

Annual Report

वार्षिक प्रतिवेदन

2003 - 2004

NRCWA



National Research Centre for Women in Agriculture

कृषि में महिलाओं पर राष्ट्रीय अनुसंधान केन्द्र

Bhubaneswar, भुवनेश्वर

Cover Photo



1. Rice processing by par-boiling unit
2. Chaff-cutting
3. Hanging type seed cleaner-cum-grader
4. Mushroom cultivation
5. Backyard poultry
6. Pisciculture

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कृषि में महिलाओं पर राष्ट्रीय अनुसंधान केन्द्र

(Indian Council of Agricultural Research)

भारतीय कृषि अनुसंधान परिषद

Bhubaneswar - 751 003 (Orissa) India

भुवनेश्वर - 751 003 (उड़ीसा) भारत



Preface

I would like to put forth the gender concerns in agricultural development while forwarding the Annual Report of National Research Centre for Women in Agriculture for 2003-04. The global attention given to Gender Disaggregated Data (GDD), gender issues and gender mainstreaming has made us think seriously. In the process, the centre has modified its mandate and objectives and initiated gender based projects on gender database and gender mainstreaming of agricultural research and extension in collaborative mode. Research on women empowerment in aquaculture, nursery raising and ornamental fish production has provided worthwhile information for the stake holders. Success in enterprises of women self-help groups through technology management has helped the scientists come-up with modules for advocacy. Some of the findings emanating from the completed projects have bearings on programmes and policy for agricultural development.

This Annual Report of the centre brings out the highlights of its research, training and extension activities carried out during the year 2003-2004 as well as the achievement made towards infrastructural and human resource development.

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

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

I appreciate the efforts put by the Editorial Board, Dr B.N. Sadangi, Principal Scientist (AE), Dr M.P.S. Arya, Principal Scientist (Agronomy) and Mrs L.P. Sahoo, Scientist (Seed Tech) for compiling, editing and preparation of this Annual Report and Dr Suman Agarwal, Principal Scientist (HDRM) for Hindi translation of the Executive Summary. The consistent support of Director, CIAE, Bhopal, for nurturing the sub-centre of NRCWA, very effectively, is deeply appreciated.

(HEMA PANDEY)
Director

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कृषि में महिलाओं के लिए राष्ट्रीय अनुसंधान केन्द्र, भुवनेश्वर, का अधिदेश व उद्देश्यों को कृषि विकास में लिंग सम्बन्धी विभिन्न परिपेक्ष में अधिक वास्तविक व उपयोगी बनाने के लिए चर्चा की गई व दसवी योजना में केन्द्र के बदले हुए अधिदेश, उद्देश्यों व गतिविधियों को शुरू करने के लिए इनसे सम्बन्धित एक प्रत्यय-पत्र, भारतीय कृषि अनुसंधान परिषद द्वारा स्वीकृत किया गया। इस वार्षिक प्रतिवेदन में संस्थागत एवं बाहरी वित्तीय शोध योजनाओं की उपलब्धियों के अतिरिक्त नई शुरू की गई शोध योजनाओं के बारे में विस्तृत जानकारी है।

पूर्व भारत की कृषक महिलाओं के लिए प्रसार के तरीकों की जाँच एवं विकास शोध योजना के अन्तर्गत, उड़ीसा राज्य के कोरापुट जिले के अन्दरूनी जनजातीय क्षेत्रों में महिलाओं तक प्रसार सेवाओं की पहुँच, उनकी संरचना, कृषि से सम्बन्धित विभिन्न आयामों, प्रसार के तरीकों के बारे में उनकी पसन्द एवं प्रसार के तरीकों से पुरुष व महिलाओं को लाभ के बारे में अध्ययन किया गया है। अध्ययन से प्राप्त आकड़े, विभिन्न स्तर पर कृषि से सम्बन्धित प्रसार संस्थाओं की संरचना एवं उनकी कार्य प्रणाली में बदलाव की ओर इंगित करते हैं। प्रसार कार्य-कर्ताओं का सामाजिक-सांस्कृतिक समन्वय व उनकी साख, जन-जाति महिलाओं में उनकी पहुँच प्रसार सेवाओं के लिए महत्वपूर्ण है। जन-जाति पृष्ठभूमि के प्रसार कार्य-कर्ता अधिक पसन्द किये जाते हैं। जन-जाति क्षेत्रों में कृषि विकास के लिए कार्यरत व्यक्तियों को जन-जाति महिलाओं में प्रसार के लिए उनकी वास्तविक आवश्यकताओं, उनकी कार्य कुशलता को बढ़ाने के लिए उपयुक्त विषयों/क्षेत्रों का चुनाव, कृषि-विकास से सम्बन्धित अन्य सेवाओं को ध्यान पूर्वक समझने की आवश्यकता है।

उड़ीसा राज्य के जन-जाति परिवारों की अर्थ व्यवस्था एवं कृषि में लिंग सम्बन्धी एक अध्ययन में कन्ध जन-जाति की महिलाओं का जनसांख्यिकीय वर्गीकरण एवं कार्यों में उनकी भागीदारी का विश्लेषण, महिलाओं एवं परिवारों पर जिम्मेदारियों व उनके भार का अध्ययन करने के लिए किया गया। अध्ययन से ज्ञात हुआ कि जन-जाति आबादी में उपस्थित आयु संरचना को ध्यान में रखते हुए कार्यकारी जनसंख्या में महिलाओं की भागीदारी अधिक रहेगी। इसका मतलब है कि आने वाले समय में कार्यों की भागीदारी में महिलाओं का अनुपात अधिक होगा व श्रमिक बाजार में महिलाएं अधिक महत्वपूर्ण होंगी, विशेष रूप से, कृषि क्षेत्र में चूँकि अधिकांश लड़कियाँ अपनी पढ़ाई को छोड़कर, परिवारों की

आजीविका के लिए धन कमाने के कार्यों में व्यस्त हैं। अतः जनजातीय परिवारों की अर्थ व्यवस्था को मजबूत करने के लिए युवतियों के लिए रोजगार के साधनों को बढ़ाने की आवश्यकता है।

महत्वपूर्ण फसलों के अनाजों एवं बीजों को संरक्षण करने के तरीकों को महिलाओं के परिपेक्ष में उल्लेख करना शोध योजना के अन्तर्गत मूँगदाल, अरहर व मूली के बीजों के संरक्षण के देशी तकनीकी ज्ञान को प्रयोग करके विभिन्न परिपेक्ष में परीक्षण किये गये। परीक्षणों से प्राप्त निष्कर्ष के आधार पर बीजों के संरक्षण के लिए कुछ बातें आवश्यक हैं जैसे संरक्षण से पहले बीजों को साफ करना, अनावश्यक सामग्री को बीजों से अलग करना, बीजों को ठीक प्रकार से सुखाना, नमी की मात्रा 10 प्रतिशत से कम रखना, बीजों को संरक्षण करने की जगह सूखी, साफ व हवादार रखना व बीच-बीच में जाँच करते रहना कि कहीं कोई कीड़ा तो नहीं लगा है।

ग्रामीण क्षेत्रों में सब्जियों की फसल को तोड़ने व इकट्ठा करने व बाद के रख-रखाव के बारे में सर्वेक्षण से ज्ञात हुआ कि इन क्षेत्रों में किसानों व सब्जियों बेचने वालों को सब्जियों को तोड़ने के बाद किस प्रकार सुरक्षित रखा जाए इसका तकनीकी ज्ञान नहीं है और न ही उन्हें इसकी जानकारी है कि सब्जियों के संरक्षण द्वारा उनका महत्व बढ़ा कर उनकी उपयोगिता बढ़ायी जा सकती है। सर्वेक्षण से यह भी ज्ञात हुआ कि ग्रामीण क्षेत्रों में सब्जियों की तुड़ाई व उन्हें इकट्ठा करने के बाद रखने व संरक्षण की कोई उचित व्यवस्था न होने के कारण किसानों को बिचोलियों को सब्जियाँ बहुत ही सस्ते दामों में बेचनी पड़ती है। अतः किसानों में, सब्जियों की फसल काटने व इकट्ठा करने के बाद के प्रबन्धन व उनके संरक्षण के बारे में जागरूकता व उनकी कार्यकुशलता को विकसित करने की आवश्यकता है। सब्जियों के संरक्षण की उचित व्यवस्था, पानी की उचित निकासी व सब्जी बाजार में खुला स्थान होना, सब्जी बेचने वालों की सब्जियों को नष्ट होने से बचाने में सहायक होगा। राष्ट्रीय कृषि तकनीकी योजना के अन्तर्गत एक परियोजना 'उड़ीसा में चकवात से प्रभावित तटीय कृषि पर्यावरण प्रणाली का प्रबंधन' के अन्तर्गत गृह वाटिका में सब्जियों की पैदावार व उनकी उपयोगिता को बढ़ाकर संरक्षण करना इत्यादि से सम्बन्धित महत्वपूर्ण प्रशिक्षण कार्यक्रम आयोजित किये गये। गृह वाटिका की क्षारिय भूमि में कौन कौन सी सब्जियों के उन्नत बीज अधिक पैदावार देंगे, इसके बारे में भी महिलाओं

को जानकारी प्राप्त हुई। चक्रवात से प्रभावित पुरी व कटक क्षेत्र की 844 कृषक महिलाओं को प्रशिक्षण दिया गया। प्रभावित परिवारों ने लगातार पोषण सुरक्षा के लिए गृह वाटिका को लगाकर व उसकी देखभाल करने में काफी वाटिका की है। प्रभावित परिवारों द्वारा गृह वाटिका से दैनिक भोजन में सम्मिलित की गई सब्जियों से उनके स्वास्थ्य में काफी लाभ हुआ। राष्ट्रीय कृषि तकनीक परियोजना 'कृषि में महिलाओं का सशक्तिकरण' के अन्तर्गत महिला स्वयं-सहायता समूहों द्वारा आय उपार्जन व कृषि कार्यों की नीरसता को कम करने के लिए 19 उन्नत कृषि तकनीकी उपकरणों का कृषक महिलाओं के साथ मिल कर मूल्यांकन किया गया, जिससे वैज्ञानिकों व विकास कार्यकर्ताओं के लिए महत्वपूर्ण जानकारी प्राप्त हुई है। कृषि कार्यों को परम्परागत व उन्नत तकनीकी/उपकरण से करने की विधि से प्राप्त श्रमदक्षता आंकड़ों में तुलनात्मक अध्ययन किया गया, जिससे कि उन्नत उपकरण/तकनीकी की उपयोगिता की संस्तुति की जा सके। स्थानीय उपलब्ध वस्तुओं से सम्बन्धित लघु उद्योग लगाकर आय उपार्जन करने की संभावना को स्वयं-सहायता समूहों की सफलता गाथाओं ने प्रदर्शित कर दिया है।

एक अन्य राष्ट्रीय कृषि तकनीकी परियोजना 'देशी तकनीक ज्ञान को इकट्ठा, प्रलेखन व वैधीकरण करना' के अन्तर्गत दालों का संरक्षण सूखी लाल मिर्च का प्रयोग करके किया गया। परीक्षण से ज्ञात हुआ कि सरसों के तेल व सूखी मिर्च, दालों व उनके बीजों विशेषतौर पर मूँग दाल, का संरक्षण करने में काफी प्रभावी है।

कृषि में महिलाओं से सम्बन्धित विभिन्न पक्षों व उनकी जागरूकता के विभिन्न स्तरों का अध्ययन भारत में कृषि में महिलाओं द्वारा विशेषरूप से फसल के तकनीकी उत्पादन में ए.पी.सेस परियोजना के अन्तर्गत किया गया। अध्ययन से ज्ञात हुआ कि अधिक जागरूक कृषक महिलाओं में फसल उत्पादन की अच्छी कार्य कुशलता थी जो कि उन्होंने अपने साथी किसानों से ग्रहण की थी।

जैव - प्रौद्योगिकी विभाग द्वारा स्वीकृत शोध परियोजना 'महिलाओं को मछली पालन में लगाना - आर्थिक व पोषण सुरक्षा की ओर एक कदम' के अन्तर्गत महिलाओं में मछलियों की नर्सरी लगाने की क्षमता विकसित की गई जिससे परिवार की जीविका के लिए आय उपार्जन भी हो तथा उनके स्थानीय क्षेत्र में मछली पालन को बढ़ावा मिले। केन्द्र द्वारा एक महत्वपूर्ण कदम विभिन्न संस्थाओं के साथ एक नेटवर्क परियोजना 'कृषि अनुसंधान व प्रसार का लैंगिकीकरण प्रारम्भ कर इसके अन्तर्गत केन्द्रों, जैसे केरल कृषि विश्वविद्यालय, त्रिचुर व चौ. चरणसिंह हरियाणा कृषि विश्वविद्यालय, हिसार, के साथ कार्यकारी सह-सम्बन्ध

स्थापित किये गये हैं। इस परियोजना से राष्ट्रीय कृषि परिपेक्ष में लिंग सम्बन्धी विभिन्न पहलुओं के महत्व का आदान-प्रदान कर लिंग के प्रति व्यक्तियों को संवेदनशील बनाना है। इससे लिंग सम्बन्धी संवेदनाओं से युक्त कार्यकर्ता तैयार हो सकेंगे।

वर्ष के अन्त में शरू की गई शोध परियोजनाएं जैसे 'महिला सशक्तिकरण के लिए परवल की फसल का सूक्ष्म प्रजनन', 'कृषि श्रमिक महिलाओं के साधनों का प्रभावी प्रबन्धन', 'कृषि में लिंग सम्बन्धी आंकड़ों का कोष', 'महिला स्वयं-सहायता समूहों द्वारा लगातार जीविका साधन के लिए एक मॉड्यूल को विकसित करना', 'पर्यावरण हितैषी खर-पतवार के प्रबन्धन का अध्ययन' व 'शकरकन्दी को विभिन्न अनुपातों में मिलाकर शिशुओं के आहार का मानकीकरण' पर कार्य आरंभ हो चुका है।

भोपाल स्थित उपकेन्द्र ने पहली बार मध्य प्रदेश राज्य में महिलाओं द्वारा कृषि यन्त्रों व मशीनों द्वारा कार्य करने का तरीका व नीरसता की दशा का सघन सर्वेक्षण किया है इससे केन्द्र के आंकड़ों का आधार मजबूत होगा। हाथ से चलाने वाले यन्त्र जैसे अनाज का सफाई यन्त्र, अनाज को ग्रेड करने का यन्त्र बीज बोने का यन्त्र, उर्वरक डालने/छीटने वाला यन्त्र, मेंढू बनाने वाला यन्त्र, इत्यादि का श्रमदक्षता मूल्यांकन किया गया जिससे महिलाओं के लिए इन यन्त्रों की उपयोगिता का मूल्यांकन किया जा सके। इन विभिन्न यन्त्रों की आनुभविक एवं गुणात्मक जाँच की गई जिससे महिलाओं के लिए इन यन्त्रों की श्रमदक्षता उपयोगिता की जाँच ठीक प्रकार से हो सके।

भारतीय कृषि अनुसंधान परिषद के वैज्ञानिकों व कृषि महाविद्यालयों के अध्यापकों तथा सरकारी व गैर - सरकारी संस्थाओं के विकास के लिए कार्य कर रहे कार्यकर्ताओं की कार्य कुशलता व क्षमता को बढ़ाने के लिए विभिन्न प्रशिक्षण कार्यक्रमों को आयोजित किया गया। इन प्रशिक्षण कार्यक्रमों में लिंग सम्बन्धी पहलुओं को मुख्यधारा में लाने के लिए विशेष ध्यान दिया गया। इसके अतिरिक्त विभिन्न शोध परियोजनाओं के अन्तर्गत 1645 कृषक महिलाओं का प्रशिक्षण कार्यक्रमों द्वारा सशक्तिकरण किया गया।

इस वर्ष की मुख्य सफलता प्रशासनिक एवं प्रयोगशाला भवन का निर्माण कार्य पूरा होना व अपने नये भवन में कार्यालय का कार्य शुरू करना है। भवन व प्रयोगशालाओं को कार्य करने योग्य बनाने के लिए विभिन्न उपकरणों की खरीद, पुस्तकालय को समृद्ध करना व शोध कार्यों के लिए सुविधाएं एकत्रित करना प्राथमिकता रही। मानव संसाधन विकास व कर्मचारियों की कार्य कुशलता को बढ़ाने पर भी महत्व दिया गया।

Executive Summary

The mandate and objectives of National Research Centre for Women in Agriculture came up for discussion to improve its practical utility and address the various gender perspectives for agricultural development. A concept note on the centre containing the revised mandate, objectives and activities was finally approved by the Council for implementation from X Plan. This annual report, besides carrying the findings emanating from institutional and externally funded projects, has detailed information on newly launched projects.

The access of tribal women to extension services, their profile, parameters associated with agriculture, exposure to extension, preferences for extension methods and benefits accrued to the men and women were studied in the interior tribal pockets of Koraput district, Orissa, under the project "*Development and testing of extension methods for farmwomen in Eastern India*". Data obtained from the study suggested changes in the structural and functional aspects of the organizations at different levels associated with agriculture. Creditability and socio-cultural compatibility of the change agents being important aspects for increasing the access of tribal women to extension services. The change agents having tribal background were most preferred. The stake holders must put tribal farm women in the central focus to bring agricultural development in the tribal areas. Care must be taken to understand exactly the extension needs of the farm women, areas of capacity building and other related services associated with agricultural development.

The demographic classification of the women Kandha tribes and their work participation were analysed to study the burden and responsibility for self and families under the project "*A gender study on agriculture and household economy of tribal of Orissa*". Keeping in view the prevailing age structure of tribal population, women would continue to have higher share in working age population. This means Work Participation Rate (WPR) of women in coming years would be higher and contribution of women would be more important in the labour market,

particularly in agricultural sector. As increasing number of girls were involved in economic pursuits to support their families neglecting their education, there was a need to strengthen the household economy of tribals through increased productive employment opportunities of adult tribal women.

The experiments conducted under the project "*Improvement in storage practices of seeds and grains of important crops with women perspective*" successfully tested the storage of green gram, arhar and radish seeds by use of different ITKs. The findings recommended pretreatment measures such as cleaning the seed and removing all inert matters and weed seeds, drying the seeds properly (moisture content should be below 10%), maintaining dryness, cleanliness and ventilation in the seed store and checking in between for any insect infestation.

As Indigenous Technological Knowledge (ITK) contributes greatly towards eco-friendly farming as well as pest management, special drives were made to collect ITKs on pest management for vegetables in homestead lands under the project "*Popularization of eco-friendly pest management technologies for vegetables among farm women in homestead lands*". Twenty ITKs were collected and 13 participatory valedictory trials were conducted. The eco-friendly character of ITKs were studied which would enable to refine and provide suitable recommendations on eco-friendly practices.

Survey on post harvest handling of vegetables in rural areas brought out that heavy loss of vegetables was due to lack of value addition and adoption of post harvest management techniques by farmers and vendors. It was also reported that lack of storage structures and exploitation of middlemen in the rural areas forced the farmers to sell their produce at a throw away price. Awareness building on post harvest management and value addition for capacity building of vegetable growers is required. Provision for storage structures, proper drainage systems and open space in the vegetable markets may help the vendors to over come the post harvest losses.

