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ON
Gender Sensitization of Extension
Functionaries for Engendering
Agriculture

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Gender Sensitization of Extension Functionaries for Engendering Agriculture

(Compendium: Training Programme on 'Gender Sensitization of Extension Functionaries for Engendering Agriculture' organized at ICAR-CIWA, Bhubaneswar during 26-28 June, 2018)

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PREFACE

Women have been contributing enormously to agricultural growth and development through their involvement in crop production, horticulture, animal husbandry, fisheries, natural resource management etc. Though the proportion of women workers in agriculture has declined, yet they constitute a significant workforce in agriculture. Globally, they constitute about 42% of economically active population in agriculture. Region-wise figures show that agriculture supports a very high proportion of economically active women, particularly in Asia and Africa and in India, it is about 62%. Women's contribution varies across regions, socio-cultural and agro-production systems. On the other hand, the persisting gender gap in access to and control over resources remains an important concern which has not only kept women in a vicious circle of low productivity but also has thrown up questions about inclusive and sustainable growth of the sector. Today, how to bridge the gender gap and empower women with new knowledge and technology is a great challenge, particularly in the context of socio-economic and climate related changes. Importantly, our approach to research, extension and development have not been gender sensitive and there is a general reluctance on part of a large section of researchers, extension and developmental workers to include gender component in programmes. While at global level there has been a lot of concern and action on empowerment of women in agriculture, efforts in India has been slow on this front. The first ever Global Conference on Women in Agriculture (GCWA) held in March 2012 at NASC complex, New Delhi also recommended gender sensitization of agri-researchers, extension and development personnel to integrate gender in agricultural research and extension to generate evidences on gender based outcomes of R&D interventions. Considering the above, the Training Programme on 'Gender Sensitization of Extension Functionaries for Engendering Agriculture' is being organized to develop the competency of development and extension professionals in strengthening gender component in their development & extension programmes. The training material has been designed keeping in view the requirements of the participants with different backgrounds. The contents included issues related to women in agriculture in various domains of extension & development, methodologies for strengthening gender perspective in interventions, gender and data analysis, monitoring and evaluation of gender based R&D projects. All these are compiled to develop this Compendium which, we hope, will be useful for agricultural R&D stakeholders.

The training programme is organised under the project entitled "Engendering Agricultural Research and Extension through Gender Sensitive Technology Hub" at ICAR-CIWA, Bhubaneswar. We are grateful to Dr. S. K. Srivastava, Director, ICAR-CIWA for his guidance and support in organizing the programme. We are also thankful to all the resource persons, who accepted our request and shared their valuable knowledge and experience with the participants. We thank all the Scientists, Technical, Administrative, Finance and other supporting staff of ICAR-CIWA for their whole-hearted support for the programme. Special thanks are due to Mr. B. C. Behera and Mr. Subrat Kumar Das for their continued support.

TRAINING PROGRAMME TEAM

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ICAR-CIWA: GENESIS, PROGRESS AND ACTIVITIES FOR GENDER MAINSTREAMING IN AGRICULTURE

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INTRODUCTION

In the agricultural sector, women participate in a number of agro-production systems that govern the nature and extent of their involvement. There is a significant heterogeneity across regions, states, locations and context in the role of rural women and their participation in agricultural and other economic activities. Most significant agricultural activities undertaken by women include farming, post harvest management, horticultural crop production, livestock management, fisheries and homestead resources. In paddy, women are mainly involved in transplanting, weeding, harvesting, drying harvest, winnowing and seed storage. As far as total workload is concerned, women spend 40.2 percent of their time per season, performing transplanting (39.1 hours), harvesting (29.8 hours) and weeding (19.0 hours) as the major activities (AICRP Report). In sugarcane based cropping system, women participate in activities like manure and fertilizer application at first step, preparation of sugarcane sets for sowing, placing these sets into the ridges, irrigation, weeding, harvesting, tying the bundles, carrying sugarcane bundles and loading it in to the vehicle. Again these are not women dominant or exclusive activities and are performed jointly with males. The data on role profile indicates that joint participation of rural women with men was higher than independent participation of women in all activity areas.

Agricultural development cannot take place without fullest consideration from family life, general education of women, improvement of home conditions, nutrition, housing, sanitation, personal health, clothing and cultural arts. Therefore, attention should be given to these areas and the researchers and policy makers should sensitize themselves for the development and wellbeing of farm women. In rural India, the prosperity of the household depends on the prosperity of agriculture and allied occupation in any particular point of time vis-à-vis the role of women in innumerable activities connected with farming, dairying, sericulture etc. But the women hands are invisible even to this day, so it is not surprising that the agricultural extension activities are mainly a male oriented pursuit.

Genesis and Progress of ICAR-CIWA

Realizing that the research information and the technologies developed in the ICAR Institutes and State Agricultural Universities rarely incorporated the farmwomen perspectives and considering that there is a gap in the technology available at the research stations and the technologies suitable for farmwomen, the Working Group on Agricultural Research and Education constituted by the Planning Commission for the formulation of the Eighth Five Year Plan (1992-97) recommended establishment of National Research Centre for Women in Agriculture (NRCWA) to undertake research relevant to the needs of farm women in agriculture and home management. It also focuses on research for generation of jobs involving flexibility in time, duration and place of work for women. Accordingly, the ICAR established the NRCWA in the year 1996 at Bhubaneswar, Odisha and subsequently upgraded it as Directorate of Research on Women in Agriculture (DRWA) from the year 2008. A Sub-centre of ICAR-CIWA had functioned at CIAE Campus, Bhopal up to 2010. After up-gradation to the level of Directorate, the operational and administrative control of All India Coordinated Research Project on Home Science is vested with it. This unique institution is expected to catalyze and

facilitate R&D institutions to bring in farm women perspectives in their programmes and prepare women to take a lead role in technology development and dissemination. The Directorate has been upgraded and renamed as “ICAR-Central Institute for Women in Agriculture” (ICAR-CIWA) in the year 2015 under XIIth plan EFC.

Activities for Gender Mainstreaming in Agriculture

ICAR-CIWA carries out research programmes in various dimensions related to women in agriculture. These activities are carried out through the in-house, inter-institutional, network or collaborative and coordinated modes of research. The All India Coordinated Research Project (AICRP) on Home Science is operating in 10 centres at nine Agricultural Universities such as, AAU, Jorhat (Assam); PJTSAU, Hyderabad (Andhra Pradesh); CCSHAU, Hisar (Haryana); CSK HPKV, Palampur (Himachal Pradesh); GBPUAT, Pantnagar (Uttarakhand); MAU, Parbhani (Maharashtra); MPUAT, Udaipur (Rajasthan); PAU, Ludhiana (Punjab) and UAS, Dharwad (Karnataka) and UAS Bengaluru (Karnataka). Three more new centres viz., Central Agricultural University, Tura, Tamil Nadu Agricultural University, Madurai and Sardakrushinagar Dantewada Agricultural University, Dantewada have been included in the XII five year plan. The technical plan of the project during XI plan period focused on development of gender specific database and training modules for farm women, technology interventions for drudgery reduction in agriculture, nutritional security & health promotion of farm families, promotion of vocational skills among adolescent girls, value addition to under utilised natural fibre resources and empowerment of rural women for livelihood security.

The ICAR-CIWA activities were focused in following thrust areas:

(i) Creating a repository of gender disaggregated data and documentation

Gender disaggregated information in the field of agriculture and allied areas are scanty and scattered. Such information need to be collected, collated, synthesized and published in order to make it available to the users.

(ii) Technology assessment & evaluation

Research efforts in NARS rarely take into account the needs of women which very often differ from that of men. As a result, there is differential adoption of technologies between men and women. It ultimately affects the productivity of women and agricultural production. Therefore, ICAR-CIWA identified relevant technologies in the fields of crop production, horticulture, animal husbandry, agricultural engineering and aquaculture and tested them in women perspective, and suggest refinement to make them women friendly. Technologies were assessed through on-farm participatory research involving women.

(iii) Farming system approach

In the wake of emerging problems related to sustainability, the focus has been shifted to farming system approach to produce agricultural commodities. Moreover, as farmwomen struggle to meet their diverse needs from different sources, they eventually spend a lot of time and energy in supporting their households. Therefore research on micro-level farming/agricultural systems has become urgent to develop sustainable livelihood options for women and their households.

(iv) Drudgery assessment and reduction

Farmwomen face a lot of drudgery while performing farming operations and household activities. Even women suffer from different health problems, which adversely affect their working efficiency and family welfare. But, data on the extent to which women are affected in the working environment and the effect on their work output are limited. Hence, studies were

commissioned on drudgery assessment and development of reducing tools and implements suitable drudgery.

(v) Gender sensitive extension

Access of farmwomen to extension/information is very limited due to various reasons. One reason is lack of required degree of gender sensitivity of our extension system and lack gender focused extension approaches and models for dissemination. Extension modules on various subject matter areas like integrated farming system, post-harvest technology, integrated pest and nutrient management, poultry and fish farming, home garden and homestead farming were be prepared for rural women.

(vi) Capacity building of R & D functionaries

Scientists, both in research and extension systems, need orientation to appreciate the vital role of women in agriculture and the areas in which their efficiency of work could be enhanced either by technological intervention in agriculture and allied sectors on important problems or by improving their knowledge and skills for better job performance. In the first instance the scientists of ICAR-CIWA need to be given required training in certain identified areas so that the centre can address researchable issues on priority. Based on the research outcomes, suitable training capsules are being developed according to the need of various stakeholders like, directors, scientists, policy makers, KVK & development functionaries and women leaders.

(vii) Resource management

Resources, both natural and household, provide an important base for livelihood of women and their families. The means of livelihood that women adopt depends on resource endowment of a particular region, their households and access to such resources. The resources can be common property resources such as forest, water bodies, fallow lands etc. and household resources like cultivable lands, ponds, livestock and different assets. Lack of adequate resources at household level and poor management of existing resources have made poor in general and women in particular vulnerable to livelihood insecurity. More importantly there is need to improve the resource use efficiency on one hand, and make sustainable use of resources on the other. Hence, studies taken up related to women's role in resource conservation and management; and S&T options to harness sustainable benefits assume immense significance.

ICAR-CIWA has being working on refinement/ development of drudgery reducing tool for farmwomen under the research projects and AICRP on Home Science. These include tools and equipment for farming operations and household management. Nineteen technologies were field validated in the operational villages such as seed bag, fertilizer trolley, manual seed drill, mat nursery, vegetable plucker, vegetable bag, water bag, face protector, dung collector, fodder chopper, fodder collector, ground nut stripper, groundnut decorticator (sitting & standing), groundnut stripping frame, long handle fork, maize sheller, mango harvester, potato picker and revolving stool. It was observed that among the technologies, mat nursery, revolving stool, groundnut decorticator was found above 70 per cent adoption where as long handle fork, water bag, face protector, mango harvester, vegetable plucker, maize sheller, ground nut decorticator (sitting type) and fertilizer trolley found 50 – 70 per cent adoption and dung collector, vegetable bag, groundnut stripper, potato picker and fodder collector found the adoption of 30-50 per cent. Besides addressing drudgery issues the ICAR-CIWA also carries out of research on various disciplines in agriculture with emphasis on improving the food and nutritional security of the farm families.

