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CLIMATE SMART AGRICULTURE WITH GENDER PERSPECTIVE

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ABSTRACT

In the present time climate change became a one of the biggest developmental as well as environmental challenge. Agriculture which is the backbone of Indian economy is one of the vital sources of greenhouse gas (GHGs) emissions. Out of many GHGs three main GHGs such as methane (CH_4), carbon di-oxide (CO_2) and Nitrous oxide (N_2O) used to emit from the different agricultural practices. In this context, well proved climate smart agricultural (CSA) practices can be played major role in reducing as well as in mitigation of GHGs from farming practices. CSA aims to sustainable improvement of agricultural productivity and enhance food security, increase farmers' resilience and adaptation to climate change. In other hand gender relations are very dynamic**;** they vary across the time and place. In India, Agriculture remains the mainstay of livelihood from the beginning and it has been developed over the different five year plans (FYPs) with gender perspective. In social context, use of climate smart agricultural practices are also depends on particular institutional and behavioural change; various studies reflect that gender-based context and constraints must be addressed to increase agricultural productivity, improve food and nutrition security, also to make farming climate resilient. There are some key issues such as gender has effect on adoption of climate smart agricultural practices, perception and attitude towards climate smart agricultural practices also varies based on gender etc. In this perspective gender responsive climate smart agricultural policy only can make the path suitable for further development of farming and to make it climate and gender resilient.

KEYWORDS: Agriculture, Climate Smart Agriculture, Gender, Greenhouse Gas

INTRODUCTION

Changing climate exacerbates existing pressures on natural resources such as land and water and it has emerged as a biggest developmental and environmental challenge in present time. According to one assessment, world's agricultural productivity will decline by 3–16 percent by the 2080s (FAO 2010) and what we say Agriculture is the backbone of our Indian economy, accounts for nearly 14 percent of greenhouse gas emissions, also contributes to climate change (IPCC 2007). Methane (CH_4), Nitrous oxide (N_2O) and carbon di-oxide (CO_2) are three main Green house gases usually emit from different activities of agriculture and allied. Various studies documented that the emissions from agriculture are primarily due to methane emission from enteric fermentation in ruminants and rice fields, nitrous oxide from application of nitrogen through manure and fertilizer to agricultural soil and manure management and burning of crop residue etc.

It has been proved that climate change is already having an impact on agriculture and food security as a result of increased prevalence of extreme events and increased unpredictability of weather patterns. In this context, the concept of climate –smart agriculture (CSA) has too much relevance and it is not a single specific agricultural technology or practice that can be universally applied, such as conservation or organic agriculture, although either may be key components of a CSA strategy in specific locations and countries. CSA is an approach to developing the technical, policy, and investment

conditions—the enabling environment—to support actions aimed at achieving sustainable agricultural development for food and nutrition security under a changing climate. CSA aims to sustainably improve agricultural productivity and enhance food security, increase farmers' resilience and adaptation to climate change, and reduce and/or remove greenhouse gas (GHG) emissions where possible (FAO 2013). The CSA approach involves site-specific assessments of the adaptation, mitigation and food security benefits of a range of agricultural production technologies and practices, and identifies those which are most suitable for a given agro-ecological and socio-economic situation.

SOME PRACTICES RELATED TO CLIMATE SMART AGRICULTURE

Table 1

These are some examples of climate smart agricultural practices refer from documented case studies in various regions such as East Africa, West Africa, and South Asia. A practice may be climate smart in one context but not in another, it depends on the context.

A. Improved land and water management practices:

- Agroforestry
- Terraces and bunds
- Water harvesting structures and systems
- Small scale irrigation practices
- Planting pits
- Crop residue mulching

B. Improved soil fertility and crop management practices:

- Composting
- Cover cropping
- Conservation agriculture
- Efficient use of fertilizer
- Improved, high yielding varieties use
- Use of stress tolerant varieties
- Use of zero tillage practices
- Alternate wetting and drying for rice management

C. Improved Livestock management practices

- Improved feed management
- Manure management
- Destocking
- Pasture management
- *Other practices*
- Improved post harvest practices
- Improving cooking stoves
- Fisheries and aquaculture

Some Other Adaptation and Risk Management Interventions in the Climate Smart Village

Table 2

Key Interventions	Examples
Water smart	direct seeded rice, raised bed, maize bed system, alternate wetting and drying
Weather smart	Weather forecast, index based insurance, seeds for needs, crop diversification, agro forestry
Nutrient smart	Nutrient expert decision support tool for maize and wheat, green seeker, legume integration
Carbon smart	No tillage or zero tillage, residue management
Energy smart	No tillage or zero tillage, residue management, DSR
Knowledge smart	ICTs, Gender empowerment, capacity development programme

CONCEPT OF GENDER

Gender defines individuals who are born into the biological categories of 'male' or 'female' become the social categories of men and women through the acquisition of culturally defined attributes of masculinity and femininity as well as the resources and responsibilities associated with these categories.