Under the National Agricultural Technology Project (NATP), a project entitled "*Management of coastal agro eco system affected by Super Cyclone in Orissa*," strategic trainings were organized in the areas of vegetable production and value addition with the participation of 844 farm women in the Super Cyclone affected areas of Cuttack and Puri districts. The affected families made significant progress on nutritional security through establishment and maintenance of kitchen gardens on sustainable basis. The increased consumption of vegetables by affected families had brought improvement in their general health. The NATP project on "*Empowerment of women in agriculture*" made significant interventions in drudgery reduction and income generation through women self help groups. The participatory evaluation of 19 implements on drudgery reduction provided valuable feedback for researchers and development functionaries. Comparisons were made on ergonomic data between selected interventions and traditional practices to justify the recommended interventions. The potentiality of selected location specific enterprises in income generation by women self help groups were depicted through success stories. Another NATP project on "*Collection, documentation and validation of ITK – Storing pulse grains by using dry chilli*" revealed that dry chillies and mustard oil treatments were effective in storing the seeds/grains of pulses like green gram. Studies on women in agriculture in India with special emphasis on crop production technologies were made under AP ccess project to study the various aspects of women in agriculture at different level of awareness. It was found that farm women under high awareness situations were equipped with better practical skills in crop production which they had reported to have acquired from co-farmers. The project sanctioned by Department of Bio-technology (DBT) "*Involving rural women in aquaculture – A step towards ensuring economic and nutritional security*" demonstrated the capacity of the rural women in nursery raising and income generation for promoting pisciculture in the locality and livelihood for their families.

The centre made an important beginning by launching a network project on "*Approaches to engendering*

agricultural research and extension" and developed functional linkage with Centre for Studies on Gender Concerns in Agriculture, Kerala Agricultural University and CCSHAU, Hisar. This would provide ample scope to share, experience and assimilate gender issues in broad national perspective and produce gender sensitive human resource materials. The projects launched towards the end of the year were "*Micro propagation of pointed gourd (Trichosanthes dioica Roxb) for empowerment of women*", "*Efficient resource management of women agriculture labourers*", "*Database on gender in agriculture*", "*Development of modules for mobilization of rural women for sustainable livelihood through Women Self Help Groups*", "*Studies on eco-friendly integrated weed management*" and "*Standardization of weaning mix using different proportions of sweet potato*".

The sub-centre at CIAE, Bhopal, in its maiden venture to assess the working pattern and drudgery status of women working with agricultural tools/equipment/ machinery started an extensive survey in the state of Madhya Pradesh which would strengthen the data base of the centre. Ergonomical evaluation of manual operated cleaner, grader, seed drill, fertilizer broadcaster and ridger was made to assess their suitability for farm women. Empirical and qualitative observations were made for different equipments for correctly assessing their ergonomical suitability for women.

Trainers' training programmes were organized for capacity building of the partners such as scientists/teachers of ICAR and SAUs and development functionaries of the Government and Non-Governmental Organizations with special emphasis on gender mainstreaming. In addition farm women trainings were conducted in different villages under the approved projects empowering 1645 farm women.

Another land mark achievement of the year was completion of the construction of administrative-cum-laboratory building and shifting of office in our own campus. For making the building functional procurement of laboratory equipments, enrichment of library and creation of facilities for research work were taken up on priority. Human resource development and capacity building of the staff was also given due importance.

1.1. Brief History

The Working Group in Agricultural Research and Education constituted by the Planning Commission for the formulation of the Eighth Five Year Plan (1992-97) recommended for establishment of a National Research Centre for Women in Agriculture (NRCWA) during the Eighth Five Year Plan. Accordingly, the Indian Council of Agricultural Research established the NRCWA in the month of April 1996 at Bhubaneswar. The Sub-centre of NRCWA is located at the campus of CIAE, Bhopal.

1.2. Mandate and Objectives

1.2.1 Mandate and Objectives upto Dec, 2003

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

The specific objectives were :-

Main centre

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

Sub-Centre

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

1.2.2 Revised Mandate and Objectives from Jan, 2004

The centre while finalizing the X plan EFC considered the views offered by different reviewing agencies including Planning Commission and in consultation with the Director General, ICAR, revised the mandate and objectives of the centre to streamline the research programmes and make it more relevant.

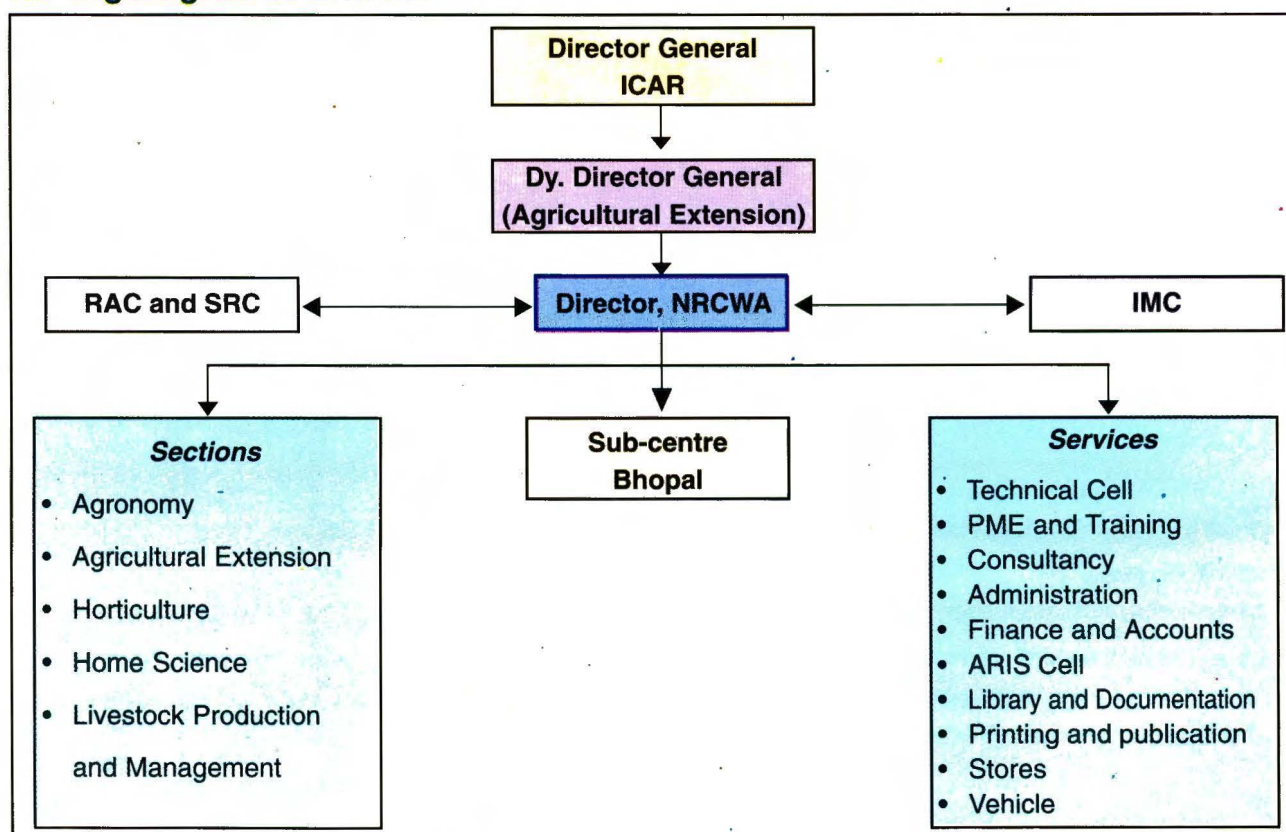
Mandate

To identify gender issues and test appropriateness of available farm-technologies/ programmes/ policies with women perspective 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.

Objectives

- To create a 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 training 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.

1.3 Organogram of NRCWA

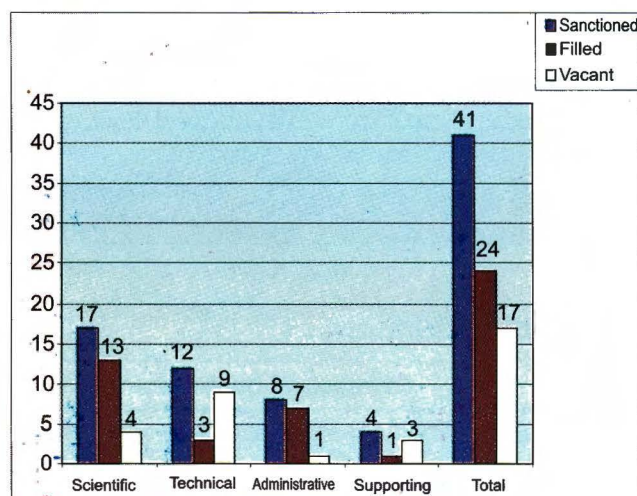


1.4 Budget and Expenditure (Main and Sub centre)

(In lakhs)

Sl. No.	Head of Account	Budget		R.E.		Expenditure	
		Non-plan	Plan	Non-plan	Plan	Non-Plan	Plan
A. Recurring							
1.	Estt. Charges including LSP and PF contractual charges	40.00	24.80	54.00	-	53.90	-
2.	Traveling Allowances	-	4.00	-	4.00	-	3.95
3.	HRD	-	2.00	-	1.00	-	0.49
4.	Contingency	10.00	25.00	20.00	25.00	6.59	22.70
	<i>Total</i>	<i>50.00</i>	<i>55.80</i>	<i>74.00</i>	<i>30.00</i>	<i>60.49</i>	<i>27.14</i>
B. Non-recurring							
1.	Equipments	-	20.00	-	20.00	-	19.92
2.	Works	-	115.00	-	119.00	-	118.97
3.	Vehicle	-	-	-	-	-	-
4.	Library	-	1.20	-	0.50	-	0.49
5.	Furniture/Livestock	-	8.00	-	30.00	-	28.14
	<i>Total</i>	<i>-</i>	<i>144.20</i>	<i>-</i>	<i>169.50</i>	<i>-</i>	<i>167.52</i>
Total (A+B)		50.00	200.00	74.00	199.50	60.49	194.66

1.5 Manpower (Main and sub Centre)



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

1.6 Scientific Staff (Main and Sub centre)

Sl. No.	Discipline	Sanctioned Strength			In position as on 31.3.2004		
		Scientist	Sr. Scientist	Pr. Scientist	Scientist	Sr. Scientist	Pr. Scientist
1	DIRECTOR			RMP (1)			RMP (1)
	Scientific						
2	Agricultural Economics	1	-	-	1	-	-
3	Entomology	-	1	-	-	1	-
4	Agricultural Extension	-	1	1	-	1	1
5	Agronomy	-	-	1	-	-	1
6	Farm Machinery and Power	-	1	-	-	1	-
7	Food and Nutrition	1	-	-	1	-	-
8	Family Resource Management	-	1	-	-	-	-
9	Home Development Resource Management	-	-	1	-	-	1
10	Livestock Production and Management	-	-	1	-	-	-
11	Dairy Technology	-	1	-	-	-	-
12	Fish Processing Technology	-	1	-	1*	-	-
13	Horticulture	2	1	1	2	1	-
	Total	4	7	6	5	4	4

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

1.7 Technical Staff

Designation	Sanctioned Post	In position as on 31.3.2004
Technical Assistant (T-II-3)	9	2
Technical (T-1)	3	1

1.8 Administrative Staff Including Supporting

Designation	Sanctioned post	In position as on 31.3.2004
Asstt. Administrative Officer	1	1
Asstt. Finance and Accounts Officer	1	0
Personal Assistant	1	1
Sr. Clerk	2	2
Stenographer, Gr-III	2	2
Jr. Clerk	1	1
S.S.G.1	4	1
Total	12	8

2. RESEARCH ACCOMPLISHMENTS

During the period under report 10 projects were concluded and 7 new projects were planned and initiated as per the new mandate of the Institute. The details of research achievements are given below:

2.1. Development and testing of extension methods for farm-women in eastern India

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

Survey results

The district, Koraput, being an interior district of Orissa and covered under Training and Extension for Women in Agriculture (TEWA) was selected for the study. The district is inhabited largely by ST and SC population. The data were collected in two blocks, namely, Similiguda and Boriguma, covering a sample of 80 farmers and farm women who belonged to Paroja tribe and Mali caste.

About tribal farm women

Farm women as a class have a distinct position in tribal areas. The intricate relationship between agriculture and household economy of tribals in one hand and the commitment of farm women to their family and contribution to the agriculture on the other speak volume of the importance of tribal women in agricultural economy of inland district. This could be further substantiated by the fact that most of the farm women (75%) had their entry into agricultural work at an age of 10 years. Some even had their entry into farm work at an early age of 8 years. In this respect, these farm women are a distinct lot not only from the farm women of other regions (coastal) but also from their men counter parts of the same region. Importantly, approximately 92 per cent of farm women did not have any formal education.

Exposure of gender to training

Results of data given in table 1 reveals that higher percentage of farm women (42.5%) had undergone different training programmes on agriculture and allied subjects with more duration in distant places than the farmers (35%) under TEWA villages. The non-trained women and men were 90 and 80 per cent, respectively, under non-TEWA and TEWA villages. It was very interesting to state here that the women had attended the exhibition (7 days) in Delhi, training on rice production (10 days) in Madras, agri-clinic (8 days) at Barhampur, organic pesticide and balanced fertilizer (7 days) at Bhubaneswar, agriculture through SHG (6 days) by Agriculture Technology Management Agency (ATMA), vegetable cultivation and crop production (5 days) in KVK where as the farmers were imparted training on cultivation of rice, mushroom, floriculture, niger, vegetable and improved agriculture with 1 - 4 days duration in local places.

- In cases women had longer period of participation in some kind of training programme as compared to the men counter parts. Maximum days of training attended by farm women was for 10 days as against maximum of 5 days in case of men members.
- In TEWA village relatively more emphasis was given to orientation and training of farm women as compared to non-TEWA villages.
- There was a mismatch between the normal activity pattern and the subject/area of training offered to the farm women. For example women being major players in Jhola land management did not receive required trainings in rice cultivation in those lands. Similarly, weeding in ragi being an important activity of farm women did not figure as a training area for farm women. Rather farm women were given trainings in allied subjects such as mushroom, floriculture, which could hardly practiced by them. Therefore, the importance of training need assessment was amply highlighted.
- Training-cum-demonstration was found to have positive impact on the rate of adoption by farm women. This was evident from the adoption of certain crops particularly sunflower and maize in the locality and its inter cropping with vegetable crops.

Table 1 - Exposure to training and other related programs

Training programmes	Farmers				Farm women				Total N-80	
	TEWA (N-20)		Non-TEWA (N-20)		TEWA (N-20)		Non-TEWA (N-20)		f	%
	f	%	f	%	f	%	f	%		
No training	10	50.00	16	80.00	5	25.00	18	90.00	49	61.25
Crop production	7	35.00	3	15.00	8	40.00	2	10.00	20	25.00
Crop protection	-	-	-	-	3	15.00	-	-	3	3.75
Veg. Production	1	5.00	1	5.00	1	5.00	-	-	3	3.75
Floriculture	1	5.00	-	-	-	-	-	-	1	1.25
Entrepreneurship development	-	-	-	-	1	5.00	-	-	1	1.25
Mushroom cultivation	1	5.00	-	-	1	5.00	-	-	2	2.50
Attending exhibition	-	-	-	-	1	5.00	-	-	1	1.25
Total	20	100.00	20	100.00	20	100.00	20	100.00	80	100.00

The tribal women were very receptive to changes suggested to them by change agents unlike women of coastal district, even though they have little or no awareness on very purpose of change. For example, it was found that farm women grew mustard in small patches by using the kits supplied by the change agents of Department of Agriculture. But, the women instead of meeting their oil requirement of the family from the crop, used mustard plants as greens for family and market.

Gender analysis in occupational fields

Farming was the primary occupation for 62.5 per cent men and 70 per cent women (Table 2) where as farm labour was primary occupation of 37.5 per cent men and 30 per cent women, respectively. In a given year the people ate food for six months from their own farm and for rest six months, they worked as wage earner. Animal husbandry was adopted as secondary occupation by equal percentage (50%) of farmers and farm women. However, 20 per cent farmers and 10 per cent of farm women had no secondary occupation. None of the woman had service as secondary occupation while 5 per cent of men had service. Under tertiary occupation marketing was done by 20 per cent men and 32.50 per cent women where as, 80 per cent men farmers and 67.50 per cent women farmers had no tertiary areas.

Table 2 : Gender wise involvement of men and women farmers in occupational fields

Occupation	Farmers (N- 40)	Farm women (N-40)
1. Primary	(%)	(%)
a. Farming	62.50	70.00
b. Farm labourer	37.50	30.00
2. Secondary		
a. Farming	0.00	12.50
b. Farm labourer	25.00	27.50
c. Service	5.00	0.00
d. Animal husbandry	50.00	50.00
e. No secondary	20.00	10.00
3. Tertiary		
a. Marketing	20.00	32.50
b. No tertiary	80.00	67.50

Participation of women in farming systems

Under this study, eight numbers of farming systems were identified out of which rice+ragi+ livestock was adopted by the highest percentage (22.50%) of farm women followed by rice+ragi+vegetable+livestock+post harvest (17.50%) and rice+vegetable+ livestock+post harvest (15%) (Table 3). But a lowest percentage (7.5%) of farm women adopted vegetable+livestock as one of their farming systems. The major enterprises in the systems were rice (72.5%), ragi (70%), livestock (62.5%), vegetable (45%) and post harvest (35%).

Table 3 : Participation of women in farming systems

Sl. No.	Identified farming systems	f (N-40)	(%)	Major enterprises	Extent (%)
1.	Rice +Ragi+Livestock	9	22.50	Rice	72.50
2.	Rice+Ragi+Vegetable+Livestock+ Post harvest	7	17.50	Ragi	70.00
3.	Rice + Pulses +Vegetable +Livestock	4	10.00	Livestock	62.50
4.	Rice +Livestock+Post harvest	5	12.50	Vegetable	45.00
5.	Rice+Vegetable+Livestock+Post harvest	6	15.00	Post harvest	35.00
6.	Rice +Oilseed +Livestock	4	10.00		
7.	Sugar cane+ Livestock	2	5.00		
8.	Vegetable +Livestock	3	7.50		
	Total	40	100.00		



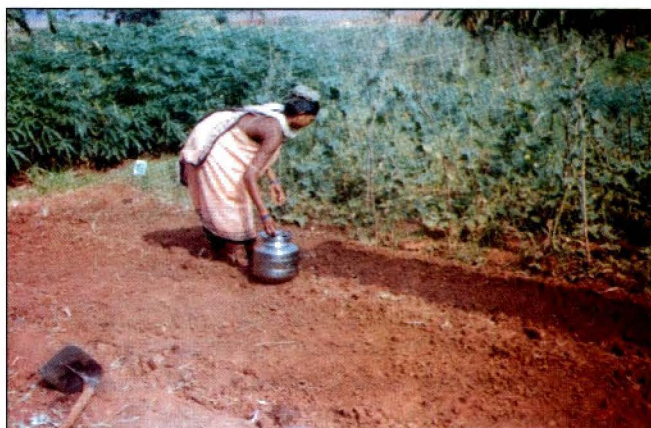
Tribal women preparing JHOLA land for rice cultivation

Gender involvement in farming system activities

The data on gender involvement in farming systems as perceived by the respondents under three levels of activity index have been shown in table 4. It reveals that the farm women took part highly in the farm activities like Jhola land preparation (75%), transplanting (82.5%), weeding (72.5%), harvesting (82.5%), transportation (60%), threshing (52.5%), hand milling (80%) and processing (85%).

Farmers also had high involvement in some activities of crop production like Bheda land preparation, sowing and nursery raising. Under livestock management, women were involved in

fodder collection (82.50%), feeding the animals (97.50%), cleaning the animal shed, (87.50%), caring the newborn calf (87.50%) and preparing cow dung cake (90.00%). They also did household activities like family nutrition (100%), cleaning of home (75%), caring of family members (92.50%) and collecting fuel and water (67.50%). Contrary to this, the involvement of farmers in both livestock and home management was very negligible and anyhow upto 7.50% men had low participation in these two areas. Tribal women were found very busy in farming as well as household chores whereas men waste time being addicted to country liquor.



