25 farmers
7.	Eco-friendly pest management technologies and vermi composting	Mendhasal	20 farmwomen
8.	Eco-friendly pest management technologies and vermi composting	Italanga	89 farmwomen

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## 2.3 SYSTEM DEVELOPMENT AND MANAGEMENT

### Economic Upliftment of Rural Women Through Integrated Fish Farming

*P.K. Sahoo, B.N. Sadangi and Abha Singh*

The project was launched in 8 villages of Puri and Cuttack districts and 170 women belonging to nine SHGs were trained in integrated fish farming viz. duck-fish, poultry-fish, horticulture-fish and mushroom-fish. Twenty nine ponds covering water area of 4.39ha were selected for demonstration of fish farming as a group activity.

Data were collected on socio-economic conditions, knowledge level, attitude and skills of the beneficiaries related to integrated fish farming, marketing and account keeping. It was found that the members of the SHGs perceived aquaculture as a suitable enterprise for income generation for the group. Eighty per cent of them showed interest to learn the technology. About 70 per cent of the respondents had poor knowledge about cultivable species and 30 per cent had some knowledge about the scientific aquaculture such as , pond preparation and supplementary feeding . Fifteen per cent had strongly favoured the integrated farming. Rural women were found possessing skill in digging, cleaning and weeding of pond.

#### **Carp culture**

Carp fry production was taken up in 4 small ponds for demonstration. All the ponds were stocked with IMC fry and also two medium carps i.e. *Puntius saran* and *Labeo gonius* for species diversification. Pond preparation and management of pond was demonstrated and monitored.

#### **Fish-cum-duck integration**

Fish-cum-duck integration was demonstrated in a pond with the participation of 70 women. Trainings on duckling care and management of integrated farming were conducted. After one month stocking of ponds, these were stocked with one-month-old ducklings. Twenty five adult males were sold and the females were further reared. A total amount of Rs. 1000/- was generated from selling of the duck eggs.

Rabbit breeding and production was introduced for the first time in the village as an income generating activity.

**Table 14: Farmers' training conducted**

Sl. No.	Title of the training	Village	No of participant
1.	Composite fish culture	President and Secretary of SHGs, Sakhigopal Block	16
		Jaypur	50
		Balabhadrapur	40
2.	Carp fry production	Damara	15
		K.sasan	20
		Siula ,	19
		Jaypur	50
		Balabhadrapur	30
3.	Mushroom Culture	Damara	15
4.	Record keeping	Damara	15
		President and Secretary of SHGs of Sakhigopal block	16
5.	Duckling care	Jaypur	30
6.	Managing duck-cum-fish culture	Jaypur	70

### **Pilot Study on Resource Base, Traditional Knowledge and Participation of Farm Women in Livestock Production**

*A.K. Misra*

The study was undertaken to characterise the traditional livestock rearing systems, identify the involvement of farmwomen and major constraints for improved livestock production and suggest strategies based on participatory action research for enhancing the livestock productivity.

Kantamalim village of Begunia block in Khurda district, Orissa was selected for conducting the pilot study. Participatory rural appraisal (PRA) and focused group discussion with men and women were used for collection of information.

Farmers kept mix species of animals such as cattle, buffalo, sheep and poultry depending on availability of crop residues and family labour. Women from forward communities reared cows whereas women from SC/ST communities generally reared small ruminants and poultry to earn income and

provide economic stability to the farming systems. Small ruminants were primarily kept as mobile asset which could be sold as and when required to get money. A close link was observed between livestock and common grazing resources. Landless and SC/ST women depended heavily on common property resources such as village pasture, forests, tanks, etc. for grazing and watering of their livestock.

Most of the work related to livestock management was considered the traditional responsibility of women. They were responsible for the day to day care and management of animals in most of the communities; the poorer the community the greater was their role. Needs and priorities of women varied according to the socio-economic groups they belonged to and access to natural and material resource bases. Generally, both men and women made decisions jointly in the family as regards to the purchase and sale of animals. Women of SC/ST communities had independent decision making power as regards to the purchase and sale of poultry birds and small ruminants.

The problems faced by women in relation to livestock rearing varied according to their caste and class. For women who belonged to the marginal farmer and landless category; scarcity of water, grazing land and green fodder are perceived as of utmost concern. Women who belong to land owning families and rearing cattle; lack of access to credit is regarded as the most important problem. The main constraint faced by the farmwomen was scarcity of fodder and water in summer particularly during March to May, resulting in reduced productivity of animals and high incidence of diseases. The various reasons mentioned by the farm women for water and fodder scarcity were :

- Collapse of traditional water harvesting systems.
- Change in cropping pattern from traditional food crops to cash crops.
- Shrinking of common grazing resources.
- Low production potential of the native breeds, non-availability of inputs and services (veterinary, credit, seed, feed, market) in time, high incidence of diseases during rainy season and high cost of maintenance.

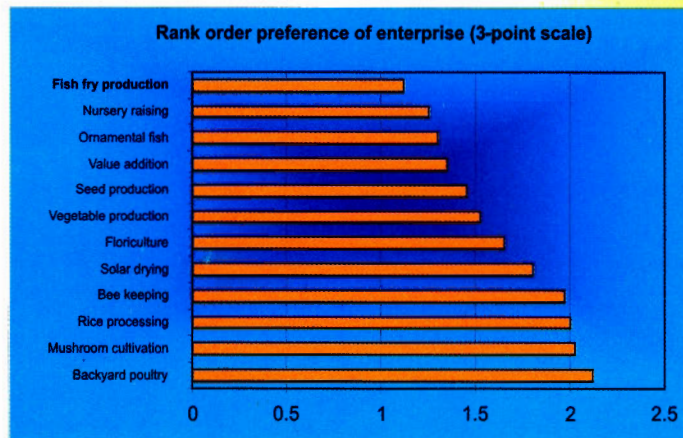
Supplementary feeding of home made concentrate to small ruminants was demonstrated to farm women and recording of data related to birth weight, sex, growth rate etc. were in progress.

## Capacity Building of Women Agricultural Labourers (WALs) for Increasing Efficiency in Agro-Enterprises

*S. Mishra and B. N. Sadangi*

The study was taken up in four blocks viz., Tangi, Salepur, Nuagaon and Nayagarh of two districts namely Cuttack and Nayagarh. Four villages (one in each block) and four SHGs (one in each village) were selected for the study. Based on the criteria of i) being married ii) having children and iii) dependent mostly on labour work, fifteen respondents (one

woman SHG) from each village were selected constituting sixty in total. Focus group discussion and PRA was conducted in villages to know their problems and identify the training needs. Preference ranking was used for selection of income generating enterprises following the criteria of affordability, climate and market. Out of 12 enterprises five enterprises were selected on the basis of their preference.



**Poultry rearing:** The women agricultural labourers had some experience in poultry rearing and had control over the sale of egg and meat which helped them in making decision for the same. The improved technology was also found easy for adoption.

**Mushroom cultivation:** Mushroom was selected because the raw materials like straw, pulse powder etc. was locally available. The landless/ small holders could grow mushroom inside their homes and they could utilize their leisure time in productive way besides realizing very quick returns.

**Rice processing:** Parboiling is a very common practice for most of the farmwomen in rural areas. The introduction of parboiling unit could save their time and energy with reduction of drudgery of women agricultural labourers.

**Solar drying:** The criteria for selection of this enterprise was that the women agricultural labourers had no time to watch the agro-products like badi, papad, red chilli, coconut chips, while direct sun drying to protect them from dust, birds and stray animals. The solar drier could be a very good option under these conditions.

**Bee keeping:** As villages were located near the forests honey collection was felt to be easy by the women agricultural labourers.

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### Capacity building of WALs on agro-enterprises

Interventions made for capacity building of the WALs were trainings both on-campus and off-campus, demonstrations in farm women's field and exposure visits to successful farmers' field and ICAR Institutes / State Agriculture University and farm women group discussion.

**Table 15: Training/demonstrations conducted for capacity building of WALs**

Topic	Village/ block	No. of beneficiaries (category)
Rice processing by using mini par boiling unit	Tangi Chaudwar	20 (ST)
Solar drying of Agro-products	Tangi Chaudwar	20 (ST)
Rice processing by using mini par boiling unit	Nayagarh	24 (Gen.)
Training-cum-demonstration of oyster mushroom cultivation	Salepur	10 (OBC)
Training-Cum-Demonstration of oyster mushroom cultivation	Tangi Chaudwar	25 (ST)
Rice processing by using mini par boiling unit	Salepur	15 (OBC)
Backyard poultry rearing	Tangi, Chaudwar	18 (ST)
Training-cum-demonstration on solar drying	Tangi Choudwar	18 (ST)
Training-cum-demonstration on solar drying	Salepur	15 (OBC)

## Livelihood Security Through Entrepreneurial Activity Among Farm Families

*Suman Agrawal and Geeta Saha*

With the aim of enabling women self-help groups to develop entrepreneurial activities into economically viable business units for self-reliance and self-sustenance, the study was carried out in the selected villages of the Pipili and Shakhigopal blocks of Puri districts of Orissa. From each selected blocks, two villages were selected. It was found that two women SHGs existed in village for the past four years but were not involved in any entrepreneurial activities as no skill training had been provided to them for income generation. Therefore, efforts were made to apprise them about various enterprises which they could take-up for income generation.

### **Mushroom cultivation**

Fifteen farmwomen of a SHG were trained in the cultivation of paddy straw mushroom.

### **Agro processing**

Two training programmes were conducted on agro-processing and value addition of fruits and vegetables. The trainings were attended by 51 women including school drop out girls.

The participants were imparted skill development training on the following areas :

- Sada badi making
- Masala badi
- Ash gourd - black gram badi
- Radish - black gram badi
- Masala sabudana papad and
- Potato and sabudana papad

### **Value addition of fruits and vegetables**

The women were trained to develop the skills in the preparation of the following value added food products:

- Tomato sauce
- Apple ginger jam
- Lime ginger squash
- Tomato puree
- Tomato ketchup
- Apple marmalade and
- Lime pickle

### **Socio-political awareness**

Group discussions were also conducted to sensitize women on socio-political issues and leadership development.

MARGINAL

## SUCCESS STORY

*Sangram Vikram Self Help Group of the village Konjar comprises of 14 members. Amita Pradhan and Surekha Dash are the President and Secretary of the group respectively. The group was formed as a part of the study of NRCWA, Bhubaneswar and it opened Bank Account in SBI, Pipili branch in September 2002. The monthly deposit of the group is Rs. 280/ @ Rs. 20/- per member. Group members took a land area 0.2 ha on leased basis for three years @ Rs. 650/- per year.*



*In November 2002 they grew vegetables like tomato, cauliflower, green leafy vegetables, bean and potato. Their total expenditure for this enterprise was Rs. 320/-. After two months they sold the produce in the market and earned a gross profit of Rs. 1278/- with a net profit of Rs. 958/-. However, after skill development training on value addition of fruit and vegetable, this group got motivated to start enterprise on processing of fruits and vegetables. They prepared lime and orange squash with an investment of Rs. 1120/- and sold it in the local market @ Rs. 55/- per bottle. The gross profit from this enterprise was Rs. 2070/- with a net profit of Rs. 950/-.*

*This group was also trained for agro-processing through skill development trainings. After that they started making different types of Badi with a total expenditure of Rs. 280/-. They sold the prepared products in the Bhubneswar city market and Exhibitions organised by Orissa Rural Marketing Society at Cuttack, @ Rs. 60/- per kg. They earned a gross profit of Rs. 740/- with a net profit of Rs. 460/-. Thus, in a year's time their net profit from the enterprises was Rs. 2368/-.*

*This inspired the group to continue with the efforts to earn money. Amita Pradhan, President of the group being a very energetic and having leadership qualities, tried to create Marketing Avenue for their produce. In the process, she came into contact with a renowned company like Hindustan Lever Limited. The company was very happy with the quality of the product developed by Sangram Vikram SHG. The company placed an order of 40 lime squash bottles @ Rs. 60/-. Encouraged by the success, the group obtained a loan of Rs. 50,000 from the SBI, Pipili for expanding the enterprise/business. The group prepared 2000 lime squash bottles, 50 bottles of tomato puree and also ventured in preparation of different types of spices, especially Haldi powder. They are selling spices in poly pack in local market. The products were sold in an exhibition organised by State Govt. to promote SHGs. Thus, the group earned a net profit of Rs. 28000/- after repaying the Bank loan. With this success, Group members have developed self-confidence and a quality of self-reliance. All the members feel that group is their power, depends upon collective ideas and actions. This has helped them to improve their status within the family and outside. Now the members say that they can educate their children and have better food for their children and family.*



## Participatory Evaluation of Low Cost Weaning Mix

Abha Singh

Studies conducted earlier in coastal Orissa on feeding practices and weaning foods revealed that roasted rice-flake powder with sugar and water/milk was the main weaning food. Based on the common weaning food used in the project area and locally available food stuff various combinations of weaning mixes were tried out. Sweet potato added weaning mix was developed with locally available food stuff using very simple methodology and tested in the laboratory. It is also a low cost and nutritionally balanced food for the infants.

Two villages of Khurda district namely Italanga and Bagalpur were selected for the study. Thirty families having infants between the age group of 6-18 months were selected to assess the impact of weaning mix on their health and nutritional status. Trainings were also conducted in Mendhasal, in which Kantamalim and Italanga village in which 81 mothers participated. Participatory evaluation of proposed intervention is in progress.

### 2.4 DRUDGERY ASSESSMENT AND REDUCTION

#### Introduction of Women Friendly Improved Farm Tools and Implements in Selected Villages of Bhopal District

S. P. Singh & R. S. Singh

For the study 264 households of different farm size groups from three villages namely Nipania Jat, Adampur and Dobra-Sagonikala of Bhopal district were selected. Among twenty farm operations, womens' involvement (ratio of farmwomen involved in the operation to the total women respondents, expressed in per centage) was found highest in interculture (93.9%) operations followed by harvesting (93.2%), groundnut decortication (90.2%), cleaning and grading (86%), preparatory work for seed bed (80.3%), threshing (66.3%), ridge and furrow making (58%) and grain carrying after threshing (54.5%). Most of the farm operations were carried out by farmwomen either by their own hand, feet or by using traditional tools, such as sickle, spade, Supa and Chalani.

Women Involvement Index in farm operation ( $WII_o$ ) was calculated using the following formula :

$$WII_o = \frac{TN_w \times TT_w}{(TN_m \times TT_m + TN_w \times TT_w)}$$

Where,  $WII_o$  = Women Involvement Index in farm operations,

$TN_w$  = Total number of farm women involved in all operations,

$TN_m$  = Total number of men involved in all operations,

$TT_w$  = Total time spent by farm women in these operations in days/ha

$TT_m$  = Total time spent by men in these operations in days/ha

Women Involvement Index ( $WII_o$ ) in farm operations was worked out to be 0.42, which varied from 0.36 to 0.53 across the selected villages. The highest  $WII_o$  of 0.53 was found in Dobra-Sagonikala village as the majority of households were involved in vegetable production. The activities that showed

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involvement index of more than 0.50 were drying and storage, cleaning and grading, intercultural operations, vegetable plucking, maize shelling, harvesting, groundnut decortication and preparatory work in field for sowing. Fourteen equipment namely seed treatment drum, hand ridger, fertilizer broadcaster, Naveen dibbler, twin wheel hoe, PAU weeder, grubber weeder, sitting type groundnut decorticator, hanging type cleaner with five sieves and sack holder, PAU seed drill, power operated cleaner grader, knapsack sprayer, groundnut stripper with four stools were introduced in the selected villages and the farmwomen were given training in their operation and adjustments. Training was also given to a group of women from these villages on repair and maintenance of these equipment. Most of these tools and implements had the potential to reduce the cost of operation as well as drudgery per unit output due to increased work efficiency. There was saving of Rs. 1563/ha and Rs. 1514/ha (over traditional method) in the cost of weeding and intercultural operations by use of PAD wheel hoe and twin wheel hoe respectively. Labour saving to the extent of Rs. 333/ha was found through use of hand ridger. Saving in cost of operation of Rs. 21.85, Rs. 123.20 and Rs. 63.40 per quintal were also found on account of labour saving by the use of tubular maize sheller, groundnut decorticator and groundnut stripper respectively.

About 500 women farm workers and extension functionaries visited the Sub-Centre during the year and they were given information about improved farm tools and equipments.



Interaction with farmwomen on International Womens' Day

## 2.5 GENDER SENSITIVE EXTENSION APPROACH

### Designing Gender Sensitive Extension Model and Testing its Efficacy

*B.N.Sadangi, Sabita Mishra, H.K.Dash, P.K.Sahoo, S.K.Srivastva, L.P.Sahoo and Abha Singh*

With the aim of developing a gender sensitive extension model for promoting gender mainstreaming an experimental study was taken up in Simor and Kantamalim of Begunia Block in rainfed situation and Padasahi and Tangibanta in Bhubaneswar Block in irrigated situation. Bench mark data on socio-economics, farming situations, farm productivity, extension services and human resource variables were collected from 120 farm men and women.

#### **Selection of Para Extension Workers**

Two Village Level Para Extension Workers (VPEW) (one man and one woman) were selected from each village based on pre-determined qualification desirable for carrying agricultural extension work.

#### **Gaps in extension identified in the selected villages**

The important farm related problems and gaps in extension were identified in the villages through discussion, PRA and field visits.



