

# COMBATING CLIMATE CHANGE AND MAINSTREAMING GENDER IN AGRICULTURE IN AFRICA



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## EXECUTIVE SUMMARY

Social and economic fabric of the Global South has a lot in common. Dependence of rural communities on agriculture, livestock and related activities is one such phenomenon that is central to this commonality. A large number of farming communities in these regions rely on traditional means of agriculture and have no access to irrigation facilities. Dependence on rain definitely is a major issue that defines the livelihood situation in the context of rainfed agriculture, in dry and arid regions, and even a slightest variation in the rain patterns can potentially cause crises for the farming community. In the absence of modern irrigation facility, water resource management remains the only viable option to ensure optimum productivity in agriculture and availability of water for livestock.

Dry and arid regions in India and in some countries of Africa witness the problem of water scarcity of similar nature in varying degrees. Through the Indi-Africa Knowledge Bridge programme, Gravis and TechnoServe have been engaged in the transfer of the rainwater harvesting techniques from India and their suitable adaptation in arid regions of Kenya and Malawi. These interventions are being carried out with financial support of USAID under the aegis of Indi-Africa Knowledge Bridge programme. Construction of rainwater harvesting structures that suit the topographical characteristics and also cater to specific water related needs of the community is contributing towards creation of climate change resilient farming communities. Introduction of innovative farming practices that enable multi-cropping and enhanced yield is also an integral component of the strategy to achieve food and livelihood security for people.

Although not recognized financially, women's role in the traditional rainfed agriculture has been of a fulcrum, and in spite of this they remain at the periphery of any benefits arising out of the progress made and gains achieved in agriculture. The need to mainstream gender in agriculture not only arises from the fact that women need to be equal partners in accessing the dividends but also from the very nature of the agriculture related processes that are heavily dependent on women's work. Empowering women to be able to play a meaningful role in decision making also lead to positive outcomes for household level food security and nutrition.

Design and implementation of the interventions in the Kenya and Malawi are informed by the recognition of the current challenges that the agriculture related ecosystem is confronted with, of which climate change and climate volatility as well barriers to women's participation are part of. Involvement of women and women's groups in decision making relating to timings, locations and nature of structures being constructed, has enabled women not only voicing their concerns but also gleaning the benefits from the outcomes. Time saved from drudgery is being utilized to ensure regular schooling for young girls and effective and prominent role being played by women in community life. Increased water security has also resulted in tangible financial gains for women. Amplified milk produce that is attributable to the availability of ample quantity of water for cattle even during dry seasons, will potentially result in financial empowerment for about 5000 members of Masai Dairy Women's Cooperative.

This report is an attempt at capturing the gains made so far and also identify the components of future strategy that can help leverage the encouraging outcomes of interventions in favour of women and suggest built-in mechanisms for climate change resilience. Further extrapolation and augmentation of the outcomes and impact is expected both in terms of empowerment of women and climate change resilience, in the identified regions of Kenya and Malawi. The methodical adherence to gender mainstreaming approach has resulted in creation of an enabling environment for women to participate effectively on one hand, and have inclusive dialogue along with men on the other. The opportunity available for further scaling up the project interventions are also needed to be optimised in order to move towards comprehensive climate change resilience.





## INTRODUCTION

*The world faces a major agricultural challenge. We must, over the next few decades, and ways to deliver nutritious, safe, and affordable food to a growing global population that is projected to reach 9 billion people by 2050. Stress on our land and water, increase in soil degradation, salinization of irrigated areas, migration of youth to urban areas, climate changes, are among the many risks that are negatively affecting the agricultural production potential in many countries around the world. The need for a comprehensive solution to global food and nutritional security is urgent.*

*-(Kofi Annan) –*

Agriculture as a process has a determining role in ensuring food security for people and as a sector it has a key role in the economies of the countries. This holds particularly true for the Global South where majority of the population depends on agriculture, animal husbandry and related processes for their livelihood. Agriculture in Sub-Saharan Africa is source of 32% gross domestic product (GDP), although about 65% of Africa's labour force is employed in agriculture<sup>1</sup>. Owing to the fact that agriculture has not been transformed into a high productivity levels, a large part of rural population languishes in poverty. This is also one of the major aspects of widespread underdevelopment in Sub-Saharan Africa. The level of agricultural productivity, growth, and competitiveness are the products of physical environmental, technology, policy, climatic conditions and micro- and macroeconomic factors pertaining to each country.