Conclusion

ICAR-CIWA is the only institution under Indian Council of Agricultural Research (ICAR) to address gender concerns in agriculture for achieving good performance of agriculture by enhancing the productivity of women engaged in agriculture. To address the issues of women in agriculture for farm mechanization and to reduce their drudgery with increased output researches are carried with the aim to frame strategies for reducing drudgery of farm women to fabricate and disseminate the available drudgery reducing farm tools and equipment to stake holders. In order to demonstrate the output and utilities of gender research, strong partnerships with ICAR institutions, KVKs, SAUs, development agencies, NGOs and international organizations would be worked out in future.

Efforts for gender mainstreaming are required to bring social, cultural and attitudinal changes which not only strive for ending the invisibility of women's contribution to agriculture, but of eliminating the drudgery that blights the lives of millions of working women in India. It is important to recognize that women's empowerment through technologies can raise their status only through a meaningful stimulation. There is therefore, needed to have the participation of women at every level in decision making, program formulation and implementation.

GENDER CONCEPTS AND GENDER STEREOTYPES

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Understanding the gender concepts and their uses in agriculture development constitute the basis of learning. Each concept has broad definition and operational part according to the field of development. Some of the concepts are mentioned below.

GENDER CONCEPTS

Sex: Biological differences between women and men, which are universal, obvious and generally permanent.

Gender: The socially constructed differences in roles and responsibilities assigned to women and men in a given culture or location and the societal structures that support them. Every society has different 'scripts' for male and female members to follow. Thus members learn to act out their feminine or masculine role, much in the same way as every society has its own language.

Gender roles: The role refers to the activities performed by men and women in different situations and in different times and within the different cultures, classes, castes, ethnic groups etc. The roles of men and women are shaped by various forces such as social, cultural, economic, environmental, religious and political. The gender roles may change depending on the socio-cultural dynamics of the society.

Triple roles: Are roles (tasks and responsibilities) men and women may have related to: production (producing money value), reproduction (the child bearing and rearing responsibilities required to guarantee the maintenance and reproduction of labour force), community management/ community politics (producing community goods and well beings).

Gender analysis: Gender analysis is a tool to better understand the realities of the women and men, whose lives are impacted by planned development. These include gender issues with respect to social relations; activities; access and control over resources, services, institutions of decision-making and networks of power and authority and needs, the distinct needs of men and women, both practical and strategic.

Access to resources: Refers to right and opportunity of men and women to use the resources as per one's need to carry out his/ her activities.

Control over resources: Refers to the rights and power of men and women to decide on the use and destination of the resources.

Practical gender needs: Practical gender needs are the needs women identify in their socially accepted roles. Practical gender needs do not challenge the gender divisions of labour or women's sub-ordination position in society, although rising out of them. These are a response to immediate perceived, identified necessity, within a specific context. They are practical in nature and often are concerned with inadequacies in living conditions such as water provisions, health care and employment.

Strategic gender interests: The needs women identify because of their subordinate position to men in their society. These vary according to particular context. They relate to gender divisions of labour, power control and may include such issues as legal rights, domestic violence, equal wages etc. Meeting strategic needs helps women to achieve greater equality. It also changes existing role and therefore challenges women's sub-ordinate position.

Gender equality: Gender equality means that women and men have equal conditions for realizing their full human rights and potential to contribute to national, political, economic, social and cultural development, and to benefit from the results. It is therefore the equal valuing by society of both the similarities and differences between women and men, and the varying roles that they play.

Gender equity: Gender equity is the process of being fair to women and men. To ensure fairness, measures must often be available to compensate for historical and social disadvantages that prevent women and men from otherwise operating on a level playing field. Equity leads to equality.

Gender blind: Gender blind is a person who does not recognize that gender is an essential determinant of life choices available to people in society.

Gender bias: Perception that both sex are not equal and do not have similar rights to resources.

Gender discrimination: Unfavorable treatment of individuals on the basis of their gender

Gender mainstreaming: It is the process of assessing the implications for women and men of any planned action, including legislation, policies and programmes, in all areas and at all levels. It is a strategy for making women's, as well as men's concerns and experiences, an integral dimension of the design, implementation, monitoring and evaluation of policies and programmes in all political, economic and societal spheres so that women and men benefit equally and inequality is not perpetuated. The ultimate goal is to achieve gender equality

Women and development: It emerged from a critique of the modernization theory. The theoretical base of wad is dependency theory and focuses on relationship between women and development process and examines the nature of integration. It is concerned with women's productive role and assumes that once organizational structures become more equitable, women's position would also improve.

Gender and development: The gender and development seeks to base interventions on the analysis of men's and women's roles. It questions the basis of assigning specific gender roles.

Gender planning: Gender planning is done only on basis of gender needs, gender needs assessment is an important aspect of the whole process. Gender planning is undertaken with the objectives of achieving gender equity, equality and empowerment through practical and strategic gender needs.

GENDER STEREOTYPES

Socio-cultural explanations are more appropriate behind development of perceptions of men and women on gender development. Culture prescribes certain activities in a different way for men and women. We often call these as gender stereotypes. On the basis of gender, society expects typical behaviour patterns e.g. Women are stereotyped as being caring, soft, obedient, shy, weak, protection seeking, while men are stereotyped as being strong, aggressive and

courageous. The stereotypic views on men and women’s role in workplaces are important limitations to growth and development of gender. In the developing countries it is more pronounced and has brought gender inequalities in different spheres of development including agriculture. The personnel in the agriculture research and extension systems also endorse the stereotypic views on the role of men and women in agriculture and accordingly address the needs and interest of the farm women. Gender sensitization of the scientists, extension functionaries and project managers can help in overcoming the gender stereotypes to harness the potentiality of the rural women in agriculture. In an exercise done by the participants of a workshop the following stereotypes of farm men and farm women were found which are presented in the table given below.

Gender stereotypes

Farm men	Farm women
• Dominant	• Recessive
• Tough	• Soft & tender
• Disorganized	• Considerate
• Less patience	• Patience
• Hasty	• Inside
• Outside	• Clever
• Less dynamic	• Dynamic
• Harsh	• Sensitive
• Hard working	• Responsible
• Strong	• 2/3 of a man
• Head	• Back bone of agriculture
• Emotional	• Less aggressive
• Humility	• Docile
• Do not recognize	• Sweet voice
• Materialistic	• Weaker
• Do not cry	• Multi roles
• Less emotional	• Highest talent & potentiality
• Crocodile skin	• Hard worker
• Responsible	• Adjustive
• Earning	• Co-operative
• More education	• Sub-ordinate
• Problem tackling	• Dependable
• Egoistic	• Emotional
• Adventures	• Uneducated
• Selfish	• Sympathetic
• Intelligent	• Loving & caring
• Aggressive	• Logical
• Money minded	• Social
• No sacrificing	• Sacrificing
• Practical	• Tactful
• Suspicious	• Jealousy
	• Polite
	• Shy
	• Sharing
	• Analytical
	• Broad

Farm men	Farm women
	• Egoistic
	• Acceptance
	• Burden taking
	• Oppressed

ROLE OF WOMEN IN AGRICULTURE AND ALLIED SECTORS

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In achieving food and nutritional security through agricultural production women play a crucial role. They work as female agricultural labourers, as farmers, as co-farmers, as female family labour and (with made out-migration, widowhood, etc) as managers of farms and farm entrepreneurs. In many rural areas, migration of men and other changes in farming systems are placing even greater burdens on women, who are left behind to manage agriculture and entire household alone. Research on women's time utilization revealed that on an average women work for 15-16 hours a day out of which 7-8 hours in peak and 5-6 hours in lean season are spent in farm work. Also women are involved in labour intensive, monotonous, repetitive and drudgery prone work, which are carried out manually, leading to mental and physical exhaustion and occupational health hazards.

Depending on the region and crops, women's contributions vary but they provide pivotal labour from planting to harvesting and post-harvest operations. Traditionally, women had usufruct rights to the community land. But after the land reforms, land titles were given to men, denying women's access to land. In general, women in tribal households enjoy more decision-making power than women in many other Indian households because of their greater contribution to household income (Yadama, Pragada and Pragada, 1997). The gender statistics on work participation in India are available at Census website or at Gender Knowledge System in agriculture portal (<http://icar-ciwa.org.in/gks/>).

Although women currently provide 60-80% of the agricultural labor, they have limited access to the resources and opportunities needed to maximize and profit from their contributions. Limitations constrain farmers' ability to improve their lives and that of their families and the transformative power of agriculture to alleviate poverty and hunger.

Labor inputs in rainfed rice production (days/ ha)

Country	Villages	Total	Male	Female
Indonesia	Jakenan Central Java	161	54	46
	Sumber Central Java	178	59	41
Thailand	Ban Sai Khram,	104	45	55
	South Ban Don Paw Daeng	102	46	54
Philippine	Carosucan, Sta. Barbara	133	73	27
	Tampac, Nueva Ecija	188	68	32
Cambodia	Kandal and Takeo	167	54	46
Vietnam	He Thu District	105	45	55
Laos	Khok Nghai, Xaythani	110	24	76
	Ak-sang, Phonethong	117	38	62
India	Chandpur, faizabad	187	16	84
	Mungeshpur, faizabad	132	33	67
	Sariyawan, faizabad	211	45	55
	Khanpur, faizabad	210	24	76
Nepal	Naldung, nagarkot	269	42	58
	Mohana, rantnagar	101	50	50
	Baghmara, rantnagar	95	45	55

(Thelma R. Paris, Sept 23, 2009. Gender considerations in partnership design and management strengthening partnerships and networks ICRISAT, Patancheru, A.P. India)

Participation of women in agriculture also varies in irrigated and rainfed situation. Studies conducted in nine states in India, under AICRP on home science of DRWA (AICRP Annual Report, 2007 & 08) indicated that independent participation of women was more in homestead-based agriculture. Joint participation in crop production activity was 75% for major crops, 79% for horticulture and 51% in post harvest operations. In livestock work participation rate of women was 58% and in fisheries about 95%. Highest participation of women in agriculture was observed in Himachal Pradesh and lowest in Uttarakhand and in the latter joint participation was prevalent.

Rice is widely grown in southern, eastern and northeastern states. Wheat is mainly grown in Punjab and Haryana. Jowar and bajra are important food grains in dry land areas. Assam and west Bengal are famous for tea, whereas Karnataka, Tamil Nadu and Kerala are coffee and coconut producing states. In certain areas in India women play a key role as seed selectors and in seedling production. 'feminization' of agriculture in countries like China and Nicaragua has increased women's participation in seed management. In other cases, the traditional role of women in seed management has been marginalized by the introduction of modern cash crop varieties through extension programmes that target male farmers. In villages near Cuzco, Peru. Among the women, it is the older and poorer women farmers who know most about the native varieties, they hire their labour to the wealthier farmers in their community. They harvest and select the potatoes in the fields of the richer farmers' fields (Zimmerer, 1991).