**Scientists analyzing the gaps in extension and other farm problems**

NRGWA

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**Table 16 : Gaps in extension identified in selected villages**

Irrigated village		Rainfed village	
Padasahi	Tangibanta	Simore	Kantamalim
<ul style="list-style-type: none"> <li>• Non availability of quality seeds</li> <li>• Severe disease and pest problems in cereals and vegetables</li> <li>• Inappropriate application of plant protection measures</li> <li>• Nutritional imbalance in soil</li> <li>• Lack of motivation, training &amp; awareness among SC and backward communities</li> <li>• Very poor contact with extension agencies</li> <li>• Lack of use of agricultural implements</li> </ul>	<ul style="list-style-type: none"> <li>• Non availability of quality seeds</li> <li>• Poor productivity of crops</li> <li>• More drudgery and health hazards with farm women</li> <li>• Lack of motivation, training and awareness</li> <li>• Poor contact with change agents</li> <li>• No exposure to extension methods</li> <li>• Lack of agricultural implements</li> <li>• Poor management of pest and diseases</li> <li>• No diversification in farming</li> </ul>	<ul style="list-style-type: none"> <li>• Frequent crop failure during dry spell</li> <li>• Poor water holding capacity</li> <li>• Poor rice and pulse yield</li> <li>• No water harvesting structures</li> <li>• Poor extension services</li> <li>• Nutritional disorders among goat and sheep</li> <li>• Prevalent of diseases among goat and sheep during rainy season.</li> <li>• Non availability of quality seeds</li> <li>• Improper water management</li> <li>• Inadequate application of manures and fertilizers</li> <li>• No serious attention to pest and disease control</li> <li>• Poor cropping intensity</li> </ul>	<ul style="list-style-type: none"> <li>• Frequent crop failure during dry spell</li> <li>• Poor rice and pulse yield</li> <li>• No water harvesting structures</li> <li>• Away from extension services</li> <li>• Nutritional disorders among goat and sheep</li> <li>• Prevalence of diseases among goat and sheep during rainy season</li> <li>• Migration of youth to urban centres for daily wages</li> <li>• Non availability of quality seeds</li> <li>• Improper water management</li> <li>• Inadequate application of manures and fertilizers</li> <li>• No serious attention to pest and disease control</li> <li>• Poor cropping intensity</li> </ul>

### Capacity building of Para Extension Workers

All the para extension workers were given orientation to the project objectives, their roles and responsibilities and were introduced to the villagers through village level meetings. Two need based location specific pre-season trainings were organised for the VPEWs before the onset of cropping seasons and trainings were imparted on crop production, vegetable and fruit cultivation, animal nutrition, insect pest management, mushroom cultivation, seed selection and storage, pisciculture, value addition, nutrition and child care. Besides training on subject matter the para extension workers were equipped to provide farm advisory services and conduct discussions, meetings, method and result demonstrations and organize self help groups. They were specially sensitised on gender bias and advised to initiate effective dialogue with men of the villages to accommodate the concerns of farm women. The para extension workers were also supplied with farm literature relating to the above identified areas on the following aspects for their capacity building and circulation among the farming community.

The para extension workers were provided with literatures on

▪ NRCWA at a glance,	▪ Dairy farming,
▪ Vermi-compost,	▪ Bitter guard cultivation,
▪ Mushroom cultivation,	▪ Okra cultivation,
▪ Food & vegetable preservation	▪ Tomato cultivation,
▪ Women empowerment through agricultural implements	▪ Cauliflower cultivation,
	▪ Radish cultivation,
▪ Nursery raising,	▪ Amaranthus cultivation,
▪ Vegetable cultivation,	▪ Commercial marigold cultivation and
▪ Two row paddy transplanter,	▪ Vegetable nursery raising- a profitable enterprises by WSHG.
▪ Sweet potato cultivation,	

NRCWA

Technology	Irrigated village Bhubaneswar block		Rainfed village Begunia block	
	Tangibanta	Pada Sahi	Kantamalim	Simor
Nutrition garden-cum-seed production unit	✓	✓	✓	✓
Ornamental fish farming	✓	✓		
Mushroom cultivation	✓	✓	✓	✓
Flower cultivation	✓	✓		
Pheromone trap demonstration	✓	✓		
Improved horticultural planting material (papaya, drumstick and lime)	✓	✓	✓	✓
Bitter guard cultivation	✓	✓	✓	
Fish farming	✓			
Vermi composting	✓			
Trichogramma demonstration		✓		
Pheromone trap demonstration	✓	✓		

### Benchmark data on the profile of men and women

Organisation	Situation			
	Irrigated		Rainfed	
	Men	Women	Men	Women
Women SHG	0.00	80.00	0.00	60.00
Mahila Samiti	0.00	36.67	0.00	43.33
Village Panchayat	13.33	0.00	43.33	0.00
Zilla Parishad	0.00	0.00	0.00	0.00
MCB	0.00	0.00	0.00	0.00
Youth Club	33.33	20.00	50.00	16.67
PCS	0.00	0.00	6.67	0.00

In both the situations, farm women's participation in Women self help group and Mahila Samiti was fairly good but their participation in Panchayati Raj Institutions was negligible.

**Table 19: Pre-project awareness (%) about change agents**

Change agent	Situation			
	Irrigated		Rainfed	
	Men	Women	Men	Women
Village Level Worker	90.00	90.00	63.33	40.00
Agriculture Extension Officer	80.00	53.33	46.67	33.33
Fishery Extension Officer	0.00	0.00	0.00	0.00
Social Extension Organiser	0.00	0.00	0.00	0.00
Auxiliary Nurse Midwifery	0.00	0.00	0.00	0.00
Livestock Inspector	53.33	0.00	33.33	23.33
Veterinary Doctor	43.33	66.67	43.33	13.33

It is observed that out of 7 change agents only four agents were known to the villagers. The percentage of awareness among men was found to be higher than that of women. The Livestock Inspector in irrigated situation was not at all known to any farm women although women are more involved in livestock production and management. In rainfed situation about 23 per cent of farm women knew the Livestock Inspector. The veterinary doctors were found to be known to both men and women in irrigated and rainfed situations with varying percentage.

**Table 20: Pre-project average score of contact with change agents (5-point scale)**

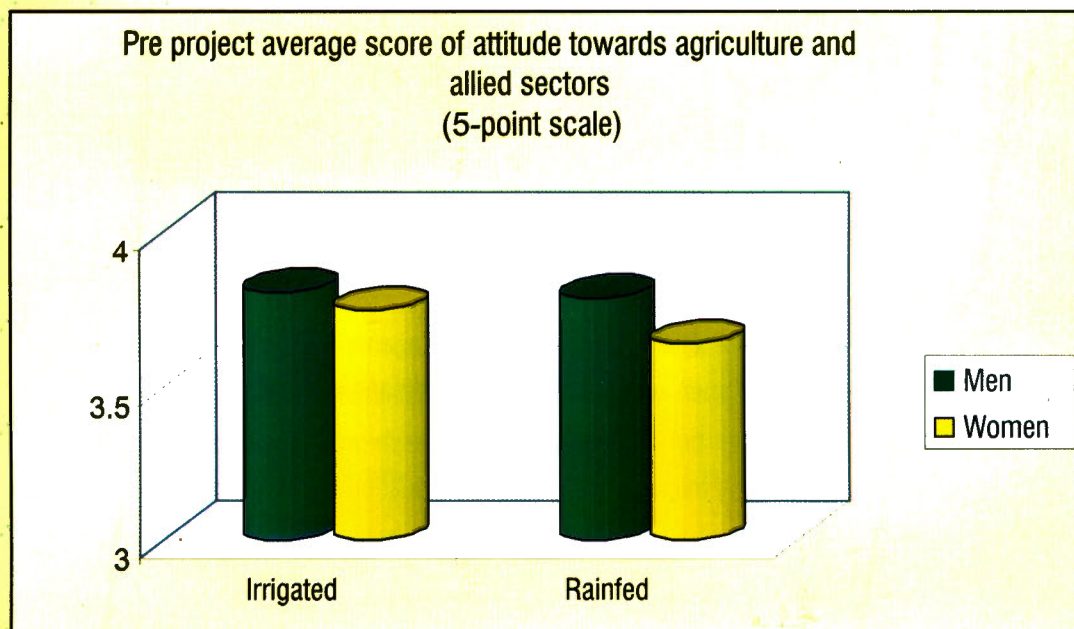
Change Agent	Situation			
	Irrigated		Rainfed	
	Men	Women	Men	Women
Village Level Worker	1.55	2.00	1.02	2.00
Agricultural Extension Officer	1.75	1.88	1.15	0.75
Fishery Extension Officer	----	----	----	----
Social Extension Organiser	----	----	----	----
Auxiliary Nurse Midwifery	----	----	----	----
Livestock Inspector	1.70	----	1.00	----
Veterinary Doctor	1.56	2.50	1.87	1.00

The analysis of intensity of contact of men and women with change agents, revealed that in both the situations the contact with village level worker by farm women was found higher. It was so because in both the situations there was a woman village agricultural worker who preferred to contact farm

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women more frequently. It was observed that the change agents were not maintaining adequate number of contacts for transfer of farm technology. Similarly, the contact of Livestock Inspector with farm women was found nil where as the veterinary doctors maintained some contacts with men and women in both the situations. However, the intensity of contacts of change agents in the field of animal husbandry was also found to be poor.

Attitude of men and women towards agriculture and allied sectors was studied with the objective to understand the psychological preparedness for participation in agriculture programmes and adopting farm technology.



The gender difference in attitude towards farming was not significant. Both farm men and farm women had more or less same magnitude of positive disposition in both the situations suggesting that both men and women with positive attitude can successfully participate and adopt farm technologies provided appropriate gender sensitive approaches are formulated and implemented.

The pre-project knowledge of men and women in farming was measured through a teacher-made type test developed for the purpose. It was found that difference in knowledge score between men and women in each situation was higher than the differences due to the situation with the implication that special efforts are required for farmwomen for enhancing their knowledge level in farming.



**Table 21: Change in capacity of Para Extension Workers  
(Period - June 2007 to March 2008)**

Situation	Gender	Knowledge level				Skill level	
		Pre-project knowledge score (%)	Capacity building intervention (June 2007 to March 2008) Training	Knowledge score (%) (after one year)	Change (%)	Pre-project skills	Present skills
Irrigated	Male	60	<ul style="list-style-type: none"> <li>▪ Demonstration</li> <li>▪ Group discussion</li> <li>▪ Audio-visuals leaflets, Technical bulletins Tele-vision, Exposure visits/ Field visits</li> <li>▪ Lecture</li> </ul>	77	17	NIL	<ul style="list-style-type: none"> <li>▪ Mushroom cultivation (oyster), nursery raising in vegetable crops, flower cultivation (marigold), ornamental fish farming, pheromone trap technology, vermi composting, fish farming, biological method of pest management (<i>Trichogramma</i>), insect pest management and their suitable control measures and chemical preparation.</li> <li>▪ Value addition squash, pickle preparation</li> </ul>
	Female	55	- do -	72	17	NIL	<ul style="list-style-type: none"> <li>▪ Mushroom cultivation (oyster), nursery raising in vegetable crops, flower cultivation (marigold), ornamental fish farming, pheromone trap technology, vermi composting, fish farming, biological method of pest management (<i>Trichogramma</i>), insect pest management and their suitable control measures and chemical preparation.</li> <li>▪ Value addition squash, pickle preparation</li> </ul>
Rainfed	Male	62	- do -	82	20	NIL	- do -
	Female	56	- do -	78	22	NIL	- do -

WATER



Motivating the rural women to implement action plan in village Tangibanta



Method demonstration for para extension workers



Helping the para extension workers to identify field problems

Capacity building of the para extension workers in the project being an important activity set forth, all possible steps were taken to help them acquire knowledge and skills in scientific farming suitable to their local situations. It was attempted by organizing tailor made training, discussion, field visits, demonstrations and other programmes. In order to examine the changes taking place in human resource factors attempt was made to find out the gain in knowledge and skills after lapse of one year. The result of the study is presented in Table 21. Men and women para extension workers in both the situation gained knowledge varying from 17 to 22 per cent and both the categories had also almost equal percentage gain in knowledge. Prior to project implementation the para extension workers had no skills in scientific farming and after one year of implementation they are now able to demonstrates the skills as stated in the table 22.

## MONITORING MECHANISM

Table 22: Monitoring of extension activities of Village level Para Extension Worker (VPEW)

Sl. No.	Situation	Gender	Performance on the monitorable parameters (reference month March 2007)									
			Writing of weekly diary	No. of farmers contacted per week in the preceding month	No. of farm women contacted per week in the preceding month	No. of field visits per week in the preceding month	No. of problems identified in the preceding month	No. of demonstrations conducted in the preceding month	No. of other related agencies contacted in the preceding month	No. of consultation made with scientists and technicals for capacity building in the preceding month	No. of exposure to agriculture information - leaflet, newspaper, TV, Radio programme etc. in the preceding month	
1.	Irrigated	Men Para Extension Worker (2)	Regular	13	15	5	4	2	2	2	8	4
		Women Para Extension Worker (2)	Regular	10	20	3	2	1	5	9	4	
2.	Rainfed	Men Para Extension Worker (2)	Regular	25	15	5	6	3	3	3	9	9
		Women Para Extension Worker (2)	Regular	16	30	4	5	2	2	8	5	

WATER

Nine performance indicators for para extension workers for effective management of extension in gender perspective were identified and data on all the indicators which were collected through interview and observations are presented in Table-22.

The findings on the functioning of the para extension workers emerged from the analysis have been summarised below:-

- Farmwomen availed more extension services than men in both irrigated and rainfed situations.
- VPEWs (Male/ Female) had more contact and interaction with poor farm women and WSHG.
- The VPEWs had consultation with scientists and technicals through personal contact and telephone calls about the problems in the current farming. They sought suggestions and solutions for the farm problems.
- VPEWs worked as mediators in transfer of technology in a two way process.
- The capacity of the VPEWs was found to have increased through training, reading of technical bulletins, through exposure visits, radio and TV programmes and by interacting with scientists and technicals.
- The personality and leadership quality of VPEWs was found increased by leading the farmwomen and farmers in different activities.
- VPEWs seek help and assistance from other agencies like State Agriculture Department, Veterinary Department, Bank, Panchayat, etc.
- VPEWs in rainfed situation were found more active than irrigated situation due to more demand from farmers and farmwomen.
- Farm women belonging to SC, ST and poor families were making more contact with VPEWs and deriving more benefits from the system.

VPEWs were more involved in strengthening the women SHGs through various types of farm production.

## 2.6 EFFICIENT RESOURCE MANAGEMENT

### Mechanisation of Activities in Rice Farming

*H.K. Dash and B.N.Sadangi*

The study was conducted in two locales representing two different situations, namely, irrigated and non-irrigated. While the study village in Nimapara block of Puri district was irrigated with consolidation of land holdings, the village in Khurda district was a non-irrigated area without consolidation of land holdings.

#### **Impact of tractor use on households**

The study revealed that households depending exclusively on wage earnings in agriculture lost about 57.1 man-days in the irrigated situation and 22 days in non-irrigated situation due to use of tractors in farming operations.

**Table 23: Loss of man-days for wage earning households**

Mechanised activity	Loss of man-days to men	
	Irrigated	Non-irrigated
Land preparation	26.5	10.5
Threshing	18.6	7.2
Other activities like transport of harvest and manure application	12.0	4.2
Total	57.1	21.9

About 75 per cent of affected men in irrigated areas turned to non-farm activities, while 40 per cent of men in non-irrigated areas took to leasing in of lands. Participation of women in activities like harvesting was found increasing as evidenced by the fact that women contribute up to 62 per cent of total labour requirement in harvesting.

In case of households with very small land holdings, loss of man-days to male workers due to mechanisation was 41.6 days in irrigated and 19.6 days in non-irrigated situation. Diversification into activities such as betel leaf cultivation, vegetable farming in irrigated area and non-farm activities in non-irrigated area were some of the alternatives for more income generation of households affected by mechanisation. Increased participation of women in vegetable farming was also observed.

#### **Economic advantage of mechanisation**

Mechanisation of farming activities was found beneficial by the farms that were heavily dependent on hired labour. It was estimated that per acre reduction in cost in manure application was Rs. 230/- and in case of land preparation, it was Rs. 360/- (only considering human labour) and up to Rs. 2160/- considering both human and bullock labour. Similarly, use of electrically operated thresher saved Rs. 350/- per acre. Impact of mechanisation in irrigated areas has been the reversal of the trend in leasing-out of lands by land owners to landless and land poor. Similarly, in non-irrigated areas, there has been evidence of reversal of the practice of keeping field fallow because of low returns and high cost of production due to labour

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## Spread of the activities

Table 24 : Number of days taken to complete an activity (range)

Activity	Irrigated		Non-irrigated	
	Manual	Mechanised	Manual	Mechanised
Manuring	5-10	2-3	7-12	2-5
Ploughing	10-20	1-7	18-24	5-9
Transporting the harvest	3-7	2-3	5-10	3-5
Threshing	5-10	1-5	5-15	2-7

### Gender implications

- Save time on the part of men in contacting and coordinating the activities
- Free from inconvenience like repeatedly contacting labourers and succumbing to workers' terms and conditions
- Reduced burden on women as they were no more required to support their male counterparts and prepare food for hired labourers

### Benefits of mechanisation to women

Benefits of mechanisation such as timeliness of operation, cost saving, reduced inconvenience were shared by all categories of farms.