Access to productive resources – land, water, seeds - and other agriculture inputs and their quality largely determine the outputs in terms of yield of food crops and cash crops. However, climatic conditions – rainfall, temperatures and moisture levels etc. – are the major attributes that involve any decision making by farmers pertaining to choice of crops and sowing schedules. While the significance of other factors such as market, cannot be trivialized, climate is the most critical but erratic phenomenon that also remains outside the realm of human control, its impact of agriculture and food security is not only immense but more often than not unpredictable too. In the present century, rapidly changing and vacillating climate has become a matter of grave concern for policy makers and farmers alike.

Another critical dimension of the rural agrarian economies is the role and status of women in agriculture and related processes. While the gender-based quantification of contributions has been a complex proposition; factors such as time spent by women, contributions made to food production, and involvement in various direct and allied processes, establishes their key role in agriculture. Non recognition both financially and socially, of this contribution, in most rural economies keeps women disempowered with little or no say in decision making and/or control over finances.

It is against this backdrop that the need to analyse and examine interventions supporting agriculture, rural livelihoods and food security, especially in the context of gender and climate change assumes importance.

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<sup>1</sup> Africa Agriculture Status Report, Youth in Agriculture in Sub Saharan Africa, Alliance for Green revolution in Africa, Nairobi, 2015, <http://www.fairmatchsupport.nl/wp-content/uploads/africa-agriculture-status-report-2015.pdf>





## 1. Addressing Climate Change and Mainstreaming Gender in Agriculture : About the Project

The Indi-Africa Innovations Bridge (I-AIB) programme aims to address agricultural challenges through transfer of innovations and value chains to the target countries of Africa, Malawi and Kenya, under the aegis of its feed the future (FTF) programme, that have been proven to successfully work in similar contexts in India. The programme aligns the food security needs of FTF countries with USAID-India's strategic goals of partnership and facilitation, leveraging India's intellectual and innovation resources to create global development impact.

Overall goal of the project being implemented by Gravis and TechnoServe in Africa is to achieve increased climate resilience and enhanced productivity in agriculture for farmers. For dairy farmers, this is meant to enable increased milk yields; and for farmers increase in production of beans, legumes, fruits or vegetables, i.e., increased yield in existing crops such as maize and also the ability to grow additional crops within an annual cycle. It is hoped that there will be a consequent improvement in both household income as well as nutritional outcomes. Transfer of the Indian water-conservation innovations and their widespread adoption at scale by rural communities in Malawi and Kenya was the key strategy used to achieve these goals.

The present project *demonstrated that Indian water-saving methodologies can have impact upon target value chains in arid and semi-arid regions of Malawi and Kenya*. Through a collaborative process of idea exchange, the pilots are being facilitated through African development agencies to reach out to the community. It is planned to measure the impact of these pilots on target value chains in terms of yield improvement and upon existing development programmes through feedback from participating agencies and evidence of adoption. Those methodologies deemed successful in the target geographies are to be promoted locally among a range of stakeholders to ensure their ultimate uptake.

The project implementation was initiated with the mapping of water related needs of the rural communities in Kenya and Malawi and identification of destination partnerships to carry out the implementation of pilots. Rather than importing a technique or methodology wholesale from India, the project in ensuring that the methodology has full buy-in from the implementing partner and that it has been tested against someone who is expert in the destination context.

Through the project visits by the implementing partners in Africa to the Innovation Knowledge Partner (GRAVIS) in India were facilitated for undergoing training on the new techniques and watch them being implemented from start to finish. The visits to expose them to the processes involved, surrounding ecosystem, community structures that drive success of these programmes, ongoing maintenance and other such aspects of the work. The project provides an opportunity to review the methodologies adopted in India and presents prospects for innovation in Indian context too.