Tribal women in homestead farms

Table 4: Gender involvement in farming activities

Activities	Intensity of Involvement (%)					
	Farmers (N=40)			Farm women (N=40)		
	High	Moderate	Low	High	Mode-rate	Low
Crop production						
Preparation of <i>Jhola land</i>	37.50	10.00	10.00	75.00	20.00	5.00
Preparation of <i>Beda land</i>	77.50	22.50	0.00	0.00	0.00	0.00
Sowing	77.50	20.00	2.50	0.00	0.00	5.00
Nursery raising	67.50	17.50	15.00	5.00	5.00	2.50
Transplanting	7.50	12.50	15.00	82.50	10.00	7.50
Weeding	10.00	10.00	12.50	72.50	25.00	2.50
FYM/Fertilizer application	32.50	30.00	37.50	0.00	10.00	7.50
Pesticide application	32.50	37.50	30.00	0.00	0.00	12.50
Irrigation	0.00	0.00	20.00	0.00	5.00	0.00
Harvesting	30.00	40.00	30.00	82.50	17.50	0.00
Transportation	45.00	45.00	10.00	60.00	35.00	5.00
Threshing	37.50	42.50	20.00	52.50	32.50	15.00
Drying	27.50	30.00	42.50	45.00	45.00	10.00
Storing	25.00	22.50	52.50	55.00	25.00	20.00
Hand milling	7.50	17.50	75.00	80.00	17.50	12.50
Processing	0.00	0.00	10.00	85.00	10.00	5.00
Livestock management						
Collection of fodder	0.00	0.00	7.50	82.50	10.00	0.00
Feeding animals	0.00	0.00	0.00	97.50	2.50	0.00
Cleaning shed	0.00	5.00	7.50	87.50	10.00	2.50
Care for new born calf	0.00	0.00	5.00	87.50	5.00	0.00
Preparation of cow dung cake	0.00	0.00	0.00	90.00	10.00	0.00
Home management						
Family nutrition	0.00	0.00	0.00	100.00	0.00	0.00
Caring child/old/sick	0.00	0.00	7.50	92.50	0.00	0.00
Collecting fuel and water	0.00	0.00	0.00	67.50	25.00	7.50
Cleaning home	0.00	0.00	0.00	75.00	20.00	5.00
Marketing						
Selling vegetables	0.00	0.00	15.00	32.50	50.00	17.50

Gender responsibility in important household resource management

Gender responsibilities in resource management indicated that nearly equal percentage of farmer and farm women (50%) fully managed their household land resources namely irrigated, non-irrigated, backyard and orchard land (Table 5). In case of livestock and seed storage higher percentages of farm women were found fully responsible than that of farmers, while in case of farm implements like sprayer, country plough, seed drill and farm power higher percentage of farmers took full responsibility than their counterpart. Farmers' responsibility in management of hired labour was also found to be greater than that of farm women.

Table 5 : Gender responsibility in important household resource management of the family

Resources	Extent of responsibility (%)					
	Farmers (N-40)			Farm women (N-40)		
	Fully	Partially	Never	Fully	Partially	Never
Land	50.00	32.50	17.50	52.50	22.50	25.00
Livestock	27.50	30.00	42.50	62.50	37.50	0.00
Seed	45.00	25.00	30.00	50.00	22.50	27.50
Agril implements	67.50	32.50	0.00	50.00	27.50	22.50
Farm power	60.00	20.00	20.00	55.00	20.00	25.00
Hired labour	45.00	45.00	10.00	20.00	22.50	57.50

Awareness knowledge of men and women on extension agencies and their roles in TEWA and non-TEWA villages

Table 6 reveals that the farm women under TEWA were more aware about the extension agencies, the grass root worker, supervising officer and their supportive roles in the department of agriculture, animal husbandry, health and family welfare than non-TEWA villages. But the farm women as well as men under both the TEWA and non- TEWA did not know any official and their supportive roles of fishery field. Only a few women knew the name of the supervising officers of horticulture department under TEWA and non-TEWA villages.

Table 6: Awareness knowledge of farmers and farm women about extension agencies and their roles in TEWA and non-TEWA villages

Sl. No.	Name of the extension agency	Respondent Knowing the grass root worker			Respondent Knowing the superior officer			Respondent Knowing the supportive role of grass root worker/ supervisor		
		Farm women under TEWA (N-20)	Farm women under non TEWA (N-20)	Farmers (N-40)	Farm women under TEWA (N-20)	Farm women under non TEWA (N-20)	Farmers (N-40)	Farm women under TEWA (N-20)	Farm women under non TEWA (N-20)	Farmers (N-40)
1.	Department of Agriculture	14 (70)	8 (40)	24 (60)	7 (35)	5 (25)	12 (30)	8(40)	6(30)	10 (25)
2.	Department of Animal Husbandry	15 (75)	12 (60)	32 (80)	9 (45)	7 (35)	14 (35)	7 (35)	6 (30)	5 (12.5)
3.	Department of Horticulture	2 (10)	0	4 (10)	1(5)	0	1 (2.5)	0	0	1 (3)
4.	Department of Health of Family Welfare	10 (50)	8 (40)	12 (30)	9 (45)	4 (20)	16 (40)	6 (30)	4 (20)	6 (15)

Figures in parentheses indicate percentages.

Intensity of contact of farm women with change agents under TEWA and non-TEWA villages

The data on intensity of contact of farm women with different extension functionaries in two different situations have been shown in table 7. It reveals that in both situations Auxiliary Nurse Midwifery (ANM) had rank-I so far as their contact with the farmwomen was concerned. Next in order (Rank-II) was Lady Village Agricultural

Worker/ Village Agricultural Worker of Agriculture Department. Under TEWA area the LVAW had the same intensity of contact as that of Livestock Inspector (both Rank II). The grass root functionaries of Horticulture Department (Gardener/Grafter) had least intensity of contact. The comparison of intensity scores obtained for different functionaries by Wilcoxon-Mann-Whitney test brought out no significant difference in Z values implying that all the change agents of various department in both the situations have almost similar intensity of contact. Further it was found that VAWs had higher intensity of contact with farm women than the LVAWs. The following reasons very well support the above findings:

- (i) Tribal women are intensely involved in farming and they are the backbone of farming in tribal households.
- (ii) Unlike in the coastal tract, tribal women feel free in interacting with male change agents as their culture do not create any barrier in communication between tribal women and male extension worker.
- (iii) Further it was found that many VAWs had a tribal local background, which gave them an edge to work with farm women.
- (iv) Many LVAWs working in tribal areas had experienced difficulties as they (a) belonged to different socio-cultural background, (b) faced problems in reaching interior places and (c) apprehended misbehaviour from the men who remained in drunken state even in day time.

Table 7 : Intensity of contact of farm women with extension functionaries in TEWA and Non-TEWA villages

Sl. No.	Name of the extension functionaries	Intensity of contact (Mean score) in TEWA village (N=20)	Rank	Intensity of contact (Mean score) Non-TEWA village (N=20)	Rank	Difference ("Z" value)
1.	VAW/LVAW	3.00	II	3.50	II	0.92 NS
2.	Livestock Inspector	3.00	II	3.20	III	0.48 NS
3.	Gardener/Grafter (Horticulture Department)	2.33	III	2.00	IV	0.54 NS
4.	Auxiliary Nurse Mid-wife (ANM)	3.80	I	3.88	I	0.06 NS

NS - Not significant

Preference of gender for effective extension

The preferences of farmers and farm women for effective extension as found out from the study have been presented in table 8. The farm women preferred most the female extension agent, group contact, forenoon contact time, place of contact at home, group discussion, on campus training, tour within block boundary, referring extension agent within a fortnight or month time gap, demonstration farmer to be a man or woman, village common place for discussion and starting enterprise individually as well as in group. The farmers preferred most male extension agent, group contact, afternoon contact time, place of contact at home, group discussion, on campus training, tour within district, one visit per week, man as demonstration farmer, community place for discussion and starting enterprise in groups. Although the farmers and farm women had some common preferences, still there were some significant differences in certain options of the methods such as the most ideal extension agent, location of training, boundary of tour, gap of contact with extension agent, preference for the demonstration farmer and location for discussion.

Table 8 : Preference of gender for effective extension

Extension methods/ issues	Options	Preference of farm women (N=40)			Preference of farmers (N=40)			CR value
		f	%	Rank	f	%	Rank	
Most ideal extension agent	Male extension agent	3	7.50	IV	24	60.00	I	4.47**
	Female extension agent	19	47.50	I	5	12.50	III	3.41**
	Male para extension agent	2	5.00	V	10	25.00	II	0.97NS
	Female para extension agent	10	25.00	II	0	-	-	-
	Any one of the above	4	10.00	III	0	-	--	-
	No choice	2	5.00	V	1	2.50	IV	0.58NS
Most preferred contact	Individual	5	12.50	II	5	12.50	III	-
	Group	30	75.00	I	25	62.50	I	1.20NS
	Mass	2	5.00	III	6	15.00	II	1.49 NS
	Combined	2	5.00	III	2	5.00	IV	-
	No choice	1	2.50	IV	2	5.00	IV	0.59 NS
Time for contact	Evening	12	30.00	II	13	32.50	II	0.22 NS
	Fore noon	13	32.50	I	10	25.00	III	0.74 NS
	After noon	9	22.50	III	14	35.00	I	1.23 NS
	Any time	6	15.00	IV	3	7.50	IV	1.06 NS
Place for contact	Home	32	80.00	I	25	62.50	I	1.73 NS
	Farm	8	20.00	II	10	25.00	II	0.53 NS
	Office of the change agent	0	0.00	-	5	12.50	III	-
Most preferred group methods	Group discussion	25	62.50	I	22	55.00	I	0.68 NS
	Training	8	20.00	II	9	22.50	II	0.27 NS
	Method demonstration	2	5.00	IV	2	5.00	IV	-
	Result demonstration	0	0.00	-	-	-	-	-
	Tours	5	12.50	III	7	17.50	III	0.62 NS
Training	Off campus	5	12.50	II	12	30.00	II	1.91 NS
	On campus	33	82.50	I	17	42.50	I	3.70**
	Both type	2	5.00	III	11	27.50	III	2.72**
	No training	0	0.00	-	-	-	-	-
Boundary of tour	Within block	24	60.00	I	12	30.00	II	2.70**
	Within district	7	17.50	II	15	37.50	I	2.00*
	Outside district	2	5.00	III	8	20.00	III	2.03*
	Any place	7	17.50	II	4	10.00	IV	0.97 NS
	No tour	0	0.00	-	1	2.50	V	-
Time gap to refer extension agent	Within a week	10	25.00	II	24	60.00	I	3.16**
	Within a fortnight	15	37.50	I	8	20.00	II	1.72 NS
	Within a month	15	37.50	I	8	20.00P	II	1.72 NS
Preference for demonstration farmer	Be a man	5	12.50	III	18	45.00	I	3.21**
	Be a woman	6	15.00	II	12	30.00	II	1.60 NS
	Be man/woman	29	72.50	I	10	25.00	III	4.24**

Extension methods/ issues	Options	Preference of farm women (N=40)			Preference of farmers (N=40)			CR value
		f	%	Rank	f	%	Rank	
Location for discussion	Common places of village	36	90.00	I	30	75.00	I	2.69**
	House of progressive farmer	2	5.00	II	8	20.00	II	2.02*
	Inner yard of house	0	0.00	-	-	-	-	-
	Neighbouring village	0	0.00	-	-	-	-	-
	Any place	2	5.00	II	2	5.00	III	-
Preference for kind of doing enterprise	Doing individually	15	37.50	I	12	30.00	II	0.70 NS
	Doing in group	15	37.50	I	23	57.50	I	1.79 NS
	Doing both ways	10	25.00	II	4	10.00	III	1.76 NS
	Any other	0	0.00	-	1	2.50	IV	-

NS - Not significant

* - Significant at 0.05 level of confidence

** - Significant at 0.01 level of confidence

Perceived gain in knowledge and acquisition of skills by farm women under LVAWs and VAWs

Farmwomen identified 12 areas (Table 9) where they had received additional knowledge from the change agents during the reference year. The comparison of LVAW and VAW in providing additional knowledge to the farm women in their jurisdiction brought out that the Lady Village Agricultural Workers were found giving more information than the Village Agriculture Worker on mushroom cultivation, seed treatment, compost making, sun flower cultivation, germination test and storage. In the rest six areas VAWs were more effective than LVAWs.

In the year of reference the farm women improved their 7 different skills (Table 9) showed to them by the LVAWs and VAWs. Improvement in skills through LVAWs was found to be higher than the VAWs on seed treatment and planting of sugarcane. The VAW's contribution in other 4 areas was found more than LVAWs. By and large both VAWs and LVAWs had helped the women farmers to gain knowledge and improve their skill.

Table 9 : Perceived gain in knowledge and acquisition of skills by farm women under LVAWs and VAWs

Sl. No.	Field of knowledge	Gain in knowledge (MS)		Name of skill	Gain in skill(MS)	
		Farm women under LVAWs (n=20)	Farm women under VAWs (n=20)		Farm women under LVAWs (n=20)	Farm women under VAWs (n=20)
1.	Transplanting of ragi	2.06	3.01	Preparation of spray solution	0.72	1.02
2.	New varieties of ragi	1.00	1.24	Compost pit making	2.03	2.72
3.	Alasi in fallow land	1.22	2.00	Sugarcane planting	1.25	0.06
4.	Commercial fertilizer	0.88	1.02	Vegetable planting	1.00	1.80
5.	Fertilizer application	0.74	1.01	Germination test	3.06	4.33
6.	Line sowing	0.27	0.68	Soil sample collection	0.66	0.92
7.	Mushroom cultivation	3.02	2.25	Seed treatment	4.07	3.72
8.	Seed treatment	3.20	3.00			
9.	Germination test	1.75	1.50			
10.	Compost making	2.25	1.77			
11.	Sunflower cultivation	1.67	1.45			
12.	Storage bin	1.09	0.92			

The intense involvement of tribal women in agriculture as evident from data suggests changes in the structural and functional aspects of the organizations associated with agriculture. The service providers in this sector must consider the tribal farm women as the number one clientele so far as agricultural development in the tribal areas is concerned. Care must be taken to understand exactly the extension needs of the farm women, areas of capacity building and other related services associated with agricultural development. Much emphasis should be given on the creditability and socio-cultural compatibility of the change agents for making extension services very effective.

2.2. A gender study on agriculture and household economy of tribal of Orissa (H.K. Dash, B.N. Sadangi & Hema Pandey)

Demographic structure and working age population

Family size is often an important factor for many of the economic decisions and consequences. If considered along with family income it could be an important determinant of economic wellbeing of the family. Small families as an outcome of economic imperatives of changing situation are quite a visible phenomenon amongst tribals of the region.

As evident from the table-10 that highest proportion of families i.e. 27.5 per cent of the families were of size four, while twenty per cent of the families were of size five. Family size ranges from 2 to 9 with average size 5.2.

Table 10: distribution of family size (N=80)

Family size and distribution (%)					
Up to 3	4	5	6	7	8 and more
12.5%	27.5%	20%	15%	12.5%	12.5%

Getting splitted away from joint families and forming a nucleus family just after marriage is fast picking up among tribal youths.

Gender distribution of population across different age groups as given in the table-11 indicates that while men outnumbered women under age group of 0 - 5 years, where as women outnumbered men in age group of 10 - 15 years both in absolute and in percentage terms. While 59.60 per cent of men and 58.18 per cent of women belonged to the working age group i.e. 15-59 years, over all 58.85 per cent of total population came under working age group and rest 41.15 per cent under non-working age group.

Table 11: Age-wise distribution of population

Gender	Age group (yrs)					Total
	0 - 4	5 - 9	10 - 14	15 - 59	60 and above	
Men	26 (13.13)	28 (14.14)	14 (7.07)	118 (59.60)	12 (6.06)	198 (100)
Women	16 (7.27)	30 (13.64)	36 (16.36)	128 (58.18)	10 (4.55)	220 (100)
Total	42 (10.05)	58 (13.87)	50 (11.96)	246 (58.85)	22 (5.26)	418 (100)

Figures in parentheses indicate percentages.

Regarding proportion of men and women in the age group of 0-4 years, 61.90 per cent were men and 38.10 per cent were women, while in the age group of 10 -14 years, 72.0 per cent were women and only 28.0 per cent were men (Table -12).

In other age groups, difference in the proportion of men and women was marginal. Further disaggregating the working age population into sub groups such as 15 -29, 30-44 and 45-59 years it could be observed that women

Table -12: Proportion of men and women in different age groups

Gender	Age group (yrs)					
	0 - 4	5 - 9	10 - 14	15 - 59	60 and above	Total
Men	26 (61.90)	28 (48.27)	14 (28.0)	118 (47.58)	12 (54.53)	198 (47.37)
Women	16 (38.10)	30 (51.73)	36 (72.0)	128 (52.42)	10 (45.45)	220 (52.63)
Total	42 (100)	58 (100)	50 (100)	246 (100)	22 (100)	418 (100)

Figures in parentheses indicate percentage.

population in the age group 15-29 years far exceeded the men population both absolute and percentage terms. As evident in the table-13, approximately 31 per cent of women population and only 23.23 per cent of men population belonged to this sub-group. On the other hand in the age group 45 - 59 years the situation was just reverse with 16.16 per cent of men population and only 7.27 per cent of women population belonging to this group.

Table 13: Distribution of working population in different sub groups

Age group	Men	As % of working age population	As % of total men population	Women	As % of working age population %	As % of total women population
15 - 29	46	38.98	23.23	68	53.13	30.91
30 - 44	40	33.90	20.20	44	34.37	20.00
45 - 59	32	27.12	16.16	16	12.50	7.27
Total	118	100.00	59.59	128	100.00	58.18

The pattern of distribution is the same if distribution of adult population as percentage of working age population was considered. If a different class interval of working age population i.e. 15 - 23, 24 - 32, 33 - 41, 42 - 50 and 51 - 59 years are considered (Table -14) same kind of picture would emerge.

Table-14: Distribution of working population under different age groups

Age group	Men	As % of working age population	As % of total men population	Women	As % of working age population %	As % of total women population
15 - 23	24	20.34	12.12	42	32.81	19.09
24 - 32	30	25.42	15.15	38	29.69	17.27
33 - 41	25	21.19	12.63	32	25.00	14.55
42 - 50	23	19.49	11.62	12	9.31	5.45
51 - 59	16	13.56	8.08	4	3.13	1.82
Total	118	100.00	59.60	128	100.00	58.18

In interval 15 - 23 years women outnumbered men. In subsequent two class intervals, proportion of women was marginally higher than men. But in class intervals 42 - 50 years and 51 - 59 years men outnumbered women.

Work force participation amongst tribals

Size of work force is an important determinant of the level of economic activity. In this respect, the work participation rate (WPR) is an important indicator of the extent of involvement of population in various economic activities. It is defined as the proportion of workers (considering in working age group 15 - 59 years, now age group 15-64 yrs is considered working age group) to the total population. WPR can be measured at three different levels it may be the overall WPR (considering both men and women together) WPR of men and WPR of women.

It is not uncommon to find that the children participating in numerous activities particularly in agricultural sector, while estimating the WPR it is customary to exclude the persons out side 15 - 59 years of age group. It is a fact that a sizeable proportion of people outside this group are involved in some kind of economic activities. This is particularly more discernible in tribal areas where even school going girls and women graduates offer their labour either for self reliance or for family sustenance. In such a situation, when economically active persons below 15 years and above 60 years do matter can they really be ignored or can their role be down played in the over all context of tribal economy ? The rational approach perhaps would be to recognize the contribution of all these persons and at the same time to describe the workers in the age group of 15 to 59 years as designated workers for assigning them a different status in the work force.

Table -15 : Distribution of gender population

Gender	Parameter	Below 15 years	Designated worker (15 - 59)	Above 60 years	Total
Men	Population	68 (34.34)	118 (59.59)	12 (6.06)	198 (100.00)
	Economically active	8 (6.67)	108 (91.52)	2 (1.69)	118 (100.00)
Women	Population	82 (37.27)	128 (58.18)	10 (14.54)	220 (100.00)
	Economically active	18 (13.24)	114 (83.82)	4 (2.94)	136 (100.00)

The overall WPR among the tribals was found to be 53.11 per cent (considering only the designated workers), when the men WPR was 54.54 per cent in case of women it was 51.82 per cent. However, if the workers in the age group of below 15 years and 60 years and above were considered along with the designated workers, the overall WPR would be 60.29 per cent. While the WPR of men was 59.59 per cent, the women WPR was 61.82 per cent (Table -16).