- Among the families depending on wage labour in agriculture, but, having small landholdings, about three-fourth were found adopting the use of tractor.
- Mechanisation of activities created additional space for women in new areas and led to restructuring of gender roles. About 25 per cent of women from traditionally non-working families in irrigated areas and 17.5 per cent in non-irrigated areas were found involved in activities like threshing using threshers. Similarly, about 80 per cent of working women, mostly agricultural labourers, were found involved in threshing, normally a male-dominated activity, by using thresher.
- Introduction of threshers has created, on an average, 18 additional days of employment for women in irrigated areas and 5.2 days in non-irrigated areas.
- Mechanisation has motivated women to take up some kind of supervisory /managerial role. About 20 per cent of women in the project area were found managing the work through custom hiring of machines in the absence of male members,

Thus mechanisation did have differential impact on different categories of farm families. While there was displacement of male workers from their traditional tasks; the process has created additional

space for women as family labour in threshing and winnowing, an activity that was largely done by men earlier. There was evidence of reversal of the process of leasing out of lands by land owning families due to mechanisation.

## 2.7 ALL INDIA COORDINATED RESEARCH PROJECT ON HOME SCIENCE

The All India Coordinated Research Project on Home Science was merged with National Research Centre for Women in Agriculture during XI plan. The focus of this inter-disciplinary project has been on agriculture as family enterprise, which engages rural women in varied activities with larger work hours in different agro-climatic conditions. AICRP integrates all the five components of Home Science viz: Foods and Nutrition, Clothing and Textile, Family Resource Management, Human Development and Home Science Extension Education within the micro and macro ecosystem to bring about qualitative changes in family life of rural households. The AICRP on Home Science is in operation at nine Centres/ SAU's viz. CCSHAU, Hisar; PAU, Ludhiana; UAS, Dharwad/ Bangalore; MPUAT, Udaipur; ANGRAU, Hyderabad; GBPUAT, Pantnagar; MAU, Parbani; AAU, Jorhat and CSKHPKV, Palampur. During XI plan period the project plan has been laid down with the following objectives.

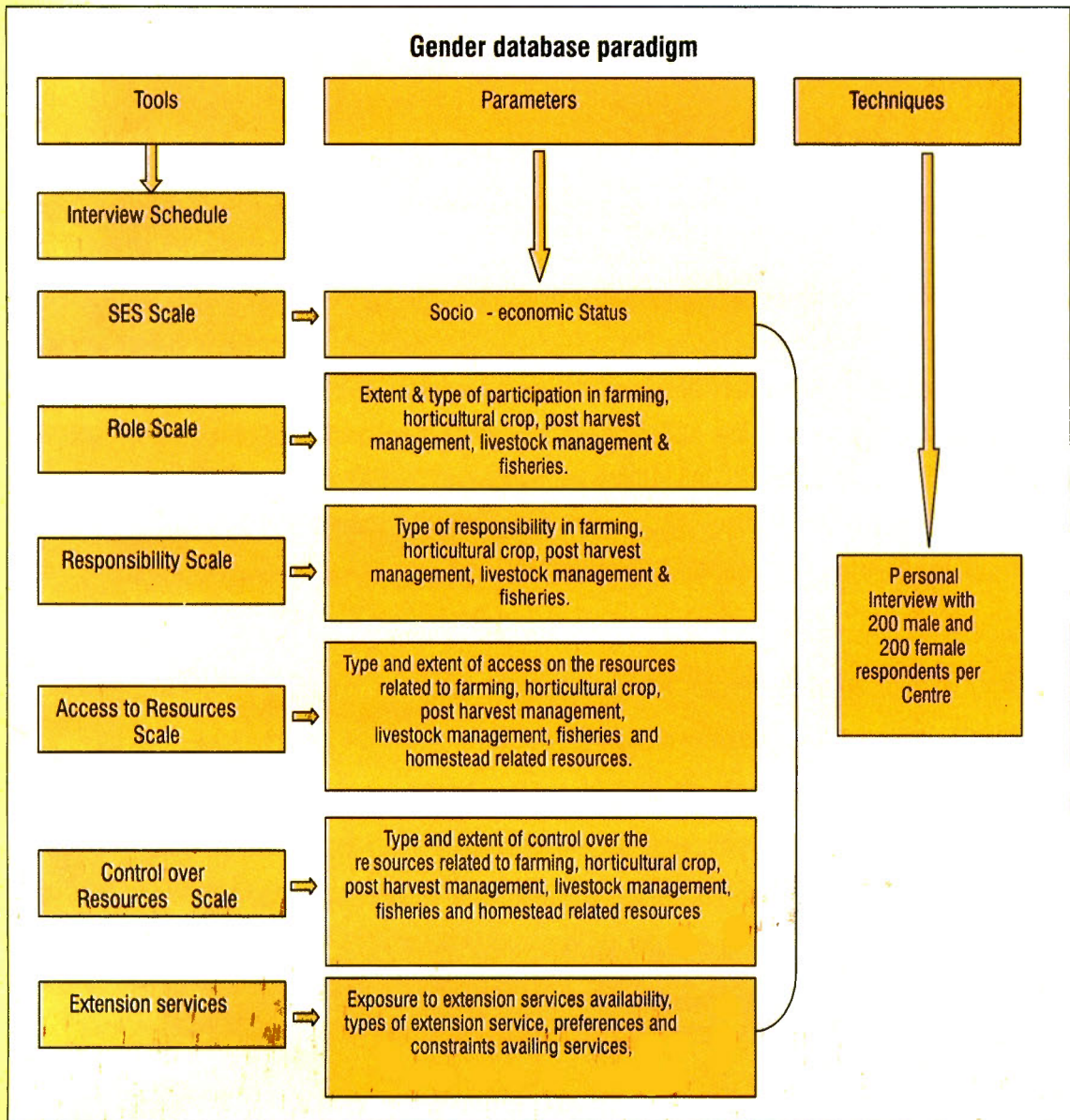
- Development of gender specific database of farm families
- Development of gender specific extension methodologies and training modules
- Technology Interventions for drudgery reduction in agriculture and enterprises
- Nutritional security and health promotion of farm families
- Promoting vocational skills amongst adolescent girls
- Value addition to under-utilized natural resources for enterprise development
- Utilization of non-degradable farm waste
- Empowerment of rural women

### Salient Achievements

#### 2.7.1 GENDER SPECIFIC DATA BASE OF FARM FAMILIES

The gender specific data were collected from 1800 households covering a total of 3600 respondents from nine states (400 respondents from each centre). One male and one female respondents were selected from each household.

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The age profile of respondents indicated that majority (58.49%) of women and 54.08 per cent men were in lower middle age (31-45 years) group in all the states. However, in the category of young (18-30 years) the percentage of women was found more (21.40) as compared to men (13.18).

### **Role, responsibility, access to and control over resources**

The data on role, responsibilities, access to and control over resources of male and female were collected pertaining to major activities such as farming, post harvest management, horticultural crop production, livestock management, fisheries and homestead resources. The sample for this purpose included only those farm families who owned land/leased own land and livestock so that actual information can be gathered.

### **Role in farming activities**

The role of both women and men in various activities are presented in Table 25 and 26. The pooled data of all the states indicated that the independent participation of women is more in livestock management activities i.e. 29.85 per cent and less in horticulture activities (6%). Highest percentage of women performed the activities jointly with men in all the states. The joint participation is more in horticulture activities (79.70%) followed by farming (75.20%) and livestock management activities (58.37%). It was observed that the participation of female jointly with female was high in farming activities (14.29%) followed by horticulture activities (14.29%) and livestock management activities (11.78%). This indicated that the female member played an important role along with their male counterparts in performing various activities. However, the pooled data of all the states revealed that the participation of female members jointly with male members is higher than the independent participation of female members.

Highest percentage (42.69%) of men performed the farm related activities independently. The joint participation of male along with female is high in livestock management activities (50.99%) followed by horticulture activities (44.54%) and other farm related activities (32.77%). The participation of male jointly with female in farming activities is 24.53 per cent, in horticulture 30.96 per cent and in livestock management 25.33 per cent.

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Table 25: Role profile among women (%)

State	Independent			Jointly with female			Jointly with male		
	Farming	Horticulture	Livestock	Farming	Horticulture	Livestock	Farming	Horticulture	Livestock
Assam	10.26	5.14	6.31	17.95	2.10	2.38	71.79	92.76	91.31
Himachal Pradesh	14.67	7.68	32.63	10.77	8.38	18.39	74.55	83.94	48.98
Maharashtra	1.16	1.55	9.41	34.92	37.95	13.28	63.92	60.49	77.31
Rajasthan	12.09	0.00	42.37	9.03	0.00	13.91	78.88	100.00	43.72
Haryana	3.01	6.06	40.98	21.80	48.48	30.10	75.19	45.45	28.92
Karnataka	1.66	0.00	2.69	19.50	0.00	15.82	78.84	0.00	81.48
Punjab	4.82	5.88	42.93	1.61	11.76	5.06	93.57	82.35	52.01
Uttarakhand	4.91	30.65	44.49	4.70	20.97	4.76	90.39	48.39	50.74
Pooled	8.63	6.00	29.85	16.17	14.29	11.78	75.20	79.70	58.37

Table 26: Role profile among men (%)

State	Independent			Jointly with female			Jointly with male		
	Farming	Horticulture	Livestock	Farming	Horticulture	Livestock	Farming	Horticulture	Livestock
Assam	42.64	38.31	27.94	11.40	22.37	48.91	45.97	39.32	23.15
Himachal Pradesh	16.26	14.02	14.61	79.82	82.78	82.69	3.91	3.20	2.70
Maharashtra	17.54	18.18	14.52	23.96	21.99	32.65	58.50	59.83	52.82
Rajasthan	41.43	0.00	30.77	58.20	100.00	39.78	0.36	0.00	29.45
Haryana	51.28	3.23	32.10	16.37	0.00	46.24	32.35	96.77	21.66
Karnataka	10.50	0.00	3.10	70.17	0.00	96.90	19.33	0.00	0.00
Punjab	38.78	45.16	19.51	5.18	16.13	53.24	56.04	38.71	27.26
Uttarakhand	82.27	75.78	29.11	17.69	24.22	70.31	0.04	0.00	0.58
Pooled	42.69	24.51	23.67	32.77	44.54	50.99	24.53	30.96	25.33

The pooled data of all the states regarding the responsibility of both women and men pertaining to farm related activities, horticulture and livestock management indicated that 16.39 per cent of women have taken complete responsibility in farm related activities followed by 17.19 per cent in horticulture activities and 34.10 per cent in livestock management. The highest percentage of women (63.09%) has taken partial responsibility in horticulture. However, 38.45 per cent of women have taken no responsibility in farm related activities followed by 19.72 per cent in horticulture and 18.00 per cent in livestock management.

Similarly, 66.89 per cent men have taken complete responsibility in farm related activities followed by 68.25 per cent in horticulture and 42.12 per cent in livestock management. However, among men 23.86 per cent have taken partial responsibility in farm related activities, 27.55 per cent in horticulture and 37.10 per cent in livestock management. From the pooled data it was observed that very less percentage of men (4.13 - 20.76 %) have taken no responsibility in all these activities (Table 27 and 28).

### **Access to resources**

The access to various resources by women indicated that 15.78 per cent women have complete access in farm related resources followed by 25.53 per cent, 28.19 per cent and 27.36 per cent in horticulture, livestock management and homestead resources respectively. Similarly 40.86 per cent women have partial access in farming, 40.90 per cent in horticulture, 40.95 per cent in livestock management and 51.95 per cent in homestead resources. The percentage of women who have no access in these resources were 43.36 per cent in farming, 33.57 per cent in horticulture, 30.86 per cent in livestock management and 20.69 per cent in homestead resources (Table 29).

The pooled data of all the states indicated that highest percentage of men (80.60%) had complete access to horticultural resources followed by farm related resources (68.23%), livestock management (45.77%) and homestead resources (41.56%). However, among men 10.57 per cent have no access in farm related resources followed by 8.57 per cent in horticulture, 26.86 per cent in livestock management and 17.45 per cent in homestead resources (Table 30).

### **Control over resources**

As far as the control over resources is concerned, pooled data of all the states indicated that 7.34 per cent of women have complete control over farm related resources followed by 7.81 per cent, 21.48 per cent and 15.67 per cent in horticulture, livestock management and homestead resources respectively. Majority of the women (59.62%) have partial control over homestead resources. About 45.87 per cent women have partial control over farm related resources, 32.38 per cent in horticulture and 44.80 per cent in livestock resources. The percentage of women who have no control over these resources were 46.79 per cent in farming, 39.25 per cent in horticulture, 33.72 per cent in livestock management and 27.41 per cent in homestead resources (Table 31).

The data presented in Table 32 showed that majority of the male members (64.96%) have complete control over horticulture resources. Whereas, 61.83 per cent women have complete control over farm related resources, 38.03 per cent in livestock resources and 34.85 per cent in homestead resources. Similarly, 26.89 per cent of men have partial control over farm related resources followed by 22.29 per cent, 33.63 per cent and 47 per cent in horticulture, livestock management and homestead resources respectively. However, among men 11.28 per cent have no control over farm related resources, 12.68 per cent in horticulture, 28.33 per cent in livestock management and 18.14 per cent in homestead resources.

NREGS

The findings indicated that majority of the men have complete access and control over these resources compared to women. Therefore, strategically planning and implementation of different programmes are needed for the women of these states to increase the access and control over the resources.

Table 27 : Responsibility profile among women (%)

State	Farming			Livestock			Horticulture		
	Farming	Horticulture	Livestock	Farming	Horticulture	Livestock	Farming	Horticulture	Livestock
Assam	14.03	7.14	10.27	70.90	83.07	81.92	15.07	9.78	7.80
Himachal Pradesh	42.94	27.16	65.62	47.03	65.85	28.84	10.03	6.99	5.55
Maharashtra	7.22	5.95	8.80	42.29	40.88	42.29	50.49	53.17	48.91
Rajasthan	9.34	0.00	34.45	50.37	0.00	44.58	40.29	0.00	20.97
Haryana	4.03	79.41	61.21	21.00	14.71	24.27	74.97	5.88	14.53
Karnataka	0.75	0.00	6.19	67.55	0.00	90.38	31.70	0.00	3.44
Punjab	3.64	11.76	31.83	7.82	70.59	51.18	88.54	17.65	16.99
Uttarakhand	3.58	10.68	37.18	9.12	16.99	40.61	87.30	72.33	22.22
Pooled	16.39	17.19	34.10	45.16	63.09	47.89	38.45	19.72	18.00

Table 28 : Responsibility profile among men (%)

State	Farming			Livestock			Horticulture		
	Farming	Horticulture	Livestock	Farming	Horticulture	Livestock	Farming	Horticulture	Livestock
Assam	83.21	88.55	84.31	15.07	11.37	15.58	1.72	0.08	0.11
Himachal Pradesh	36.89	40.93	20.03	43.82	50.42	48.68	19.29	8.65	31.29
Maharashtra	66.40	81.38	66.51	26.21	17.15	28.54	7.39	1.48	4.95
Rajasthan	41.30	0.00	30.38	49.44	0.00	39.63	9.27	0.00	29.99
Haryana	88.90	93.55	38.47	6.51	0.00	23.77	4.58	6.45	37.76
Karnataka	42.70	0.00	3.73	28.47	0.00	92.12	28.83	0.00	4.15
Punjab	80.21	88.46	21.11	1.49	11.54	56.97	18.31	0.00	21.92
Uttarakhand	87.13	70.00	20.91	9.70	16.47	42.17	3.17	13.53	36.93
Pooled	66.89	68.25	42.12	23.86	27.55	37.10	9.25	4.13	20.76

Table 29 : Access profile among women (%)

State	Complete				Partial				No Access			
	Farming	Horticulture	Livestock	Homestead	Farming	Horticulture	Livestock	Homestead	Farming	Horticulture	Livestock	Homestead
Assam	10.95	9.12	7.64	16.03	81.65	69.05	86.47	81.65	7.41	21.82	5.89	2.31
Himachal Pradesh	62.20	55.16	81.43	71.51	20.51	27.45	14.60	20.73	17.29	17.39	3.97	7.75
Maharashtra	12.91	15.52	16.02	20.81	39.22	49.85	37.20	52.17	47.88	34.64	46.78	27.02
Rajasthan	10.72	20.00	29.29	14.37	43.93	30.00	40.86	61.72	45.36	50.00	29.85	23.91
Haryana	2.84	0.66	26.17	25.83	19.49	3.95	24.45	33.69	77.67	95.39	49.38	40.48
Karnataka	52.75	0.00	65.25	68.71	34.35	0.00	21.11	23.27	12.90	100.00	13.65	8.02
Punjab	2.40	0.00	26.29	27.22	63.02	0.00	52.96	71.58	34.58	100.00	20.75	1.21
Uttarakhand	3.94	4.73	18.94	9.47	17.92	11.54	26.19	46.21	78.14	83.73	54.87	44.32
Pooled	15.78	25.53	28.19	27.36	40.86	40.90	40.95	51.95	43.36	33.57	30.86	20.69

Table 30 : Access profile among men (%)