**Following roles were identified for partners towards implementation of project:**

<b>Stakeholder</b>	<b>Role</b>
<i>African Innovation Adopters (Technoserve)</i>	<ul style="list-style-type: none"><li>• Adapt innovations to their own context</li><li>• Integrate new technologies and methods into existing programming</li><li>• Promote new methodologies through their networks</li></ul>
<i>Indian Knowledge Partners (GRAVIS)</i>	<ul style="list-style-type: none"><li>• Host African exchange visits</li><li>• Support adaptation of techniques to African context</li><li>• Technical Assistance during pilot phase</li></ul>
<i>Supportive ecosystem</i>	<ul style="list-style-type: none"><li>• support pilot initiatives</li><li>• adopt, scale-up or invest into successful models</li></ul>

The project was managed by TechnoServe, drawing upon the organisation's experience in managing innovation transfer programmes with transformative impact upon target population. TechnoServe is widely recognized for catalyzing the adoption of innovation in high-impact, market-led interventions that increase smallholder income and improve food security. With a strong presence, deep understanding of the agricultural development ecosystem, and extensive networks in India, Malawi and Liberia, TechnoServe is uniquely positioned to deliver this programme effectively.

Gravis, India has been providing technical expertise in the innovations in water conservation technology and natural resource management. Gravis is a community-based organization with over three decades of experience in supporting isolated desert communities in natural resource management. Based on Gandhian principles of self-reliance, Gravis works toward the rehabilitation of drought affected and marginalized rural communities, enabling village ownership and control over the natural environment. Gravis has benefited over 50,000 households through over 8,000 households and community-level rainwater-harvesting and other natural resource management initiatives. The Gravis team brings intensive understanding of the techniques and of the challenges involved in mobilizing communities to build such structures and are expert in the technological aspects of the rain water harvesting.

In Africa, the project is being implemented in close collaboration with and support of local partners such as CADECOM in Malawi and Massai Women Dairy Cooperative in Kenya.

## 2. About the Study

Implementation of any intervention needs to constantly be informed by the ecosystem consisted of social and environmental conditions. Interface with the stakeholders to analyse the social impact and climate change viability has to be a constant process. Considering the vital role that women play in agriculture, mainstreaming of gender has been at the core of the project implementation. An attempt at assessing the climate change adaptability as well as the impact of these efforts on the status of women provides an opportunity to re-emphasize and reinforce the inclusion of gender sensitive and climate responsive outlook within the overall scheme of the interventions. It also provides for an opportunity to draw the points of comparisons and contrasts in Indian and African contexts.

Present study 'Climate Change and Gender in Agriculture in African Countries' is aimed at looking at gender and climate related issues that impact agriculture and allied activities within the context of the project and the ecosystem that it gets implemented in. Specifically, the study was guided by the following key objectives:

1. Understand the influence of gender and climate change in agriculture in African countries of Kenya and Malawi in the context of the project
2. To identify factors that deter or act as constraints to gender mainstreaming and address climate change impact on agriculture in the identified areas
3. To identify the factors that can be leveraged and built upon to ensure empowerment and participation of women in the farming system and deal with the climate change
4. To analyse the efficacy and suitability of the project interventions from gender and climate change perspective
5. To identify if there are any challenges and limitations from gender and climate change point of view

The study largely relied on the experience gathered from the field and the discussions with the implementing partners and technical experts. Preliminary observations and findings based on the qualitative data collected during the visits to the project sites in Kenya and Malawi, where GRAVIS and TechnoServe were making interventions collaboration with local partners. This entailed understanding of different social, economic, infrastructural and policy related factors and processes that affect women, especially their access to resources, technology and market, that in turn play a vital role in empowering them financially and socially. Understanding of the gender and climate context in the Thar regions provided the opportunity to compare the situation as regards key challenges faced by women in agriculture in arid and semi zones.

Analysing the interventions from the point of view of their efficacy in terms of climate change resilience formed major part of the probe. While the study largely focused on planned interventions,

also delving into associated issues such as health, legal holding of lands, deforestation, and access to education etc., issues that shape a socio-economic, environmental and cultural context. The study also specifically sought to compare the situation in Thar Desert particularly Western Rajasthan in India and African countries (Kenya and Malawi) as regards the abovementioned issues.