Table -16: Population and work participation

Gender	Population	No. of designated workers (15-59) yrs	WPR	Considering all workers	WPR
Men	198	108	54.54	115	59.59
Women	220	114	51.82	136	61.82
Overall	418	222	53.11	252	60.29

It could be noted that when only designated workers were considered the men WPR came out be higher than women WPR. But when workers of all age groups are considered the women WPR came out to be higher than the men WPR.

It was due to the fact that proportionately more number of women out side 15-39 yr age group was engaged in economic activity. It could be observed that while 21.95 per cent of women below 15 years and 40.0 percent of women of 60 years and above were engaged in productive activities, the corresponding figures for men were 11.76 per cent and 16.66 per cent respectively (Table-17). It is worth noting that women work force constituted 51.35 per cent of the designated workers. If workers from all age groups were considered then the proportion would increase to 53.54 per cent.

Table 17 : Proportion of economically active population in different age groups

Age group	Variable	Men		Women	
		f	%	f	%
Less than 15 years	Population	68	100	82	100
	Economically active	8	11.74	18	21.95
15 - 59 years	Population	118	100	128	100
	Economically active	108	91.53	114	89.06
60 years and above	Population	12	100	10	100
	Economically active	2	16.60	4	10.00

Conclusion

The above analysis indicates that the women of all age groups in Kandha tribals of Orissa are relatively more burdened with the responsibility of maintenance of self and their families. The findings contradict the census figures on WPR which indicates higher men WPR as compared to the women, thus, down playing the extent of work participation of women. Keeping in view the prevailing age structure of tribal population, women will continue to have higher share in working age population. This means WPR of women in coming years will be higher and women will be more important in the labour market, particularly in agricultural sector. As increasing number of girls are involved in economic pursuits to support their families neglecting their education, there is a need to strengthen the household economy of tribals through increased productive employment opportunities of adult tribal women.

2.3. Improvement in storage practices of seeds and grains of important crops with women perspective (L.P. Sahoo & M.P.S. Arya)

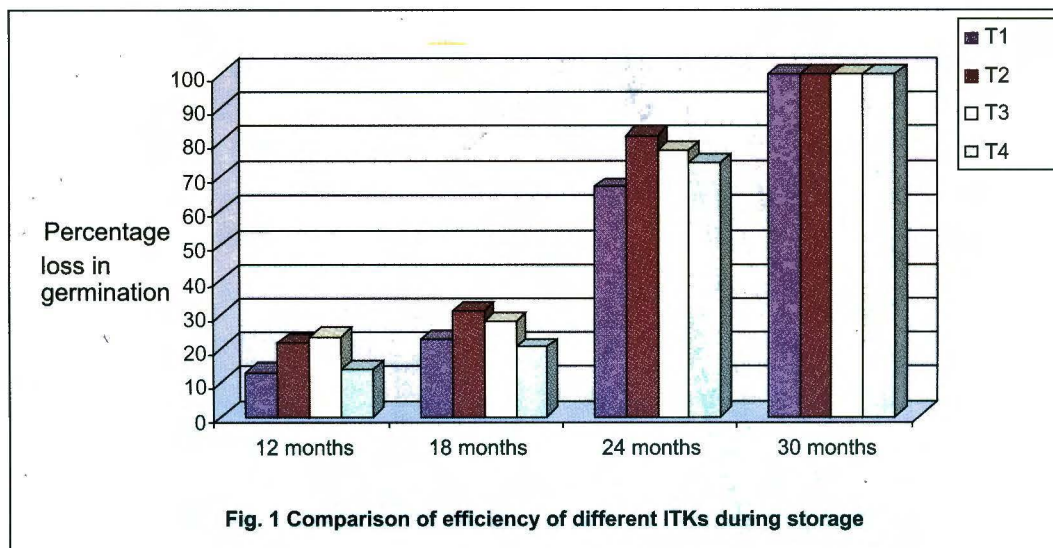
Attempt was made in this project for identifying some of the promising ITKs practised in different parts of Orissa, documenting and establishing its effectiveness by experimental validation. The efficiency of the ITKs was measured in terms of its seed and grain quality by recording germination percentage and moisture content and then comparing with the recommended method. The loss in seed and grain quality was assessed by comparing the initial seed quality with seed quality at different stages of storage.

Experimental validation for testing the efficiency of the Indigenous methods in prolonging the storage life was undertaken in green gram. The seeds were stored using four different methods such as : seed+begunia leaf+cow dung ash (T1), seed+neem leaf (T2), seed+naguari leaf (T3), seeds treated with captan @3 gm/kg of seed (T4) in 4 replications. Seeds were stored for 2 years. The efficiency of different methods with respect to germination percentage were studied (Table 18).

Table 18 : Comparison of different indigenous treatments/materials for storing green gram seeds

Treat-ments	Parameters for testing storability of seed							
	Germination (%)				Loss in germination (%)			
	12 months	18 months	24 months	30 months	12 months	18 months	24 months	30 months
T1	82 (94)	73(94)	31(94)	0(94)	12.76	22.34	67.02	100
T2	74 (94)	65(94)	17(94)	0(94)	21.27	30.85	81.9	100
T3	72 (94)	68(94)	21(94)	0(94)	23.4	27.65	77.65	100
T4	81 (94)	75(94)	25(94)	0(94)	13.8	20.21	73.9	100

Figures in parentheses indicate the initial germination percentage of greengram seed before storage.



Green gram seeds treated with Begunia leaves (*vitex negundo*) and cow dung ash had 9.3 per cent less loss in germination than the recommended method (treated with thiram @ 3 kg of seed) after 12 months of storage. Thus, the initial observation revealed that the use of begunia leaf and cow dung found effective in storing the green gram seeds. In another set of experiment on redgram six different treatments such as seeds coated with red earth and stored in polythene bag (T1), seeds smeared with red earth and stored in cloth bag (T2), seeds treated with mustard oil and stored in polythene bag (T3), seeds treated with mustard oil and stored in cloth bag (T4), seeds stored without any treatment and stored in cloth bag (T5), seeds stored without any treatment and stored in polythene bag (T6) were tested with respect to germination percentage (Table 19).

Table 19 : Comparison of different indigenous treatments/materials for storing redgram seeds

Treat- ments	Parameters for testing storability of seed							
	Germination (%)				Loss in germination (%)			
	12 months	18 months	24 months	30 months	12 months	18 months	24 months	30 months
T1	82(84)	62(84)	27(84)	0 (84)	2.38	26.19	67.85	100
T2	73(84)	57(84)	30(84)	0 (84)	13.09	32.14	64.28	100
T3	71(84)	59(84)	19(84)	0 (84)	15.47	29.76	77.38	100
T4	75(84)	66(84)	31(84)	0 (84)	10.71	21.42	63.09	100
T5	72(84)	49(84)	13(84)	0 (84)	14.28	41.66	84.52	100
T6	70(84)	53(84)	17(84)	0 (84)	16.66	36.9	79.76	100

Figures in parentheses indicate the initial germination percentage of redgram seed before storage.

The lowest loss in germination was reported from the seeds treated with red earth and stored in polythene bag (16.67%). This was followed by seeds treated with mustard oil and stored in cloth bag(21.43%).

The effect of different indigenous storage treatments was also studied on the germination of radish seeds. The loss in germination in radish seeds treated with chemical (Captan @3 g per kg of seed) was the lowest (3.7%). Among the indigenous treatments, seeds treated with neem leaf and stored in steel containers retained higher germination percentage (76%) and was comparable to the recommended method of chemical treatment i.e. Captan @3 g per kg of seed.

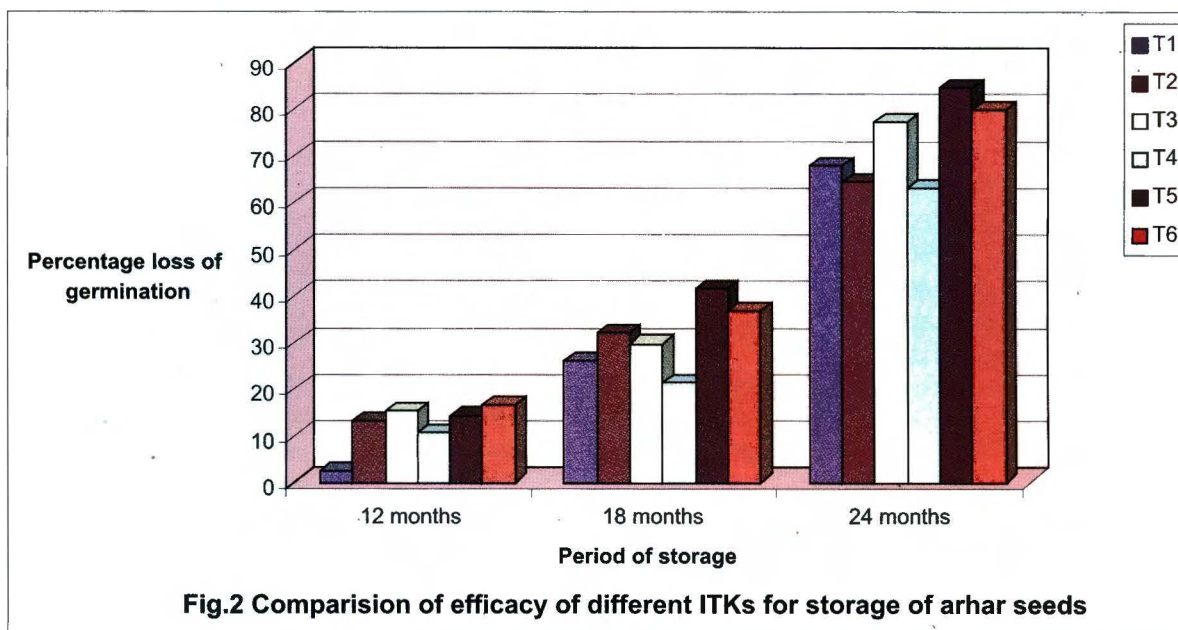


Table 20 - Comparison of different indigenous treatments/materials for storing radish seeds

Treat- ments Treatments/ containers	Parameters for testing storability of seed after one year of storage					
	Germination (%)			Loss in (%)		
	Seeds stored with neem leaves	Seeds stored with cow dung ash	Seeds stored with chemical	Seeds stored with neem leaves	Seeds stored with cow dung ash	Seeds stored with chemical
Steel box	76(81)	66(81)	78(81)	6.17	18.51	3.7
Plastic box	72(81)	68(81)	77(81)	11.11	16.04	4.9
Glass bottle	64(81)	68(81)	75(81)	20.98	23.4	8.6

Figures in parentheses indicate the initial germination percentage of radish seed before storage.

Conclusion

From the above experiments it can be inferred that some of the ITKS could be successfully explored for storage of green gram, arhar and radish seeds only after following the recommended pretreatment measures i.e. cleaning the seed and removing all inert matters and weed seeds, drying the seeds properly (moisture content should be below 10%), maintaining dryness and cleanliness in the seed store, keeping it well ventilated and checking in between for any infestation by insects.

2.4 Popularization of eco-friendly pest management technologies for vegetables among farm women in homestead lands (S.K. Srivastava, B.L.Attri and L.P. Sahoo)

Under the project entitled " Popularization of eco-friendly pest management technologies for vegetables among farm women in homestead lands" two hundred farm women were interviewed to find out the technological gap in pest management and Indigenous Technology Knowledge from 23 villages viz; Khamang Sasan, BasantPadhi, Jagannathpur, Balbhadrapur, Saripur, Andharua, Siwla, Parijanar, Magalapur, Matiapara, Khatiyari, Gangadevipara, Kusumara, Pampalo, Taradapara, Dahijang, Bishnupur, Khedarpur Hanspara, Chawalia, Kankān, Kothi and Kumbhrajpur of 4 districts viz; Khurda, Puri, Jagatsinghpur and Cuttack in Orissa. Thirteen participatory validation trial (4 on cabbage, 4 on brinjal and 5 on tomato) were conducted in Khamang Sasan and Mendhasal village of distt. Khurda. Seed material of different varieties, pheromone trap and lure, neem seedd and neem oil

were distributed among the selected farmwomen for participatory validation trials. Ten awareness generation training programmes on eco-friendly pest management alongwith vermicomposting for 264 farmwomen were organized in 9 villages viz; Gadapadampur, Siwla, Matipara, Khatiyari (Sunder), Kusumara and Hanspara of distt. Puri, Basantpadhi and Khamang Sasan of distt. Khurda and Gangadevipara of distt. Jagatsinghpur.

Twenty ITKs related to vegetables were collected from the farm women of different village of Orissa and different organizations located at Bhubaneswar (Table 21).

Table 21: List of ITKs and eco-friendly pest management technologies

Sl. No.	Name of the eco-friendly pest management technologies	Crop	Pest
1.	Application of Kochilla (<i>Strychnos nuxvomica</i>) + cow dung compost	Brinjal	Fruit and shoot borer
2.	Inter cropping of cabbage+ tomato (1:1) (tomato seedling should be transplanted before 30 days transplanting of cabbage)	Cabbage	Diamond back moth
3.	Inter cropping of cabbage+mustard (25:2). (First line of mustard 15 days before and second line 25 days after the transplanting of cabbage)	Cabbage	Diamond back moth, leaf webber, web worm and aphids
4.	Inter cropping of tomato with marigold (16:1). (Forty days old seedling of marigold should be transplanted with tomato)	Tomato	Fruit borer
5.	Inter cropping of okra and chilli with marigold & chilli with Ramadana (<i>Amaranthus</i>)	Okra and chilli	Mosaic and root knot nematode
6.	Spraying of Neem (<i>Azadiracta indica</i>) seed kernel extract @ 4% or Neem soap @ 10gm/litre of water	Cabbage	Leaf webber aphid and diamond back moth
7.	Spraying of Neem oil 0.03% @ 2.5 lit./ha	All vegetables	Fruit borer insect
8.	Resistant variety, pusa purple long and surti gota	Brinjal	Fruit and shoot borer
9.	Spraying of Karada (<i>Cleistanthus collinus</i>) plant leaf and bark extract	Brinjal	Fruit and shoot borer
10.	Spraying of 1 kg bael (<i>Aigle marmilos</i>) leaf with 10 litre of water or cow dung slurry 1 kg in 10 litre of water	All vegetables	Bacterial blight
11.	Broadcasting of 4-5 kg sugar/acre. (Ants are attracted to sugar particles and thereafter they feed on the larvae of the pest).	All vegetables	Larval form of the pest
12.	Release of poultry birds early in the morning	Tomato and French bean	Fruit borer
13.	Application of Kochilla leaf (<i>Strychnos nuxvomica</i>) + Karanj leaf + Neem leaf + cow dung in the form of compost	All vegetables	Different insect pests
14.	Putting of old fishing net in the periphery of vegetable field	All vegetables	Non insect pest Poultry folks

Sl. No.	Name of the eco-friendly pest management technologies	Crop	Pest
15.	Planting of Marigold in the periphery of vegetable field or intercropig with Okra and Brinjal	All vegetables	Different insect pests
16.	Keeping the seed after sun drying in earthen pots sealing by mud and cow dung	Vegetable seeds	Storage pest
17.	Dry powder of Karanj+ Neem with water solution	Brinjal and Cabbage	Different pests of Brinjal and Cabbage
18.	Root dip of nursery of vegetables with Water solution of Heeng (Asofoetida) Powder+ Turmeric powder	All vegetables	Fungal diseases of Vegetables
19.	Mixing of cement with the seed of vegetables and keeping in polythenes/ glass bottles/ tin containers	All vegetables	Storage pest
20.	Keeping seeds on dry sand in a container and sealing the container by putting lid tightly.	Vegetable seeds and other seeds	Storage pest

Data on technological gap will be compiled and the gaps in different pest management practices relevant to farm women will be worked out in the coming season. Results of participatory trials on eco friendly characters of technology together with existing pest management gap would help to refine and recommend suitable eco friendly practices.

2.5 Survey on post harvest handling of vegetables in rural areas (B.L. Attri and Abha Singh)

The project was undertaken during 2003-04 with the objectives to identify the areas of vegetable cultivation in Khurda and Puri districts of Orissa and carry out the survey on post harvest handling of vegetables in selected areas as well as Bhubaneswar market. Out of a total geographical area of 1.6 million sq.km. in Orissa, vegetables occupy about 6.20 lakh ha with an annual production of 74.6 lakh tones (Table 22). From the reports it has been observed that about 25-40 per cent of the total produce is spoiled between harvesting and consumption causing a huge wastage to the national economy. The farmers are growing vegetables since long but are lacking in post harvest management techniques. There is always pressure of the ever growing population for green vegetables. Further the area under vegetable cultivation is decreasing. The per capita availability of vegetables can go up by reducing the post harvest losses.

Table 22: Area and production of different vegetable crops in Orissa during 2001-2002 *

Sl.No.	Crop	Area (ha)	Production (MT)
1.	Brinjal	112329	1420055
2.	Tomato	56011	669781
3.	Okra	73700	673590
4.	Cauli lflower	51462	635702
5.	Cabbage	44861	1238866
6.	Sweet potato	38481	312854
7.	Potato	18261	269768
8.	Peas	5696	48791
9.	Others	227024	2197065
	Total	627825	7466472

* Directorate of Horticulture, Bhubaneswar, Orissa.

The survey on post harvest handling of vegetables was conducted in two districts i.e. Khurda and Puri. From each district two blocks and from each block four villages were selected. In each village ten farmers were interviewed for the post harvest handling and management practices being followed round the year. From the preliminary observations it was found that the vegetable growers were not following the post harvest management of their produce except cutting/trimming of leaves/roots, sorting, sprinkling of water. Almost all the farmers were harvesting their vegetables in morning and taking the produce to the local markets in the evening. The farmers carry the produce mostly on bicycles to the local markets. The price of vegetables was generally fixed after negotiation between farmer and middle man. The middle men used to carry the harvest to the distant market in mini truck, gunny bags and bamboo baskets. After harvesting, the produces were not given any treatment for reduction of spoilage. Except some quantities of fresh vegetables for current and potato for 3 to 4 months consumption the rest produces were found disposed off in the local markets. It was found that none of the farmer was making any value added product from the vegetables being produced by them. Sometimes farmers were forced to auction their whole crop produce at very low rates indicating their vulnerability to exploitation by the middlemen as there was no co-operative marketing system in the villages. It often happens when the farmers carry the produces to the distant market for better return. During the survey it was found that the farmers got better yields in winter season as compared to summer because of congenial climate and availability of water. The farmers were found unaware of the simple post harvest techniques applicable for summer crops. Farmers showed much interest to learn and adopt the simple post harvest techniques for vegetables to reduce the spoilage.

The Bhubaneswar vegetable market was also surveyed twice to know the post harvest handling and management techniques being followed by the wholesalers and retailers of the vegetables. As the market was very congested and there was no cold storage facility for keeping the vegetables the spoilage was recorded between 5.0 to 68.0 per cent in summer as compared to 1.3 to 40.0 per cent in winter (Table 23). Similarly, the average cost of the vegetables was found comparatively higher in summer than winter season which was mainly decided by the supply of vegetables. In winter most of the vegetables of the local farmers were sold in market whereas in summer the supplies were from West Bengal, Jharkhand, Andha Pradesh and Chhattisgarh.