State	Complete				Partial				No Access			
	Farming	Horticulture	Livestock	Homestead	Farming	Horticulture	Livestock	Homestead	Farming	Horticulture	Livestock	Homestead
Assam Himachal	87.19	86.15	80.01	78.89	12.27	12.66	19.44	20.39	0.54	1.18	0.55	0.72
Pradesh	83.58	79.63	84.81	74.13	10.50	14.55	12.98	21.57	5.92	5.82	2.21	4.29
Maharashtra	70.37	93.46	73.73	58.85	19.62	4.78	16.89	34.82	10.01	1.77	9.38	6.33
Rajasthan	51.63	0.00	30.77	29.68	41.00	100.00	39.78	56.55	7.37	0.00	29.45	13.77
Haryana	51.50	39.39	23.07	28.50	20.97	0.00	19.24	20.79	27.53	60.61	57.68	50.71
Karnataka	73.27	0.00	80.68	74.44	18.93	0.00	9.92	20.49	7.80	0.00	9.40	5.08
Punjab	68.82	81.25	26.29	6.56	22.88	18.75	52.54	79.28	8.31	0.00	21.18	14.15
Uttarakhand	65.10	35.07	14.32	14.38	17.87	11.81	27.09	47.64	17.03	53.13	58.59	37.98
Pooled	68.23	80.60	45.77	41.56	21.20	10.82	27.37	40.99	10.57	8.57	26.86	17.45

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**Table 31 : Control profile among women (%)**

State	Complete			Partial			No Control					
	Farming	Horticulture	Livestock	Homestead	Farming	Horticulture	Livestock	Homestead	Farming	Horticulture	Livestock	Homestead
Assam	10.84	8.33	8.14	14.09	74.10	65.36	81.16	80.89	15.06	26.31	10.70	5.02
Himachal Pradesh	18.26	12.36	45.28	14.86	62.19	65.31	48.80	76.14	19.55	22.33	5.92	9.01
Maharashtra	6.97	4.16	11.20	15.48	40.92	48.96	38.11	43.31	52.11	46.88	50.69	41.21
Rajasthan	10.72	0.00	28.88	13.97	44.16	0.00	41.47	62.19	45.12	0.00	29.65	23.84
Haryana	2.44	0.00	22.81	23.51	15.47	3.15	24.82	30.10	82.09	96.85	52.37	46.39
Karnataka	0.76	0.00	1.49	3.93	46.78	0.00	63.33	66.51	52.46	100.00	35.18	29.56
Punjab	1.61	0.00	25.50	27.30	63.65	0.00	54.05	71.54	34.74	0.00	20.45	1.15
Uttarakhand	3.73	5.41	18.73	8.12	15.27	11.46	23.19	39.55	81.01	83.12	58.08	52.33
<b>Pooled</b>	<b>7.34</b>	<b>7.81</b>	<b>21.48</b>	<b>15.67</b>	<b>45.87</b>	<b>32.38</b>	<b>44.80</b>	<b>59.62</b>	<b>46.79</b>	<b>39.25</b>	<b>33.72</b>	<b>27.41</b>

**Table 32 : Control profile among men (%)**

State	Complete			Partial			No Control					
	Farming	Horticulture	Livestock	Homestead	Farming	Horticulture	Livestock	Homestead	Farming	Horticulture	Livestock	Homestead
Assam	88.00	82.25	81.81	77.44	11.46	12.02	17.54	21.60	0.54	5.73	0.65	0.96
Himachal Pradesh	40.14	48.81	25.54	28.76	52.08	40.61	64.54	65.06	7.78	10.59	9.92	6.18
Maharashtra	63.14	80.42	70.16	57.57	24.30	12.69	19.97	33.72	12.56	6.89	9.86	8.71
Rajasthan	51.39	0.00	30.38	30.05	41.48	0.00	39.63	56.29	7.13	0.00	29.99	13.66
Haryana	60.60	42.62	27.71	30.71	10.70	0.00	14.86	17.79	28.70	57.38	57.43	51.50
Karnataka	21.02	0.00	8.45	4.50	59.07	0.00	60.56	83.86	19.91	0.00	30.99	11.63
Punjab	67.55	76.47	25.50	5.35	25.14	17.65	54.18	80.52	7.31	5.88	20.33	14.13
Uttarakhand	68.95	34.93	17.59	22.06	14.22	13.24	23.26	40.99	16.84	51.84	59.15	36.95
<b>Pooled</b>	<b>61.83</b>	<b>64.96</b>	<b>38.03</b>	<b>34.85</b>	<b>26.89</b>	<b>22.29</b>	<b>33.63</b>	<b>47.00</b>	<b>11.28</b>	<b>12.68</b>	<b>28.33</b>	<b>18.14</b>

### **Role and responsibilities in fisheries related activities**

As regard to gender role in fisheries, the women of Karnataka, Maharashtra and Assam states were involved in fishing and shouldered the partial responsibility. In Maharashtra state, women have performed the activities jointly with men and the male members had the major share of responsibility. In case of Assam, equal numbers of male and female members were involved in fishing related activities and equally shouldered the responsibility.

### **Access to and control over fisheries related resources**

In fisheries related resources the rural women had only partial access to the resources and majority of the women had no control over resources whereas, the male members had complete access and control over the resources. The data showed that though the women respondents are involved in the activities their right to use was limited.

Thus from the findings over role and responsibility of activities in different areas, it can be concluded that the rural women perform all the activities but not given the responsibility. With regard to access to and control over various resources, women have partial access to resources but the control was limited except in homestead related resources. Therefore it can be concluded that findings emphasized the need for gender sensitization programmes.

### **Access to extension services**

In order to bring the women at par with men by making the women friendly technologies available to them, improvements should be made to their knowledge and skill in technologies through extension services. Knowledge of the extension personnel, availability of extension services, preferences of different type's of extension services and the reasons for not availing the extension services was studied under this project.

Highest percentage (50.98% and 63.69%) of both female and male members of Assam possessed knowledge of VLEW followed by Karnataka (44.44 % and 39.13%, respectively). In Maharashtra more (80.50%) male members had knowledge of VLEW where as the percentage of female members was less (43.00%). In Karnataka more of the female members had knowledge of extension officer (59.26%) and NGO personnel (44.44%). Both female and male members of Haryana know University personnel, which was 53.70 per cent and 60.00 per cent respectively. The NGO network seems to be strong in Maharashtra and Rajasthan compared to rest of the states.

The data related to the extension services clearly indicated that the contact of extension worker with rural population must be regularized covering a wider geographical area. More number of rural population should be covered. Number of extension programmes need to be increased and the method of information dissemination should be diversified. Moreover, the extension programmes should be conducted at convenient time of the target group to increase the effectiveness and output of the programme.

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The adoption rate of technologies delivered through different extension methods is not satisfactory as revealed by different research studies. Therefore, the type of problems faced was studied in this project. The data revealed that 51.69 per cent of female respondents at Haryana always faced some problems in adoption of farm related technologies. In Uttaranchal 80.15 per cent of female respondents faced problems both in horticulture related as well as homestead related technologies. Similarly, the male members also faced problem in adoption of improved farm related technologies in these two states due to complexity of the technologies.

### 2.7.2 DEVELOPMENT OF GENDER SPECIFIC EXTENSION METHODOLOGIES AND TRAINING MODULES

To develop gender responsive training modules for livelihood security, all the nine states had collected the list of successful women entrepreneurs from one agro climatic zone of each state. The list had been collected from the District Industrial Centre, Directorate of Rural Development Agency, etc. The collected information indicated that the various enterprises in which women are involved are rice processing, oil milling, flour mill, tasty pickles, ayurvedic swagruha products, plastic industries, ready made garments, paper cups and plates, bags and banjara products, herbal beauty products, bricks, bakery products and book-binding.

Further, to develop innovative strategies for up-gradation of knowledge and skill of farmwomen to enhance their productive role, each centre has adopted five villages with in a radius of 20- 50 kms. Disadvantaged women groups have been identified according to socio-cultural variables and PRA has been conducted in each selected village for need assessment of these women groups. Awareness camp, Information, Education and Communication (IEC)



(Need assessment through PRA)

programme and Training programmes are being conducted in different areas by all centres. Capacity building in terms of knowledge and skill of the women groups in the adopted villages at each centre was being conducted from time to time. Linkages were established with the line departments, organised exposure visits for both farmers and farm women and completed the PRA activities such as transect walk, village mapping, resource mapping, Venn diagram and time- line in the adopted villages.

### 2.7.3 TECHNOLOGY INTERVENTIONS FOR DRUDGERY REDUCTION IN AGRICULTURE AND ALLIED ENTERPRISES

The data for technology interventions have been collected from 45 adopted villages from nine different centres of AICRP. The collected data have been analyzed for the following aspects:

- Gender participation in farm activities as per location specific cropping system (state wise)



- Gender variation in the drudgery experiences in different crop activities
- Gender friendly technologies available.

### Gender participation in farm activities as per location specific cropping system (state wise)

The following were the cropping systems identified by each centre for technology validation and intervention for reducing drudgery (Table 33).

Table 33 : Identified cropping systems in the adopted villages

Centre	Adopted villages	Cropping systems identified in the adopted villages (Kharif & Rabi)
AAU, Jorhat, (Assam)	Dulia Gaon, Ohar Gaon, Fota Gaon, Silikha Sanatan and Hatichungi Chamua Gaon	Rice – maize – vegetables – black gram – mustard-fruit orchards – perennial cultivation of tea, bamboo, aquatic fish
ANGRAU, Hyderabad (Andhra Pradesh)	Kandawada, Palgutta, Malkapur, Ibrahimapli and Kasaram	Rice- bengal gram - maize X cotton – sorghum X red gram - safflower/ sunflower – flowers - vegetables
CCSHAU, Hisar (Haryana)	Shahpur, Ludas, Bhurri, Harikot and Gandhinagar	Cotton x bajra – jowar - wheat x mustard – bengal gram
CSKHPKV, Palampur (Himachal Pradesh)	Banuri, Jalehar, Gankhetar, Panaper and Sarkari Sidhpur	Rice – maize - wheat - vegetables
GBPUA&T, Pantnagar (Uttarakhand)	Jai Nagar , Dogra, Netaji Nagar, Amia, Anandpur, Bhamborla, Pantpura and Shanti Nagar	Rice x red gram – maize
MAU, Parbani (Maharashtra)	Erandeshwar, Nandkheda, Taroda, Brahmanagaon and Singnapur	Sorghum X safflower – cotton – maize – vegetables
MPUA&T, Udaipur (Rajasthan)	Palana Kala(Jharna), Palana Khurd (Rampuria), Mahuda, Virdholia and Noorda (Sindhu)	Rice x red gram – maize ; wheat – mustard - vegetables
PAU, Ludhiana (Punjab)	Hassanpur, Bhanaur, Gahaur, Mohi and Mansuran	Rice – vegetables ; wheat - vegetables
UAS, Dharwad (Karnataka)	Yettingudda, Nigadi, Govanakoppa, Hebballi and Uppinbetageri	Rice x red gram – maize/ jowar – vegetables ; oil seeds - bengal gram x safflower – wheat

Gender role participation in the farming activities for each crop in the adopted villages was analyzed and the results are as follows (Table 34).

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Table 34 : Crop wise gender participation (%) in farming activities

crop	Women exclusive	Women dominant	Women & men equal participation	Women subordinate	Men Exclusive	States
Rice	7.5	10.5	10.5	52	48	Assam, Andhra Pradesh, Himachal Pradesh
Wheat	0	23	21.5	40.5	16.5	Haryana, Himachal Pradesh, Punjab Rajasthan,
Sorghum	0	31	43	26	0	Maharastra
Maize	15.8	7.3	26.0	12.2	31.8	Himachal Pradesh, Rajasthan,
Vegetables	0.8	3.2	19.8	17.6	29.4	Andhra Pradesh, Haryana Himachal Pradesh
Cotton	14	29	5	24	35	Haryana Maharastra

### Drudgery in men and women

Among the agricultural operations, in the adopted villages of ANGRAU Centre in Andhra Pradesh, the most drudgery prone activities were tillage, manuring, fertilizer broadcasting, storage and marketing as perceived by men. Whereas, women found drudgery prone activities like harvesting, weeding, intercultural operations and threshing. Thus, distinctly different technological needs were observed between gender. Men wanted technologies that can be operated with power and tractor for all the crop production operation except weeding. However, women used no improved hand implements in the adopted villages. They used indigenous methods and had many body discomforts/disorders but used to ignore the disorder if it was of mild nature which indicated the need for developing women friendly tools.

### Intervention of gender friendly technologies

The improved technologies, which were available for different agriculture activities included, ring cutters for harvesting vegetables and flowers, improved sickle for harvesting paddy, harvest bag for cotton picking, improved weeders, maize shellers for maize threshing, hand wheel hoe, long handled scrubbing brush, hand rake, paddy row seeders, water fetching trolley, potato picker and vegetable peelers. These technologies were validated for transfer to women after multi location field trials.

Ergonomic assessment of third improved model of potato picker designed by FRM component of PAU Ludhiana was carried out and the results showed a decrease in ergonomic parameters like heart rate and energy expenditure. Less muscular stress was found while using the improved potato picker as compared to second model, which was quite heavy. Improvements are being incorporated in its design to make it more comfortable and women friendly and the development of final design is in progress.

Ergonomic assessment was conducted for a newly developed ring cutter for cutting of vegetables. The ergonomic assessment included the comparison of both traditional tools (ordinary knife) and newly developed tool (ring cutter) in terms of different parameters like heart rate, energy expenditure, total cardiac cost of work, physiological cost of work and muscular stress. The trials were performed in the vegetables fields of Malerkotla in Punjab on a sample of 30 farmwomen in the age group of 20-35 years. Initial trials have shown positive results for the use of vegetable plucker and the suggestions given by the respondents are being incorporated for the further improvement of vegetable ring cutter.

Technology was developed at ANGRAU, Hyderabad for reducing drudgery in the manual head loading of vegetables while transporting and it is being tested for its validity. The Head Load Manager developed by ANGRAU, Hyderabad is being validated for relieving drudgery by shifting the loads on heads to shoulders and back muscles so that the user do not feel numbness in head and muscular pain on the neck leading to spondylitis.



Women using improved sickle



Women using improved weeders

The technologies that received wider acceptance were tubular maize sheller, wheel hoe, improved sickle, long handled scrubbing brush, hand weeder, hand rake, water fetching trolley and vegetable peeler. Fifty eight women procured the above technologies on subsidy sanctioned under DRDA, as linkages have already been established with DRDA to facilitate procurement of farm implements under their subsidy programme. Work with other technologies is in progress and linkage with line departments is being established to appraise men and women about improved machinery.

NRGVA

### Technology Intervention of ANGRAU Wheel Hoe: A Success Story

*Rajamalla Reddy (40 years) and his wife Suseela (36 years) live in the village Laxmareddyguda, Shankarpally Mandal, R.R. District of Andhra Pradesh. They belonged to a marginal farm family. They own 6 acres of land, in which they have grown tomato in 1.5 acres, brinjal in 0.5 acres, maize in 2 acres and in the rest of the land cotton was grown. Suseela is a member of a Self-Help Group named Amba, in the village.*

*Technology intervention: A training programme was conducted on drudgery reducing farm technologies on 22 June 2006 in village Laxmareddyguda, shankarpally Mandal. Suseela and Rajamalla Reddy who participated in the training programme, became aware of the technology demonstrated. Reddy was very eager to use the technology in his field. He borrowed wheel hoe from AICRP Centre and used it three times in tomato and brinjal farms in the month of July, August and September 2006.*

*Reddy used to carry out weeding using harrow attached to bullocks. He was worried about using bullocks because some of the crops were damaged during the operation. To overcome this problem he used to engage eight women labour per acre by paying Rs.80/-per head for weeding in his field. Manual power became so costly and he could not engage more people for this activity. After having this wheel hoe he could complete weeding only with two labourers per acre in place of eight thereby reducing the expenditure. The other advantages he experienced was that using the improved technology he could save crop damage and weeding could be done from root level preventing fast growth of weed and mixing up the soil, which helped in better growth of the tomato crops. The added advantage perceived by the couple was that while weeding women used to sit in squatting position which strained their back, upper limbs, lower limbs and stomach. By using wheel hoe they felt that they could do weeding in standing position helping in drudgery reduction. Initially couple used the technology in the tomato field but felt that it would also be useful in jowar, maize and brinjal crops.*

## Technology Intervention of Steam Cooker/Pressure Cooker: A Success Story

*Varalakshmi (42 years) and her husband Krishna (45 years) live in the village Laxmareddyguda, Shankarpally Mandal, R.R. District of Andhra Pradesh. They belonged to a middle-income family. Krishna is a farm labourer and Varalakshmi is a tailor. Some times she also goes to field as farm labourer. She is a member of the Self-Help Group named Bhulakshmi. She actively participates in community service and also encourages other members of her group.*

*Technology Intervention: Varalakshmi attended the training programme on fuel saving technology (steam cooker) conducted by All India Coordinated Research Project team on 16 May 2006. She was impressed by the steam cooker demonstration and got motivated to use it in her home. She borrowed the steam cooker from the AICRP Centre and used it for two days.*

*She cooked rice, dal with gongura and boiled eggs with in 45 minutes. She felt very happy by using the technology as it saved time and fuel. She repeated the cooking in steam cooker in the next day and prepared rice, dal and potato curry in the same time. Previously she used to spend 2 kg wood and some agricultural waste as fuel for cooking, but after the use of steam cooker only half of the fuel was consumed. This made her quite happy. Another advantage she experienced was that continuous stirring and constant attention is not required in cooking the food in a steam cooker.*

*Further, after adopting this technology she need not to strain the water from the rice as she used to do previously, thus minimizing the nutrient loss.*

*Varalakshmi and her family members were happy to adopt the steam cooker as it saved time, energy and money.*

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### Technology Intervention of Hand Rake: A Success Story

*H.Malla reddy is a marginal farmer having six acres of land residing in Lakshma Reddyguda village, Shankarpalli mandal, R. R. District. He cultivates cotton, maize and tomato in this land. He has five buffaloes and two bullocks. His wife Saritha maintains the cattle shed. Saritha participates in farm operations like sowing, weeding, broadcasting fertilizers, harvesting etc. She also earns income by selling milk within the village.*

*Technology Intervention: Training cum demonstration programme was conducted for the use of hand rake on 22 June 2006 by the AICRP Centre in Lakshma Reddyguda village. Malla reddy and his wife were impressed by the demonstrated technology and were motivated to use this technology for cleaning the cattle shed. Before exposure to this technology, Saritha used to gather waste and dung from the cattle shed with hands and transfer it into a bamboo basket. Then she used to clean the floor by coconut broom. This task used to involve lot of bending and squatting positions causing strain to her upper limbs, lower limbs, back and shoulder muscles. She used to feel that maintenance of cattle shed is a difficult job.*

*She felt very happy to use the hand rake in her cattle shed, as by use of the hand rake not much bending and squatting positions were required thereby reducing drudgery in cleaning and maintaining the cattle shed. Another advantage she experienced was that she could finish the work in lesser time. This gave her an impetus to increase her income by increasing the number of cattles as the task of maintenance of cattle shed has become easier by adopting the technology.*



(Women using handrake for dung picking)

### Technology interventions in rural enterprises

All the centres have surveyed the enterprise activities carried out in the adopted villages. The details have been given in table 35

**Table 35: Enterprises run by women in the adopted villages of different states**

Centre	Enterprises
AAU, Jorhat (Assam)	Weaving, food processing, parboiling of rice, vegetable production and selling
ANGRAU, Hyderabad (Andhra Pradesh)	Vegetable production, bakery unit, snacks centre and tailoring
CCSHAU, Hisar (Haryana)	Bead making and string making
CSKHPKV, Palampur (Himachal Pradesh)	Floriculture, making of baskets and brooms, weaving of shawls bag making and soap making
GBPUA&T, Pantnagar (Uttarakhand)	Dairy
MAU, Parbani (Maharashtra)	Gur making
MPUA&T, Udaipur (Rajasthan)	Pottery, Jaggery preparation and dairy
PAU, Ludhiana (Punjab)	Vegetable production, stitching and Dari making
UAS, Dharwad (Karnataka)	Vermicelli production

The collected data revealed that, the following activities/ enterprises require technology intervention for drudgery reduction as shown in Table 36.