Focus groups discussions, transect walks in habitations and interviews with the community members, members of community based institutions, farmers especially women, project partners and implementing staff were undertaken to gather the relevant information from ground.

In addition to the experiential data, research on gender mainstreaming in the agriculture especially in the context of dry land and rain-fed agriculture also provided background and understanding for further probe and exploration. Interviews with the academics in the subject also substantiated the understanding of issues and realities. State level policy and programmatic environment were also studied to identify linkages and make pragmatic and relevant recommendations. Insights from the similar study in three districts of Western Rajasthan were also referred to in order to draw comparisons in Indian and African situations. Existing status of work as part of the project in Dedza and Kajiado, tribal areas of Malawi and Kenya, respectively, provides for the ground level realities for analysis of interface between gender, climate and agriculture. An interim report was prepared half way through the project and the same was revised and updated in the light of the developments in the project implementation.

### **3. Climate change and gender related issues in agriculture in India and Africa**

Changes in climatic conditions have direct impact on crop growing conditions, affecting agricultural productivity and the suitability of crops in different agro-ecological zones, potentially creating socioeconomic and especially food security related challenges. High temperatures can lead to negative impacts such as added heat stress, especially in areas at low and mid-latitudes that are already at risk. Higher temperatures can increase evapotranspiration. Changes in precipitation can result in a reduction of water availability for rainfed crops, and alterations of discharge in river systems may lower reliability of irrigation water supply for irrigated crops and/or increase demand for irrigation.

Severe impact of the climate change phenomenon on agriculture and lives of poor people, especially farmers, is being recognized world over. Change in climate consequently affects the temperature levels, soil moisture, groundwater recharge, and frequency of flood or drought, and finally groundwater level in different areas. Higher temperatures and changing precipitation patterns will severely affect the production patterns of different crops. All these changes will increase the vulnerability of the landless and the poor. Several recent analysis have concluded that the higher

temperatures expected in coming years will disproportionately affect agriculture in the planet's lower latitudes where most of the world's poor live<sup>2</sup>. Any alteration in the climatic parameters such as temperature and humidity which govern crop growth has a direct impact on quantity of food produced. Indirect linkage pertains to catastrophic events such as floods and droughts that are projected to multiply as a consequence of climate change leading to huge crop loss and leaving large patches of arable land unfit for cultivation and this threatens food security. The net impact of food security will depend on the exposure to global environmental change and the capacity to cope with and recover from global environmental changes. On a global level, increasingly unpredictable weather patterns will lead to a fall in agricultural production and higher food prices, leading to food insecurity.

The World Food Programme notes that climate change threatens to significantly increase the number of people at the risk of hunger and malnutrition. It is estimated that the Sub Saharan Africa is the most affected region in terms of hunger and malnutrition and in this region, in many countries yield from rain fed agriculture could fall by 50% by 2020. According to Inter-governmental Panel on Climate Change (IPCC), climate change will lead to increase in the frequency and intensity of the natural disasters and extreme weather events such as droughts, floods, hurricanes, contamination of water supplies and agricultural land; changes in rainfall patterns, with an expected reduction in agricultural productivity in already fragile areas, sub Saharan Africa and declining water quality and availability in arid and semiarid regions. Without climate change and other policy interventions, the number of malnourished children in Africa is likely increase from 33 million to 42 million. Climate change could mean a further 10 million children suffer from malnutrition. IPCC has also predicted decreases food availability with a deficit of about 500 Kcal per person in 2050 and a further increase in the number of malnourished children<sup>3</sup>.

With only about 35% of cropland being reliably irrigated, India predominantly has rainfed agriculture system agriculture largely dependent on monsoons. Climate change induced droughts and floods are likely to increase production variability. Recent studies done at the Indian Agricultural Research Institute indicate the possibility of a loss of between 4 and 5 million tons in wheat production in the future with every rise of 1 degree Celsius temperature throughout the growing period. Rice production is slated to decrease by almost a ton/hectare if the temperature rises by 2 degree Celsius. In Rajasthan, a 2-degree rise in temperature was estimated to reduce production of pearl millet by 10 to 15 percent. Agriculture will be affected in the coastal regions of Gujarat and Maharashtra, as fertile areas are vulnerable to inundation and salinization<sup>4</sup>.