Table 23: Percent spoilage of vegetables in the market in 7 days

Sl.No.	Vegetable	Percent (spoilage) (Average + S.D.)	
		Winter season	Summer season
1.	Brinjal	3.5 ± 1.08	7.6 ± 1.26
2.	Capsicum	4.4 ± 0.97	7.7 ± 1.56
3.	Cabbage	3.9 ± 0.74	8.9 ± 1.10
4.	Cauli flower	6.1 ± 0.74	13.7 ± 1.57
5.	Beet	2.1 ± 0.53	7.1 ± 0.87
6.	Carrot	1.7 ± 0.65	11.8 ± 1.47
7.	Tomato	9.6 ± 1.18	17.6 ± 2.12
8.	Bhindi	8.1 ± 1.20	16.7 ± 2.40
9.	Ridge gourd	5.2 ± 0.79	12.0 ± 1.63
10.	Cowpea	7.4 ± 0.97	19.0 ± 2.49
11.	Cucumber	6.6 ± 0.97	16.7 ± 1.77
12.	Bitter gourd	5.2 ± 1.03	11.6 ± 1.35
13.	Pointed gourd	4.3 ± 0.95	10.7 ± 1.34
14.	Ginger	2.2 ± 0.63	5.0 ± 0.82
15.	Chillies	9.9 ± 1.56	19.6 ± 2.27
16.	Drumstick	7.2 ± 1.03	15.1 ± 1.37
17.	Spine gourd	4.6 ± 0.70	14.4 ± 2.06
18.	Bottle gourd	2.7 ± 0.67	7.8 ± 1.39
19.	Pumpkin	1.3 ± 0.48	3.0 ± 0.82
20.	Spinach	40.0 ± 7.07	68.0 ± 7.14

Conclusion

It can be concluded from the survey that the productivity of the vegetables is at par with national average, but due to lack of post harvest management techniques and value addition, the losses are very high. Due to lack of storage structures the farmers are forced to sell their produce at throw away prices and are exploited by the middlemen. Awareness building on post harvest management and value addition for capacity building of vegetable growers is required. Provision for storage structures, proper drainage systems and open space in the vegetable markets may help the vendors to overcome the post harvest losses.

2.6 Standardization of weaning mix using different proportions of sweet potato (Abha Singh and Archana Mukherjee)

A survey conducted in coastal Orissa under NATP project revealed that pre-school children were malnourished due to protein energy malnutrition and vitamin A deficiency. It is well established fact that malnutrition in pre school children is related with weaning foods. The project was prepared with the aim to develop nutritionally balanced weaning food which are cheaper and could be prepared at home by using a variety of raw materials available in the household. The preparation should be very simple and make use of simplified machinery. Thus, the present project is an effort towards the development of weaning foods especially for those who belong to the lower income strata and aims at achieving the following objectives:

- To identify various feeding practices of children, traditional weaning mix and assess their nutritional value in rural and backward areas of Orissa.
- To identify protein and vitamin A rich locally available food materials suitable for non-traditional weaning mixes and assess their nutritive value, palatability and acceptability.
- To standardize the methodology for the preparation of non-traditional protein and vitamin A rich weaning mix for children.
- To disseminate the methods of preparation of weaning mixes through training and demonstration in rural areas.

Interview schedule was developed for collecting information on feeding practices of children and locally available weaning foods in Orissa. Hundred farm women were interviewed from four blocks namely Bhubaneswar, Pipili, Nimapara and Balipatna. Dehydrated powder of sweet potato (*Ipomoea batatas*) was prepared in various ways like blanched/non-blanched, peeled/non-peeled which will be used in preparation of weaning mix, standardize the methodology and evaluate its nutritional quality.

2.7 Micro Propagation of Pointed gourd (*Trichosanthes dioica*) for empowerment of women (Bharati Killadi and Archana Mukherjee)

Pointed gourd (*Trichosanthes dioica* Roxb) commonly called "parwal" is widely cultivated vegetable in Orissa. Most of the lines are local with wide genetic variation. However, no systematic studies have been taken up so far for its genetic improvement and meeting the requirements of domestic and export markets. The crop is propagated vegetatively through vine and root cuttings. Poor germination of seeds with 50 per cent population as non fruiting types (men) poses a serious problem for the farmers. Further, the problem in procurement of planting material from authentic sources and timely availability increase the risk of growing the crop. As the crop is vegetatively propagated through vine and root cuttings, planting materials are being maintained in the field involving lots of space, money and labour. Besides, disease and pest attack pose a serious problem for the farmers to maintain the propagating material in the field. For maximum fruit set and yield only 10-12 per cent men plants are maintained in the field to facilitate the source of pollination. Despite the limitations of conventional breeding, pointed gourd has not been subjected to intense biotechnological research like micro propagation. Thus, the present programme "Micro propagation of pointed gourd for empowerment of women" was proposed with the following objectives:

1. To collect local varieties of pointed gourd.
2. To evaluate the collected local varieties for yield.
3. To standardize the *in vitro* techniques for micro propagation of the selected varieties.
4. To assess the role of farm women in cultivation of pointed gourd.

The target set in the above project was to collect ten numbers of local varieties from the pointed gourd growing areas of Orissa. Six numbers of local varieties from three villages i.e. Bolobhadrapur, Padampur and Khamang sasan of Pipili block of Puri district and three villages i.e. Podona, Kopasi and Kulojalarpur of Niali block were collected.

2.8 Efficient resource management of women agricultural labourers (*Sabita Mishra*)

According to census 2001 among the women workers 32.5 per cent are cultivators and 39.43 per cent are agricultural labourers. The women agriculture labourers remain busy and overloaded with various farm activities as well as their household activities including collection of fuel, fodder and water. They take the responsibility of livestock production and management, care of children, old and sick, family nutrition, other domestic works and all most all the agricultural practices except ploughing. How they manage both the home and farm in a parallel way needs detailed investigation ? She is torn by the role flit i.e. she goes to farm, she is neglecting her home and children. She feels it is her responsibility to do both the jobs efficiently. Studies have shown that farm-women are more efficient than men in performing the activities like sowing of seeds behind the plough, uprooting and transplanting of pulse crops, groundnut decortications, picking of cottons, extraction of fiber from jute and sun hemp and picking of kendu leaves. In this context, the study entitled "efficient resource management of women agriculture labourers" is selected with the following objectives.

- To make an assessment of socio-economic conditions of women agricultural labourers (WALs) working in different farming situations like irrigated and non irrigated.
- To examine time management, family resources use and household activities of the women agricultural labourers and to find out ways and means of improvement through different human resource inputs.
- To develop a strategy on the basis of result of the study for increasing their efficiency in terms of better utilization of family resources for strengthening their socio-economic standing in the society.
- To help some selected farm women adopt the strategy and measure the extent of improvement in their socio economic levels.

The pilot study was done by interviewing 20 women agricultural labourers (10% of the total respondents) and necessary corrections were made to make the instruments reliable and valid. Survey was undertaken after finalization of the interview schedule and 50 women agricultural labourers from ten villages covering five from each village of Niali block one of the irrigated situation of Cuttack district were interviewed.

2.9 Studies on eco friendly weed management (*M.P.S. Arya*)

The involvement of women in weed management in different crops through manual weeding clearly indicates the eco friendly intention of women which provided a strong base for starting the project. Literature on different aspects of eco friendly weed management were collected and the experimental details were finalized. The study has the following objectives:

1. To evaluate and refine available technology in reference to women in agriculture
2. To conduct on-farm testing and create awareness among the women in agriculture through training and demonstration
3. To generate basic information for further studies on environmentally safe methods of weed control.

2.10 Approaches to engendering agricultural research and extension - on networking mode

(Hema Pandey, B.N. Sadangi, Indu Grover and P.S. Geethakutty)

The net work project has been launched in collaboration with CCSHAU and KAU with the following objectives:

- To develop methodologies for analyses of the gender dimensions in different areas of agriculture i.e. crop and animal husbandry, fisheries, forestry and agro-processing.
- To identify the gender issues and special needs of women in agriculture with a view to reducing drudgery and enhancing productivity, with special emphasis on women belonging to the socially and economically under privileged sections of the society.
- To develop training modules and materials on gender analysis and gender sensitization for scientists and extension functionaries.
- To build up gender sensitive human resources for gender mainstreaming of agricultural research and extension at three selected locations of the country.

A workshop-cum-orientation programme was held at Kerala Agriculture University, Thrissur, from 18th -20th February, 2004 to discuss and finalize the co-ordination, methodologies, tools and activities of the project. During the workshop, appropriate methodologies and tools for making gender analysis were worked out. A comprehensive plan of work and interview schedule for household survey were finalized.

2.11 Database on gender in agriculture

(H.K. Dash, P.K. Sahoo and B.L. Attri)

In the process of developing a repository of information on gender in agriculture the above project was launched during February, 2004 with the following objectives:

- To create a database on :
 - * Gender participation in farm-household systems under different production systems of the country.
 - * Access to and control over different resources, extent of utilization of resources/inputs, time use in different activities.
- To characterize the farm women and their farming, and socio-economic environment for variation in their participation.
- To create a depository (of information) on the centres involved in activities related to research/development/extension on farm women and the studies that such centres have undertaken and/or undertaking.

Identification of areas of data and relevant sampling frame have been worked out.

PROJECTS UNDER NATIONAL AGRICULTURAL TECHNOLOGY PROJECT

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

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

The project entitled "Management of Coastal Agro-Ecosystem Affected by Super Cyclone in Orissa" was implemented with the involvement of all ICAR centres and agricultural university located in the twin city of Bhubaneswar and Cuttack. Central Rice Research Institute (CRRI), Cuttack, was designated as the lead centre for this project. The project work undertaken by NRCWA had three major objectives:

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

To fulfill the objectives, the following activities were undertaken:

A survey was conducted in the severely cyclone affected village KAKAN in Erasama block of Jagatsinghpur

district to assess the nutritional status of farm women and children and to know the farm women's knowledge on different aspects of nutrition. From the study it was found that the women and children in the sample were either under nourished or suffering from malnutrition. The height and weight of the boys and girls between 6 - 15 years also provided the sign of malnutrition and poor general appearance. The cases of night blindness and lips stomatitis were also recorded. The deformities observed in the skin appearances were found because of deficiency of protein and vitamin A. From the study it can be concluded that majority of women and children of the affected areas had poor knowledge on balance diet and special nutritional needs. To improve the nutritional status of these families interventions like nutrition education and laying out nutritional gardens in the homestead areas of the families were considered to be very useful.

Nutritional gardens in homestead areas of the families

One hundred thirty two nutritional gardens developed each of 10 x 10m at Erasama and Astaranga were covered by different vegetables round the year. The cultivators of various vegetables like bottle gourd (Shambu), bitter gourd (Priya), brinjal (Green star long), ridge gourd (Dhara), cucumber (Nirmalaya), radish (Mino early) and cow pea (Maharaja) performed better in the kitchen gardens at Astaranga. In Erasama the varieties which performed better were radish (Pusa chetki), cowpea (Selection - 22) ridge gourd (Dhara), ladies finger (MOHK-14 and Bhanupriya), pumpkin (Yellow flash), cauliflower (K.S.B.-50), amaranthus (Kanak red), tomato (Utkal kumari), bitter gourd (Nakhara) and cucumber (Nirmalya).

Material on nutrition education to the farm families

The package of practices developed on brinjal, bhindi, tomato, radish, palak, cow pea, pumpkin, ridge gourd, bottle gourd, cucumber, amaranthus and bitter gourd were distributed among the farm women.

From the survey on impact assessment of the project it was found that the affected families got fresh vegetables from their kitchen garden round the year because of their awareness for vegetable cultivation and adoption of recommended situations-specific technologies. Similarly, a significant improvement was recorded in the general health of the children and women. From the study it was concluded that there was good impact of the project on motivation of the affected families for deriving maximum utility of the available fruits and vegetables in the kitchen gardens.

The affected families have made significant progress on nutritional security through establishment and maintenance of kitchen gardens on sustainable basis. The consumption of vegetables by affected families has brought improvement in their general health.

A number of trainings were organized under this project. The trainings covered diversified fields of vegetable production and value addition (Table 24).

Table 24 : Farm women training conducted under the project

Sl.No.	Topics	No. of participants
1.	Soil and water conservation in the kitchen garden for summer vegetables	120
2.	Home purification of water	120
3.	Value addition of mango for jam and squash	60
4.	Planting and after care of the cucurbitaceous vegetable crops in the kitchen garden	67
5.	Conservation of nutrients during cooking	67
6.	Balanced diet for various stages of life cycle	110
7.	Importance of fruits and vegetables in daily diet	70
8.	Preparation of vermi compost	70
9.	Sweet potato and its products for nutritional security	90
10.	Lay out of kitchen garden and enhancing the shelf life of vegetables after harvesting	20
11.	Biological control of insect-pests in kitchen garden	20
12.	Importance of kitchen garden for year round production of vegetables	30
Total		844

2.13 Empowerment of women in agriculture

(Suman Agarwal and Laxmipriya Sahoo)

Participation of members of self help groups in agriculture and animal husbandry activities

Survey undertaken on the above aspect reveals that 75-100 per cent members of self help groups participated in activities like drying, parboiling of paddy, threshing, cleaning, storage, dehusking, weeding, raising nursery for seedlings, transplanting, grading, picking, gap filling and thinning. Similarly, the activities undertaken in animal husbandry sector by 75 - 100 percent member were feeding of animals, preparation of feed at home, cleaning of cattle shed, collection and disposal of dung, cooking feed at the time of delivery, care of animal at the time of delivery, cutting of naval cord, feeding colostrum to calves, removing mucus and cleaning of calves, preparation of cow dung cakes, cleaning of utensils used for milking, offering water to animals, processing of milk into milk products and boiling of milk.

Drudgery perceived by members in agriculture and animals husbandry activities

The most five drudgerous activities in agriculture as perceived by the members of self help groups in descending order were paddy transplanting, harvesting/cutting, carrying load on head, weeding and parboiling of paddy. Milking was perceived as most drudgerous activity in animal husbandry followed by cleaning of cattle, procurement of fodder, preparation of cow dung cake and cleaning of cattle shed.

Identification and Intervention of need based agriculture and animal husbandry technologies

Keeping in view the involvement of farmwomen in agriculture operations and animal care related activities in the selected locale, relevant technologies were identified. Twenty different agricultural implements were provided to the beneficiaries of the project. Farmwomen were trained through field demonstrations for making use of these implements. Women found these implements and machine very useful and convenient to handle. Feedback data indicated that women were making extensive use of these technologies in their day-to-day activities. Advantages and problems faced by farmwomen in using improved technologies were studied and the summary of feedback was presented in table 25.

Table 25 : Feedback on technology intervention

Sl. No.	Drudgery reducing technology/ intervention	Feedback	
		Advantages	Problems
1	Improved Sickle	Reduction of pain in hand; and palm, more output and saves time	Some times causes hand injury
2	Gruber Weeder	Saves time and labour, less backache and easy to handle	-
3	Twin Wheel Hoe	Saves time and labour; less backache and reduces pain in hand and palm	Heavy in weight to carry, require more pressure for push and pull and difficult to maintain
4	Manual Bund Former	Easy to handle; cover more area in less time and reduces back pain.	-
5	Groundnut Stripper	Easy to handle; reduces pain in hand and palm and avoid hand injury.	-
6	Groundnut Decorticator	Faster and easier decortication of groundnuts; less breakage of seeds and reduces monotony of actions.	Proper handling requires practice and skill

Sl. No.	Drudgery reducing technology/ intervention	Feedback	
		Advantages	Problems
7	Pedal Thresher For Paddy	Threshing of paddy is easier compared to traditional method; increases work efficiency; and promotes multiple uses i.e. it can be used for threshing of groundnuts also.	Pain in legs / thighs, needs man power of atleast two persons and heavy in weight to carry from one place to other.
8	Rake	Easy to use in cleaning cattle shed; multipurpose uses - suitable for removing paddy straw while threshing and weeding.	-
9	Wheel Barrow	Easy to handle; saves time, energy and labour	-
10	Shovel	Easy to handle; hygiene is maintained by using it in cleaning cattle shed; thus prevents health hazards and experienced no problem in it's use	-
11	Chaff Cutter	Reduces the wastage of fodder and ensure more efficiency.	Difficult to use; difficult to maintain and pain in limbs
12	Spraying Safety Kit	Handy and effective in protecting against hazards. Also protects the eyes, mouth and nose from paddy husk and dust	-
13	Fertilizer Broadcaster	Uniform distribution of fertilizer; minimizes skin irritations and also used for broadcasting of seeds of mustard, other oil seeds and pulses	-
14	Hanging Type Cleaner Cum Grader	More output in less time and reduces boredom and easy to operate	-
15	Pedal Operated Cleaner Cum Grader	More output compared to hanging type	Difficult in comparison to hanging type. Pedal operation causes leg pain.
16	Seed Treatment Drum	Saves time; avoid hand infection and skin allergy.	-
17	Bhindi Plucker	Reduction in skin allergy; avoid hand injury and saves time.	-
18	Paddy Parboiling Unit	Saves time and energy; easy to use; less fuel consumption compared to traditional method; more amount of paddy parboiled at a time and broken grain percentage reduced in milling	Heavy in weight and difficult to maintain

Sl. No.	Drudgery reducing technology/ intervention	Feedback	
		Advantages	Problems
19	Manual Rice Transplanter	Saves time and labour; more working capacity than the manual method of transplanting	Heavy in weight, difficult to maintain and difficulty in raising mat type seedlings

Ergonomic assessment of improved technologies

Ergonomic assessments of the traditional and improved implements were carried out to find out the extent of drudgery experienced by farm women.

Table 26 : Percentage reduction of drudgery by using improved method over traditional method in different farm activities

Equipment	Average working heart rate (b/min)	Average energy expenditure (kj./min)	Percentage reduction in heart rate	Percentage reduction in energy expenditure	Output	Musculo Skeletal Problems	Rate of perceived exertion
1. Activity of harvesting paddy							
Traditional (Local sickle)	143.65	14.12	-	-	206.11 (m ² /hr.)	Palm, lower back, shoulder joint	Moderately heavy
Improved (Improved sickle)	141.90	13.84	1.21	9.06	226.56 (m ² /hr.)	Lower back, shoulder joint	Light
2. Activity of threshing paddy							
Traditional (Hand beating)	134.61	12.68			32.2 (kg/hr.)	Palm, mid back, shoulder	Heavy
Improved (Pedal thresher for paddy)	121.31	10.56	9.88	16.71	48.4 (kg/hr.)	Calf muscle, knee	Light
3. Activity of paddy parboiling							
Traditional (Aluminum Hundi)	107.7	8.4			35 (kg/batch)	Mid back, shoulder, foot	Moderately heavy
Improved (Parboiling Unit)	98.6	6.95	8.44	17.26	75 (kg/batch)	Wrist	Light
4. Activity of cleaning and grading of pulses							
Traditional (By hand)	94.19	6.25	-	-	50.7 (kg/hr.)	Wrist, mid back, shoulder joint	Moderately heavy

Equipment	Average working heart rate (b/min)	Average energy expenditure (kJ./min)	Percentage reduction in heart rate	Percentage reduction in energy expenditure	Output	Musculo Skeletal Problems	Rate of perceived exertion
Improved (Hanging type cleaner cum grader)	93.51	6.14	0.72	1.76	118.3	Shoulder (kg/hr.)	Light joint
5. Activity of Paddy Transplanting							
Traditional Uprooting	96.78	6.66	-	-	56 (m ² /hr.)	Wrist, knee, lower back, calf, neck, palm	Heavy
Transplanting (By hand)	98.75	6.98	-	-	60 (m ² /hr.)	Wrist, knee, lower back, calf, neck, palm	Heavy
Improved (Transplanter)	114.36	9.46	-15.80	-35.53	120 (m ² /hr.)	Upper arm	Light
6. Activity of chaff cutting							
Traditional (Sickle)	99.39	7.08	-	-	7 (Bundles /hr.)	Lower back, finger, knee	Moderately heavy
Improved (Chaff cutter)	96.15	6.56	3.25	7.34	19 (Bundles/hr.)	Shoulder,	Light elbow

It is evident from the table 26 that there was reduction of drudgery in terms of working heart rate (HR) (b/min) and energy expenditure (K.J./min.) by using all improved technologies except for paddy transplanting. Thus, it was found that by using improved technologies the drudgery of farm women was reduced in terms of physiological cost of work and time spent with simultaneous increase in output. The farm women could also feel the above benefits while working on the implements. However, in case of paddy transplanting it was found that there was an increase in physiological work load in terms of heart rate and energy expenditure but these were within the acceptable limit. The output (area transplanted per unit time). The output was considerably more in the traditional method. Further, in improved method of uprooting process, the problems of arranging paddy seedlings in the transplanter is completely eliminated due to use of seedlings produced through mat type nursery. The use of transplanter reduces the postural discomfort and health hazards among the farm women. The feedback of farm women revealed that they found difficulty in handling the equipment because of heavy weights added to the equipment from ten rows.