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**Table 36 : Enterprises and required activities intervention**

Enterprises	Activities require intervention
Vegetable production	<ul style="list-style-type: none"> <li>• Hand grading and bunching the vegetables in squatting position for long period.</li> <li>• Vegetable packing for maintaining the quality and for fetching higher price.</li> <li>• Manual loading and unloading of harvested vegetables for transporting from farm to market.</li> </ul>
Bakery	<ul style="list-style-type: none"> <li>• Food safety in handling material mix for preparation of puffs and other savories</li> <li>• Packing of prepared food products for marketing.</li> </ul>
Snack and beverage centre	<ul style="list-style-type: none"> <li>• Food safety in handling material manually in preparing snacks and beverages.</li> <li>• Food preparation and service place devices.</li> </ul>

### **Empowerment of women for resource management**

Empowerment programmes were conducted through group discussions, demonstrations and trainings in the adopted villages for women in the resource management practices such as fuel/energy saving practices, alternative energy technologies, water management practices and time and income management.

- The fuel saving devices used were steam cooker, low cost solar drier, solar energy system and solar deices.
- ANGRAU, Hyderabad fabricated low cost solar dryer using indigenous material for effective use of solar energy for household purposes and this technology has been transfered to women in adopted villages.
- Training cum demonstration programme was conducted on solar energy system and its rural application in Govanakoppa village at Dharwad.
- One month intensive training programme on various income generating activities was organised in Hebballi and Nigadi village by Dharwad Centre.
- Three demonstrations were conducted on preparation of household cleaning agents in two villages in Dharwad.
- Training cum demonstration programme on value addition of mango was organised.
- Demonstration was conducted on health and environmental sanitation, water harvesting techniques, crop insurance schemes and household methods of water purification in the adopted villages including Erandeshwar, Nandkheda of MAU Parbani. Microbial testing of water samples collected from Erandeshwar village, Parbani showed that water was unsafe for drinking before intervention programme.



Plant materials viable for setting up dry flower enterprise were identified in the rural areas and women and girls were encouraged to take up this activity as an enterprise.

#### **2.7.4 NUTRITIONAL SECURITY AND HEALTH PROMOTION OF FARM FAMILIES**

The importance of optimal nutrition for health and human development is well recognised. Assessment of socio-economic status, somatic, biochemical and dietary intakes of rural families are necessary to develop strategies to improve the quality of life of the rural people. Therefore, efforts have been made to develop protective foodstuffs to safe guard the nutrition and health of the people.

##### **Protective foods for health promotion and nutritional security**

The base line information was collected from 45 adopted villages of nine states covering 1350 farm families (150 house holds in each state) regarding the socio-economic profile of the respondents, anthropometry, food intake and nutritional status of the families. Information related to population and access to infrastructure and farming inputs including educational institutions, health services, agricultural crops, subsidiary enterprises, government programmes related to women were obtained from records maintained by village panchayats, village accountants and key informants including the village school teacher, anganwadi teacher, presidents of mahila mandals and presidents of dairy cooperatives in each adopted village.

Majority of the farm families had agriculture as main occupation and source of income followed by dairy. The mean annual income of the households in the adopted villages of nine centres ranged from Rs. 1864/- to Rs. 73000/- for agriculture followed by dairy (Rs. 3096/- to Rs. 58116/-). However, mean annual income from other sources ranged from Rs. 1672/- to Rs. 63298/-. The total mean annual income from various sources ranged from Rs. 14455/- to Rs. 146405/- (Table 37).

The total mean monthly expenditure on various food items ranged from Rs. 627 to Rs. 4575. The maximum expenditure of selected households was found on grocery items, which ranged from Rs 202 to 1146. The minimum expenditure was observed on fruits which ranged from Rs 25 to Rs 257. Variations in expenditure on different food items were found in all the states (Table 38).

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Table 37 : Estimated average annual income from various sources

Sl. No.	State	Annual Income (Rs.)			
		Agriculture	Dairy	Others	Total
1.	Assam	21197	-	48629	69030
2.	Andhra Pradesh	1864	9098	3493	14455
3.	Haryana	44600	8462	28296	82058
4.	Himachal Pradesh	7754	3149	63298	73064
5.	Uttarakhand	38696	3096	36833	76671
6.	Rajasthan	7656	47664	1672	56992
7.	Maharashtra	59900	4453	21266	85620
8.	Punjab	73000	58116	15620	146405
9.	Karnataka	16046	8193	28603	52843

Table 38 : Estimated monthly expenditure on various food items by farm families of different centers located in nine States

Sl. No.	State	Expenditure in Rs. On Food Items					Total
		Milk	Veg.	Fruits	Grocery	Others	
1.	Assam	36	286	25	825	365	1539
2.	Andhra Pradesh	175	312	130	859	6	1484
3.	Haryana	1788	412	257	1146	472	4077
4.	Himachal Pradesh	125	139	133	1081	1541	3021
5.	Uttarakhand	133	315	76	1023	154	1640
6.	Rajasthan	115	153	35	202	121	627
7.	Maharashtra	167	162	122	801	59	1313
8.	Punjab	2094	571	166	895	855	4575
9.	Karnataka	106	110	56	870	404	1548

The food consumption pattern reflected the nutrient intake of different members in a household. Mean nutrient intake by farm families (per family and per adult consumption unit) of adopted villages was worked out. The protein intake by all families was above 46 g per day. The mean intake of carbohydrate, fat, energy, calcium, iron and Vitamin C ranged from 293 to 2737g, 15 to 185 g, 884 to 13745 Kcal, 22 to 2708 mg, 14 to 112 g and 52 to 1025 mg per day respectively. The mean intake of  $\beta$ Carotene was 1079 mg per day (Table 39).

Table 39 : Estimated mean nutrient intake by farm families of nine states

Sl. No	State	Protein (g)	Fat (g)	CHO (g)	Energy (Cal)	Calcium (mg)	Iron (mg)	Vitamin C (mg)	$\beta$ - Carotene (mg)
1	Assam	52	15	440	2082	250	14	52	1079
2	Andhra Pradesh	348	140	2360	13745	2456	85	-	-
3	Haryana	74	61	381	2428	1101	24	-	-
4	Himachal Pradesh	53	31	604	1965	609	23	-	-
5	Uttarakhand	76	63	2737	884	22	67	1025	-
6	Rajasthan	315	185	1735	9859	2708	112	-	-
7	Maharastra	46	16	293	1508	251	17	-	-
8	Punjab	65	67	314	2218	1140	18	-	-
9	Karnataka	53	28	392	1999	738	20	-	-

To determine the nutritional status of the women of the selected households, anthropometric measurements were taken. The mean Body Mass Index (BMI) of adult women are presented in (Table 40) which ranged from 18 to 29. The mean BMI of pregnant and lactating women ranged from 17 to 22.

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Table 40 : Mean anthropometric measurements of farmwomen of nine different states

Sl. No.	State	Adult Women			Pregnant Women			Lactating Women		
		Height (cm)	Weight (Kg)	BMI	Height (cm)	Weight (Kg)	BMI	Height (cm)	Weight (Kg)	BMI
1.	Assam	147	46	21	149	49.50	22.29	149	45	22.29
2.	Andhra Pradesh	151	46	20	-	-	-	-	-	-
3.	Himachal Pradesh	142	41	29	127	28	17.2	150	40	17.0
4.	Uttarakhand	151	50	22	-	-	-	-	-	-
5.	Rajasthan	156	46	19	-	-	-	-	-	-
6.	Maharashtra	152	45	19	-	-	-	-	-	-
7.	Karnataka	134	36	18	-	-	-	-	-	-

It was evident that majority of selected women in each centre had normal BMI i.e., 18.5 to 25.0, except Rajasthan State (Table 41) where majority of women were found to be under nourished (BMI < 18.5).



Scientist measuring the height of farm women

Table 41: Distribution of women respondents over BMI classification

Sl. No	Centre	Body Mass Index (BMI)	Percentage		
			Adult women	Pregnant women	Lactating women
1	AAU, Jorhat (Assam)	<18.5	10.20	-	18.20
		18.5-25.0	79.60	100.00	81.80
		>25	10.20	-	-
2	ANGRAU, Hyderabad (Andhra Pradesh)	<18.5	30.90	-	-
		18.5-25.0	63.00	100.00	100.00
		>25	6.10	-	-
3	CSKHPKV, Palampur (Himachal Pradesh)	<18.5	38.55	-	100.00
		18.5-25.0	54.58	50.00	-
		> 25	6.87	50.00	-
4	GBPUA&T, Pantnagar (Uttara Khanda)	<18.5	16.67	-	27.27
		18.5-25.0	62.25	100.00	72.73
		>25	21.08	-	-
5	MPUA&T, Udaipur (Rajasthan)	<18.5	47.90	-	-
		18.5-25.0	45.70	-	-
		>25	6.40	-	-
6	MAU, Parbhani (Maharashtra)	<18.5	41.79	40.00	68.96
		18.5-25.0	54.72	60.00	31.04
		>25	3.48	-	-
7	UAS, Bangalore (Kranataka)	<18.5	27.50	15.39	-
		18.5-25.0	61.67	46.15	100
		>25	10.83	38.46	-

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### Promoting micronutrient security among farm families through nutrition garden

The concept of nutrition garden was promoted among the selected families to create awareness and motivation about the role of micronutrients in the diet. The baseline information was collected from 1350 households of 45 adopted villages of nine states. Very few (less than 40%) families were having some kind of kitchen garden to be used for household purposes. Ten families from each village were selected, out of these five were taken as control group and another five constituted the experimental group for promotion of nutrition garden. The experimental group was given seeds and seedlings for raising the nutrition garden. Guidance was given for systematic layout, seedbed preparation, time of sowing seeds, timely irrigation, manuring and regular care.

### Processing and quality evaluation of region specific under utilized foods to combat micronutrient deficiency (anaemia)

An iron rich product named as **Lehyams** by using locally available unconventional green leafy vegetables was developed at ANGRAU, Hyderabad. All the scientists of other centres were trained in the preparations of this iron rich '**Lehyams**' by using unconventional green leafy vegetables available in their respective states. The standardization of the product developed with different combinations of ingredients was carried out by all Centres. The analysis of nutrient composition of the product formulations is in progress. These formulations will be further studied for storage and will be utilized as iron supplement to improve nutritional status against anaemia. The Combination of the lehyams standardized have been presented in Table-42.



Preparation of iron rich product LEHYAMS

Table 42 : Combinations of the Lehyams standardized

Sl. No.	Lehyams standardized	Combinations/ Ingredients used
1.	<b>AAU, Jorhat ( Assam)</b> Matured cauliflower leaves dry powder + Madhusuleng ( <i>Polygonum microcephalum</i> )	Matured cauliflower leaves dry powder 25 g, madhusuleng leaves dry powder 8 g, jaggery 125 g, lemon juice ½ tsp, ginger ½ tsp.
2.	<b>CSKHPKV, Palampur (Himachal Pradesh)</b> Cauliflower leaves	Cauliflower 125 g; amla 50 g; fenugreek leaves 25 g; basil leaves 20 g; jaggery 125 g; cardamom, clove, black pepper powder 1 tsp.
3.	<b>GBPUA&amp;T, Pantnagar (Uttarakhand)</b> Bengal gram leaves	Bengal gram leaves (pulp) 450 g; jaggery 450 g; amla pulp 150 g; dry dates pulp 450 g; cardamom 20 nos.
4.	<b>PAU, Ludhiana( Punjab)</b>	
i)	Amla prash	Amla pulp 100 g; mishri 110 g; cauliflower green powder 7.5-15 g; honey 5 g; cinnamon, clove, cardamom 1.5 g
ii)	Ginger prash	Cauliflower green pulp 100 g; jaggery 100 g; lemon juice 7 ml; honey 5 g; ginger extract 2 ml
iii)	Mint prash	Cauliflower green pulp 100 g; jaggery 100 g; lemon juice 7 ml; honey 5 g; mint extract 5 ml
iv)	Missa Prantha	Wheat flour 75 g; bengal gram flour 25 g; oil 15 g; cauliflower green powder 5 g – 7.5 g; lemon juice 15 ml
v)	Bengal gram dhal	Bengal gram dhal 100 g; onion 35 g; tomato 35 g; cauliflower green powder 5-7.5 g; lemon juice 15 ml.

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### **Nutrition education and awareness through information, education and communication (IEC) programmes for improving health & nutrition of farm families**

Nutrition education was imparted to women of 45 villages of nine states in the areas such as general health and nutrition, hygiene and sanitation, balanced diet, recommended daily allowances, different food groups, sources of different nutrients, nutritional requirement by different age groups, micronutrient deficiencies, importance of green leafy vegetables, Iron lehyams and utilization of locally available foods to minimize post harvest losses for nutrition security. Demonstrations were conducted in food processing and value addition in locally available foods.



**Fig 28: Glimpses of IEC Programmes**

Two training programmes, for Self-Help Group members in the adopted villages were organised on causes and control of anaemia and 100 women beneficiaries participated in the training programme. The training programme on anaemia covered areas like, prevalence, causes, preventive measures, de-worming, importance of hygiene and sanitary practices to prevent anaemia, balanced diet and therapeutic diets for anaemia and rich sources of iron, beta-carotene and vitamin C. Specimens of iron rich sources and iron rich diet were displayed during the training programmes.

### **Promoting food based enterprise among farmwomen for livelihood security**

Training programmes were conducted in the adopted villages for rural women and adolescent girls for promoting food-based enterprises like, agro-processing and preservation of fruits and vegetables into pickles, chutneys, squash, ketchup and sauce from locally available foods (Table - 43). The training programmes were found to be helpful in promoting food based entrepreneurial activities of Self Help Groups in the adopted villages.