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<sup>2</sup> Rohitash Kumar and Harender Raj Gautam, Climate Change and its Impact on Agricultural Productivity in India, J Climatol Weather Forecasting, Volume 2, Issue 1, 2014

<sup>3</sup> Jane Kabubo-Mariara, Richard M. Mulwa, and Salvatore Di Falco, Adaptation to Climate Change and Variability and Its Implications for Household Nutrition in Kenya, Environment for Development, Discussion Paper Series June 2017

<sup>4</sup> Abhimanyu Shrivastava, Climate Change and Indian Agriculture, WORLD NEWS /22 AUG 2016, <https://intpolicydigest.org/2016/08/22/climate-change-and-indian-agriculture/>



The impact of climate change in African context, especially for the rain-fed agriculture has been a matter of serious concerns for the agriculturalists, policy makers and the community alike. Many studies have estimated that an increase of 4 degrees Celsius worldwide would spell increased droughts, more frequent flooding, and shifts in rainfall in Africa, jeopardising the region's food security and economic growth. It is predicted that by the 2080s, annual precipitation may decrease by up to 30% in southern Africa, while East Africa will see more rainfall, by the 2030s, when temperatures could be 1.5°C warmer, previously unprecedented heat extremes would cover one-fifth of the land areas in the southern hemisphere during the summer. Another direct impact of global warming would be the expansion of arid regions that would expand by 10%, particularly in Southern Africa and parts of West Africa. Increase in sea levels may also threaten agriculture activities (World Bank, 2013)<sup>5</sup>. It is expected that the farmers would see lower crop yields: Maize, wheat and sorghum are all sensitive to high temperatures. As heat extremes exceed these thresholds more often, these crop yields would diminish. With loss of arable land drought and aridity would contribute to African farmers' losing 40 to 80% of their croplands used to grow maize, millet and sorghum. Warming patterns mean that per capita cereal production would be 10% lower in 2050 than in 2000. If we also consider the effect of food trade, potential food availability per person actually drops by 15%.

There have been efforts at the global level and also at the levels of various countries to combat climate change, such National Action Plan on Climate Change in India that was unveiled in 2008. There are eight national missions that would form the core of the national plan. These include national missions for solar energy, enhanced energy efficiency, sustainable habitat, conserving water, sustaining the Himalayan eco-system, a “Green India”, sustainable agriculture and strategic knowledge platform for climate change. However, given the scale of the problem and its present and potential impact it is required to explore community based sustainable solutions, that are low cost and are based on simple technologies that can be easily grasped by rural population.

In addition to climate change, empowering women and closing gender gaps is equally important to ensure food security and moving toward an equitable society. Despite the fact that women comprise the largest percentage of the workforce in the agricultural sector, they do not have access and control over all land and productive resources. Owing to social and cultural barriers and lack of information and awareness they are unable to assume decision making roles at the level of family, community and beyond. Similar issues pertaining to women's role in agriculture also exist in India, with a large number of agricultural labourforce being deprived of any control over land or other resources. In both India and Africa, cultural and social barrier further insemminate oppressive practices leaving women at margins in terms of financial gains. Legal framework has so far not been able to challenge such social norms and enable empowerment of women.

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<sup>5</sup> World Bank, Turn Down Heat the Climate Extremes, Regional Impacts, and the Case for Resilience, June 2013, A Report for the World Bank by the Potsdam Institute for Climate Impact Research and Climate Analytics, <http://documents.worldbank.org/curated/en/975911468163736818/pdf/784240WP0Full00D0CONF0to0June19090L.pdf>



The need to address the issue of climate change and close gender gap in agriculture is very well established. Dealing with the climate change or coping with it is critical to human survival. Similarly, addressing the issue of gender within agriculture can lead to massive gains for social equity, economic parity and food security. While women's access to resources is a massive task that requires deliberate, planned and radical transformation in gender relations, dealing with climate change also requires coordinated efforts at the level of community as well as state.