Modifications suggested in Four Row Manual Paddy Transplanter after ergonomic assessment

Based on the findings of the ergonomic assessment and feedback on performance of Four Row Manual Paddy Transplanter, certain modifications were suggested to the scientist of CRRI, Cuttack. The concerned scientist has modified the transplanter as per suggestions given to him. The modified transplanter was tested in the field and was reported to be easier than the former one.

Village level trainings organized for entrepreneurial development

Based on need and preferences of farmwomen and resources available in the selected area, entrepreneurial activities were identified and trainings were organized for skill development among farmwomen of the Self Help Groups. About 197 women were trained on different enterprises.



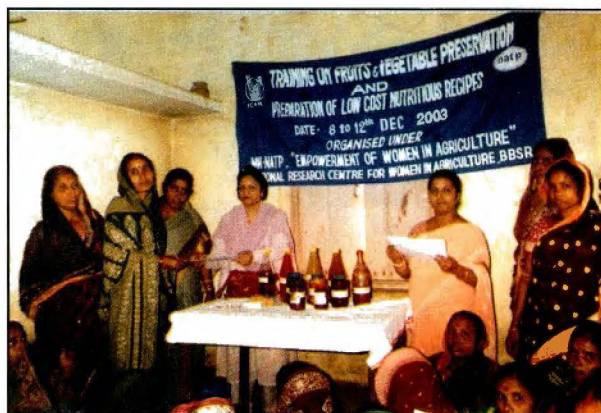
Trainer's Training on Coir Work

A one-month's training programme (1-30 Nov. 03) was organized in village 'Kanta Para' for the skill development of the farmwomen and adolescent girls in coir work. The main objective was to train the village level trainers. This training programme was conducted with the help of State Coir Designing and Training Institute. Twenty farmwomen and girls participated in the training programme. During the training, trainees acquired the skills for making coir yarn, rope, and different types of doormats.

Trainings on fruits and vegetable preservation and preparation of low cost nutritious recipes

Under the additional component of the project, 40 adolescent girls and 80 farmwomen were trained for fruits and vegetable preservation and uses of low cost nutritious recipes. The selected farmwomen belonged to different villages of districts Puri and Kurda. The trainings were conducted with the help of Community Food and Nutrition Extension Unit, Bhubaneswar.

The five-day training programme, covered contents on nutrition for health, balance diet, different food groups and their nutritive value, importance of nutrition during special periods like pregnancy, lactation, childhood and adolescence, deficiency diseases principles and methods of food preservation, causes of food spoilage, and use of different preservatives. Demonstration on preparation of products such as lemon squash, orange squash, lemon syrup, papaya jam, mixed jam, guava jelly, rose syrup, orange syrup gingerale, tomato sauce, chutney, puree, mixed, brinjal, mango and lemon pickle, besan sag omelet, paustik khichdi, missy- roti, porridge, mixed burfi, ladoos & papaya bada was done using indigenous and low cost ingredients.



Pisciculture

Farmwomen of twelve self-help groups were trained in pisciculture/aquaculture. Awareness was created among the farmwomen about the advantages of composite fish farming. They were trained on pond preparation, release of fries and fingerlings, feed for fish, disease control, marketing and ornamental pisciculture. The ponds were stocked with CMR fries for starting fishery enterprise. A demonstration on preparation of fish pickle was also organized for the farmwomen during the training programme.

Mushroom cultivation

Four self-help groups started paddy straw mushroom cultivation after undergoing the training programme on mushroom cultivation. Success story of one self-help group i.e. Archana self-help group need a special mention. The group utilized the unusable land for raising the mushroom beds and earned substantial amount of income. Since spawn is the pre-requisite for mushroom cultivation, therefore it was thought imperative, that raw material for mushroom cultivation should be available in the villages itself. Keeping this in view, two farmwomen of two

self-help groups and one SRF were deputed to attend the training programme on spawn production organized by Centre for Tropical Mushroom Research and Training, Orissa University of Agriculture and Technology, Bhubaneswar, from 16th to 26th, December 2002.

Fruits and Vegetable Growing

Five self-help groups of Pipli and Nimapara block, comprising of 79 farmwomen from Siula village of Pipli block and Haripur and Renschasan villages from Nimapara block, were trained on fruits and vegetable growing. In the month of December, two days training programme for each SHG was organized to give exposures to these farmwomen on cultural practices of vegetable growing, plant protection measures and growing good quality fruits and post harvest handling. Farmwomen were taken to the Regional centre of Central Tuber Crop Research Institute, Bhubaneswar, Central Horticultural Experimentation Station, Bhubaneswar and Regional Plant Resource Center, Department of Forest and Environment, Govt. of Orissa to show crops and their varieties of choice, implements, methods of growing and scope of developing enterprises in those lines. the crop.

Besides, training programmes on floriculture, agro processing, backyard poultry farming, nursery raising, vermin composting and chalk, candle and white phenyl making were held to promote entrepreneurship and income generation by women of help groups.

SUCCESS OF SELF HELP GROUPS IN DIFFERENT ENTERPRISES

1. Narayani Self-Help Group – Success in aquaculture

Narayani self-help group comprises of 14 members in the village Siula. This group set up an enterprise in pisciculture in August 2002 in a leased pond of 0.02 ha. The annual amount to be paid for pond was Rs. 1000/-. First of all, they prepared the pond in a scientific manner as directed by the project scientists. Then they stocked their pond by releasing 12000 fingerlings in a composite form (rohu, mrigal and catla) and fish meal was given regularly as per the nutritional requirement of the fishes. The details of expenditure incurred in aquaculture are given below.

Major heads of expenditure	Cost (Rs)
1. Leased pond cost per year	1000.00
2. Pond preparation	180.00
3. Fingerling 12000 @Rs.160/- per 1000 No.	2000.00 (with packing charge)
4. Fish meal	1820.00
Total	5000.00

After 8 months, they harvested 320 kg of table fish from their pond with weight ranging from 800gm to 1.2 kg. They sold 250 kg of fish @ Rs 40/- per kg in local market and earned Rs. 10,000/-. Also each member of the group took 5 kg of fish for their home consumption valuing Rs.2800/- as per market price. Thus, the total gross income was Rs.12,800/- with a net profit of Rs.7800/- from the enterprise in a year's time.

2. Jageswari Self Help Group – Prosperity through diversification

Jageswari Self Help Group was started in August 2000 with 16 members. All the members of the group were trained on coir work for 6 months duration under TRYSEM programme of the Govt. of India. After the training, the group took up the coir work. Thus, group activities were diversified into agriculture (paddy cultivation, groundnut cultivation, vegetable growing, floriculture), pisciculture and coir work.

The group has received the award of best SHG in the Puri district by DRDA. The expenditures incurred and income incurred by the group for coir and other enterprises are given below :

Expenditure and income of the group for the year 2002 and 2003

Sl. No.	Enterprises undertaken	Expenditure (In Rs.)	Income (In Rs.)	Net profit (In Rs.)
1	Year 2002			
	Farming			
	a Paddy cultivation	5,350.00	11,000.00	5,650.00
	b Groundnut cultivation	2,500.00	11,000.00	8,500.00
	c Vegetable growing	1,000.00	3,885.00	2,885.00
	d Floriculture	300.00	1,910.00	1,610.00
	Total	9,150.00	27,795.00	18,645.00
2	Pisciculture	1,100.00	6,000.00	4,900.00
3	Coir work	2,000.00	10,200.00	8,200.00
4	Rent towards leased land	4,667.00	---	---
	Total	16917.00	43995.00	27078.00
1	Year 2003			
	Farming			
	a Paddy cultivation	4,200.00	9,850.00	5650.00
	b Vegetable growing	1246.00	4236.00	2990.00
2	Pisciculture	890.00	1360.00	470.00
3	Coir work	2400.00	11600.00	9200.00
	Rent towards leased land	4,667.00	---	---
	Total	13403.00	27046.00	13643.00
	Groundnut cultivation	3170.00	Continuing	Awaited
	Floriculture	360.00	Continuing	Awaited

Thus the group earned Rs. 27,078/- in the year 2002 and Rs. 13,643/- in 2003.

3. Beleswari Self Help Group – Paddy parboiling an economic venture

Beleswari SHG consists of sixteen members. The women started paddy parboiling enterprise for income generation using paddy parboiling unit provided by NRCWA.

They purchased 30 bags of paddy from local farmers with a total expenditure of Rs.9750.00 @ Rs.325.00 per bag of paddy. Each bag contained 75 kg of paddy. The calculated per kg cost was approx. Rs. 4.30/-. After parboiling of paddy they got the milling done in the rice mill outside on payment basis. The milling cost was Rs. 300.00 @ Rs. 10.00 per bag of paddy. So, their total expenditure was Rs.10050.00/-. They also got 30 bags of bran each bag had capacity of 20 kg. They sold the parboiled rice @ Rs.6.50/-per kg. and got a total amount of Rs.10,530.00 for 1620 kg of rice. They also sold the bran @ Rs.25.00 per bag and received of Rs.750.00. The net profit of the enterprise was Rs.1230.00 accrued to the enterprise within a span of 10 days. The parboiling unit could process 1620 kg parboiled rice from 2250 kg of paddy and showed milling efficiency of 72 per cent.

Income and expenditure details of the enterprises

Sl. No.	Entrepreneurial activities	Period	Operational Cost(Rs)	Gross Return (Rs)	Net profit (Rs)
1.	Paddy parboiling	May, 03	10,050.00	11,280.00	1230.00

This technology has impressed them very well and they have a plan to expand the business of producing and selling parboiled rice.

4. Gruhalaxmi self help group

Gruhalaxmi SHG functions in village Haripur of Nimapara Block. The group had 19 members. The group started paddy straw mushroom cultivation alongwith badi and papad making. The group managed the above enterprises by adopting the technologies given to them by the project scientists.

In the paddy straw mushroom cultivation they spent Rs.459.00 towards the purchase of raw materials like straw, polythene and spawn in the month of May 03. They sold 30kg of mushroom @ Rs.40.00/kg in the month of July and got a net profit of Rs.741.00.

They collected the infrastructure like spreading stick (Belan), weighing machine, measuring cup cane mat, jhanjara, polythene sheets for drying, and polythene bags for packing required for starting the badi and papad making enterprise.

They prepared 26 kg of masala badi and 8 kg plain badi. They incurred Rs. 481/- towards the expenditures and earned a net profit of Rs.519/-. The group prepared varieties of papads like plain papad, rasi papad and Punjabi special papad. The investment was Rs. 1250/- in making 32 kg of plain and 60 kg of Rasi papad. The group sold all the stock through various sell points.

Income and expenditure details of the enterprises :

Sl. No.	Entrepreneurial activities	Duration	Operational Cost(Rs)	Gross Return (Rs)	Net profit (Rs)
1.	Mushroom cultivation	May 2003 to July 2003	459.00	1200.00	741.00
2.	Badi making	Nov 2003 to Dec. 2003	481.00	1000.00	519.00
3	Papad making	Nov 2003 continuing	1250.00	1920.00	670.00
Total		8 months	1890.00	4120.00	1930.00

5. Archana Self Help Group – Turning waste land into wealth

The 18 members of Archana self help group made one of the waste land near a pond which was shaded by bamboos for growing mushroom. They spent about Rs.564/- initially for the purchase of spawn and other related materials and laid 20 beds of 2" X3" size for growing paddy straw mushroom and got 18 Kg. of mushroom which was sold in the local market @ Rs. 40/- per kg and earned Rs. 165/-. Their subsequent effort of growing mushroom in larger area with more number of beds resulted in earning of Rs. 2,080/- within 3 months. This enterprise is giving greater dividends.

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

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

Experimental validation of ITK

With a view to verify the results of field validation on storing pulse grains by using the dry chilli, a laboratory experiment was conducted on green gram at the centre. Three treatments i.e. (i) Check (no treatment), (ii) Mixing dry chilli at 1kg/q seed (ITK) and (iii) Use of chemical (recommended practice) i.e. Aluminum phosphide in two containers i.e. (i) Metal bin and (ii) Earthen pot (ITK) were tested with four replications. The data recorded at three different stages of storage have been discussed here as under.

Assessment of seed quality before storage

Table 27: Initial evaluation of seed

Particulars	Germination percentage (%)	Moisture content (%)	Infection (%)	Types of pathogen
Mung grains	88.87	7.55	2.87	Sclerotium spp Fusarium spp

The initial seed quality of the lot was satisfactory with purity above 98 percent, average germination of 88.87 percent, moisture 7.55 percent and seed infection (pathogen) 2.87 percent.

Assessment of seed quality at 4 months of storage

Table 28: Seed quality of mung at four month of storage under different treatments

Particulars of treatments	Germination (%)	Loss/gain in germination (%)	Moisture content (%)	Loss/gain in moisture (%)	Infection (%)	Reduction/increase in Pathogens (%)
Seed Treatments						
Check	87.25	(-) 1.82	7.70	(+) 1.98	3.13	(+) 9.05
Dry chilli	87.63	(-) 1.39	7.59	(+) 0.52	2.50	(-) 12.89
Chemical	88.38	(-) 0.55	7.65	(+) 1.32	2.13	(-) 25.70
Containers						
Metal bin	85.75	(-) 3.50	7.49	(-) 0.79	2.75	(-) 4.18
Earthen pot	89.75	(+) 0.99	7.80	(+) 3.31	2.42	(-) 15.67

Effect of seed treatments

Results in the table 28 revealed that the loss in germination was decreased over initial germination (88.87%) in treated seeds over check (1.82%) and lowest loss (0.55%) was recorded with the use of chemical. The gain in initial moisture (7.55%) was lowest (0.52%) with chilli followed by use of chemical. The infection of pathogens was highest (+9.05%) over its initial value of 2.87 per cent in check while it was lowest (-25.70%) in treated seeds. The major pathogens recorded in samples were Fusarium spp, Penicilium spp and Aspergillus spp.

Effect of containers

The seeds stored in metal bin had marginal reduction (3.50%) in germination percentage (Table 28), whereas those stored in earthen pot had no loss (-0.99%) in germination. Moisture content found increased (+3.31%) in seeds stored in earthen pot while in metal bins there was no increase (-0.79) in moisture content rather it showed a marginal reduction in moisture percent. Though the infection of pathogens was reduced in both type of containers, however, the tin containers recorded lowest infection (-15.67%) over its initial infection level i.e. 2.87 per cent.

Assessment of seed quality on over season storage (i.e. just before sowing in next season)

Table 29: Seed quality of mung at sowing under different treatments

Particulars of treatments	Germination (%)	Loss/gain in germination (%)	Moisture content (%)	Loss/gain in moisture (%)	Infection (%)	Reduction/increase in Pathogens (%)
Seed Treatments						
Check	88.13	(-) 0.83	8.05	(+) 6.62	2.00	(-) 30.31
Dry chilli	90.25	(+) 1.55	8.19	(+) 8.48	2.50	(-) 12.89
Chemical	89.25	(+) 0.43	8.14	(+) 7.81	3.50	(+) 21.95
Containers						
Metal bin	89.33	(+) 0.52	8.28	(+) 9.67	3.17	(+) 10.45
Earthen pot	89.08	(+) 0.24	7.98	(+) 5.69	2.17	(-) 24.39

Effect of seed treatments

Results in the table 29 revealed that there was no loss in germination under chilli (90.25%) and chemical (89.25%) treatments. The lowest germination (88.13%) was recorded with check. The seed under all the treatment gained moisture over its initial status (7.55%) and highest moisture (8.48%) was recorded with chilli. The infection of pathogen was decreased under check and chilli treatments; while chemical treatment (as insecticide) increased the incidence of pathogen. The major pathogens recorded in samples were *Fusarium* spp, *Penicilium* spp and *Aspergillus* spp.

Effect of containers

Both the containers i.e. metal bin and earthen pot proved equally good so far as germination of seed was concerned. However, the germination was a little higher in tin containers (89.33%) as compared to earthen pot (89.08%). There was a moisture gain under both the containers. The tin container recorded higher gain (9.67%) in seed moisture than earthen pots (5.69%). It was also found that the tin containers recorded increased infection of pathogens (10.45%), while it was considerably reduced (24.39%) in earthen pots.

Conclusion

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

2.15. Studies on women in agriculture in India with special emphasis on crop production technologies

(M.P.S. Arya, Hema Pandey and Y.V.R. Reddey)

The study on various aspects of women in agriculture was undertaken under different situations of awareness, viz. Situation-1: where the farmers were exposed to crop production technologies, Situation-2: where the farmers were not exposed to crop production technologies and Situation-3: where the farmers were intermittent between the above two situations. Stratified random sampling technique proportional to stratum size was used in selecting the women households for each of the three selected villages. Seventy five households per village, 15 each from five land holding categories i.e. landless, marginal (< 1 ha), small (1-2 ha), medium (2-4 ha) and large (> 4 ha) size were selected from each village. The important findings emanating from the project are as follows:

Women workers per household

The study revealed that women constituted as much as 43- 60 per cent of total population. Women workers were worked out to be 44 - 59 per cent of the total working population among different categories of households in the three selected villages under different situations.

Table 30 : Details of workers and non-workers in total population per household in each selected village under different situations (adults)

Situations	Workers			Non-workers			Total population		
	M	W	T	M	W	T	M	W	T
Situation 1	1.8	2.0	3.8	0.1	0.1	0.2	1.9	2.1 (53)	4.0
Situation 2	2.1	1.9	4.0	0.2	0.1	0.3	2.3	2.0 (47)	4.3
Situation 3	2.2	2.0	4.2	0.1	0.1	0.2	2.3	2.1 (48)	4.4

* Figures in parentheses indicate percentage of women in the total population.

* M : Men; F : Women; T : Total

The total workers per household (Table 30) in overall groups were worked out to be higher (4.2) under Situation-3, followed by (4.0) and (3.8) under situation 2 and 1, respectively. On the overall basis, women workers in the total workers per household were higher under Situation-1 and Situation-2 (each 2.0) than Situation-3 (1.9). However, the proportion of non-workers were found to be abysmally low (0.2 - 0.3) in the three selected villages under different situations. No relationship (direct or inverse) between workers (men or women) and farm size registered under different situations.

Participation of women in different enterprise combinations

It is seen from table 31 that women were prone to contributing a maximum possible extent of income to the family as a whole by diversifying their activities through undertaking own farm, hired, non-farm and dairy activities in all the three selected villages under different situations of awareness.

Table 31 : Participation of women on different enterprise combinations

Sl. No.	Enterprise combinations	Situation 1		Situation 2		Situation 3	
		No.	(%)	No.	(%)	No.	(%)
1.	Large farmers	15	20	14	19	15	20
2.	Medium farmers	15	20	15	20	15	20
3.	Small farmers	15	20	15	20	15	20
4.	Marginal farmers	11	15	15	20	12	16
5.	Landless/agricultural labourers	19	25	1	1	18	24
6.	Livestock maintenance	-	-	-	-	-	-
	Total	75	100	75	100	75	100
7.	One activity alone	24	32	46	61	34	45
8.	More than one activity	51	68	29	39	41	55

Note : Each enterprise enlisted here under 'enterprise combinations' is based on the major source of income. For example, 'agriculture' is the major source of farmers and 'wages' is the major source of landless.

However, the extent of diversification of women activities (more than one activity) were found to be higher (68 per cent) under Situation-1 followed situations 3 (55%) and 2 (39%), respectively.