Table 43 : Training programmes conducted for livelihood security

Sl. No.	Name of training programmes	No. of trainings	No. of participants
<b>1.</b>	<b>AAU, Jorhat ( Assam)</b>		
	a) Importance of green leafy vegetables and their uses	5	128
	b) Nutrition garden – its importance	5	141
	c) Food processing and preservation for small scale industries	5	160
	d) Preparation of pickle and chutney from locally available seasonal vegetables	5	179
<b>2.</b>	<b>HAU, Hisar ( Haryana)</b>		
	a) Health care of infants	-	25-30
	b) Balanced diet for pregnant and lactating mothers	-	25-30
	c) Nutritional requirements of adolescent girls	-	25-30
	d) Kitchen garden for good health	-	25-30
	e) Demonstration on nutritious recipes	-	25-30
<b>3.</b>	<b>GBPUA&amp;T, Pantnagar ( Uttarakhand)</b>		
	a) Anaemia-causes and remedies	5	55
	b) Importance of green leafy vegetables and their uses	5	55
<b>4.</b>	<b>MPAU&amp;T, Udaipur( Rajasthan)</b>		
	a) Value addition of amla.	2	15
	b) Low cost nutritious recipes.	2	12
	c) Maize papad preparation	2	10
	d) Importance of balanced diet	2	54 (school children)
<b>5.</b>	<b>MAU, Prabhani ( Maharashtra)</b>		
	a) Causes and symptoms of anaemia	5	350
	b) Methods of dehydration and use of dehydrated leafy vegetables in the preparation of different iron rich recipes like cauliflower leaves (Dhapate) and rice flakes (Chiwada)	5	400

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Table 44 : Training programmes conducted for livelihood security

Sl. No.	Name of training programmes	No. of trainings	No. of participants
	c) Balanced diet d) Importance of soybean e) Nutritional deficiency disorders f) Protein energy malnutrition g) Health, hygiene and sanitation h) Storage practices of food commodities.	20	70-75 beneficiaries in each villages
<b>6.</b>	<b>PAU, Ludhiana (Punjab)</b>		
	a) Balanced diet	2	50
	b) Healthy foods to combat anemia	5	55
	c) Importance of nutrition garden	5	50
	d) Nutritional care of vulnerable groups	2	55
	e) Preservation of amla, carrot and lemon.	1	60
<b>7.</b>	<b>UAS, Bangalore ( Karnataka)</b>		
	a) Value added products from grain, amaranth and rice bean.	1	35
	b) Fruit and vegetable preservation techniques.	1	40
	c) Preparation of papads from rice bean and horse gram for rural entrepreneurship.	1	45
	d) Preparation of jam, jelly and squash using locally available fruits.	1	58
	e) Nutritious papads from ragi, soyabean and rice bean.	1	55
	f) Pickle making for rural entrepreneurship.	1	45
	g) Fruit and vegetable preservation for small-scale cottage industries.	1	58
	h) Value added papads for nutrition and cottage industry.	1	62
	i) Value addition of common products using finger millet and under utilized grains.	1	48
	j) Pickles and squashes for rural industries to empower Self Help Group women.	1	55

## 2.7.5 PROMOTING VOCATIONAL SKILLS AMONGST ADOLESCENT GIRLS

A sample of 1351 adolescent girls and young married women in the age group of 11-25 years were selected by all the nine centres (100-150 from each centre). Intensive training programmes of three months duration were conducted to develop vocational skills among adolescents in areas like, crèche organization and management, establishment and management of early child hood education centres, preparation of educational play materials, nursery raising for vegetables and fruits, vermi compost preparation, colour yielding and medicinal plants and mushroom cultivation. The technology transfer and training programmes helped the women to take up the income generating activities. Adolescents also become members of self-help groups and were involved in enterprise development. It was found that all the participants gained sufficient knowledge of all the selected technologies after training.

### **Social and educational empowerment of adolescent girls and young women of farm families**

Five educational packages which were developed under AICRP in 2003-04 were used for educational empowerment of adolescent girls and young women. The different aspects of educational packages are knowledge, communication and social skills, legal awareness, general knowledge and economic empowerment. The components of the knowledge index included health, reproductive health, nutrition, child rearing practices, general knowledge and entrepreneurial activities. These were translated into regional languages and were provided to literate adolescent girls to read on their own. The intervention was provided to the adolescent girls and young women for a period of 18 months. The content of the packages were presented through slides, films, group discussions and trainings. To address the gender issues, group discussions were also held on differential treatment between boys and girls and how the next generation should overcome it.

Educational intervention with a sample of 1227 adolescent girls was provided with four post testing with an interval of six months between two post tests, revealed that the intervention was effective in enhancing the awareness, knowledge, skills and capacities. The awareness and knowledge on health, hygiene, nutrition, reproductive and child health, general knowledge, child rearing practices had increased by 8-10 indices from pre test to post test-I in all the components. There was an increase of 8 points in the total knowledge scores when all the centres were combined. Similar trend was observed at post test-II with an increase of eight points. It is evident that the knowledge indices increased in all the seven components from pre test to post test 5 (Table - 44).

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Table 44 : Knowledge Index

Variables	Pre Test N=1227	Post Test-1 N= 963	Post Test-2 N =634	Post Test-3 N= 454	Post Test-4 N= 165	Post Test-5 N= 165
Numeric	42.13	49.17	59.58	63.44	56.93	59.93
Health & hygiene	18.77	22.44	29.11	31.49	23.32	23.33
Nutrition	10.66	15.85	19.71	23.55	14.83	15.51
Child & reproductive health	16.11	26.65	35.08	41.43	27.27	27.80
General knowledge	34.92	43.51	52.99	56.92	45.83	46.57
Child rearing	37.68	49.33	62.06	64.87	62.69	63.52
Economic	23.62	33.78	42.07	37.92	58.96	59.96
<b>Total</b>	24.50	32.52	40.59	43.38	38.45	39.26

Maximum percentage of mean gain (149.61) after 2 years of rigorous intervention was observed on economic aspect followed by child and reproductive health (69.27) and knowledge regarding child-rearing practices (66.37). Mean percentage gain was found to be minimum (Table 45) in health and hygiene (24.24) Hence, the areas of health and hygiene, common knowledge and nutrition still need to be strengthened through further intervention.

Table 45 : Mean Gain at Final Post Test

Variables	Percentage Gain
Numeric	35.13
Health & hygiene	24.24
Nutrition	39.11
Child & reproductive Health	69.27
Common knowledge	31.24
Child rearing	66.37
Economic	149.61
General Knowledge	56.93

### Communication skills among adolescents

Communication is an important aspect for vocational success of the adolescents. Therefore, the communication skills of adolescents were assessed. The communication skills at pre test was found lowest among adolescents of Punjab, Haryana and Assam states ranging from 5-6 indices whereas, highest among adolescences of Andhra Pradesh and Himachal Pradesh ranging from 33-35. Adolescence of Karnataka state ranged between 10-19.

Marked changes were observed in communication skills of adolescence belonging to different states under study on post test. The overall communication skill of the sample of all the nine centres/states showed an improvement of 13 indices at the stage of post test from 3 at the time of pre testing (Table 46).

States	Components	Pre Test	Post test-1	Post test-2	Post test-3
Punjab	C1	7.78	8.39	8.85	8.80
	C2	5.96	6.92	6.91	6.97
	C3	6.75	7.30	7.58	7.87
	Total COMMU	5.93	6.87	7.37	7.59
Karnataka	C1	19.35	25.12	-	-
	C2	13.78	33.47	-	-
	C3	13.44	21.60	-	-
	Total COMMU	10.38	27.10	-	-
Andhra Pradesh	C1	38.52	52.96	74.44	-
	C2	33.4	45.03	66.23	-
	C3	34.28	48.36	72.64	-
	Total COMMU	35.28	48.55	70.80	-
Haryana	C1	2.37	6.70	7.33	8.61
	C2	2.58	3.36	3.99	4.85
	C3	3.23	4.84	5.24	6.53
	Total COMMU	10.31	18.62	20.70	24.30
Assam	C1	5.84	13.07	-	-
	C2	3.36	8.00	-	-
	C3	4.00	5.03	-	-
	Total COMMU	3.10	7.45	-	-
Himachal Pradesh	C1	22.00	26.00	30.00	32.00
	C2	16.67	20.00	21.67	23.33
	C3	22.00	22.00	24.00	24.00
	Total COMMU	21.88	27.5	28.13	29.38
Uttarakhand	C1	40.4	69.44	84.64	86.48
	C2	33.10	62.67	76.73	83.07
	C3	29.12	64.4	84.84	95.6
	Total COMMU	34.18	66.35	82.53	88.83
Maharashtra	C1	19.43	-	-	-
	C2	16.79	-	-	-
	C3	16.65	-	-	-
	Total COMMU	15.03	-	-	-
Rajasthan	C1	18.72	23.28	18.72	-
	C2	13.33	17.00	20.00	-
	C3	12.80	15.20	18.00	-
	Total COMMU	14.85	18.40	18.98	-
Pooled data	C1	18.83	21.67	13.55	8.80
	C2	16.29	17.49	13.16	6.97
	C3	19.06	19.90	12.92	7.87
	Total COMMU	16.35	17.98	14.81	29.19

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## 2.7.6 VALUE ADDITION IN UNDER-UTILIZED AGRO AND ANIMAL BASED FIBRE RESOURCES FOR ENTERPRISE DEVELOPMENT

Data related to availability of underutilised agro and animal based fibres resources, prevalence of technologies in fibre/extraction/ process, product development, their present status, and gender involvement in utilization were collected from 200 families from all zones of each state. The details have been given in Table 47.

Table 47 : Availability of agro and animal based fibers in different states

State	Agro based fibres	Utilization	Animal based fibres	Utilization
Assam	Jute Pati doi	Partially Partially	Eri Muga Mulberry	Fully Partially Partially
Andhra Pradesh	Mesta Jute Banana fibre Coir Palmyra	Partially Partially	Deccani wool	Fully
Punjab	Babbar grass Paddy straw Hemp (Bast) Cane Palm leaves Mulberry stem Cotton (pod)	Partially	Sheep rearing wool	Fully
Rajasthan	Moonj Sunn Ambadi Linseed Dhencha Dadun	Fully	Goat hair Sheep hair	Partially

In Andhra Pradesh State the minor fibres found in North coastal zone I were mesta and jute, in Godavari zone II - banana, coir and palmyra, in Krishna zone III - banana fibre and in Southern Telangana zone IV - deccani wool. Coir and palmyra were mainly used for non-textile purposes.

In zone II, 84 per cent of the respondents were involved in banana fibre product making whereas, 10 per cent were involved in banana fibre extraction. In zone III 50 per cent of the respondents were engaged in making product from banana fibre as secondary occupation. In zone IV deccani sheep rearing was taken up by 72 per cent of the respondents followed by 34 per cent in deccani wool spinning and only 8 per cent in kambali weaving as a primary occupation.

Male members were mainly involved in the activities of mesta and banana fibre extraction, deccani sheep rearing and shearing whereas, females were involved in activities such as handicraft

making from banana, jute and mesta fibre, spinning of deccani wool and making of soft luggage bag from jute fibre.

Mesta fibre seed was sown in both Rabi and kharif in the month of April and June and harvested in August and January in zone I, whereas, in zone II the banana crop was sown in June and January and harvested in December and July. Sheep shearing is done during the months of May and October. Retting and manual extraction methods were followed for extracting mesta fibre and Raspidar machine and knives were used for extracting banana fibre. Large number of respondents expressed that they were facing problems while using machines such as lack of technical expertise, lack of skilled labour, lack of demand for the product and proper price. The deccani wool sheep rearers were not able to realize even the cost.

In zone I, 46.6 per cent respondents were engaged in making mesta handicrafts and 33.3 per cent respondents in making soft baggage with jute. In zone II, 90 per cent respondents were associated with banana fibre handicrafts, whereas, in zone IV, 6 per cent respondents were making deccani wool kambalies. Different techniques used by the respondents for product making from banana, mesta and jute fibres were non-loom techniques such as braiding & macramé and stitching. Pit looms were used for making deccani wool products.

In Punjab the minor fibres available in zone I were - babbar grass (*Eulaliopsis binate*) and paddy straw (Basmati rice). In Zone II, hemp, cane, mulberry sticks and cotton. These fibres were used for making ropes, floor mats, baskets, yarn, *durrie*, *khes* and bed sheets.

In zone I and II of Rajasthan state data were collected from villages of Bikaner and Pali districts from families involved in sheep/ goat rearing, product making and spinning of goat fiber. In zone III, villages of Ajmer districts were selected and data related to agro fibers like, Moonj and Sunn used for product making at household level. Villages of Udaipur district were selected from zone IV and data on Ambadi fiber making were collected. Villages of Kota district from zone V were selected for Sunn, linseed, Dadun and Dhencha fibre. Out of these, only linseed fibres were extracted but not utilized by them so far. Other fibres including dhencha and dadun were used for making ropes for fencing purpose at household level.

### **2.7.7 UTILIZATION OF DEGRADABLE AND NON - DEGRADABLE FARM WASTE**

The degradable and non-degradable farm wastes such as Sisal (*Agave americana*) which is grown as edge plant around the field is usually thrown as agricultural waste were identified in different states. This plant is abundantly available and is a good source for hand-made paper. A group of young men and women were imparted training on making hand made paper, covers, carry bags and big shoppers from sisal fibres. Fibre was extracted from the plant using Raspidar machine to ensure the quality of the fibre to suit the purpose of hand-made paper making.

#### **Standardization of natural dye printing procedure on silk**

Natural dyes developed under the project were standardized into natural dye colour concentrates. Standardization of natural dye printing procedure on silk was also done. Preliminary tests were conducted to optimize the dye and mordant concentrations. Shade cards were developed and fastness test is in progress.

MRGWA

Centre at ANGRAU, Hyderabad, conducted experiments on silk printing with natural dyes using Bombax and Eclipta. Experiments with four mordants (alum, tartaric acid, copper sulphate and ferrous sulphate) and five after-treatments (vinegar, common salt, alum, lime juice and sodium carbonate) were completed. The samples were prepared for colour fastness tests and fastness to sunlight, washing, crocking and perspiration properties were assessed. For silk printing, various vegetable dyes i.e. barberry bark, neem leaves, black kikar bark, reinwardtia flowers and kachnar bark were tried. Two sources viz. reinwardtia flowers and kachnar bark were selected for final printing on the basis of visual assessment and washing fastness. Four mordants including alum, copper sulphate, ferrous sulphate, stannous chloride and their five concentrations were tried. Finally, three mordants (copper sulphate -3 & 5%, ferrous sulphate 1 & 2% and stannous chloride 5 & 7%) were selected for further work.

In Udaipur, the silk fabric was degummed and given Harda treatment for optimization of mordants for outer and filling block were done both by subjective and objective evaluation methods. Pre mordanting method was used for optimization. After mordanting the fabric was dyed with kesula and khakhra dyes. After optimization of 1<sup>st</sup> stage samples, 1 outline block for khakhra and 1 block for kesula dye were optimized from 1 to 10 concentrations of  $\text{Fe}_2\text{SO}_4$  and 2 filling block from each mordants were selected. After mordanting of samples, separate dyeing of samples in Khakhra and Kesula dye was done. After dyeing of samples treatment were given to the samples with  $\text{Na}_2\text{CO}_3$ , Alum, NaCl, Citric acid and Vinegar. Then washing fastness, sunlight fastness and crocking fastness were done with treated samples.

Dyeing and printing of silk were carried out with different dye sources like marigold, arecanut, acalypha, red sander bark, mahogany and teak using different mordants by UAS, Dharwad. Further, dyed and printed silk samples were subjected to after treatments and their colour strength values were recorded. Based on the colour strength values and visual analysis, two best dye sources and two best dye concentrations were selected to assess the colour fastness. Two best dye sources were used to produce value added products like diwan set, bed spread, cushion covers, load covers, pouches, teapoy covers and dress material.

At Parbani centre optimization of concentrations of four mordants namely Alum, Stannous chloride, Copper sulphate, and Ferrous sulphate for block printing on silk and dyeing with flame or forest dye was completed. Five treatments were given to samples and the colour fastness of treated samples to washing, sunlight, dry and wet crocking was tested. Silk yarns were dyed with different natural dyes for preparation of saris.

Further, each centre developed printed shade catalogues for silk samples by using the natural dye sources. MAU, Parbani prepared shade cards of printed silk samples dyed with flame or forest dye. These shades are useful for commercialization as technology for artisans and interested women groups.



## 2.7.8 EMPOWERMENT OF RURAL WOMEN

### Capacity building for micro-enterprise for economic empowerment

Several training programmes were organised for adolescent girls and women Self Help Groups by all the nine centres depending on their need and availability of raw material in their respective states. Trainings were organised related to making natural dye colour concentrates, dyeing cotton, wool and silk with natural dyes, block printing, dyeing and printing, weaving, fabric embellishment and fibre handicrafts, garment making, hand embroidery, designing for textiles, use of different yarns in weaving, carpet making, knitting of mufflers, socks and sweaters and making natural dyed banana handicrafts etc. The trainees were exposed to colour combinations, types of embroidery, designs, embellishments available in market and present fashion trends. The village women were trained to assess the cost of the products. The number of stitches estimated the cost of the products, colour threads and embellishments used, time taken for stitching and market value.

The impact of the trainings was observed as groups established enterprises related to preparation of tie and dye dress materials, hand embroidery, patchwork, tie and dye block printing.



Training on hand embroidery

NRGVA



Garment making



Product preparation from dyed fibre

### Protective clothing for addressing occupational health hazards

The agricultural operation like, pesticide application is a hazardous activity for health and involvement of women in this activity was observed. To identify the region specific women involvement in this operations and available protective clothing and other safety devices. Data were collected on pesticide application on most prevalent crop in that area. The activities were documented using video recording of the Kinematics postures involved. The data revealed in few states that men applied the pesticide to the crops only whereas, in Hyderabad women performed most of the activities in pesticide application and other hazardous agricultural operations in grape gardens. Different precautions were taken by men while applying pesticide like covering face, head, neck, hands, feet, upper part of body and lower part of body. Women experienced skin irritation on hands and upper part of body during hand plucking of okra. They were not aware and familiar about protective clothing. The designs for protective clothing were developed specific to each crop and pre testing of protective clothing schedules was done. Data from 30 pesticide applicators were collected at each centre. Farmwomen in 45 adopted villages of nine Centres were educated in the importance of clothing selection, care and disinfection.

## 2.8 EXTERNALLY FUNDED PROJECTS

### Visioning, Policy Analysis and Gender (V-PAGe)

*Krishna Srinath and H.K. Dash*

#### Objectives

- Document experiences and lessons learnt of various agricultural programmes towards social and economic empowerment of women (especially through a review of literature).
- Undertake case studies to understand the problems and opportunities for women in agriculture.
- Work with the agencies involved (including consortia partners and women groups) and facilitate interventions.
- Develop a strategy (for gender studies and gender interventions) for addressing gender issues especially participation of women in decision-making and build capacity of consortia partners in gender analysis.