Horticulture sector

Small scale production of vegetables, fruits, flowers, mushroom, vermin, seeds, seedlings in the village farms served as a source of employment. Women are found to play a role in raising and nursing the crop and selling them in the weekly market. Horticulture as an industry is management oriented requiring immediate post harvest processing due to its perishability and women are found to participate in inter-culture and harvesting. Gender issues in horticulture involves drudgery of inter-culture operations and harvesting.

Livestock sector

In India, livestock plays a multi-faceted role in providing draught power for the farm, manure for crops, and energy for cooking and food for household consumption as well as the market. In animal husbandry women have a multiple role. With regional difference, women take care of animal production. Their activities vary widely ranging from care of animals, grazing, fodder collection, cleaning of animal sheds to processing milk and livestock products. In livestock management, indoor jobs like milking, feeding, cleaning, etc. are done by women in 90% of families while management of male animals and fodder production are effected by men (Narayanan, 1997). Women accounted for 93% of total employment in dairy production (World Bank, 1991). Dung composting and carrying to the fields is undertaken by women. Women also prepare cooking fuel by mixing dung with twigs and crop residues. Though women play a significant role in livestock management and production, women's control over livestock and its products is negligible.

Forestry sector

The Indian population, particularly the rural, is highly dependent upon forests. Fuel wood contributes 84% of the total household energy consumption (undp, 1997). There are 66.5 million tribals in India and with few exceptions, the majority of them are forest dwellers (fao, 1997). Unfortunately, forests are deteriorating massively due to encroachment of agricultural production, mining, construction of dams, industrial and railway demand.

Gender roles in using forest resources vary widely depending upon the region as well as socioeconomic class and tribal affiliation. Rural Indian women's interface with the forests is

varying - gathering, wage employment, production in farm forestry and management of afforested areas in the community plantation (saxena, 1991). In india, women are the major gatherers and users of a much more diverse range of forest products than men. Depending upon the socio-cultural variations among different communities, primarily non-timber forest products (ntfp) are collected by women and timber by men (sarin, 1998). In several parts of india, large proportions of the population depend on ntfp as their main source of livelihood. Apart from fodder and fuel, women collect food, medicinal plants, building materials, material for household items and farm implements. Sal and tendu leaves are primarily collected by women. As women are the ones who have traditionally been collecting forest products, they possess the knowledge of properties and potential uses of these products.

Fishery sector

In India, nature and extent of women's participation in fishery varies across the states. Fish drying/curing, marketing and hand braiding and net-mending are the main areas of women's involvement in Tamil Nadu, Andhra Pradesh and Orissa. Women are also involved in shrimp processing in these states. In addition, in Andhra Pradesh, women are engaged in Mollusc and shell collection on a seasonal basis in a few places along the coastline. However, marine fish capture is a men's domain (fao, 1980). Among the mangroves of Bhitarkanika on the Odisha coast, both women and men fish in the fresh water estuarine areas. Men cast nets while women and children catch fish with hands. But fishing by boat in the flood tides is exclusively performed by men (Kanvinde, 1997). In contrast, women's participation in small-scale fisheries is very limited in west bengal. Even ancillary industry, which in the other Indian east coast states is a women's domain, is dominated by men, as a relatively low number of days in a year is spent on actual fishing. In the fishing villages, fish drying/curing is performed by both women or men who do not belong to the fishing community. In coastal aquaculture, women are involved in prawn and seed collection to a very limited extent (FAO, 1980).

Environmental sector

Deforestation has increased time and distance involved in grazing and collection of fuel and food. Distance to forests or other sources of fuel, type of farming system, etc. Have explained increases ranging from 45 minutes to 5 hours in women's work time (World Bank, 1991). Moreover, it has also threatened income generating opportunities for women by affecting livestock rearing and collection of NTFP. Reduced or non-availability of NTFP has shifted women from self-employment to wage employment. In areas where traditionally men also collected fuel wood, deforestation resulted in decrease in men's participation, as it was no longer possible to collect fuel wood in bulk (CPSW, 1992).

Women play a key role in both land use and management. They supply inputs from the forests as fertilizer to the soil as well as fodder for the cattle, which produce fertilizer for the soil. In India there are women-headed movements for forest protection such as Chipko and Appiko. Women have also been the source of knowledge relating to conserving and maintaining the quality of water. Depleting water resources have also impacted women severely in terms of longer walk and more work, as they are principal collectors of water. In the island ecosystem of Lakshadweep, off the coast of Kerala in the Arabian sea, women are more conversant with the resources around their homes and along the reef and shore, while men who go further afield to fish and collect coconuts are more knowledgeable about land, lagoon and sea (Hoon, 1997).

Rural production sector

Women in rural India generate income in various ways. Women are highly involved in processing of the NTFP, particularly in small-scale enterprises. This includes basket, broom, rope making, tasar silk cocoon rearing, lac cultivation, oil extraction, and bamboo works, etc.

Women constitute 51% of the total employed in forest-based small-scale enterprises. However, this does not mean that men do not have any role in these activities. Among the scheduled-caste weavers in Orissa, men collect grass for basket making while women cure it and make the basket (Kanvinde, 1997). In the Jeypore tract (Orissa), men and women are equally involved in collection, processing and marketing of forest products such as grass, bamboo and resin (Sharma, Tripathy and Gurung, 1997). But among some tribal in Arunachal Pradesh, all the tasks related to basket-making is considered men's work (Krishan, 1997).

Food security sector

In India, food security as a national objective was placed on the policy agenda much earlier than in other developed and developing countries. With the green revolution technology, India has achieved self-sufficiency in food grains. Women's key role in the production of major grains and minor millets illustrates their invaluable contribution to the food security. In addition, women play a crucial role in ensuring supply of food as food vendors and post-harvest processors of livestock and fishery products. As major buyers of family food and meal-makers, women ensure adequate food security. As primary providers of nutrition to the young children, women are the major decision-makers in ensuring nutrition to the next generation.

GENDER ISSUES IN AGRICULTURE AND STRATEGIES FOR MAINSTREAMING

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Women compose one-half of the world's population and perform two thirds of the world's work hours, yet are poorer in resources and poorly represented in positions of power. These inequalities are seen in all parts of the world. Without acknowledging gender inequalities, economic development and globalization cannot be understood. At present situation, gender bias is a universal phenomenon. The following are some of the issues the farm women face.

1. Lack of Extension Service: All agricultural services still have gender bias in favour of men. Women's work remains invisible to extension workers and policy makers so that the extension and research priorities- are directed to cash and export crops rather than food crops for domestic consumption. Hence much research and extension support is not available on technologies appropriate for women's multiple tasks. It is often assumed that men are the heads of households and they will pass on the extension information to women in the households. The fact is that male migration has lead to increased women headed households but enough technological support is not available to such women. Women are generally by passed in development efforts. For example, group discussion meetings are usually held in villages involving mostly men. Further, the venue and timing of such meetings are inconvenient for women and hence most needy are not able to attend, so is the case with training. While designing a training programme for women their dual rather triple burden of child rearing, farm work and household responsibilities is not given due consideration. Its venue, timing, duration, content and methodology are not very appropriate for women. Extension workers, almost exclusively male, aim their advise at men and at men's activities and crops. Extension personnel and researchers often overlook the constraints faced by women due to lack of resources, time, over burden, cultural reasons, inability to leave the children, which may prevent women from attending the demonstration and trainings. Lack of women extension workers and the gender relevant extension training material.

2. Gender issues in land ownership: Women's lack of ownership of land/ access to land continues to be major obstacle to increasing their contributions and benefits. Access to land affects their decision-making. Limitations of land access hamper the long term planning. Women headed households suffer by land constraints as their credibility to resources also get affected. Women who do not own the land they work on are less inclined to invest precious time and scarce resources in long term and improvements such as irrigation or drainage systems, terracing, tree planting and other activities that maintain soil fertility. Moreover, women who do not own land are usually denied access to agricultural support services such as credit for purchasing inputs, training in land and water development and water supplies for irrigation.

3. Over burden of work: Women suffer the brunt of triple responsibilities- agricultural production, reproduction, and nurturing. Research on women's time utilization revealed that on an average women work for 15-16 hours a day out of which 7-8 hours in peak and 5-6 hours in lean season are spent in farm work. Also women are involved in labour intensive, monotonous, repetitive and drudgery prone work, which are carried out manually, leading to mental and physical exhaustion and occupational health hazards.

4. Gender bias in development policies: Since women's work is invisible & their contribution not recognized as paid work they are treated as "consumers" rather than "producers". Hence development policies are lopsided not always favouring women.

5. Limited Access to production Resources: It is an accepted fact that farmwomen play crucial roles in production, storage and processing of food in most societies. Despite playing a pivotal role in food production women face several hardships, in case of breakdown of family due to death of husband, divorce or desertion; women are rendered landless because no assets are no women's name. Even if they have land they are constrained for money and other resources (inputs and technical knowhow) required for cultivation. Agricultural development programmes are usually planned by men and aimed at men. Mechanization, for example, alleviates the burden of tasks that are traditionally men's responsibility leaving women's burdens unrelieved or even increased.

6. Out Migration of Men: In many rural areas, migration of men and other changes in farming systems are placing even greater burdens on women, who are left behind to manage agriculture and entire household alone. The figures on male out migration from 74 developing countries indicate that the incidence is highest in Sub-Saharan Africa (22 per cent), and Caribbean (20 percent), and lowest in the Near East (16 percent) and Latin America (15 percent) (Buvinic, Youssef, 1978). In areas of high out migration males, the percentage of household heads which are de facto headed by women is much higher, reaching 63 percent in one Southern African country. Women heads of households are much more likely to work for wages in agriculture than other women due to the resource constraint. It has been observed that extension services, cooperatives and credit support are less available for women household heads than for men.

7. Socio-Economic Status: Women's share of work in agriculture is greatest among small farmers. When holdings are larger, women may withdraw from work in the field or supervise hired female labour. Women in landless households spend twice as much time working for wages in agriculture than do women in families with land.

Since rural women contribute 50 percent or more of the total family income in some cases, women's access to income they control can be vital for family welfare. This is so in many societies where men and women are expected to provide different kinds of income items for the family and where the family's daily food is largely the women's responsibility. In these cases men who earn cash from the sale of their crops tend either to reinvest it to increase productivity, or to use it for personal items and consumer goods. Improvements in their income need not therefore increase the amount or quality of food available to their families. Women farmers, on the other hand, earn comparatively little cash but are likely to spend a larger portion of it on family food. Therefore, improvement in family/child nutrition is more strongly associated with the increase in mothers' incomes than they are with the increase in aggregate income (Acharya et.al., 1981; Kumar, Shubh, K. 1977; and Quizon, et.al. 1978).

8. Shift towards Cash Crops: Introduction of cash crops changes the pattern of household labour allocation by diverting labour from subsistence crops. When women are expected to provide labour for cash crops, they have less time available for subsistence agriculture. The income from cash crop usually comes under the immediate control of men through the practice of directing inputs, credit and extension to heads of household.