Allocation of time on farm

Table 32 shows that out of the total time per day spent by women on various activities, agriculture occupied a major share to the extent of 51, 48 and 35 per cent in situation 3, 1 and 2, respectively as against 59, 57 and 52 percent in same order in case of men.

Table 32 : Time allocation pattern of women workers versus men for different activities under different situations (hours/day)

Activity	Men			Women		
	Situation 1	Situation 2	Situation 3	Situation 1	Situation 2	Situation 3
Domestic	1.56 (11)	1.30 (10)	1.60 (12)	4.00 (24)	4.50 (31)	4.35 (28)
Milch animals	3.46 (25)	3.20 (25)	2.93 (22)	4.00 (24)	4.60 (32)	3.00 (19)
Agriculture	8.00 (57)	6.74 (52)	8.00 (59)	8.00 (48)	5.19 (35)	8.00 (51)
Non-farm	0.98 (7)	1.62 (13)	0.94 (7)	0.46 (4)	0.37 (2)	0.40 (2)
Total	14.00 (100)	12.86 (100)	13.47 (100)	16.46 (100)	14.66 (100)	15.74(100)

Figures in parentheses indicate percentage to total

Moreover, the time spent by women workers on domestic and milch animal care occupied second and third positions under Situation 3, respectively and vice versa under Situation 2; while the share of time spent on each of these two activities was found to be nothing less or more than the other (each 24%) under situation 1. However, the time spent by women on domestic and animal care found to be more than that of men in all the three selected villages under different situations.

Labour use under different situations

A perusal of data on labour use were worked out and the results are presented in tables 33 and 34.

Table 33 : Labour use in different crops (Days/ha)

Crops	Situation 1			Situation 2			Situation 3		
	M	W	T	M	W	T	M	W	T
Cereals									
Kharif paddy (Irrigated)	70 (30)	160 (70)	230 (100)	-	-	-	-	-	-
Kharif paddy (Rainfed)	121 (45)	147 (55)	268 (100)	75 (46)	87 (54)	162 (100)	42 (30)	99 (70)	141 (100)
Vegetables									
Kharif brinjal (Rainfed)	-	-	-	-	-	-	127 (45)	156 (55)	283 (100)
Rabi potato (Irrigated)	102 (53)	91 (47)	193 (100)	-	-	-	-	-	-
Rabi cabbage (Irrigated)	102 (53)	102 (53)	102 (53)	-	-	-	-	-	-
Rabi other veg.*(Irrigated)	102 (53)	102 (53)	102 (53)	-	-	-	-	-	-
Pulses									
Rabi blackgram	102 (53)	102 (53)	102 (53)	-	-	-	-	-	-
Rabi green gram	102 (53)	102 (53)	102 (53)	-	-	-	-	-	-
Overall	62 (34)	122 (66)	184 (100)	75 (46)	87 (54)	162 (100)	60 (35)	110 (65)	170 (100)

Note : * includes tomato, radish, brinjal Figures in parentheses indicate percentage to total.

M - Men, W-Women, T-Total

With regard to absorption of work force in the farm field, it is seen that Situation 1 generated the highest total employment (family + hired) per hectare of gross area sown (184 days) followed by Situation 3 (170 days) and Situation 2. Obviously, the total women labour employment (family/hired) per hectare of gross area sown was found to be 122, 110 and 87 days which were higher than that men labour days i.e. 62, 60 and 75 days in Situation 1, 3 and 2, respectively (Table 33). The higher cropping intensity generated more employment for women or men under situation 1 as compared to situation 2 and 3.

Table 34 : Total and women employment days per hectare of gross area sown

Village	Cropping intensity (%)	Women days	Total days	Share of females (%)
Situation 1	137	122	184	66
Situation 2	100	87	162	54
Situation 3	100	110	170	65

Comparative earnings of women versus men workers

Comparative earnings of women versus men workers were worked out from total employment days of these workers in different farm and non-farm activities and the results are presented in Table 35. It is evident from the data that the annual earnings per worker in case of women workers were less than that of men in the three selected villages under different situations which is attributed mainly due to gender disparities in wages and level of employment.

Table 35 : Comparative earnings of men and women from different farm and non-farm activities (Rs./worker/annum)

Situations	women				Men			
	Own farm	Hired farm	Non-farm	Total	Own farm	Hired farm	Non-farm	Total
Situation 1	1040	960	840	2840	1400	1550	2250	5200
Situation 2	240	400	680	1320	750	600	3700	5050
Situation 3	750	640	720	2120	1350	750	2150	4250

Out of the three selected villages under different situations, as expected, the total annual earnings per worker of overall groups from different activities were worked out to be higher in case of men (Rs. 5200) than women (Rs. 2,840) under Situation 1 followed by Situation 2 (Rs. 5,050 in case of men and Rs. 1,320 in case of women) and Situation 3 (Rs. 4,250 in case of men and Rs. 2,120 in case of women).

Gender disparities in wages

The prevailing wages per day was Rs. 40/- in case of women workers while Rs. 50/- in case of men workers in the three selected villages under different situations (Table 36). The gender disparities in wages and also incidence of disparities were there in all the three selected villages (each 20 per cent).

Table 36 : Wage rates of men and women agricultural workers in the three selected villages under different situations

Situation/village	Money wages (Rs./day)		RFWM	Gender disparities in wages (%)
	Men	Women		
Situation 1	50	40	0.80	20
Situation 2	50	40	0.80	20
Situation 3	50	40	0.80	20

RFWM - Ratio of women wages to men

Ratio of women wages to men (RFWM) was worked out to be 0.80 in each of three selected villages under different situations. Consequently, the incidence of disparities in wages between men and women workers was 20 per cent. The differential wage rates prevailed between the women and men due to the customary feature of agrarian economies arising from gender based specialization of specific farm operations like sowing, transplanting and weeding (light works) which are predominantly performed by women workers while operations like ploughing, blade harrowing, intercultural and threshing (hard works) are generally performed by men workers.

Women's participation in decision-making

Women's participation in decision-making of various issues like agriculture, dairying, routine domestic works, food items, clothes, functions etc. was analyzed to assess the extent of their participation and identify the gender-concentric issues of decision-making (women dominated issues) in the three selected villages under different awareness situations. The results are presented in Tables 35 and 36.

(a) Crop production issues

A perusal of Table 37 reveals that the major decisions on crop production issues relating to selection of seed and variety, fertilizer use, pesticides, marketing and credit were taken by 'husband' only in all the three selected villages under different situations except intercultural operations under Situation 1 and Situation 2. However, the decision on weeding/intercultural operations in cultivation of crop(s) was taken by both men and women jointly with mutual consultation. It is seen that group of family members also played an important role which occupied third position in decision-making of crop production issues. However, the individual role of women in decision-making of various crop production issues was found to be abysmally low and almost negligible. Thus, at an individual level, men dominated the decision making of various components of crop production issues.

Table 37 :Decision-making behaviour of women, their men-counterparts and group of family members on crop production issues (%)

Crop production issues					Crops							
	Paddy				Vegetables				Pulses			
	S	H	B	G	S	H	B	G	S	H	B	G
Situation 1												
Seed	1	99	-	-	1	99	-	-	1	99	-	-
Fertilizer	1	99	-	-	1	99	-	-	1	99	-	-
Pesticide	1	99	-	-	1	99	-	-	1	99	-	-
Marketing	1	49	48	2	1	49	48	2	1	49	48	2
Interculture	1	21	72	6	1	21	72	6	1	21	72	6
Credit	1	57	40	2	1	57	40	2	1	57	40	2
Situation 2												
Seed	-	87	-	13	-	-	-	-	-	-	-	-
Fertilizer	-	87	-	13	-	-	-	-	-	-	-	-
Pesticide	-	82	-	13	-	-	-	-	-	-	-	-
Marketing	-	2	2	13	-	-	-	-	-	-	-	-
Interculture	-	40	45	15	-	-	-	-	-	-	-	-
Credit	-	58	27	15	-	-	-	-	-	-	-	-
Situation 3												
Seed	3	72	18	7	3	72	18	7	-	-	-	-
Fertilizer	3	72	18	7	3	72	18	7	-	-	-	-
Pesticide	3	72	18	7	3	72	18	7	-	-	-	-
Marketing	3	72	18	7	3	72	18	7	-	-	-	-
Interculture	3	72	18	7	3	72	18	7	-	-	-	-
Credit	3	72	18	7	3	72	18	7	-	-	-	-

Note: S-Self (Woman) ; H-Husband; B-Both; G-Group of family members

(b) Dairying issues

It is interesting to note that 100 per cent decisions on dairying issues were made by women only under Situation 1 indicating an absolute women dominance where the role of their men counterparts in decision-making of dairying issues was virtually bleak (Table 38). While in the other two villages, the decisions on dairying issues were taken by both men and women jointly with mutual consultation. 'Group of family members' had virtually no role to play in making decisions on dairying issues in the three selected villages under different awareness situations.

5. Domestic issues

It is visualized from Table 38 that while the major decisions on domestic issues such as routine domestic work and food items were made by women, the decisions on clothes and celebration of functions were taken by both men and women jointly under Situation 1 and 3. However, it is seen that the major decisions on all the four aspects of the domestic issues under Situation 2 were made by women only. Decision making on domestic issues by men was found to be virtually 'nil' in all the three selected villages. However, decision-making by 'group of family members' occupied third position in the three selected villages under different awareness situations.

Table 38 :Decision-making behaviour of women, their counterparts and group of family members on dairying and domestic issues (%)

Types of issues	Situation 1					Situation 2				Situation 3			
	S	H	B	G	S	H	B	G		S	H	B	G
Dairying	100	-	-	-	4	-	96	-		11	-	89	-
Domestic													
Routine works	97	-	3	-	91	-	9	-		91	-	9	-
Food items	99	-	1	-	83	-	16	1		83	-	16	1
Clothes	7	-	83	10	73	-	-	27		-	-	73	27
Functions	3	-	70	27	73	-	-	27		-	-	73	27

Note: S-Self (Woman); H-Husband; B-Both; G-Group of family members

Present skills and knowledge in improved crop production technologies

It is evident from table 39 that women farmers were equipped with better practical skills and knowledge in improved crop production technologies under Situation 1 as compared to other two situations as they were not only 'just knowing' but 'could also practice' these technologies on their own farm to a greater extent. Situation 3 and Situation 2 stood second and third, respectively as far as practical knowledge is concerned. Co- farmers were the major source of knowledge under Situation 1 and Situation 3, while it was husband under Situation 2.

Table 39 : Present skills and knowledge (%) of women in improved crop production technologies under different situations

Situation	Source of knowledge				Extent of knowledge		
	Co-farmer	Husband	Co-farmer and husband	Husband, extension and KVK	Just knowing	Can practice	Can practice and also train others
Situation 1	41.72	12.83	41.89	3.39	22.72	72.56	15.44
Situation 2	0.00	71.72	28.28	0.00	66.00	32.44	0.00
Situation 3	37.89	8.44	53.78	0.00	43.28	49.67	12.47

Conclusion

It may be concluded from the above study that women workers were worked out to be 44 - 59 per cent of the total working population. The women contributed maximum possible income to the family as a whole by diversifying their activities. Agriculture occupied a major share of total time spend by a woman a day, the total women employment was higher under Situation 1 which has higher cropping intensity (137%). There were disparities in wages. The prevailing money wages per day was Rs. 40/- in case of women workers while Rs. 50/- in case of men workers. Major decisions on crop production issued were taken by the husband while in dairying and domestic issues the decisions on major issues were made by the women. Women under situation 1 were equipped with better practical skill, which they acquired from co-farmers. The disparities in labour wage and skill upgradation need to be addressed.

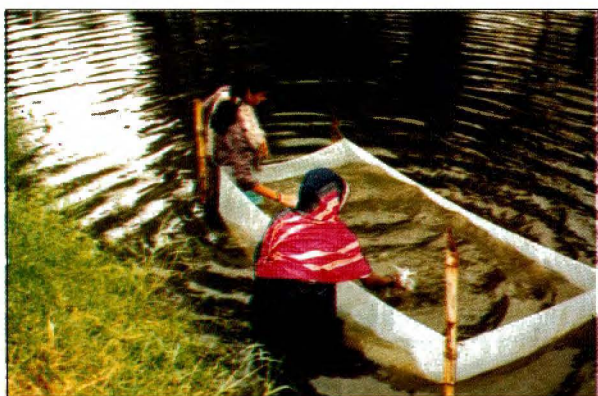
2.16. Involving rural women in aquaculture - A step towards ensuring economic and nutritional security

(P.K. Sahoo and H.K. Dash)

The project entitled "Involving rural women in aquaculture - A step towards ensuring economic and nutritional security" was launched in Nimapara block of Puri district and Balipatana and Baliana block of Khurda district. A total number of 7 villages involving 195 women beneficiaries were identified from these blocks. Of the selected 195 beneficiaries, 55 women beneficiaries had their own backyard ponds and the rest were encouraged to form groups so as to facilitate them to take up aquaculture in leased-in community ponds. Survey on socio-economic profile of women reveals that most of the beneficiaries (53.9%) were middle age group who really shouldered the household responsibility. They were illiterate (44.4%) and belonged to landless or low land holding group. Agriculture formed the backbone of the participating households both for landowning and landless household as regard to their source of income. Only 5.5 per cent of the household found dependent on non-agricultural source of income. Aquaculture as a source of income was not so much significant and contributed only 0.008 per cent in-aggregate to the total income.



Women practising netting



Conditioning the fries before packing

After selection of ponds, water analysis of each pond was made and the data obtained formed the base line information for pond fertilization and other management practices to be undertaken. The result of water analysis is summarized in table 40. Water analysis data reveals that majority of the ponds had the optimum status on the different critical water parameters like pH, total alkalinity, phosphate, total nitrogen, dissolved oxygen etc. With an objective of transferring the scientific management procedures, training programmes pertaining to pond preparation and management; ornamental fish breeding and management and record keeping were arranged in villages. Training

programmes were supplemented by field visits to CIFA and State fishery farm for giving practical exposures.

Nursery rearing of spawn was undertaken since it was perceived to be a women friendly activity. Besides, being quite remunerative, it assures the supply of healthy and quality fries. The participating women were explained and demonstrated the method of pond preparation and management practices to be undertaken for successful rearing of seeds. Monoculture of Rohu and Catla spawns was done since it would be easier for distribution among the beneficiaries later. The stocking density was maintained at 30 lakhs/hectare. After one month, fries were harvested and distributed among the beneficiaries under the project covering a total of 30 ponds. Fifty percent of the total fries were left to the owner of the ponds as the share towards their pond. On an average each pond owner earned an income of Rs. 1100/- by selling the fries. This was done to encourage the owner of the ponds as well as other participating women to take up nursery raising of spawn in the coming years and also to make them aware of the economic benefit associated with spawn raising. The details of the production statistics of the nursery ponds is summarized in table 41.



Releasing the fries from the packings

Table -40: Results of water analysis

Parameters	Range	No. of Ponds	%
pH	< 7	0	0
	7.0 - 8.6*	48	100
	>8.6	0	0
Total alkalinity	<60 mg/lit	13	27
	60 -230 mg/lit*	31	65
	>230	4	08
Phosphate	>0.05mg/lit	1	2
	0.05 - 7 mg/lit*	47	98
	> 7mg/lit	0	0
Total Nitrogen	< 0.05 mg/lit	7	15
	0.05-1.5 mg/lit*	37	77
	> 1.5	4	8
Dissolved Oxygen	< 4 mg/lit	41	85
	4 -10 mg/lit*	7	15
	>10 mg/lit	0	0

* Optimum

Table - 41 : Production of nursery

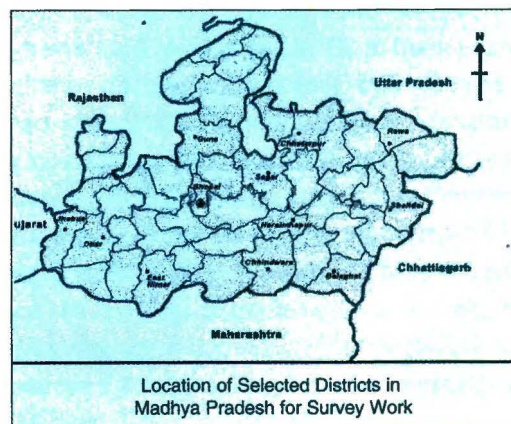
Village	Pond size (ha)	Species	Date of stocking	Date of Harvesting	Average Weight (gm)	Average length (mm)	% of survivability
Sathilo	0.0780	Catla	29.7.03	9.09.03	3.5	40	5
Sathilo	0.0680	Rohu	29.7.03	26.08.03	2.2	25	45
Khamanga Sasan	0.0200	C:R:M 2:1:1	29.7.03	9.09.03	5.0	55	20
Saripur	0.0440	Jayanti Rohu	1.8.03	The pond was affected by flood			

Advanced fries of Catla, Rohu and Mrigala in the ratio of 4:3:3 were stocked in the ponds covered under the project during the month of September with a stocking density of 7000/hectare. After stocking supplementary feeding (Groundnut oil cake and Rice bran) were distributed among the beneficiaries. Sampling of the ponds was taken up in the second week of November. The result reveals that highest growth was recorded in case of Catla, followed by Mrigala and Rohu. The growth range of the species which was found to be very high may be due to variation in stocking size.

SUB-CENTRE AT CIAE, BHOPAL

2.17 Involvement of farm women in agriculture and allied activities in the state of Madhya Pradesh

The project has been taken with objective to examine the involvement of farm women of Madhya Pradesh in various farm operations, to know the types of tools/equipment/machine used by them and to get information on their working pattern and drudgery status. For this purpose, 12 districts namely, Bhopal, Sagar, Rewa, Guna, Narsinghpur, Chhindwara, Shahdol, Balaghat, Dhar, East Nimer, Jhabua and Chhatarpur were selected for the survey work. From each district, four villages were randomly selected from each group of villages based on household population of villages viz.



<100, 101-200, 201-300, 301-400, 401-500 and >501. Thus 24 villages were selected randomly from each district. The households were divided into six categories of farmer's viz., landless, marginal, small, semi-medium, medium and large. From each of this group, 10 per cent households are being surveyed. Thus data on about 10300 farm women from all over the state would be collected during this survey. A detailed survey schedule has been prepared and pre-tested. It has three components viz., district schedule, village schedule and household schedule. During the year survey was carried out in two districts namely, Bhopal and Rewa and data on 1465 farm women were collected.

The survey data are being analyzed for each categories of farmers viz., landless, marginal (<1ha), small (1-2 ha), medium (2-4 ha), semi-medium (4-6 ha) and large (>6 ha) and will be reported in the next year.

2.18. Ergonomical evaluation of manually operated Cleaner, Grader, Seed Drill, Fertilizer broadcaster and Ridger with women workers.

Following farm equipments were evaluated ergonomically to assess their suitability for farm women:

1. Ergonomical evaluation of manually operated Fertilizer broadcaster

Commercially available manually operated fertilizer broadcaster was used for broadcasting of urea in the field. The broadcaster was operated by 11 farm women in standing posture. Mean values of age, height and weight of the subjects were 41.8 ± 11.8 years, 151.7 ± 4.1 cm and 46.4 ± 8.3 kg, respectively. Mean dry bulb temperature, wet bulb temperature, relative humidity and wind velocity were 31.50°C , 21.75°C , 46.25 per cent and 1.15 m/s, respectively during the experiment. The soil moisture content, bulk density and clod mean weight dia was 16 per cent (db), 1.2 g/cc and 30.62 mm, respectively. The duration of trial was of 15 minutes. The experimental results are given in Table 42.