Gender relations are dynamic**;** they vary across time and place and between different groups of people depending on factors such as reforms in laws, economic policies, technological change and the role of social actors who seek to transform gender inequalities. It is important to understand that gender relations are complex and can be simultaneously relations of cooperation, connection and mutual support and of conflict, separation and competition (Ramaswamy *et al* 2000). While it is important that when we look at gender as a social construct we consider *both* men and women, gender analysis tends to focus on women, as they have been largely ignored by the mainstream and their access to resources, endowments and opportunities is still restricted compared to men.

Women as Farmers

Agriculture is the largest sector in the Indian economy accounting for 73 per cent of the total labour force in the country. In their varied roles as agricultural labourers, *de jure* land owners, *de facto* household heads, or as self-cultivators and 'managers' of their homesteads women are the invisible backbone of Indian agriculture. Nearly 79 per cent of the total female workforce is engaged in agriculture compared to only 69 per cent of the male workforce. However, the extent of female work participation varies across regions and even within the same village depending on caste and class hierarchies and norms of social mobility and seclusion. In contrast, it is generally acknowledged that women from poor peasant households spend between 12 to 16 hours a day on work (this is a vast generalization, but includes both visible and invisible tasks), though this is hardly accounted for in national statistics. According to, 2001 Census women's employment in the agricultural sector is growing with annual rate of 2.3 per cent as opposed to a 3.66 per cent growth rate in the organised sector.

There is some inter-regional variation in the incidence of female agricultural labour (depending on different parameters and definitions), and it is clear that the shift towards wage-work co-relates with the period of the Green Revolution and the advent of high yielding cash crops dependent on intensive applications of water, fertilizers and

pesticides. Another factor affecting female labour is the unequal wage rates - the ratio of the agricultural wage rate of female labour to that of male was around 70 per cent in the 1980s, but declined substantially to about 60 per cent in the 1990s (Athreya 2002). Variation from region to region even at national level withstanding the prove about gender discrimination in wage rates often intersects with other forms of exclusion or susceptibility such as caste, age, disability, status etc in the societal context.

AGRICULTURAL DEVELOPMENT FROM A GENDER PERSPECTIVE

Agriculture is the primary source of employment and income in post independent India from the beginning, inequalities in land distribution coincided with exploitative tenancy and labour relations, unequal access to credit or markets etc. High population growth rate, low levels of literacy and limited access to healthcare facilities, limited focus on gender perspective research etc. marked the rural sector in general.

Later in all the FYPs (Five year plans) gradually the focus on women farmers has been changed. During Sixth FYP focus was on women as active agents of development saw agriculture being promoted in the wider context of rural development and women's empowerment. Donor agencies such as DANIDA supported the mobilisation of women farmers through Women in Agriculture' programmes run with the support of state governments in Karnataka, Tamil Nadu and Orissa. (The Royal Netherlands Embassy launched a similar initiative in Gujarat during the Seventh FYP and in Andhra Pradesh and Madhya Pradesh in the Eighth FYP). Then mainly stress was on developing women specially self help group based, later during 8^{th} FYP central sector scheme of women in Agriculture was launched and in case of 9^{th} FYP, it seeks to motivate and mobilise farm women in to groups, helped to access different technological inputs, credit etc. besides providing training in managerial and entrepreneurial activities.

He National agricultural Policy (2001) supports different plan initiatives for women farmers and calls for the mainstreaming of gender concerns in agriculture'. Appropriate structural, functional and institutional measures was taken to empower women, build their capabilities and improve their access to inputs, technology and other farming resources (GoI,2001).

The integration of India with the global economy over the past decades or so has had a significant impact on the agriculture sector in general and on the alleviation of rural poverty and food security in particular. The basic assumption underlying the opening up of trade in agricultural products under the Uruguay Round of the GATT agreement in the early 1990s was that if domestic prices are brought in line with international prices, the terms of trade would move in favour of agriculture and the comparative advantage of India in selected crops (rice, wheat, cotton, tea) can boost up exports (Duvvury 1998). The Green Revolution (GR) is the name given to the set of innovations promoted by the State from the mid-1960s onwards, primarily in the wheat-growing north-western belt (punjab and Haryana) and in limited pockets of rice growing areas. It has two core components: the water, seed, fertiliser technology associated with the high yielding crop varieties and the use of mechanical technology such as tractors, combine harvesters, threshers, etc.

INTEGRATING GENDER INTO AGRICULTURE: A CLIMATE SMART PERSPECTIVE

In social context, use of climate smart agricultural practices are also depends on particular institutional and behavioural change, which efficiently effect policies, projects, programmes or other interventions. A number of documents reflect the consensus that gender-based constraints must be addressed to increase agricultural productivity, improve food

and nutrition security, reduce poverty, and build the resilience of rural populations.