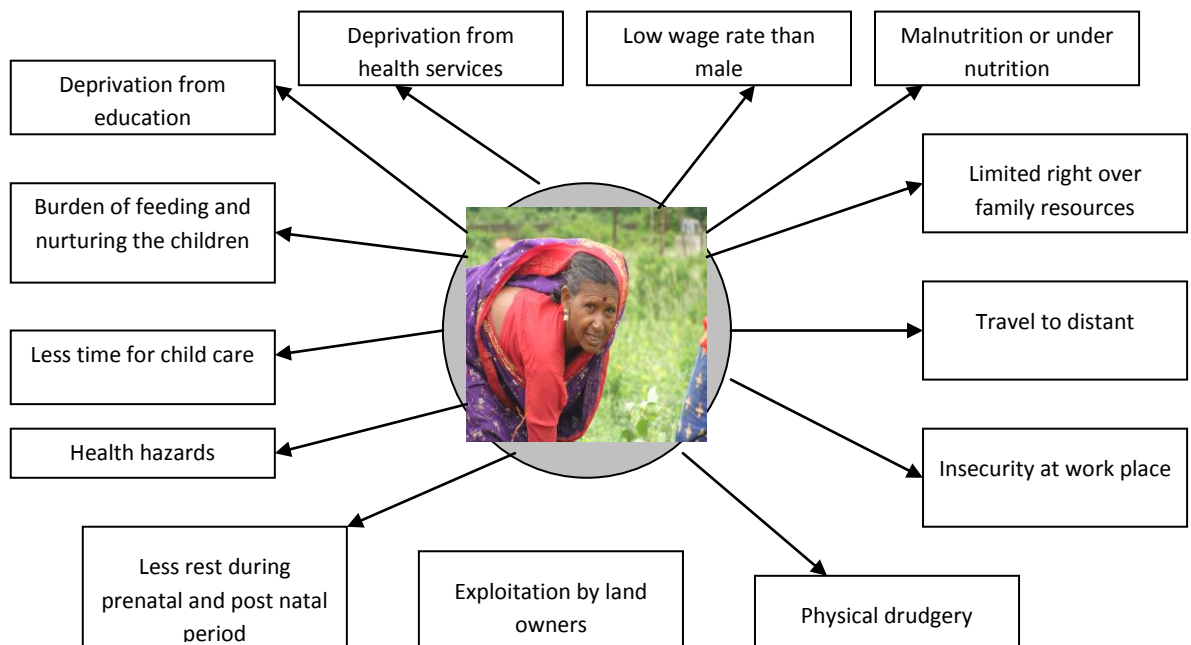
9. limited access to market: Women's efforts to expand the volume of their income generating activities are thwarted by their limited access to marketing facilities and services. Although women worldwide are active as traders, hawkers and street and market vendors, little has been done to assist them with improved transport and market facilities. Even in the countries

where women traditionally have an important role in the wholesale trading of goods, disadvantageous such as illiteracy or their limited legal capacity prevent them from being full-fledged members of formal service institutions (FAO, 1998).

10. Seasonal employment: Women bear the brunt of hardship arising out of seasonal unemployment/underemployment.

11. Lack of Education: Due to illiteracy women are forced to work as unskilled labourers. One study on agricultural productivity showed that four years of primary education increased farmers' productivity by up to 10 percent, and the benefits of education for women farmers can be even greater. A cost benefit analysis carried out by the World Bank indicated that that if women received the same amount of education as men, farm yields would rise by between 7 and 22 percent, while increasing women's primary schooling alone could increase agricultural output by 24 percent. It also enables women to earn higher wages, a recent International Labour Organization (ILO) report states that each additional year in school raised a women's earnings by about 15 percent, compared with 11 percent for a man.

12. Issues of women agricultural labourers:



STRATEGIES FOR MAINSTREAMING: Gender perspective is a theoretical and methodological approach. Gender mainstreaming is incorporating gender perspective into policies, plan, programmes and projects to ensure that these impact on women and men in an equitable way. Gender mainstreaming refers to the areas of gender concern in agriculture,

- Ergonomic data like: cost data, muscular strength data, and aerobic capacity data on farmwomen need to be gathered for different operations and equipments for designing women friendly farm equipment and to determine the suitability of the equipment to them by following participatory research approach.
- In order to adapt to the challenge posed by greater agro-ecological and socio-economic diversity, the link between extension and research need to be strengthened. This will also help to ensure that local knowledge and practices are incorporated into research design.
- At present, extension agents are predominantly male. Therefore, there is an urgent need to sensitize them about the needs and problems of women workers and other gender related issues in order to better identify women's and men's needs and

constraints, priorities and opportunities, to ensure that technological packages meet their requirements. Employment of more female extension personnel would facilitate in addressing the needs of women farmers more effectively.

- Training should be made available to women in the use of technologies. The farmwomen need to develop adequate skills that increase their work efficiency. Therefore field training/extension methodologies should be participatory and gender sensitive. Training materials methods and other infrastructure required for training must be adapted to the needs of women farmers and to their level of literacy.
- Promote an equitable relationship for both men and women in terms of sharing work and family responsibilities and eliminate factors, which subordinate women.
- Sensitizing public, private agencies, policy makers, planners on the gender perspective in environmental and developmental issues.
- Gender considerations should form an integral part of research. Efforts made towards gender mainstreaming, identification of gender issues and gender sensitization will help in addressing gender concerns and increasing productivity.
- Promoting, supporting and sustaining gender mainstreaming through participatory gender policy formulation; review of existing policy and planning gender sensitization documents and workshops, development of gender checklists and guidelines; development of incentive systems for staff; forming internal gender networks and committees to support for gender mainstreaming.
- Recognition: to women's capability and their potential to actively participate in agricultural management is to be recognized by the policy makers.
- Recognizing the gender based differences in roles and responsibilities and contribution of different socio-economic groups. Recognizing the value of men's and women's knowledge, skills and practices and their right to benefit from fruits of their labour.
- Planning at the local panchayat level should be gender-sensitive and should have gender/sex-segregated information to support for local development efforts
- Agricultural education institutions and training centers should develop regular curricula to integrate a gender approach in all technical areas of agricultural sector

Conclusion

Therefore, the planning team has to be gender balanced, well trained on gender issues and show a high degree of gender awareness. Agriculture is a dynamic sector and rapid changes occur such as those in environment and climate, technologies, development priorities, impact of changes in other sectors and social changes such as family structure, migration and international policies such as globalization and liberation. While creating new opportunities these changes also pose challenges not only to the government but also to the people and demand strategies and programmes to equip them to meet the challenges. Research and extension also need to tune the strategies to the changing situation.

TOOLS FOR GENDER ANALYSIS

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What is gender analysis: As men and women perform different roles their needs and preferences also vary. The gender analysis will help to identify and prioritize the needs & preferences and develop a more suitable, holistic, broad based and sustainable livelihood strategy. The basic gender concepts provide the base for gender analysis which focuses on understanding and documenting the differences in gender roles, activities, needs and opportunities in a given context. Gender analysis is a tool to better understand the realities of the women and men, whose lives are impacted by planned development. These include gender issues with respect to social relations; access and control over resources, services, institutions of decision-making and networks of power and authority; and needs, the distinct needs of men and women, both practical and strategic.

Gender analysis focus: It focuses on three sets of questions like: (i) who does what, when and where (ii) who has access to or control over resources for production and (iii) who benefits from each enterprise.

Why do gender analysis in agriculture: The data about the gender roles would provide the basic knowledge which will indicate the problems and priorities in gender mainstreaming. The agriculture research projects, extension and training programmes must be tailored in a way to provide equal opportunity to both men and women. The analysis of the roles also helps us to draw the gender issues in the field of agriculture and allied fields. The analysis may find ways and means in terms of facilitation, integration, collaboration, and capacity building as required for men and women to overcome the constraints in different livelihood projects.

Tools for gender analysis: Now, the researchers and policy makers have realized the importance of gender equality to understand the gender issues, their roles, responsibilities, needs, etc. Each tool is different, with some advantages and disadvantages, some account for other social characteristics and factors better, while others are more participatory. Following are some examples.

Gender Analysis Frameworks

1. Harvard Analytical Framework
2. DPU¹ Frameworks
 - Moser (Triple Roles) Framework
 - Levy (web of institutionalization) Framework
3. Gender Analysis Matrix (GAM)
4. Equality and Empowerment Framework (Longwe)
5. Capacities and Vulnerabilities Framework (CVA)
6. People Oriented Framework (POP)
7. Social Relations Framework (SRF)
8. SEAGA Approach

So, out of many available tools, **SEAGA** tool is very much appropriate for gender analysis in agriculture. Some of the **SEAGA** tools are as follows:

SEAGA tools: SEAGA is a technique for gender analysis which has been developed by FAO. It stands for Socio-Economic And Gender Analysis and helps in participatory identification of priorities of women and men to bridge the gap between them. It helps the participants to better understand the ground realities of the women and men, to identify the gender issues with respect to activities, access to and control over resources, decision making, needs and problems and also to formulate projects for gender mainstreaming in research and extension. On the other hand, it is for analysis of the current situation and planning for the future.

Broadly, all the tools are classified into three categories of gender analysis as:

- a) **Development context toolkit:** Here, the focus remains on current situation (What is) for learning economic, environment, social and institutional patterns that act as supports or constraints for development.
- b) **Livelihood analysis:** Here, the focus is on current situation (What is) for learning the flow of activities and resources for living.
- c) **Stakeholders' priorities:** Here, the focus is on future (What should be) for planning development activities based on women's and men's priorities.

A. Tools For Gender Analysis with Developmental Prospective

(i) Village Resources Map: Helps for learning about the environmental, economic and social resources in the community. This map focuses on available resources like roads, buildings, houses, water bodies, agriculture land, grazing land, forest area, shops, health clinics, educational institutions, religious institutions, bus stop, etc.

(ii) Trend lines: It is a simple graph depicting change over time. It gives a picture of what is getting better and what is getting worse over time. It helps for learning about environmental trends (deforestation, water supply); economic trends (jobs, wages, costs of living), population trends (birthrates, out-migration, in-migration), and other trends of importance to the community.

(iii) Venn diagram of Stakeholders: Stakeholder is anyone who has interest in and is going to be affected in any developmental work. It helps us to know who is going to be affected by the proposed development plan. Gives a picture about the insider and outsider stakeholders for each action proposed in the Preliminary Community Action Plan. The extent of interest of a stakeholder is determined by the size of their stake in it.

(iv) Daily Activity Clocks: It gives a total picture of activities performed by gender in a day and who does more and also who does less. Helps for learning about the division of labour and labour intensity by gender and socio-economic groups. It helps to identify the workloads and leisure time for the community people including men, women, rich, poor, young and old. The clear picture comes that who works for longest hours and who does little activities.

(v) Seasonal Calendars: Helps for learning about the seasonality of women's and men's labour and seasonality of food and water availability and income and expenditure patterns and other seasonal issues important for the community. The calendars can be used to know the changes in income over the time and the work opportunity for the people at different periods of time.