#### Achievement

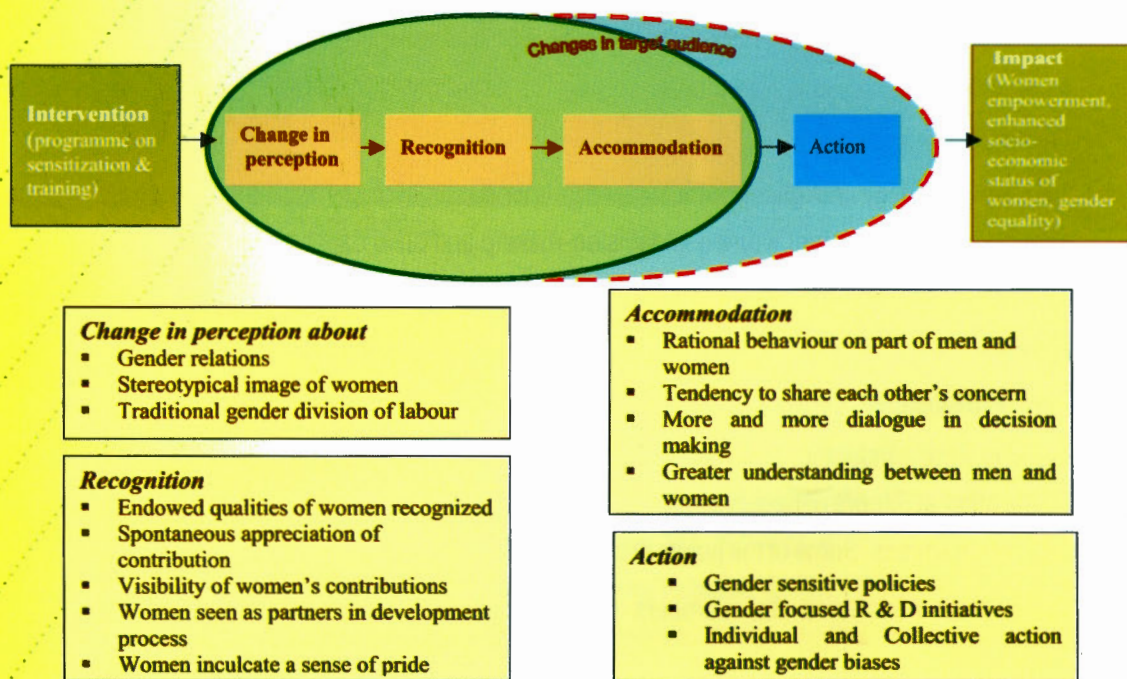
Two sensitisation workshops on Role of Panchayatiraj Institution members in gender mainstreaming were conducted, one at Raichakradharpur of Satyabadi block in Puri district on 28 March 2008 and the other at Simore of Begunia block on 30 March 2008. Ninety PRI representatives participated in the above programmes. Some of the points that emerged from the workshop were:

- About 3/4th Panchayati Raj members never discussed issues related to agriculture among themselves.
- At present, the subject of agriculture is not dealt by panchayats.
- About 88 per cent of members had never discussed problems concerning women.
- For women members, pressing household responsibilities, lack of support and encouragement from men, particularly husbands and lack of orientation to the envisaged role in Panchayati Raj Institutions were factors for low level and passive participation in panchayat affairs.
- Members of the panchayatiraj institutions should be given opportunity to get involved in agricultural planning at grass root level
- Gender sensitization for PRI members should mark the beginning of the programme at village level
- Members can be involved in organizing gender sensitization programmes through discussion, campaigns in villages.
- Strategy for gender sensitization in agriculture should be built up at panchayat level with adequate funding support.

MARGINALIA

To understand the process of gender sensitization and identify key components of a gender sensitization strategy a conceptual model was developed involving focused group discussion with participants of gender-related projects and interaction with professionals. Insights and experiences of scientists under different village level projects were also pooled.

**Conceptual model depicting stages in gender sensitization process**



**Ornamental Fish Seed Production under National Mega Seed Project on Seed Production in Agricultural Crops and Fisheries**

*P.K. Sahoo*

Necessary infrastructure like cement tanks, hatchery shed, bore well with overhead tanks, sand filter was developed. Gold fish, koicarp, rosy barb and livebearers like swordtail, guppy, molly etc, were successfully bred and fry of different species produced :

Goldfish	:	2,00,000
Koi carp	:	25,000
Live bearers	:	5000
Rosy barb	:	100

### 3. PUBLICATIONS

#### 3.1 Research papers

1. Barat, A. and Sahoo, P.K. 2007. Karyotypic analysis of *Channa punctatus* (Pisces) using restriction endonucleases. *Cytologia*, **72** (4): 471-473.
2. Kale, S., Naik, S and Gaikwad, R. 2007 Traditional textile skills in rural areas. *Indian Journal of Global Economy*, **3**(2): 143-148.
3. Mishra, A.K., Subrahmanyam, K.V. and Ramakrishna, Y.S. 2007. Effect of urea molasses mineral block supplementation on milk yield in buffaloes: On-farm evaluation under smallholder mixed farming system in semi-arid. *Indian Journal of Animal Sciences*, **77** (4): 94-100.
4. Misra A.K., Rama Rao, C.A., Subrahmanyam, K.V., Sankar Babu M.V., Shivarudrappa, B. and Ramakrishna, Y.S. 2007. Strategies for livestock development in rainfed agro-ecosystem of India. *Livestock Research for Rural Development*, **19** (6): 1-12.
5. Misra, A.K., Shivrudrappa B. and Ramakrishna, Y.S. 2007. Strategies for enhancing forage production in rainfed regions of India. *Range Management and Agroforestry*, **28** (2): 368-370.
6. Mishra, S. and Biswal, G. 2007. Areas of role conflict of women wage earners. *Journal of Extension Education.*, **IX** (1&2): 95 100.
7. Mishra, S. 2007. Role conflict of married working women and measures to overcome. *Asian Journal of Home Science*, **2** (1 & 2): 11-15.
8. Rao, G.R., Ramana, D.B.V. and Misra, A.K. 2007. Response of protein supplementation to *Deccani* lambs grazing on silvipastoral system during dry period. *Range Management and Agroforestry*, **28** (2): 352-354.
9. Sahoo, P.K., Dash, H.K. and Sadangi, B.N. 2007. Traditional prawn fishing by women in Chilika Lake: A case study. *Journal Inland Fish Soc. Ind.*, **39** (1): 55-59.
10. Sahoo, P.K., Nanda, P. and Barat, A. 2007. Karyotypic diversity among three species of *Garra* (Family: Cyprinidae) from river Dikrong, Arunachal Pradesh, India. *Cytologia*, **72** (3): 259-263.
11. Sahoo, P.K., Nanda, P. and Barat, A. 2007. Karyotypic analysis of *Neolissocheilus hexagonolepis* (McClelland), *Puntius ticto* (Ham.) and *P. Chola* (Ham.) (Family: Cyprinidae). *Cytologia*, **72** (4): 409-413.
12. Singh, A. and Pandey, H. 2007. Significance of rice as a weaning food (baby food) in coastal Orissa. *Oryza*, **44** (2):189-190.
13. Singh, S.P. and Gite, L. P. 2007. Ergonomical evaluation of a hand operated paddy winnower by women workers. *Journal of Agricultural Engineering*, **44** (4): 67-71.

### 3.2 Popular articles

1. Attri, B.L. and Singh, A. 2008. Farmer's friendly low cost storage structure Zero energy cool chamber. *Sabujima*, **16**: 65-68.
2. Babu N., Srivastava, S.K., and Pandey, H. 2008. Cultivating Marigold a remunerating enterprise for farmwomen. *Sabujima*, **16**: 20-24.
3. Dash H.K. and Sahoo, P.K. 2007. Self employment for rural women: Ornamental fish. *Employment News*, **XXXI**. (28 October-3 November. 2007).
4. Dash, H.K., Sahoo, P.K. and Biswal, J. 2007. Empowering rural women in Nursery rearing: A success story. *Agriculture Today*, **9** (9):19-20.
५. सन्तोष कुमार श्रीवास्तव, हेमा पान्डेय, नरेश बाबू और गीता साहा २००७ नई तकनीक. कैसे हो पौधशाला की सुरक्षा, कृषि चयनिका, २८ (४) : ४०-४१
६. शबिता मिश्रा एवं आम्ना सिंह २००७ डेढलाख तक एक सफल कहानी। राष्ट्रीय कृषि, खण्ड २(२) : ३
7. Misra A.K. and Ramakrishna, Y.S. 2007. Strategies for sustainable dairy development in watersheds. *Indian Dairyman*, **59** (10): 57-62.
8. Misra, A.K., Subrahmanyam, K.V., Sankar Babu, M. V., Reddy, T. Y., Shivarudrappa, B. and Ramakrishna, Y.S. 2007. Improving the livelihood of landless and marginal farmers through sheep rearing in semi-arid India. In: Integrated Rural Development: A Roadmap. Prabha S Ranade (Ed). The ICFAI University Press. P.111-123.
9. Misra, A.K. 2008. Empowerment of women through appropriate livestock production technologies. In: Animal Nutrition for Better Productivity and Health. A K Verma, P Singh, A K Pattanaik, S K Saha and K Shrama (eds). IVRI, Izzatanagar. pp: 8-12.
10. Mishra, S. and Mishra, D. P. 2008. Why Gender Analysis in Agriculture. *Kurukshetra*, **56** (3): 34-36.
11. Mishra, S. and Mishra, N. 2008. Plant products as disease preventive. *Sabujima*, **16** : 74-76.
12. Sahoo, P.K. and Biswal J. 2007. Nutritional security through aquaculture. *Sabujima*, **15** : 44 - 47.
13. Singh, A. 2008. Sweet potato added weaning foods (baby foods) for combating malnutrition among infants. *Sabujima*, **16** : 77-78.
14. Singh, A. and Mishra, S. 2007. Role of women in fruit-vegetable storage and preservation for nutritional security. *Sabujima*, **15** : 38-40.
15. Srivastava, S.K., Babu N. and Pandey, H. 2008. Medicinal use and health benefits of some easily available plants for eco-friendly life. *Sabujima*, **16**: 33-39.

### 3.3 Technical bulletin, manual and folder

1. Dash, H.K., Srinath, Krishna and Sadangi, B.N. 2008. *Gender Sensitization: Role in reforming the society*. (Gender Note (1) under NAIP).

2. Fluoride and iodine importance (Folder).
3. Anaemia prevalence and prevention (Folder).
4. PRA Techniques for Livelihood Analysis - (Resource book).
5. Variations in Hand Embroidery Stitches (Technical manual).
6. Natural Dye Extraction, Dyeing with Natural Dyes & Techniques of Tie-dye and Batik (Technical Manual).

### 3.4 Papers presented at conference / seminar / workshop

1. Agarwal, S. 2007. Gender involvement in farm mechanization - issues for extension and research. Paper presented in International Ergonomics Conference organized by Indian Society of Ergonomics and held at CIAE, Bhopal on 10-12 December, 2007 pp:126.
2. Arya, M.P.S. 2008. Effect of groundnut varieties/genotypes on weed suppression/tolerance. Paper presented at a biennial conference on Weed management in modern agriculture: Emerging challenges and opportunities, organized by Indian Society of Weed Science on 27-28 February., 2008. pp: 134.
3. Attri, B.L. and Singh, A. 2007. Effect of storage on quality of vegetables at ambient temperature and zero energy cool chamber. Abstract & extended summary of Seminar on Road map for Agricultural Development in Orissa organized by University Teachers' Association, Orissa University of Agriculture and Technology, Bhubaneswar on 6-7 November., 2007. pp: 12.
4. Babu, N., Srivastava, S.K., Attri, B.L. and Pandey, H. 2007. Empowerment of farmwomen through promotion of high value vegetables in coastal Orissa. Abstract and Extended Summary of *Seminar on Road Map for Agricultural Development in Orissa* organized by University Teachers' Association, Orissa University of Agriculture and Technology, Bhubaneswar on 6 - 7 November., 2007. pp: 97-98.
5. Mishra, S. 2007. Behaviour of women entrepreneurs towards mushroom cultivation. Paper presented in National seminar on appropriate extension strategies for management of rural resources, UAS, Dharwad on 18-20, December., 2007. pp: 311.
6. Mishra, S. and Sadangi, B.N. 2007. Green leaves in rice fallow land: A Source of food for rural families. Paper presented in National Symposium on Research Priorities and Strategies in Rice Production System for Second Green Revolution, CRRI, Cuttack on 20-22, November., 2007. pp: 138-139.
7. Mishra, S. and Sadangi, B.N. 2007. Rice as Breakfast in Coastal Orissa. Abstract & extended summary of *Seminar on Road map for Agricultural Development in Orissa* organized by University Teachers' Association, Orissa University of Agriculture and Technology, Bhubaneswar on 6-7 November., 2007. pp: 116-117.

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8. Sadangi, B.N., Dash, H.K. and Sahoo, P.K. 2007. Gender Needs in Fisheries in I.S. Bright Singh *et al.* ( eds), *Fisheries and Aquaculture: Strategic Outlook for Asia*, 8<sup>th</sup> Asian Fisheries Forum, 20-23November., 2007, Kochi, India, pp: 9
9. Sahoo, P.K., Dash, H.K. and Biswal J. 2007. Promoting Ornamental Fish culture through women's Participation: Some Insights in I.S. Bright Singh *et al.*(eds) *Fisheries and Aquaculture: Strategic Outlook for Asia*, 8<sup>th</sup> Asian Fisheries Forum, 20-23November., 2007, Kochi, India, pp: 12.
10. Singh R.S. and Singh S.P. 2007. Gender differential in work participation in various operations of crop and livestock enterprises in Bhopal district of Madhya Pradesh. Paper presented in the International Ergonomics conference, HWWE 2007 held at CIAE Bhopal on 10-12 December., 2007.
11. Srinath, K. and Misra, A.K. 2008. Knowledge gaps and dissemination techniques among livestock farmers. National Seminar on Problem and prospects in knowledge dissemination on livestock rearing among Women Self help Groups. Avinashalingam University for Women, Coimbatore, India. 13 February., 2008.
12. Srivastava, S.K. and Pandey, H. 2007. Gender based ITKs of pest management in coastal agro eco-system of Orissa. Abstract in *National Symposium on Sustainable Pest Management for Safer Environment* organized by Society for Plant Protection and Environment, Department of Entomology, OUAT, Bhubaneswar, on 6-7 December., 2007. pp: 210 212.
13. Srivastava S.K., Babu N. and Pandey H. 2007. Nursery protection technique for resource poor stakeholders. Abstract and Extended Summary of *Seminar on Road Map for Agricultural Development in Orissa* organized by University Teachers' Association, Orissa University of Agriculture and Technology, Bhubaneswar on 6-7 November., 2007. pp: 15.
14. Srivastava, S.K., Babu, N. and Pandey, H. 2007. Management of brinjal shoot and fruit borer (*Leucinodes orbonalis* Guenee). Abstracts. *International Symposium on Management of Coastal Eco-system: Technological advancement and livelihood security*. Organized by Indian Society of Coastal Agricultural Research, Central Soil Salinity Research Institute, Regional Station, Canning Town, South 24 Parganas, Kolkata (West Bengal) from 27-30 October., 2007. pp: 115.

### **3.5 Conference / seminar / workshop / short course attended**

1. Suman Agarwal attended a Workshop on Integrated Farming System: stakeholders discussion for way forward organised by M.S. Swaminathan Research Foundation, Kendrapara, in collaboration with OUAT, Bhubaneswar and held at Department of Extension education, OUAT, Bhubaneswar on 9 October., 2007.
2. Suman Agarwal attended the National conference on show-casing cutting edge science and technology by women, organised by the National Task Force for women



in Science, Ministry of Science & technology, Govt. of India, on 8-9 March, 2008 at New Delhi.

3. M.P.S. Arya attended a Workshop on Creative excellence for individual development and organisational growth organised by NAARM, Hyderabad on 6-10 August., 2007.
4. Naresh Babu attended National Seminar on Commercial Exploitation of Medicinal & Aromatic Plants for Health and Sustenance on 9-10 February. 2008 at OUAT, Bhubaneswar.
5. A.K. Misra attended Workshop on Extension Education under AICRP on Home Science, NRCWA, Bhubaneswar. on 15-16 February., 2008.
6. A.K. Misra attended Seminar on Sustainable Poultry Production: Rural and Commercial Approach at PD on Poultry, Hyderabad on 3 March., 2008.
7. Sabita Mishra attended 8<sup>th</sup> Asian Fishery Forum at Cochin on 20-23 November., 2007.
8. Sabita Mishra attended a Workshop on Extension Education under AICRP on Home Science on 15-16 February., 2008.
9. Sabita Mishra attended RPSC Meeting on 6 February., 2008 organised by All India Radio at NABARD, Bhubaneswar, Orissa.
10. H.K. Dash attended two-day launching workshop of sub-project Visioning, policy Analysis and Gender (V-PAGe) under NAIP on 26-27 June, 2007 at NCAP, New Delhi.
11. H.K. Dash attended two-day workshop on Impact assessment of emerging technologies under V-PAGe on 30-31 January, 2008 at NCAP, New Delhi.
12. H.K. Dash and V. Ganesh Kumar attended two-day workshop on procurement, M&E under NAIP on 4-6 January., 2008 at NAARM, Hyderabad.
13. M.P.S.Arya attended a trainers' training on Intellectual property protection and technology licensing in agriculture organised by CCS Haryana Agricultural University, Hisar, Indian Council of Agricultural Research, New Delhi and Michigan State University, USA on 14-16 February., 2008 at NAARM, Hyderabad under Indo-US Agriculture Knowledge Initiative.
14. V. Ganesh Kumar and Sunil Kumar attended the special interactive workshop on Administrative and Financial matters organised by ICAR at CRIJAF, Barrackpore on 2-3 August, 2007

### **3.6 Participation in Radio talks / TV programme / Kishan Mela /news paper coverage**

1. P.K. Sahoo delivered a talk on *Gramina Mahilanka pain rangeen machha chasa* which was telecast in -Krishi Khabar programme of DD (Oriya) in the month of May 2007.
2. Nidhi Agarwal demonstrated drudgery reducing implements at Directorate of Agricultural Engineering, Govt. of M.P. during training for extension worker under MAPWA.