Table 42 : Data on ergonomical evaluation of fertilizer broadcaster

Particulars	Mean values
Walking speed of subject	4.4 ± 0.46 km/h
Crank rotation	42.2 ± 7.2 rpm
Spreading disk speed	7.11 ± 1.19 m/s
Swath width of broadcaster	5.0 m
Effective field capacity	1.15 ha/h
Heart rate during work	129.7 ± 13.3 beats/min
Increase in heart rate over rest (ΔHR)	65.4 beats/min

It indicated that the broadcasting operation required ΔHR of 65.4 beats/min. Higher mean working heart rate and mean ΔHR indicates that the broadcaster requires refinement so that it can be made suitable for women workers. Following observations were recorded during the experiment:

- The crank handle rubs with operator's waist
- The operator had to bend to crank side during its operation
- Weight of the broadcaster (completely filled) was 13 kg, which was on higher side for women workers
- The top portion of hopper reached upto acromial height, which irritated most of operators.
- Operators were unable to observe the quantity of urea in the hopper during the operation.
- It was observed that operator could not mount and dismount the broadcaster by herself.

The manual operated fertilizer broadcaster is being refined to take care of above mentioned observations.

2. Ergonomical evaluation of manually operated Seed Drill

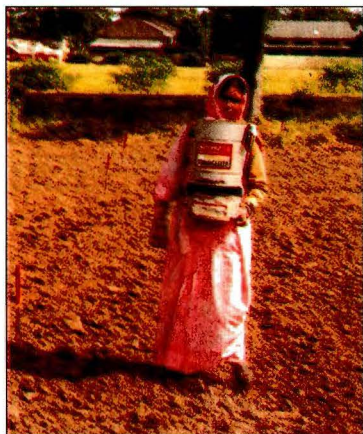
CIAE and PAU seed drills were evaluated for sowing wheat with 12 farm women. At a time two subjects were engaged for operation of each seed drill i.e. one for pulling and another for pushing the seed drill. Mean values

of age, height and weight of the subjects were 41.8 ± 11.8 years, 151.7 ± 4.1 cm and 46.4 ± 8.3 kg, respectively. Mean dry bulb temperature, wet bulb temperature, relative humidity, globe temperature and wind velocity was 27.8oC, 18.5oC, 45.5 per cent, 40.2oC and 1.3 m/s, respectively during the experiment. The soil moisture content, bulk density and clod meart weight dia was 20.1 per cent (db), 1.1 g/cc and 30.62 mm, respectively. The duration of trial was of 30 minutes.

Table 43: Data on ergonomical evaluation of manually operated CIAE and PAU Seed Drills

Particulars	Mean values for	
	CIAE Seed Drill	PAU Seed Drill
Walking speed of subject	2.55 ± 0.46 km/h	2.56 ± 0.23 km/h
Effective filed capacity	543.86 ± 60.36 m ² /h	533.14 ± 36.87 m ² /h
Seeding depth	4.1 ± 0.74 cm	4.1 ± 0.88 cm
Heart rate during work	139.8 ± 11.7 beats/min	133.4 ± 8.1 beats/min
Increase in heart rate over rest (Δ HR)	50.7 ± 7.3 beats/min	47.3 ± 9.7 beats/min
Pull force required	125.57 N	62.85 N
Push force required	25.11 N	41.6 N

Using paired t-test, it was observed that there was no significant difference in mean HR during operation for CIAE and PAU seed drills. However, the mean working HR with PAU seed drill (133.4 beats/min) was significantly lower than CIAE seed drill (139.8 beats/min). This may be due to narrower boot of the furrow opener in PAU seed drill. Following observations were recorded during the experiment:



Women operating fertilizer broadcaster

CIAE Manual Seed cum Ferti Drill

- There was sticking of soil over furrow opener due to its wider boot.
- Clogging of clods in fork ground wheel was noted.
- Handle needed refinement for comfort.
- Women operators did not feel comfortable to operate the seed drill by pulling the drill from the pulling harness.

PAU Seed Drill

- The height as well as angle of handle was not proper.
- Frequent clogging of ground wheel due to clods was observed.
- Operation of seed drill in straight line was difficult.
- Problem in sprocket and chain drive was observed in the field.

To remove these short comings, both the seed drills are being refined.



Force measurement during operation of PAU seed drill

3. Ergonomical evaluation of manually operated handing type cleaner

CIAE manually operated handing type cleaner was used for cleaning soybean using 12 farm women. Mean value of age, height and weight of the subjects were 36.3 ± 5.7 years, 154.1 ± 2.5 cm and 51.2 ± 8.5 kg, respectively. Mean dry bulb temperature, wet bulb temperature and relative humidity was 33.75°C , 19.00°C and 21.75 per cent, respectively during the experiment. Duration of trial was of 60 minutes. The experimental results are given in Table 44.



Measurement of heart rate of woman worker during operation of CIAE Seed drill

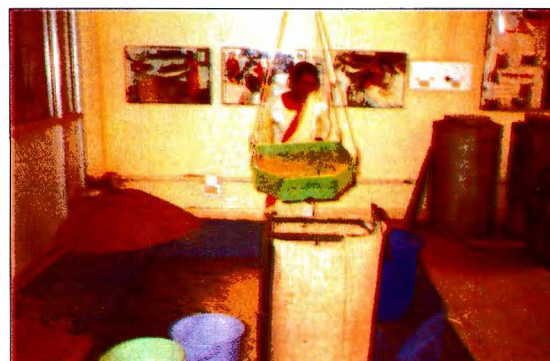
Table 44 : Data on ergonomical evaluation of CIAE handing type cleaner.

Particulars	Mean values
1000 Grain Weight of Soybean	83.64 g
Time required for cleaning per batch (8 kg)	2.27 min
Number of strokes/batch	26
To and fro displacement of cleaner	22.3 cm
Distance of subject from handle of cleaner	21.3 cm
Handle height of cleaner	86 cm
Capacity	225 kg/h
Cleaning efficiency	67.1%
Heart rate during work	102.6 beats/min
Increase in heart rate over rest (ΔHR)	21.5 beats/min

During the operation of cleaner, the physiological workload was within the limit for continuous performance i.e. having heart rate less than 110 beats/min, which suggests that the equipment is suitable for farm women to clean the grain after threshing.

Following observations were recorded with preference to the performance of equipment:

- There was need of rubber grip over mild steel handle of cleaner.
- The sieve was not properly fitting in the grooves provided due to which grains are coming out of the cleaner.
- The cleaning efficiency was less and the unit needed re-finement.



Heart rate measurement of woman worker during operation of hanging type grain cleaner

3. TRAININGS

3.1 Trainers' trainings

The centre organized trainers' training programmes for the Scientists/ Extension functionaries of the ICAR Institutes/SAUs/State Departments of Agriculture, Horticulture, Animal Husbandry and Fishery to sensitize them on the productive roles of women farmers and to train them on application of appropriate technologies in agriculture and allied fields. The details are given in table 41.

Table 45 : List of trainer's trainings conducted.

Title of the training	Days	Duration
Main Centre		
Role of new molecules in integrated pest management and their prospects	5	18th - 22nd November 2003
Techniques of improving extension services for farm women	4	27th - 30th November 2003
Gender implication in rice farming system	5	2nd - 6th December 2003

3.2 Farmers/farm women trainings

Under different research projects the centre organized 37 training programmes in the areas of organic farming, eco-friendly pest management, vermi-composting, value addition of fruits and vegetables, farm implements for drudgery reduction, improved farming techniques which benefited 1645 farm women/farmers.

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- Sadangi, B.N., Dash, H.K. and Sahoo, P.K. (2003). Techniques of improving extension services for farm women.
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- Arya, M.P.S., Routray, P.M. and Sahoo, L.P. (2004). Participation behaviour of farm women in rice cultivation under coastal agro eco system of Orissa. Paper presented at National Seminar on "Advances in Coastal Agriculture and Value Addition from National Prospective held at CPCRI, Kasargod, Kerala on January 21 - 24, 2004. P : 74.
- Mishra, S. and Satpathy, C. D. (2003). "Problem realization : An approach through agro-ecosystem analysis". Abstract published in National Seminar on Responding to Changes and Challenges: New Roles of Agricultural

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Training/Education Material

Two video films on manually operated handing type cleaner were prepared one each by main and sub centre.

Radio Talks

Sl. No.	Name and Designation	Title of the Topic	Date of broadcast	Language
1.	Dr Bharati Killadi, Scientist (Hort.)	Jaibika sara prastutire krushijibi mahila (Farm women and organic manure preparation)	4th June 2003	Oriya
2.	Dr Sabita Mishra, Sr. Scientist (Agril. Extn.)	Krushijibi mahilanka pain chhatu udyoga (Mushroom enterprise for farm women)	23rd June 2003	
3.	Dr H.K. Dash, Scientist (Agril. Eco.)	Mahilamananka pain anusthanika runara subhidha sujoga (Institutional credit facilities for women)	19th July 2003	
4.	Dr B.N. Sadangi, Principal Scientist (AE)	Mahilanka unnati pain kendra o rajya stariya jojana (Central and State Govt. programme for women development)	23rd August 2003	
5.	Mrs. L.P. Sahoo, Scientist (S.T.)	Mahila upajogi gyana kausala (Women friendly technologies)	10th September 2003	
6.	Dr P.K. Sahoo, Scientist, Sr. Scale (Fish and Fishery Sc.)	Machha chasa re mahilanka dayitwa (The role of women in carp culture)	27th September 2003	
7.	Dr Sabita Mishra Sr. Scientist (Extension)	Krushi jibi mahilanka pain alpa kharcha re pustikar khadya (Low cost nutrition for farm women)	14th February, 2004	

5. RESEARCH PROJECTS

Sl. No.	Name of the Project	Date of launching	Investigators
MAIN CENTRE PROJECTS CONCLUDED (2003-04)			
1	Development and testing of extension methods for farmwomen in Eastern India	August, 99	Dr B.N. Sadangi, Dr Hema Pandey, Dr M.P.S. Arya, Dr P.K. Sahoo, Dr H.K. Dash
2	A gender study on agriculture and household economy of tribal of Orissa	August, 99	Dr H.K. Dash, Dr B.N. Sadangi
3	Studies on technological need for empowering women in rural aquaculture	August, 99	Dr P.K. Sahoo; Dr B.N. Sadangi
4	Standardization of women specific field practices in rice in Orissa	May, 2000	Dr M.P.S. Arya, Mrs Laxmi Priya Sahoo
5	Occupational health hazards of farmwomen in coastal Orissa	May, 2000	Dr Hema Pandey, Dr Suman Agarwal, Mrs Abha Singh
6	Identification and evaluation of interactive learning modules for dissemination of homestead technologies	May, 2000	Dr Suman Agarwal, Dr Hema Pandey, Mrs Abha Singh
7	Improvement in storage practices of seeds and grains of important crops with women perspective	May, 2000	Mrs Laxmi Priya Sahoo, Dr M.P.S. Arya
NATP			
8	Management of coastal agro-eco system affected by Super Cyclone	June, 2001	Dr Hema Pandey, Dr Suman Agarwal, Dr B.L. Attri, Dr H.K. Dash, Mrs Abha Singh, Dr Bharati Killadi
9	Collection, documentation and validation of ITK - Storing of pulse grains by using dry chillies	April, 2002	Dr M.P.S. Arya, Mrs Laxmi Priya Sahoo
AP Cess Project			
10	Studies of women in agriculture in India with special reference on crop production technologies	October, 2001	Dr M.P.S. Arya, Dr. Hema Pandey, Dr. Y.V.R. Reddy
ON GOING PROJECTS			
1.	Popularization of eco-friendly pest management technologies for vegetables among farm women in homestead lands	December 2002	Dr S.K. Srivastava, Dr B.L. Attri, Mrs Laxmi Priya Sahoo
2.	Survey on post-harvest handling of vegetables in rural areas	December 2002	Dr B.L. Attri, Mrs Abha Singh
3.	Approaches to engendering agricultural research and extension - on networking mode	February 2004	Dr Hema Pandey, Dr Indu Grover, Dr P.S. Geethakutty, Dr B.N. Sadangi

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|----|--|----------------|--|
| 4. | Standardization of weaning mix using different proportions of sweet potato | Dec., 2003 | Mrs. Abha Singh
Dr Archana Mukherjee |
| 5. | Studies on eco-friendly weed management | Jan., 2004 | Dr M.P.S. Arya |
| 6. | Micro propagation of pointed gourd (Trichosanthes dioica Roxb) for empowerment of Women | Jan., 2004 | Dr Bharati Killadi
Dr Archana Mukherjee |
| 7. | Efficient resource management of women agricultural labourers | Dec., 2003 | Dr Sabita Mishra |
| 8. | Development of modules for mobilization of rural women for sustainable livelihood through Women Self Help Groups | Jan., 2004 | Dr Suman Agarwal |
| 9. | Database on gender in agriculture | February, 2004 | Dr H.K. Dash
Dr. P.K. Sahoo
Dr. B.L. Attri |

NATP

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|-----|-------------------------------------|---------------|-------------------------------------|
| 10. | Empowerment of women in agriculture | October, 2001 | Dr Suman Agarwal
Mrs. L.P. Sahoo |
|-----|-------------------------------------|---------------|-------------------------------------|

DBT Project

- | | | | |
|-----|--|--|-------------------------------|
| 11. | Involving rural women in aquaculture - A step towards ensuring economic and nutritional security | | Dr P.K. Sahoo
Dr H.K. Dash |
|-----|--|--|-------------------------------|

SUB-CENTRE

- | | | | |
|-----|---|--|--|
| 12. | Involvement of farm women in agriculture and allied activities in the state of Madhya Pradesh | | |
| 13. | Ergonomical evaluation of manually operated Cleaner Grader, Seed Drill, Fertilizer Broadcaster and Ridger with women workers. | | |

6. PARTICIPATION IN SEMINARS/ WORKSHOPS / CONFERENCES

- Dr M.P.S. Arya, Principal Scientist (Agronomy), Dr S.K. Srivastava, Sr. Scientist (Ent) and Dr B.L. Attri, Sr. Scientist (Hort.) attended 'Agriculture Summit - 2003' at Mumbai on 3rd April 2003.
- Dr S.K. Srivastava, Sr. Scientist (Ent.) attended National Symposium on "Frontier areas of entomological research" at IARI, New Delhi from 5th - 7th November, 2003.
- Er. S.P. Singh, Senior Scientist (FMP) attended 38th Annual ISAE Convention of Indian Society of Engineers (ISAE) at Dr BS KVV, Dapoli from 16th - 18th January, 2004.
- Dr M.P.S. Arya, Principal Scientist (Agronomy) attended National Seminar on "Advances in coastal agriculture and value addition from national perspective held at CPCRI, Kasargod, Kerala on 21st - 24th January, 2004.
- Dr Hema Pandey, Director and Dr B.N. Sadangi, Principal Scientist (AE) attended the launching workshop-cum-orientation for the project on "Approaches to engendering agricultural research and extension - on networking mode" at Kerala Agriculture University, Thrissur, from 18th -20th February, 2004.
- Mrs L.P. Sahoo, Scientist (Seed Tech.) attended National Conference on "Seed: A global perspective" held at Division of Seed Science and Technology, IARI, New Delhi from 26th - 28th March, 2004.

7. RECOGNITION / AWARDS

- Dr S.K. Srivastava, Sr. Scientist (Ent.) was awarded as best innovator, farmers-guide and friend with Merit Certificate and Prize for the introduction of summer groundnut in Uttar Pradesh, in Moongfali Mahotsava at Mainpuri on 31.01.2004 by Hon' ble State Minister, Govt. of Uttar Pradesh.
- Dr B.L. Attri, Sr. Scientist (Hort.) got first prize in 'Ashu Hindi Kavita Rachna' and second prize in 'Nibandh Lekhan' from Nagar Rajbhasha Karyanvayan Samiti, Bhubaneswar on 12.09.2003.

8. OTHER ACTIVITIES

Participation in regional exhibitions

NRCWA Bhopal Sub centre participated in Mamatva Mela organized by Mahila Awam Vitt Vikas Nigam, Bhopal, from February 5 - 9, 2004 and a stall was arranged in the Mela where farm tools/equipment suitable for farm women were exhibited.



NGO- Scientist Interface

NRCWA and NGOs interface conducted

The NGOs interface was organized to develop effective coordination among NGOs for formulating strategies for gender mainstreaming and empowerment of women. The main objective of the interface was to explore the possibility of working together and to know the strength, weakness, objectives, mandates and activities of each organization to develop an action plan for complementary and supplementary role of each organization for women.

“National Science Day” celebrated

The National Science Day was celebrated on 28th February, 2004 in the village Hansapara of Pipili Block and village Kadua of Satyabadi Block in Puri district. At Hansapara, more than 70 farm women had attended the programme. The topics covered in the discussion were vermi composting and preservation of locally available fruits and vegetables and formation of SHG for income generation. At Kadua 150 farmwomen had participated. Demonstration was organized on the use of improved agricultural and animal husbandry technologies like manual rice transplanter, seed treatment drum, parboiling unit, grubber weeder, manual bund former, fertilizer broadcaster, improved sickle, rake, shovel, groundnut decorticator and spraying safety kit and improved chullah (CRRI model).



M.M. NATP



Official language activities

A Hindi workshop from 4th - 6th September, 2003 was held to facilitate the use of Hindi language by the non-Hindi speaking members. The thrust was on different aspects of Hindi writing such as correct spelling, gender rule, sentence formation and short notes. A Hindi essay competition and Hindi Chetana Divas were held. Suitable actions were taken to encourage the practice of Hindi as official language by the staff.

9. IMPORTANT MEETINGS

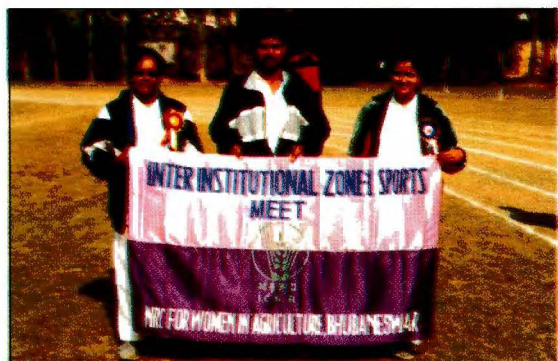
Scientific Research Council meeting held on 23rd - 24th November 2004, discussed and approved eight new research projects.

Fifth Research Advisory Committee meeting held on 4th February 2004, reviewed the progress of ongoing projects and approved the new institute projects.

Fifth Institute Management Committee meeting of centre was held on 5th February 2004.



10. PRIZE IN SPORTS



Dr Bharati Killadi, Scientist (Hort.), got third prize in Javelin Throw during the ICAR Sports Meet held at Lucknow.

11. DISTINGUISHED VISITORS

- Sh. Hukum Narayan Dev Singh Yadav, Hon'ble Union Minister of State for Agriculture, visited sub-centre located at CIAE, Bhopal, on 25.8.2003.
- Dr Mangala Rai, Director General, ICAR, visited the centre and construction site on 05.07.2003.

12. HUMAN RESOURCE DEVELOPMENT

- Sri Babu R.K., Sr. Clerk, attended a training on "Computer application in financial and administrative management" from 16th - 23rd September, 2003 organized by National Academy of Agricultural Research Management (NAARM), Hyderabad.
- Mr V. Ganesh Kumar, Personal Assistant, attended a training entitled "Cybrerary: A platform for information management and net working" at MANAGE, Hyderabad from Oct. 28, 2003 - Nov 1, 2003.
- Mrs Nidhi Agrawal, attended training on "Techniques of improving extension services for farm women" at NRCWA, Bhubaneswar, from November 27 - 30, 2003.
- Mrs L.P. Sahoo, Scientist (Seed Tech.), attended a training on "Tissue culture multiplication of banana" at Regional Plan Resource Centre (RPRC), Bhubaneswar from 8th - 12th December 2003.

13. PERSONNEL

As on 31.3.2004

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

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

Annual Report

**वार्षिक प्रतिवेदन
2003 - 2004**

National Research Centre for Women in Agriculture

**कृषि में महिलाओं पर राष्ट्रीय अनुसंधान केन्द्र
Bhubaneswar, भुवनेश्वर**



National Research Centre for Women in Agriculture

कृषि में महिलाओं पर राष्ट्रीय अनुसंधान केन्द्र

(Indian Council of Agricultural Research)

भारतीय कृषि अनुसंधान परिषद

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