(vi) Problem Analysis Chart: It is used for bringing together the priority problems of all the different groups in the community, to explore local coping strategies and to identify opportunities to address the problems.

(vii) Best Bets Action Plans: Facilitates for finalization of action plans for development activities meeting priority needs as identified by women and men of each socio-economic group Based on their communities, priorities and needs these tools for gender analysis can be used by the researchers with little modification.

TECHNIQUES / TOOLS FOR FIELD:

DAILY ACTIVITY CLOCK

Time	Women	Men
0 to 1 am		
1 to 2 am		
2 to 3 am		
3 to 4 am		
4 to 5 am		
5 to 6 am		
6 to 7 am		
7 to 8 am		
8 to 9 am		
9 to 10 am		
10 to 11 am		
11 to 12 noon		
12 to 1 pm		
1 to 2 pm		
2 to 3 pm		
3 to 4 pm		
4 to 5 pm		
5 to 6 pm		
6 to 7 pm		
7 to 8 pm		
8 to 9 pm		
9 to 10 pm		
10 to 11 pm		
11 to 12 pm		

PAIR WISE RANKING MATRIX

Organize two separate focus groups: one of women one of men with a mix of socio-economic groups. Ask the participants to list 6 problems important to them. Write the list of 6 problems on both the vertical & horizontal axis of the paper. Also write the problem in separate six cards, show the participants a pair of problem cards asking them the more important .One with reasons of choice. Record their choice on the prepared matrix.

Example

Problems	Cost of Inputs	Insect pest	Technical knowledge	Climate	Irrigation	Land
Cost of Inputs		Cost of Inputs	Cost of inputs	Cost of inputs	Irrigation	Cost of inputs
Insect pest			Insect pest	Climate	Irrigation	Insect pest
Technical knowledge				Climate	Irrigation	Technical knowledge
Climate					Irrigation	Climate
Irrigation						Irrigation
Land						

Problems	Number of Times Preferred	Rank
Cost of inputs	4	2
Insect Pests	2	4
Technical knowledge	1	5
Climate	3	3
Irrigation	5	1
Land	0	6

SOURCE: FAO SEAGA FIELD TOOL KIT. GENDER ANALYSIS FOR SUSTAINABLE LIVELIHOODS

GENDER DISAGGREGATED DATA - IMPORTANCE IN PLANNING AND POLICY MAKING

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Looking at the importance of gender in development, gender disaggregated data (GDD) are a prerequisite for effective gender planning. By data we mean known facts that can be recorded and that have implicit meaning. Gender disaggregated data mostly refers to data on different variables pertaining to both men and women at lower level of aggregation particularly at household level. Importance of GDD equals to importance of disaggregated data plus importance of gender. Data on gender are usually collected or generated with respect to different variables.

Functions and importance of GDD

Gender disaggregated data simultaneously perform three functions. Firstly, it recognizes the roles of women and men and makes them explicit. Secondly, it describes value of their contribution or extent of involvement. Thirdly, it sensitizes people about the gender concerns in different spheres. Lack of sufficient and reliable gender disaggregated data is a serious handicap for properly assessing and appreciating women's contribution to farm-household systems.

Basically speaking GDD is quite useful to know the structure of socio-economic phenomena involving gender, to assess the consequences of socio-cultural and techno-economic changes on gender. Ultimately GDD provides important insights and base for effective gender planning both at micro and macro level

Coming to agriculture, there is scant availability of GDD. Some of the reasons for this situation are biasness in our System of National Accounts against women's work, lack of thrust on gender by data collection agencies complexity of gender involvement in the sector, multiplicity of women's activities, lack of requisite skill and capability of the persons involved in collection of data and so on. Notwithstanding these shortcomings, today we find a greater sense of urgency being expressed by policy makers, development experts and researchers alike for GDD. Some of the crucial areas that can be considered on priority for collection of GDD are;

- Assessment of the extent of gender involvement in different activities
- Level of technology adoption
- Quantifying gender contribution to households and different sectors
- Understanding and measuring gender inequity
- Intra-household resource allocation
- Decision making process within household

Gender disaggregated data are the facts and figures (information) collected, analyzed and summarized for presentation and interpretation for each gender. All the data (information) collected in a particular study are referred to as the *data set* for the study. *Elements* are the entities/individuals on which data are collected. A *variable* is a characteristic of interest for the elements. In gender disaggregated data 'gender' is a mandatory variable. Measurements collected on each variable for every element in a study provide the data. The set of measurements obtained for a particular element is called an *observation*. Hence, the number of observations is always the same as the number of elements. The number of measurements obtained for each element equals the number of variables. Variables in gender disaggregated

data can be either **qualitative** or **quantitative**. The data can be cross-sectional and time series data.

Qualitative data use labels or names to identify an attribute for each element. Scale of measurement of qualitative data is either nominal or ordinal. It may be nonnumeric or numeric.

Quantitative data use numeric values that indicate how much or how many. Scale of measurement of quantitative data is either interval or ratio. Quantitative data may be discrete or continuous. Quantitative data that measure how many are discrete. Quantitative data that measure how much are continuous because no separation occurs between the possible data values.

A qualitative variable is a variable with qualitative data and a quantitative variable is a variable with quantitative data. The type of variable (qualitative or quantitative) decides the statistical analysis appropriate for a particular variable. If the variable is qualitative, it is possible to summarize the data either by counting the frequencies in each qualitative category or by obtaining the proportion of the frequencies in each qualitative category; arithmetic operations are not feasible in such cases, whereas, arithmetic operations often provide meaningful results for a quantitative variable. Therefore, statistical analysis is limited for qualitative variables than that of the quantitative variables for which more number of alternatives are available in literature.

Further, two more type of gender disaggregated data is possible: *cross sectional data* and *time series data*. This classification is based on time dimension. It is possible to obtain data for a number of variables at same point of time or at different time periods. If the data is collected at same point of time, it is known as **cross sectional data**, whereas, if the data is collected over several time periods is known as **time series data**. For cross sectional data, it is expected that all the data on different variables from different individuals/ units are independent. For time series data, as observations are taken from same set of individuals/ units over different time periods, it is expected that some relationship is present in the data. Therefore, it is important to distinguish between cross sectional data and time series data as different statistical tools are being used for analysis of these types of data.

Talking of time series data on gender, it is a great constraint. Review of secondary sources amply demonstrates this limitation. Because gender has not been considered explicitly as a factor in development, data collection agencies have not paid due attention to GDD. In absence of time series data it is difficult to trace the changes that have taken place over a period of time in different domains.

On the other hand large number studies are available based on cross section data. Even though such studies have their inherent weakness, nevertheless they have contributed significantly to the understanding of women's role in agriculture. Cross section data are quite important for explaining and analyzing a situation and bringing out differences in respect of men and women.

How to collect information?

- Observation
- Consultation
- Negotiation
- Research/studies
 - Surveys
 - Rapid appraisals
 - Participatory research
 - Case studies
 - Action research
 - Experiment

Data can be collected either from secondary sources (collected by other organizations, government offices, private sector organizations etc.) or from statistical studies. Statistical studies are of two major types: experimental studies and observational studies. In experimental studies the variables of interest are first identified. Then one or more factors are controlled so that data can be obtained about how the factors influence the variables. In observational (non-experimental) studies no attempt is made to control or influence the variables of interest. A sample survey is a good example of observational studies.

A population is the set of all the elements of interest in a study.
A sample is a subset of the population.

Different methods are used for collection of gender disaggregated data. Sometimes the whole population is of our interest and therefore, the whole population is our data set. For example, we are interested to study the variability in height of girl and boy students of a particular class in a particular school. The number of students (girl and boy) are fixed and it is limited, therefore, one can measure the height for all the students in the class, then the data set of all the students is the entire population of interest. This is feasible preferably when the number of elements (entities/individuals) is less. Instead if we have number of elements too high and it is not possible to collect data on all the elements, in such situation we need to restrict ourselves for a dataset which consist of a sample from the population. In most of the situations, we are interested/ forced to use the sample data set to draw some conclusions about the population under study, therefore, extra care is necessary and compulsory while collecting the sample from the population. Method of drawing conclusion about the population based on information from the sample is known as *statistical inference*.

Numerical characteristics of a sample, such as the sample mean and sample standard deviation, are called **statistic**. Numerical characteristics of a population, such as the mean and standard deviation, are called **parameters**. A statistic such as the sample mean is considered an **estimator** or a population **parameter** - the population mean. A sample mean provides an estimate of a population mean, and a sample proportion provides an estimate of a population proportion. A primary purpose of statistical inference is to develop estimates and test hypotheses about population parameters using information contained in a sample.

It is important to realize that sample results provide only *estimates* of the values of the population characteristics. The reason is simply that the sample contains only a portion of the population. With proper sampling methods, the sample results will provide 'good' estimates of the population parameters. But how good can we expect the sample results to be? Fortunately, statistical procedures are available for answering this question. Often the cost of collecting information from a sample is substantially less than from a population, especially

when personal interviews must be conducted to collect the information. A list of well known sampling techniques are:

Non –probability Sampling

- ✓ Convenience sampling (purposive units)
- ✓ Judgement Sampling (own judgement)

Probability Sampling

- ✓ Simple Random Sampling
- ✓ Cluster Sampling
- ✓ Systematic Sampling
- ✓ Stratified Sampling
- ✓ Multi-Stage Sampling

Obtaining and using GDD – what are the difficulties?

- Observing gender interaction process and the outcome
- Identification of relevant variables to represent the phenomena or outcomes
- Formulating appropriate questions
- Measuring or assessing the variables
- Treating data suitably
- Interpreting
- Communicating and convincing

Gender disaggregated data are pre-requisite for understanding and incorporating gender perspectives in agricultural R & D. But what is required is quality data. For, quality of research is as good as the quality of data.

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EXTENSION ISSUES AND GENDER MAINSTREAMING

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INTRODUCTION

Farming is the most dynamic and rapidly growing sector in India. By improving farm women's access to agri-production resources, their potential could be unlocked, thereby enhancing their efficiency and productivity in farming. Farm women's capacity to adopt improved farm technologies mostly depends on their access to agri-production resources. There is a need for timely and adequate access to agri-production resources and services if agricultural production is to be increased. Several studies have shown that access to productive resources is vital for improving agricultural production (Adejo et al., 2013; Okonya and Kroschel, 2014) especially in rural areas where agriculture is the main source of livelihood. If women had been provided the same access to productive resources as men, they could boost yield by 20-30 percent; raising the overall agricultural output in developing countries by 2.5-4 percent. This gain in production could lessen the number of hungry people in the world by 12-17 percent (FAO, 2011). The contribution of women to food and nutrition security cannot be overlooked. Nutrition security of all human beings continues to be an important development agenda of the global community. This is clearly reflected in the Sustainable Development Goals (SDGs) of the United Nations Organization to be achieved by 2030. Out of 17 SDGs, gender equality has significant implications for creating a nutrition secured society- a target that is still elusive despite the collective efforts of countries and organizations across the globe.