MARGWA

3. Nidhi Agarwal participated in the discussion with the farm women on the use of tools at Madhya Pradesh Vigyan Sabha on 1 Feb., 2008 during the programme organized by the IFFCO at Madhya Pradesh Vigyan sabha, Bhopal.
4. National Research Centre for Women in Agriculture participated in a State Level Agricultural Farmer Fair on 21-23 January., 2008 at Exhibition Ground, Bhubaneswar.



Farm women visiting NRCWA stall at State Level Agricultural Farmer Fair on 21-23 January 2008 at Bhubaneswar

### 3.7 Meetings Attended by Krishna Srinath, Director

1. Interaction with Director General, ICAR through video conferencing at Water Technology Centre for Eastern Region, Bhubaneswar, 30 October., 2007.
2. Chaired the technical session on Post Harvest Technology in the National Seminar on Spices organized by Indian Society of Spices, Orissa University Agriculture and Technology, 31 October., 2007.
3. 8<sup>th</sup> Asian Fisheries Forum and special workshop on Gender in Fisheries organized by the Asian Fisheries Society at Cochin, 20-23 November., 2007.
4. Speaker at the inaugural function of Scientific Public Aquarium at Central Institute of Fresh water Aquaculture, Bhubaneswar, 25 January., 2008.
5. Meeting of the Management and Monitoring Committee for Women in Agriculture, Department of Agriculture and Cooperation, New Delhi, 12 February., 2008.
6. Delivered key note address at the Workshop under the research study on Improving livelihood security of Women's Self help groups (WSHG) involved in livestock rearing through capacity building in gender awareness supported by the Development Partnerships in Higher Education (DePHE) Programme of DFID, UK, at Avinashalingam University for Women, Coimbatore on 13, February., 2008.

## 4. RESEARCH PROJECTS

### 4.1 Projects concluded

Sl. No.	Title of the project	Granting Agency	Duration	PI & Co-PI
<b>Institutional</b>				
1.	Refinement and development of eco-friendly management technology of brinjal shoot and fruit borer ( <i>Leucinodes orbonalis</i> Guence) appropriate for farmwomen.	NRCWA (ICAR)	June 2006 to May 2008	S. K. Srivastava, Naresh Babu
2.	Database on gender in Agriculture	NRCWA (ICAR)	April, 2004 - March, 2008	H. K. Dash, P. K. Sahoo, B. L. Attri
3.	Mechanization of rice sector and impact on gender	NRCWA (ICAR)	June 2006 - March, 2008	H. K. Dash, B. N. Sadangi
4.	Standardization of gender specific technologies in banana and papaya	NRCWA (ICAR)	June 2006 - March, 2008	Naresh Babu, B.L. Attri, S. K. Srivastava
<b>Outside funded projects</b>				
5.	Family based economic security of backward communities through ornamental and integrated fish farming	DBT	2004-2007	P. K. Sahoo H. K. Dash B. L. Attri
6.	Ornamental fish seed production under National mega seed project on seed production in agricultural crops and fisheries.	ICAR Seed project	2005-2007	P. K. Sahoo

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## 4.2 On-going projects

Sl. No.	Title of the project	Granting agency	Duration	PI & Co-PI
<b>Institutional projects</b>				
1.	Technological empowerment of farm women for family sustenance	NRCWA (ICAR)	2006-2008	M. P. S. Arya, S. K. Srivastava, B. L. Attri, Sabita Mishra, Naresh Babu, Abha Singh, L. P. Sahoo,
2.	Designing a gender sensitive extension model and testing its efficacy	NRCWA (ICAR)	2006-2009	B. N. Sadangi, S. K. Srivastava, P. K. Sahoo, Sabita Mishra, H. K. Dash, Abha Singh, L. P. Sahoo,
3.	Livelihood security through entrepreneurial activity among farm families	NRCWA (ICAR)	2006 -March 2009	Suman Agarwal, Geeta Saha
4.	Capacity building of women agricultural labourers for increasing efficiency in agro-enterprises	NRCWA (ICAR)	2007-2009	Sabita Mishra, B. N. Sadangi
5.	Participatory evaluation of low cost weaning mix	NRCWA (ICAR)	2007-2010	Abha Singh
6.	Introduction of women friendly improved farm tools and implements in selected villages of Bhopal district	NRCWA (ICAR)	2006-2007	S. P. Singh R. S. Singh
7.	All India coordinated research project on home science	NRCWA (ICAR)	2007-2008 continuing	Krishna Srinath
<b>Outside funded projects</b>				
8.	Economic upliftment of rural women through integrated fish farming	DBT	2006-2009	P. K. Sahoo, B. N. Sadangi, Abha Singh
9.	Visioning, policy analysis and gender (V-PAGe)	NAIP	2007-2008	Krishna Srinath and H.K. Dash

## 5. HUMAN RESOURCE DEVELOPMENT

- Nasreen Banu, Senior Scientist, AICRP-CD attended certificate course on 'Development delays and early intervention' at NIMH, Secunderabad on 3-31 October., 2007.

## 6. RECOGNITIONS

1. M.P.S.Arya nominated as member of Poster Assessment and evaluation Committee at Biennial Conference of the Indian Society of Weed Science at Patna on 27-28 February., 2008.
2. Sabita Mishra nominated as Executive Council Member by Hind Agri- Horticultural Society, Uttar Pradesh, India.
3. Sabita Mishra nominated as Organizing Secretary of the society by Orissa Society of Extension Education, Orissa, India.
4. Suman Agarwal chaired a session on Women at Work and Home held on 11 December, 2007 during the International Ergonomics Conference organized by Indian Society of Ergonomics held at CIAE, Bhopal on 10 -12 December., 2007.
5. Suman Agarwal nominated by the ICAR as Secretary of the Quinquennial Review Team (QRT) in respect of NRCWA for the period February 2001 to June, 2005.
6. Sabita Mishra nominated by Indian Society of Extension Education, as a member of Judging Committee of Poster presentation session in National Seminar held at UAS, Dharwad on 18-20 December., 2007.
7. B.L. Attri acted as judge in the flower show organized by Plant Lover's Association at RPRC, Bhubaneswar on 5 January., 2008.

## 7. OTHER ACTIVITIES

- AICRP Centre organised energy conservation and consumer protection campaign in village Shahpur, sponsored by Department of Food & Civil Supplies, Govt of Haryana on 7-8 June. 2007.
- International Women's Day was celebrated by AICRP Centre in village Pudian for women empowerment and to make women aware of their rights in the society.
- The meeting of the Technical coordinators of the AICRP was organized at NRCWA, Bhubaneswar (26-28 June, 2007) for preparation and finalization of the technical plan of action of XI plan period.
- The National Research Centre for Women in Agriculture conducted Workshop of Extension Education component under All India Coordinated Research Project on Home Science on 15-16 February., 2008.

NRCWA

- Technical coordinators' meeting under AICRP on Home Science on 26 Feb., 2008 was held at NRCWA, Bhubaneswar in which the technical plan of XI plan period was discussed and modified along with the list of equipments.

### Women in Agriculture Day

Women in Agriculture Day was celebrated on 4 December, 2007 wherein 141 women of agriculture sector from five villages participated. The Scientists of other ICAR institutes located at Bhubaneswar and Cuttack viz. Regional Centre CARI, CHES, Regional Station CTCRI, WTCER and CRRI, attended and demonstrated research activities by putting their exhibits. The scientists-farmwomen interaction session was organized wherein discussions were held on various field problems. The scientists from Regional Centre CARI, CHES, Regional Station CTCRI, WTCER and CRRI participated in the discussion. The event was covered by OTV, DD-local and local News Papers.



Chief guest addressing to the women



Farm women visiting stalls



Women from villages interacting with scientists

### **International Womens' Day**

The International Womens' Day was observed on 8 March, 2008 at NRCWA by organizing various field level awareness programmes in Kantamalim village. Over 150 farmwomen attended the event.

The Sub-Centre of NRCWA at CIAE Bhopal also organized an interaction meeting with farm women of villages Nipania, Jat and Dobra-Sagonikala on 7 March, 2008 on the occasion of International Womens' Day, 2008.

### **National Science Week**

NRCWA observed six days National Science Week inaugurated by Dr D. P. Ray, Vice Chancellor, OUAT, Bhubaneswar on 28 February 2008. Nearly 200 students from different schools were sensitized on various aspects of women in agriculture.

## **8. IMPORTANT MEETINGS/ WORKSHOPS**

### **Research Advisory Committee (RAC)**

RAC with the following members was constituted by the Council for National Research Centre for Women in Agriculture for the period 2008 - 2011.

- Dr (Smt.) Pushpa Gupta, Former Dean Home Science, MPUAT, Udaipur.
- Dr Manas Mohan Adhikary, Professor, Agricultural Extension, BCKV, Nadia.
- Dr (Smt.) Vijay Sethi, Former Head, Division of Post Harvest Technology, IARI, New Delhi.
- Dr (Smt.) Usha R. Mehra, Former Head, Division of Animal Nutrition, IVRI, Izzatnagar.
- Dr V.K. Tiwari, Professor, Agricultural Food Engineering, IIT Kharagpur.
- Dr (Smt.) Krishna Srinath, Director, NRCWA, Bhubaneswar.
- Dr (Smt.) Tej Verma, Principal Scientist, Agricultural Extension, ICAR, New Delhi.
- Smt. Fauzia Khan, MLC, Queen's School, Opp. Shivaji Park, Parbhani.
- Smt. Surekha Surendra Thakare, Moropant Joshi Colony Amravati.
- Dr B.N. Sadangi, Principal Scientist, Agricultural Extension, NRCWA, Bhubaneswar.

The RAC provided valuable directions to improve research programmes in its ninth meeting held on 26-27 March, 2008.

NRCWA



RAC meeting (above) and its members visiting the seed production fisheries unit

### **Institute Research Committee (IRC)**

The 5<sup>th</sup> IRC meeting was held on 14 March, 2008. The committee reviewed the progress of the ongoing projects and accorded approval for eight new projects.

### **Institute Management Committee (IMC)**

Tenth meeting of IMC was held on 28 March, 2008. The IMC reviewed the progress in finance, administrative and technical matters and suggested to present success stories of research programmes.

## **9. DISTINGUISHED VISITORS**

Name	Designation	Date of Visit
Dr M. Mahadevappa	Ex Chairman, ASRB and Ex Vice Chancellor, UAS, Dharwad, Karnataka	04.09.2007
Dr S.D. Sharma	Director, IASRI, New Delhi	17.12.2007
Dr S.Edison	Director CTCRI, Trivandrum	25.01.2008
Dr K.V.Peter	Professor and Former Vice Chancellor, KAU, Trichur	25.02.2008



## 10 राजभाषा संबंधी कार्यक्रम

### हिन्दी सप्ताह 2007

#### राजभाषा कार्यशाला

केन्द्र के अहिन्दी भाषी सदस्यों के लिए दिनांक 12 सितम्बर, 2007 को एक कार्यशाला का आयोजन किया गया। जिसमें केन्द्र के हिन्दी भाषी सदस्यों द्वारा हिन्दी के पर्यावाची शब्द, व्याकरण, अनुवाद, हिन्दी शब्दावली तथा हिन्दी के वाक्य बनाना व उनका मिसिल में टिप्पणी लिखने में प्रयोग इत्यादि पर प्रकाश डाला गया। इस कार्यशाला में 6 सत्रों का आयोजन किया गया व अहिन्दी भाषी सदस्यों द्वारा हिन्दी के दैनिक प्रयोग के बारे में अपनी शंकाओं का निवारण किया।

### हिन्दी चेतना दिवस 2007

दिनांक 14 सितम्बर, 2007 को केन्द्र में हिन्दी चेतना दिवस का आयोजन किया गया। इस अवसर पर दो प्रतियोगिताएं आयोजित की गईं। हिन्दी के शब्दों का लेखन (केवल केन्द्र के अहिन्दी भाषी सदस्यों के लिए) व हिन्दी वाद-विवाद प्रतियोगिता (केन्द्र के सभी सदस्यों के लिए)। इन प्रतियोगिताओं के विजेताओं को प्रथम, द्वितीय व तृतीय पुरस्कार भी दिये गये। कार्यक्रम के अन्त में पुरस्कार वितरण किये गये व सभी सदस्यों से निवेदन किया गया कि वह अपने दैनिक कार्यों में अधिक से अधिक हिन्दी राजभाषा का प्रयोग करें।

### हिन्दी राजभाषा की तिमाही बैठकें

वर्ष 2007-08 में केन्द्र में हिन्दी राजभाषा कार्यन्वयन समिति की तिमाही बैठकें नियमित रूप से आयोजित की गईं तथा बैठकों में राजभाषा हिन्दी का केन्द्र में अधिक से अधिक प्रयोग के लिए कई गतिविधियां व निर्णय लिए गए तथा प्रत्येक बैठक का कायवृत्त समय सीमा के अन्दर ही परिषद को भेजे गए।

### नगर राजभाषा समिति में केन्द्र की सक्रिय भागीदारी व उपलब्धियाँ

नगर राजभाषा कार्यन्वयन समिति, भुवनेश्वर द्वारा विभिन्न प्रतियोगिताएं आयोजित की गईं जिसमें केन्द्र के सदस्यों ने सक्रिय भाग लिया तथा निम्नलिखित सदस्यों को पुरस्कृत किया गया।

प्रतियोगिता	प्रतियोगी का नाम	प्राप्त स्थान
हिन्दी निबन्ध	डा. बृज लाल अत्री, वरिष्ठ वैज्ञानिक (हिन्दी भाषी)	प्रथम
	श्री वी. गणेश कुमार, शहायक प्रशासनिक अधिकारी (अहिन्दी भाषी)	द्वितीय
	डा. नरेश बाबू, वरिष्ठ वैज्ञानिक (हिन्दी भाषी)	चतुर्थ
अनुवाद	डा. बृज लाल अत्री, वरिष्ठ वैज्ञानिक (हिन्दी भाषी)	तृतीय
	डा. नरेश बाबू, वरिष्ठ वैज्ञानिक (हिन्दी भाषी)	चतुर्थ

**10. PERSONNEL**

(As on 31.3.2008)

Sl. No.	Name	Designation
1.	Dr Krishna Srinath	Director
2.	Dr Biswanath Sadangi	Principal Scientist (Agril Extn.)
3.	Dr Mahendra Pal Singh Arya	Principal Scientist (Agronomy)
4.	Dr Suman Agarwal	Principal Scientist (HDRM)
5.	Dr Prakash Chandra Tripathi	Principal Scientist (Horticulture)
6.	Dr Arun Kumar Mishra	Principal Scientist (LPM)
7.	Dr Santosh Kumar Srivastava	Senior Scientist (Entomology)
8.	Dr Brij Lal Attri	Senior Scientist (Horticulture)
9.	Dr Pravati Kumari Sahoo	Senior Scientist (Fish & Fishery)
10.	Er Shiv Pratap Singh	Senior Scientist (FMP) *
11.	Dr Sabita Mishra	Senior Scientist (Agril Extn)
12.	Dr Naresh Babu	Senior Scientist (Horticulture)
13.	Dr Hemanta Kumar Dash	Scientist Senior Scale (Agril Economics)
14.	Smt.Laxmipriya Sahoo	Scientist Senior Scale (Seed Technology)
15.	Smt. Abha Singh	Scientist Senior Scale (Food & Nutrition)
16.	Smt. Geeta Saha	Technical Officer (T-5)
17.	Smt. Nidhi Agarwal	Technical Assistant (T-4)*
18.	Sh. Debendra Nath Sarangi	Technical Assistant (T-3) Crops Science
19.	Sh. Manoranjan Prusty	Technical Assistant (T-3) Horticulture
20.	Sh.Prajnanu Ranjan Sahoo	Technical Assistant (T-3) Fishery
21.	Sh.Bhikari Charan Behera	Technical Assistant (T-3) Agril.Extn.
22.	Sh. Bishnu Charan Sahu	Technical Assistant (T-2)
23.	Sh. Sunil Kumar Das	Assistant Finance and Accounts Officer
24.	Sh. V. Ganesh Kumar	Assistant Administrative Officer
25.	Kumari Rina Das	Personal Assistant
26.	Smt. Parisima Sen	Stenographer Gr-III
27.	Smt. Bishnupriya Moharana	Senior Clerk
28.	Sh. Sanjay Kumar Singh	Senior Clerk
29.	Sh. Biswanath Biswal	S.S.G.1

\* Sub Centre at CIAE, Bhopal



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