Climate-smart agriculture (CSA) is an integrated approach which uses a combination of technologies and practices to meet food security goals while adapting to, and mitigating, climate change. In practice, it means having access to agricultural technologies such as crop varieties and livestock breeds that are more adapted to a changing climate, improved water management techniques to use water more efficiently, and practicing agro-forestry, crop rotation, mulching, intercropping, integrated crop-livestock management, and improved grazing to help conserve water and carbon in the soil. CSA also focuses on better weather forecasting, early warning systems, and insurance to help farmers reduce risk. Using available technologies and practices, CSA can increase agricultural productivity, adapt to climate change, reduce greenhouse emissions from agriculture, and strengthen resilience in smallholder farming systems and livelihoods. CSA cannot be promoted without exploring its implications on the dynamics between men and women farmers and their roles and responsibilities, not only to promote equality among them – which is only fair – but also because policies, projects and programs are more effective and efficient when gender considerations are taken into account. It would be short-sighted if we do not include women farmers, as we do men, in our assessment of CSA, given that women farmers are key to food security. According to the FAO, in developing countries, an average of 43 percent of the agricultural labor force is made up of women; in many countries this proportion is much higher.

According to the research conducted by Oxfam in Burkina Faso (Romero Gonzalez *et. al.* 2011), the degradation of natural resources as a result of climate change has a more drastic impact on women's livelihood, since they are more dependent on 'natural capital' to make a living. The research also highlighted that the plots cultivated by women are more vulnerable to climate change; predominantly because these plots are usually of poor quality and women do not have access to the appropriate tools to increase the yield, as those tools are reserved for family/men's plots. WOCAN (women organizing for change in Agriculture & Natural resource management), has given

Five Concrete Policy Recommendations to Make CSA More Gender-Smart

- Conduct gender analysis within all CSA projects, programs and policies to assess the implications and benefits of CSA technologies and practices on men and women.
- Identify women's groups and provide them with training and support for leadership, negotiation and communication skills, as well as business skills.
- Support women's participation in decision making related to climate change, particularly at the local level.
- Provide training to both men and women on CSA technologies and practices and awareness related to gender.
- Facilitate women's access to land and credit through transforming laws and local practices.

KEY ISSUES AND EMERGING TRENDS RELATING TO GENDER IN CSA

Gender and Adoption of CSA Practices

A study conducted by World Bank reports that in six African countries revealed that productivity per hectare is significantly low on women's farms than on men's farm. Reinforcing earlier findings on the gender gap in agriculture (FAO 2011), the researchers attribute the gender productivity gap to the challenges women experience in accessing, using, and supervising male farm labour; to the fact that women use less fertilizer, of lower quality, than men use; and to the fact

that land ownership is lower among women than men. This study has included the followings are lacking:

- Land rights
- Access to agricultural credit
- Access to productive farm inputs(including fertilizers, pesticides, and farming tools)
- Support from extension and other advisory services
- Access to markets and market information
- Access to weather and climate information

Climate smart agricultural options such as conservation agriculture have high potential to increase crop yields under certain conditions, but not in others with certain water or soil constraints. Conservation agriculture can also increase women's labor burden (Beuchelt and Badstue 2014). Investment in research to develop tested (by women and men) "CSA options by context" will help to fill the real—and wide—knowledge gap encountered by local and national policy makers seeking to develop adaptation and mitigation plans.

Gender Disaggregated Perception and Impacts of Climate Risk

Risk such as markets and prices, policies, institutions and production in addition to weather and climate risk is very common to all. Studies documented that women farmers are more exposed to climate risks compared to men for many of the same reason s that farm productivity is lower for females than males. As they have number of endowments as they have less access to information and services and are less mobile. Climate related risk can impede or supportive in adoption of a new practices or technology. Perception and types of climate risks faced by male and female farmers can also differ. A study of agricultural innovation and female farmers in Africa (Doss 2001) concludes that women lack incentives to adopt soil management measures on their plots because of the risk of losing access to the land and their investments.

Approaches based on information and communication technology (ICT), including radio, TV, cell phones, and social media, promise to enhance women's access to CSA and weather and climate information, reduce the perceived risks, and strengthen women's participation in commodity value chains. The World Bank study finds a high demand for extension information among women farmers; that level of demand presents an opportunity to train agricultural extension officers to use ICTs to reach an increased number of farmers through cost effectively.

CONCLUSIONS

A robust and diversified Monitoring and Evaluation system enables to track and assess gender-responsiveness and progress in CSA activities, identify challenges and bottlenecks, and evaluate the benefits, outcomes, and impacts of the intervention for men and women farmers throughout the project cycle. Gender responsive climate smart agriculture only can make the path of development suitable. Appropriate analytical framework and gender-related information based on comprehensive gender analysis is important means to derive an understanding of the challenges and requirements of both men and women farmers in relation to climate change and CSA and use that understanding to inform the suitable project design.

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