The role of women in agricultural and rural development is intimately related to the goal of comprehensive socio-economic and political development. Women are central to agricultural and rural development everywhere. It is impossible to talk about the processes occurring within an economy without mentioning women. More than half the population of India lives in rural areas. Male urban immigration, both permanent and seasonal, is occurring at an ever-increasing rate. The proportion of rural women to men is growing. Almost two-thirds of rural women are from low-income households. Indeed, the poorest group of all are female-headed households. In some areas, this category exceeds 35-40 percent of all heads of household.

- ❖ 79 percent of women continue to be engaged in agriculture and allied activities as against only 63 percent of men
- ❖ 65 percent of economically active women are in agriculture
- ❖ Represent 43 percent of the agricultural labour force worldwide
- ❖ Devote 45 - 50 percent of their time to agricultural activities
- ❖ Access to only 5 percent of agricultural extension resources, globally
- ❖ Women spend 354 min/day and men spend 36 min/day on household activities
(Courtesy: Gender Reference Manual, 2016, ICAR-CIWA)

WOMEN, SEX AND GENDER

Gender applies to one sex or the other, and relates to the way each behaves in a given situation. While sex is biologically determined, and cannot normally be changed, gender is a result of socialization into a male or a female role which ascribes certain behaviour according to socio-cultural norms for one's sex. Agricultural policy makers have for decades turned a blind eye to women farmers because they think of farmers as men, thus denying women's claim to participation in farming and other activities which directly affect their lives. As a result, rural women have lagged visibly behind men by most social and economic criteria. If the bias in favour of male farmers had no negative impact on agricultural production, gender

issues would probably still remain unrecognized. Until an economic imperative, such as labour shortages, declining yields, or recognition of the need for the special knowledge which women have, demands a change, most agricultural policy makers see little need to address gender issues. Some startling revelations about women farmers, derived from alternative data sources are:

- Majority of women are farmers in India, although invisible because their work is uncounted.
- Women's work day is longer than men's, and most have reached the limits of endurance in stretching their day.
- Due to experience in indigenous farm implements, women harbour specialized knowledge, and represent a pool of highly-skilled labour in many areas of agricultural and rural development, which men lack.
- Women increasingly head rural households, and are the chief economic providers for their families. About 12 percent of rural households in India are now female headed with small holdings. About 48 percent of India's self-employed farmers are women (NSSO, 2010).
- Women's productivity is severely constrained by the fragmentation of their time, their dual and triple responsibilities, and their lack of access to essential inputs including knowledge.
- Small farm production is increasingly unattractive to males who too frequently abandon agriculture in favour of better remunerated work in other sectors, leaving women to eke out a living on often degraded land.
- There is no biological imperative for men to maintain a stranglehold on technology, whether biotechnology or machines.
- Agricultural research and extension largely ignore the major concerns of women farmers - nutritious food crops, hardy planting materials, household food security, home storage and small-scale processing, for example.

GENDER AND AGRICULTURE

The results of gender researches reveal that despite the important role women play in agricultural production, they remain disadvantaged in numerous respects. On one hand, women have limited access to a wide range of agricultural inputs including seeds and fertilizers, technological resources, equipments, land and so forth. In addition, women often lack the capacity needed to deploy these resources. For example, women may have access to land but lack the capacity needed to deploy the resources as mentioned above. For example, women may have access to land but lack of access to the fertilizer needed to farm the land productively or lack of knowledge of how to properly apply fertilizer. Illiteracy, neo-literacy and lack of scientific knowledge are the major impediments in their growth. Furthermore, many non-tangible assets, such as social capital, human capital, rights and decision-making power, are more difficult for women to access and exercise due to cultural barriers and male domination.

It has also been observed that most of the agricultural activities undertaken by women are manual and drudgery prone. Trends in farm mechanization also reveal that women are the first ones to be replaced whenever any farm activity gets mechanized. Most of the farm machines- tractors, combines, threshers, balers, translators, etc are not gender friendly. Even small tools and implements such as sickles, hoes, clod breakers, etc until recently were made according to male anthropometric measurements. Certain other gender friendly equipments now available include-paddy transplanter, rake, shovel, chaff cutter, fertilizer broadcaster, improved sickle, twin wheel hoe, groundnut decorticator, groundnut stripper, seed treatment drum, bhindi plucker, pedal operated cleaner-cum-grader, maize dehusker cum sheller etc.

GENDER AND RESEARCH

It is rare for any research not specifically on women in some way, to adopt a gender-sensitive approach, and this reflects research policy beginning with the research agenda. Agricultural research is biased in favour of "male" agriculture, in cash crops, agro-industry, export commodities and mechanization. The resulting biases in "findings" and, therefore, conclusions create a cycle of skewed data that provides misleading information and emphases, which in turn lead to policies which reflect and reinforce bigoted stereotypes. A classic and universal example is in the reflection of women's work, where gender-blind definitions, concepts, and data collection methods make accurate enumeration impossible. Labour statistics thus tell us that women are merely the idle dependents of men.

Both male and female researchers have been guilty of adopting official definitions and concepts of economic activity and resources, legal and conceptual frameworks and boundaries, and the gender-insensitive tools traditionally applied in analysis. Gender-sensitising usually brings as many surprises to women as to men. So universally is patriarchy institutionalized in most societies that it is difficult for many to see it as such. Research policy, for example, recognizes the "natural" rights of men to own land when studies of land tenure are made and data is collected from the "heads of household". Such will generally exclude data about women's de jure and de facto rights to inheritance, ownership and various forms of female tenure because a male head of house is often ignorant about land tenure not concerned with his own particular title.

The traditional tools of analysis also reflect patriarchy and male-biased concerns. Cost-benefit analysis excludes much of the subsistence production of women. Yet for many rural women, this represents the overwhelming majority of their output. Productivity, production and profit are measured by the market values of goods and services, so women's non-market production and reproductive work is ignored. Economic benefits are assumed to benefit everyone even when researchers know this is untrue.

The gender issues in agricultural research policy are very wide, and each policy would need careful examination to identify the issues and linkages. In general, it is true that the priorities are set by men and some women, who are unaware of gender issues, and that these are seldom considered unless the research is sociological. But even social research can be totally gender blind. The underlying causes of imbalance in food production which affect food security at national, regional or district and household levels, for example, influence food and nutrition security at the individual level, and are clearly gender-linked. They relate to increased demands on female labour; changing sex roles and responsibility for farm management, especially on small farms; gender differences in access to resources, including land, water, credit and technologies; time use and the division of labour; demographic changes relating to family size; dependency ratios; migration patterns and land use planning; the loss of indigenous knowledge and technology without appropriate substitutes; the competition for land, water and other resources, and between food and non-food crops; seasonal fluctuations and economic access to available food, pricing policies; items qualifying for subsidy - cash vs. food crops, male vs. female crops; credit and marketing policies; resettlement and transmigration programmes, environmental issues. The list is endless.

GENDER AND TECHNOLOGY

No agricultural technology is gender neutral. Whether a hand tool, a machine, a storage bin, or biotechnology, all carry different implications for men and women. Technology is developed by men and women for use by women and men, or specifically for one sex or the other. Most are developed with a male or a female user in mind. Such implements respond to the demand

created by those who want to use them and can afford to buy them. This results in a bias determined by the culturally-ascribed division of labour, and the limits placed on women's access to finance. Policy makers who have made such sex-discriminatory norms automatically will set the agenda for technology development accordingly, and planners will allocate resources based on the same set of norms. Thus we find farm women concentrated around the most menial, boring, low-paid, "low-tech" activities, while men clamber aboard tractors and combine harvesters. In a market-led economy, technology always addresses the needs of the monied clientele first. And it is men who have the money.

Governments that allow technology development and transfer to be totally market-driven abrogate their responsibilities to the poor, most of whom are women, when they fail to introduce checks and balances into such a system. As long as discrimination precludes women's participation as equal partners in development, governments must assume some responsibility for ensuring gender-related research and development as well as they must oversee the transfer of proven technologies to address rural women's work. The primary aim should be to help women achieve the following:

- reduce the time spent on tasks
- increase productivity and income
- reduce drudgery
- diversify their production
- improve and standardize product quality
- participate in their own technology development programme so that all the above occur naturally and without pain or unnecessary conflict

EXTENSION ISSUES

- ✓ Invisible contribution of women to farming
- ✓ Multiple role of Women
- ✓ Cultural Background
- ✓ Components of extension services
- ✓ Integration
- ✓ Location specific extension

EXTENSION MANAGEMENT

- Extension structure.
- Heterogeneity among women.
- Type of grass root worker.
- Relevant training programmes.
- Infrastructural facilities.
- Gender sensitized system.
- Curriculum on gender.

EXTENSION MODELS

- Conventional Extension Model/CD model (CEM)
- Mass media Model (MM)
- Target group/area Model (TM)
- Training and Visit Model (TVM)
- Front line Extension Model (FEM)
- Integrated Extension Model (IEM)
- Training and Extension for women Model (TEM)
- Broad based Extension Model/ ATMA (BEM)
- Public-Private Extension Model/Agri-business Model (PPEM)

AREAS OF EXTENSION REFORM

- Poor access of women to extension
- High cost of public extension service
- Non-availability of village level extension functionaries in the Departments of Horticulture, Veterinary & Animal Husbandry and Fisheries
- Non-availability of grass-root extension workers in their area of jurisdiction
- Inadequate provision for the regional extension needs
- Lack of proper coordination for extension work
- Inadequate emphasis on educating the clientele
- Improper training
- Lack of suitable mechanism for monitoring and evaluation of programmes

EXTENSION STRATEGIES FOR GENDER MAINSTREAMING AND IMPROVING LIVELIHOOD

Women farmers are less productive because they do not have enough access to technical information, credit facilities, extension services, inputs and markets. This less productiveness occurs despite their working longer hours than men. Hence, it is pertinent to build their capacity and ability to shoulder new challenges and increase their efficiency. Important extension strategies to improve women's access to productive resources are as follows;

- a) Gender balanced extension system:** Agricultural knowledge is transferred inefficiently from men to women and vice-versa. Hence, there is need to increase number of women extension workers thus leading to a gender balance in extension system. Thus, women farmers will have easy access to agricultural information and technologies.
- b) Mass media support:** The access of farm women to mass media is limited due to number of reasons. But it has potential to carry messages to a large number of farm women. However, we should examine how different media support and extension model can contribute to the dissemination of farm information and technologies to the women.
- c) Women friendly technologies:** The scope of agricultural knowledge & technologies for women farmers is increasing gradually. There are many technologies developed and standardized for agriculture by the National Agricultural Research System, but their potential for women and agriculture has not been adequately demonstrated. There is dire need to harness the potential of science and technology by demonstrating their benefits thus empowering women. Extending the women friendly tools and technological innovations will reduce the burden, and save time and energy of women.
- d) Credit and technical support:** Technical support should be provided to farm women which facilitates their multiple tasks. Credit facility should be given to women SHGs to increase income by way of developing micro-enterprises.
- e) Capacity building of women:** Different agricultural training programmes in different areas will largely improve the access to agricultural knowledge and information among farm women. Therefore, gender sensitive extension training materials should be developed.
- f) Reorientation of extension and research system:** Extension and research system should be reoriented and priorities should be given to women farmers.
- g) Women farmer groups:** There is need to organise the women farmers into groups in order to strengthen their way from subsistence cultivator to commercial cultivator. Extension workers can be trained to work more closely with women and organise them into groups.
- h) Women friendly IFS model:** Involvement of women in crop and livestock production varies according to the type of crop grown and livestock reared, and socio-economic conditions. There is need to develop scientifically designed, economically profitable and

socially acceptable integrated farming systems models especially for women farmers having integration of women friendly farm enterprises.

CONCLUSIONS AND RECOMMENDATIONS

It is clear that women participate in various activities in the rural areas. All development policies in mechanization, water systems, crop priorities, land terms systems, and so on, clearly have an effect on women. To address rural women's needs, a number of steps are required, the most important being to include women in all policies. It is, therefore, recommended that:

- Personnel at the various planning and decision-making levels should be trained and oriented in understanding gender issues.
- Serious initiatives should be undertaken to improve all statistics related to rural women. All data collected should be gender disaggregated. Methodologies to capture accurately women's activities and time-use in rural areas have already been tested by FAO. The guidelines developed for data collection should be made mandatory in gathering statistics.
- To understand the constraints placed on women, in-depth qualitative studies of women's role in the agricultural sector, their work share and level of participation by crop and season, must be undertaken.
- Increased efforts must be made to include women at policy-making and decision-making levels; women should be provided with opportunities to upgrade their professional abilities.
- It is imperative that a women's unit or cell be created in the primary planning and policy-making body of Governments - the Planning Ministry or Planning Commission. Such a unit should ensure that women are included in all sectoral policies and budget allocations.
- Efforts should be made to involve women in project identification and formulation.
- In major agriculture projects, the assessment of their anticipated impact on women should be made mandatory.
- Special attention should be directed towards developing technology to ease women's work load, training should be made available to women in the use of the technology that often displaces them; credit and other facilities should also be provided so that women are in a position to make decisions critical to their activities and to their very lives.
- Dissemination of existing gender policies and programmes should be made mandatory at each and every level of programmes organized for the benefit of the society.

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CHALLENGES OF SMALLHOLDER FARMWOMEN FOR AGRO-ECO DEVELOPMENT

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Abstract: *Poor prospects of agriculture create more difficulties for women through adverse effect on food availability, income, employment and health. Widespread gender inequality, growing dependence on input intensive agricultural production, and environmental degradation stemming from ineffective management of natural resources, industrialization curtails opportunities for women. Illiteracy, technological change, access to resources & services, globalization, food & nutritional insecurity, natural resource degradation, natural calamities, climate change, increase in male migration and female headed households poses greatest hurdle for empowerment of women in agriculture. Challenges in skill acquisition also affect socio-cultural and technological environment for farm women. The eco-village development concept is an effective strategy, which involves the implementation of appropriate, inexpensive renewable-energy technology (RET) at village-level and capacity-building activities for climate change adaptation and mitigation with identification of potential in environment, land and human capital, keeping in mind the socio cultural and agro eco conditions, with special reference to history of location specific agricultural trend.*

Agriculture and agrarian community have to face the challenges of declining resources, climate related changes and increasing market risks resulting in massive migration from agriculture. Thus given the intricate relationship between women and agriculture, challenges for agriculture are also challenges for women. Poor prospects of agriculture would create more difficulties for women through adverse effect on food availability, income, employment and health. Additionally, women also face many challenges from socio-economic fronts that need to be addressed. Rural Women live under conditions of persistent rural poverty and food insecurity, gaining subsistence from small land holdings. Furthermore, emerging trends in globalization of the world economy and male out-migration are transforming the traditional pattern of intra-household rights and obligations, increasing the number of women living in extreme poverty. New and emerging trends in the globalization of the world economy such as the liberalization of trade and markets for food and other agricultural products, privatization of resources and services, and the commercialization and modernization of agriculture may compound the situation of women. This has immense implications for child nutrition, health and, consequently, their wellbeing. Despite collective R&D efforts to improve their status, rural women are still highly overrepresented amongst the poorest percentile. Widespread gender inequality, growing dependence on input intensive agricultural production, and environmental degradation stemming from ineffective management of natural resources curtails opportunities for women.

Challenges for small holder rural women

Illiteracy

Women have higher illiteracy levels; they lack access to and control over land, capital and credit markets and, thereby, inputs; there has been widespread and systematic discrimination against women in agricultural delivery systems

Technological change

Women are constrained from adopting the technology because of certain inherent characteristics: high labour and capital requirements or they are not included in the training and technology

transfer activities. Technical change that does not consider the impacts of intra-household decision-making and the complex dynamics of resource allocation within the household can make women worse off. Given the differential impacts of mechanical technology, their indirect effect should be evaluated separately for different categories of women: landless, landed women, wage earners and food producers. In general the impact of technological innovation that did not consider women's concerns has had three broad effects:

- New technology shifted the distribution of resource control within households with possible negative welfare consequences on women.
- Technical innovation, especially the highly intensive green revolution technology, increased women's workload; while mechanized technology displaced poor landless women who were wage earners.
- By appropriating women's labour for production controlled by men, technical change reduced women's income and income earning opportunities, thereby lowering household nutritional status indirectly.

Access to resources & services

Globally, farmwomen suffer from poor access to productive resources including agri-inputs like seed, fertilizer and services such as extension and market services. Further, lack of access to and control over assets and resources contribute to the economic marginalization of women and forms an important link in the vicious circle of underdevelopment of farm women.

Globalization

A major concern today is the way and extent agriculture would be affected by globalization. In coming days, countries would witness major policy changes in agriculture and other sectors. With opening up of economies, farmers in India may be subject to greater pressure and more competition. Volatility in prices of agricultural produces in both national and international markets has already become a reality and could derail the farming decisions. In medium and long terms, it could trigger structural changes including changes in cropping patterns that may have adverse effects on production of different commodities and income level of farmers, including women workers.

Food & nutritional security

In India, the proportion of undernourished declined from about 27% during 1990- 92 to about 17.5% during 2010-12, which is still very high (FAO, WFP, IFPRI, 2012). Women and children are the worst affected due to nutritional insecurity. Under nutrition among women increases the reproductive and maternal health risks and lowers productivity. This leads to diminished ability of women to gain access to other assets later in life and undermines the attempts to eliminate gender inequalities. Importantly, high economic growth has not commensurately contributed to reduction of malnutrition. Therefore, improving the performance of agriculture sector through gender focused agricultural innovations at micro level would help to overcome the problem.

Natural resource degradation

Depletion and degradation of natural resources such as soil, water, forests and biodiversity are a major concern today; as these have wider implications on sustainable growth of agriculture and livelihood security. Environmental degradation is a major factor in perpetuating poverty, particularly among the rural poor in the bio-rich regions of the country. Since the poor women draw a large part of their livelihood from these natural resources, their loss results in declining economic activities, reduced income and more burden on women. Degradation of germplasm compromises the climate resilience of women led farming.

Natural calamities

Small holder rural women are always at a disadvantage due to increased work burden and destitution after natural calamities. Often the impact of calamities could be massive and there may be structural changes in the livelihood systems of affected people. Women, being the major workforce in agriculture and allied activities, come to bear the brunt of calamities. Women may find themselves burdened with greater responsibilities than before as 'post-disaster flight of men' occurs leaving them as the sole bread earners. Small scale studies suggest that there is pattern of gender differentiation at all levels of the disaster process: Exposure to risk, risk perception, preparedness, response, physical impact, psychological impact, recovery and reconstruction (WHO, 2002).

Climate change

Global studies on projected impacts of climate change on agriculture in South Asia suggest 10-50% loss in agriculture by 2100 (Agarwal, 2012). Due to increase of average temperature, flowering behaviour of plants may change thus affecting yield of crops. Similarly, the incidence of insect and pest may increase in some of the important crops. This may impact the sustainability of fisheries and aquaculture, and the livelihoods of the communities dependent on the sector. Similarly, rising temperature would adversely affect the prospect of livestock farming, particularly that of dairy in which women are largely involved. An immediate impact could be on farmers and women through loss of farm income, livelihood and employment. Farm women in particular may become more vulnerable as they are involved in more drudgery prone activities.

Increase in male migration and female headed households

Migration may have net benefit to the family but it leads to social loss in terms of loss of traditional social networks. Women face increasing work load, mental stress and socio-economic vulnerability. The process affects family stability and development of children at home. Thus, male migration compounds the social and economic problems already faced by women. Studies also indicate that in women headed families the incidence of poverty is increasing. One of the reasons for this is the inability of women of such families to access productive resources such as modern agricultural technological know-how and tap opportunities beyond the village boundaries.

Challenges in Skill acquisition

Non inclusion of women in skill acquisition process, inappropriateness of technological interventions for small rural farms, external influences from nonfarm sectors affecting cropping decisions of integrated climate resilient farming.

Challenges for Family Nutrition

Ethnic food vs. change in food preferences, Non abundance, wrong crop combinations, no knowledge on nutrition education.

Challenges for Integrated farming

Interrelations among components, sustainability, seed sovereignty, Knowledge management, discontinuation of community exchange system.

Challenges for Organic Farming

Loss of location specific climate resilient local varieties and non availability of their seed, Deskilling of women in animal husbandry, thereby scarcity of FYM, farm and household waste management, community involvement.

Socio-cultural and technological environment for farm women

Despite enormous progress in our country, rural women face strong socio-cultural barriers which curtail their freedom of making social and economic choices. This happens within the family and also in the community. The resource environment of farm women is also undergoing a change.

Access to resources such as land, water, fuel and fire wood is going to be more restricted in coming days. As a result of which women will be under more pressure to manage their gender roles.

Any knowledge and technology that can improve women's working and resource use efficiency; help in conservation of resources, and develop new products and enhance their quality and scope of application of existing technologies, can create new opportunities in agriculture. Thus, expanding opportunities in agriculture will create greater space for women. Scientific knowledge and technologies by themselves may not usher in new opportunities, but their adoption and application will. This calls for appropriate policy environment to catalyse the flow of need based knowledge and technologies as well as their application. Therefore, programmes on protecting, regenerating and managing our natural resources must incorporate gender perspective as women are important stakeholder in these. There is also a need to map the vulnerability of women in different ecosystems and suggest measures for their sustainable development.

The Eco-Village Development concept involves the implementation at village-level of appropriate, inexpensive renewable-energy technology (RET) and capacity-building activities for climate change adaptation and mitigation. It takes a collaborative approach by involving community members deeply in planning and implementation, while also giving them the tools to be resilient while facing climate change. EVD is an integrated approach of creating development-focused, low-carbon communities of practice in existing villages. The bundle of practices includes mitigation technologies like

1. Small, household-sized biogas plants,
2. improved smokeless stoves,
3. Solar-energy technology
4. Improved water mills to generate electric power
5. Stand-alone systems like Pico-/micro-hydro power for rural electrification
6. Solar-powered drying units
7. It also includes adaptation technologies such as organic farming, roof-water harvesting, water-lifting technologies like hydraulic ram pumps, and other solutions.

Besides, for partnering in eco village development, we have to move a step further beyond just providing technologies. For effective implementation, gender issues need to be considered objectively along with strategies for improving the effectiveness of technologies and its sustainability.

Strategies for agro eco development

- Identification of potential in environment, land and human capital, keeping in mind the socio cultural and agro eco conditions, with special reference to history of location specific agricultural trend.
- To overcome the problem of small land holding, community farming and homestead agriculture has to be emphasized. Sustainability parameters like integrated farming need to be stressed upon. The bio resource flow mechanism need to be understood for improving interdependence among farming components.
- Development of a sustainable seed system by the smallholder farmwomen for climate resilient and low input intensive local cultivars using standard methodology/ Model
- Germplasm conservation as a means for agro eco development. For conserving the germplasm, community gene committee may be constituted for identification of its value for cultivation and use (VCU) and conservation, thereby creating base for development of location specific climate resilient varieties. For this these cultivars must come in an informal, rather non conventional seed multiplication chain.

- Promoting entrepreneurs for manure production at community level and capacity building in improved manuring methods.
- Strengthening the value chain for organic products by certification of the organic produce and production methods with community involvement.
- Involvement of women in secondary agriculture. In addition to production, aggregation of grains and seeds by women groups, it's processing and value addition and marketing will be useful for their development, simultaneously reducing the food miles.
- Improved cropping decision with sufficient immunity to external influences. This will necessitate an effective methodology to inculcate decision making ability among women through leadership development, knowledge on agricultural scenario, market dynamism; consumer led not corporate led farming, and accessibility improvement.
- Enabling rural environment and infrastructure like provision of irrigation, agro input service, agro implements service centre, banks, roads, godowns, processing facility and institutional credit facility with skilled human resource and technology related instruments can improve the access and initiative of women to knowledge, inputs, services and market with health and educational services.
- Strengthening of rural institutions by formation of active SHGs, producer groups, federations, societies, commodity specific groups etc can play vital role in achieving agro eco development.
- Organizational support and multiagency linkage will be helpful in providing awareness to policies, programmes, legal issues, opportunities and restrictions. Motivation for venturing into activities/ enterprises related to agriculture is enhanced with organizational support. Demonstration of technology with packages, intermittent guidance and assistance in accessing benefits and services along with new technologies will keep these women apprised of the right farming, thereby increasing chance of quick adoption with sufficient spill over effects on the nearby area. However for making small holder farm women's farming remunerative and eco friendly, related aspects and stakeholders need careful consideration. Addressing gender issues, concerns and constraints concomitant research for designing practical solutions will help them to come out of poverty with confidence and remunerative output.

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RESEARCH ISSUES IN IMPROVING ACCESS OF FARM WOMEN TO AGRI-INPUTS

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A. INTRODUCTION

Ensuring quality participation of women in agriculture should be the mission for making sustainable development in food production sector. In the changing socio economic scenario the rural agriculture witnessed phenomenal changes owing to male migration for non-agricultural jobs. Risks involved in higher investment in commercial agriculture, climate change and market uncertainty forced more male members to be displaced from agriculture. This facilitated the rural women to emerge as the actual cultivators. In response to the present role of women, marketing and credit policies are also being modified favouring farm women. At present, though rural agriculture is mostly women dependant, researcher's, extension and developmental worker's understanding on different gender issues is still at infancy. Hence engendering agriculture necessitates elaborating gender related issues objectively to cater the needs of RE & D workers, so that their efforts can be properly directed towards empowering women in agriculture.

Access to agri-inputs like seeds, manures, fertilizers and information is the key for sustainable agriculture. Male farmers and farm women require agri-inputs of diverse types for agriculture as per their farming need. However their access and control over these agri-inputs are different and are guided by socio cultural, economic and capacity factors like education, mobility, awareness, gender relation in the household and participation in decision making. Therefore the subject of empowering women in agriculture cannot be dealt in isolation without studying them as a part of their complex social setup and analysing the gender relation with respect to their household, farm, society and environment. This will generate numerous researchable issues which can generate more insight for the researches to deal with gender and agriculture development.

B. IMPORTANT AGRI-INPUTS AND WOMEN ACCESS

(i) Issues on Women's Access to Quality Seed

Seed is the most important input for farming and is the most easily available one. However unavailability of seeds of the desirable variety of appropriate quality at the right time is the matter of concern for the farming community. Access to quality seed is actually a limiting factor for both men and women, which becomes more serious in case of rehabilitating agriculture damaged due to natural disasters like flood, drought cyclone etc. Seed security is the first step towards food security of farm family. However the seed related issues are experienced differently by men and women. These issues determine farm women's access to inputs like seeds.

Researchable Issues

- Identification of gender issues in seed production and management.
- Enhancing involvement of farm women in seed multiplication and distribution of local land races.
- Development of seed production models involving women for improving the quality of farm saved seed.
- Minimizing health hazards of women in seed production and management.
- Improving access of farmwomen to information regarding seed producing organizations.
- Linking of women with state seed certification system.

- Simplification of facts on seed quality and seed laws for improving awareness of farmwomen.
- Technological need of women on seed extraction, packing and storage.
- Standardization of technology for storage and value addition of seeds suitable to the farmwomen's condition.
- Generation of gender disaggregated data on seed need and seed status of women

(ii) Issues on Women's Access to Manure

Manure is the most important component of farming and has a greater role to play both in soil health and human health. Decades back women were the sole custodians of manure. But in the changing time number of live stocks decreased in every household except few where it is taken in a commercial scale. The main cause may be reduction in skill and interest of women belonging to farm household in milking, cleaning, feeding and caring of dairy cows, buffaloes, poultry, goats and sheep. Increased mechanization nearly eliminated rearing of bullocks. Lack of grazing land increased social issues in goat and sheep keeping. Socio cultural restrictions prevented higher class people from poultry farming. These had serious repercussions for the farming and reduced the availability of manure and increased the use of chemical fertilizers leading to deterioration of soil physical property.

For mitigating the detrimental effects of manure scarcity, lot of developments have taken place in manuring and composting technology. Lot of farm and household waste material can supplement the scarce animal excreta for preparation of high quality FYM. However use of these new technologies seem more imperative in the present context of massive male migration from agriculture sector and increased burden on farm income for maintaining household food security. So solely not depending on farm income, women can depend on live stocks for more income generation, thereby addressing the interdependence of different components of the farming system. So manure being an important agri-input can generate more researchable issues for empowering women in agriculture.

Researchable Issues

- Identification of gender issues in access to manures.
- Generation of gender disaggregated data on need of women for information and technology on manuring and composting.
- Enhancing involvement of farm women in preparation of FYM.
- Development of manure preparation models keeping in mind their resource base and need.
- Minimizing health hazards of women in preparing and managing FYM.
- Improving access of farmwomen to information and technology regarding manuring and composting.
- Linking of women with marketing.
- Simplification of facts on manure quality and standards for improving awareness of farmwomen.
- Standardization of technology for storage, packing and value addition of FYM suitable to the farmwomen's condition.
- Impact analysis of capacity building programmes for entrepreneurship development in FYM production.

(iii) Issues on Women's Access to Fertilizer and plant protection chemicals

Agriculture now stands at a crossroad with a mission to reduce use of fertilizers and plant protection chemicals in one hand and increasing production at the other. This situation is further aggravated when farmwomen are concerned. Farmwomen suffer both from health hazards arising from use of agrochemicals and also in accessing those. Reasonable use of agro

chemicals with sufficient safety measures is a goal still to achieve before all of us. High cost of these combined with overuse poses many problems like reduced profit, resistance resurgence, reduced production due to deteriorated soil health, ground water contamination etc. which needs attention from all sectors. Hence for intervening modern agricultural practices and involving more women in agriculture can generate more research issues, which needs to be addressed with a gender perspective.

Researchable Issues

- Identification of gender issues in plant protection and soil fertility maintenance.
- Skill improvement in handling agro chemicals.
- Evaluation of IPM models with gender perspective.
- Minimizing health hazards of women due to agro chemicals.
- Strategies for Improving access of farmwomen to information on proper use of agro chemicals
- Technological need of women on preparation of safe organic or plant based plant protection measures.
- Generation of gender disaggregated data on access, skill, and preparedness of farmwomen for agro chemicals

(iv) Issues on Women's Access to technology

Technologies are thought to provide solution to all types of agricultural problems and technologies should be appropriate to farmer's local conditions. However some of the agricultural technologies are not developed keeping in mind the farmer's problems, as a result full benefit of it is not realized. Considering women in agriculture, their requirements like ergonomics, farming patten, input use, information need, socio cultural set up, skill and knowledge are entirely different from men. So not necessarily a good technology for men will also be good for women. So in the process of conceptualizing, developing and testing of a technology, farm women's involvement is most essential and there is a need to address the researchable gender issues arising out of it.

Researchable Issues

- Identification of gender issues in technological need in agriculture.
- Studying the constraints of women in technology adoption.
- Participatory standardization of technology with women.
- Minimizing health hazards of women in technology adoption process.
- Strategies for Improving access of farmwomen to information regarding technology developing organizations.
- Standardization of technology for storage and value addition of seeds suitable to the farmwomen's condition.
- Generation of gender disaggregated data on technological need and constraints of women.

(v) Issues on Women's Access to farm implements

Now a days the cost of cultivation has increased manifold making the farming non remunerative. The high cost of labour, agro chemicals, seed, fertilizer contributed to the cost of production. Among all, labour cost is the highest. So mechanization at all possible level is needed for reducing human days at farming. This will also facilitate timely operation, which otherwise would have delayed due to non availability of timely labour. Both manual and power operated implements and machineries were developed by different organizations for all types of land forms cropping systems. However most of the implements and machineries developed are not tested and standardized for farmwomen of different status. So while thinking of

mechanization of agriculture where farm women are major stakeholders, extra care should be taken by addressing few gender issues like

Researchable Issues

- Enhancing involvement of farm women in mechanized farming.
- Minimizing hazards of women in mechanized farming.
- Improving access of farmwomen to farm implements and machineries.
- Development of farm implements and machineries involving women for improving the women friendliness.
- Improving access of farmwomen to information regarding farm implements and machineries.
- Linking of women with the agro industries.
- Technological need of women on farm implements and machineries.
- Standardization of farm implements and machineries suitable to the farmwomen's condition.
- Generation of gender disaggregated data on farm implements and machineries

C. RELEVANCE FOR WOMEN EMPOWERMENT

Identified researchable issues with respect to agri-inputs will be handy in designing gender sensitive programmes which can address the constraints of women and men appropriately, thereby improving performance and outcomes. It will improve the research worker's understanding of gender differences in vulnerability, which could result in timely planning and lessening the differential impacts on women. It can identify activities that contribute to women empowerment by providing opportunities to improve their confidence, self esteem, skill and self-organization.