#### **4. From the warm heart and the horn of Africa**

In India and in Africa, similar issues seem to exist as regards empowerment of women and the ability of the agriculture sector to deal with the changing climatic patterns. Following sections is based on the specific challenges that the tribal communities in Dedza and Kajiado region in Malawi and Kenya, respectively, are facing, in ensuring optimum productivity in agriculture and wellbeing for themselves.

**Kajiado county lies at the southern edge of the former Rift Valley province, about 80km from the Kenyan capital Nairobi. Kajiado sits on an area of 21,901 square kilometres and borders Nakuru, Nairobi and Kiambu to the north, Narok to the west, Makueni and Machakos to the east and Taita-Taveta and Tanzania to the south. The name Kajiado is derived from the Maasai word 'Orkejuado' which means 'the long river' in reference to a seasonal river that flows west of Kajiado town. Kajiado County is primarily semi-arid. The average annual temperature in the county is 18.9°C. The area receives about 500mm of rainfall annually, most of it falling in April. The month of August is usually extremely dry. Livestock rearing is a major economic activity in Kajiado county, providing a source of livelihood for many residents. Dairy farmers mainly sell their milk to neighboring hotels and households, with the surplus being sold in Nairobi. The county also provides a huge market for beef and goat meat, with over 2,000 animals being slaughtered**

**Dedza is a district in the Central Region of Malawi. It covers an area of 3,624 km.<sup>2</sup> to the south of the Malawi capital, Lilongwe, between Mozambique and Lake Malawi. The capital is Dedza. The western part of the district is on the Central African Plateau at an altitude of 1 200 to 1,600 m. Higher mountain ranges separate this from land alongside Lake Malawi in the Rift Valley at 500 m. The landscape is a mixture of grassland with granite outcrops, natural woodland and commercial pine plantations on the mountains and some bamboo forest nearer the lake. The wet season**

Farming and livestock management has been a way of life, much more than a livelihood option, for the tribal communities in Africa. Social relations, culture, rural economy and even politics, agriculture has been the fulcrum of each aspect of the life of tribal people. While role of women in agriculture has always been a subject matter of research, changing climatic patterns and their impact of agriculture, livelihoods and food security have recently come to be critical aspects of research in agrarian studies, food studies as well as other areas of scientific enquiry in similar other fields. In this section an attempt is being made to capture the context as regards gender and the climate change viz a viz agriculture and consequently food security in Africa, especially the sub Saharan Africa.

## **4.1 Gender gaps in agriculture**

Gender gaps in agriculture across the developing world in general and in African countries in particular have been documented in many studies.<sup>6</sup> While non-recognition of the women's labour in the fields as a financial contribution is one aspect of it, women are also confronted with a range of many other constraints in even continuing to make that contribution towards ensuring food security for their families. Access and ownership of productive resources, social relations and dynamics, their status within the family, community and their levels of education and political mobilization, are few clusters of intricate issues that prevent women from exploring their full potential as well as accessing the dividends from the technological innovations and financial gains.

### ***4.1.1 Limited land use rights and disadvantageous access to land***

Access to and ownership of productive resources has always been a contentious issue with women having limited land use rights and no control over production and management related decisions in agriculture. In the tribal communities in some regions even in matrilineal societies, women's rights to land and property are very limited and dependent on their marital status. Although women constitute 70% of agricultural labour, they own only 1%-2% of land in Africa, with most of them only accessing land through male relatives.<sup>7</sup> That means women are dependent on the male heads of the households to exercise control over that marginal amount of land as well. They usually have access to land use largely by virtue of their position either as wives, mothers or other relation in the communities they live. Because they do not have control over land, it's rare to find women being holders of title deeds. Interactions with the women in Kajiado of Kenya and in Dedza region in Malawi confirmed this trend. It was noted that being matrilineal society in fact has positioned women in a more disadvantageous situation with huge amount of responsibilities to carry and yet a negligible share in the ownership and control over resources. In Dedza region of Malawi, and Kajiado region of Kenya where the project interventions are being made it was noted that the low level of education also prevents women from exercising any control over resources.

### ***4.1.2 Constraints in accessing financial resources***

Insecurities pertaining to ownership of assets and resources discourage women to invest in improving the quality of the land or resort to technological innovations and practices that can potentially enhance the produce. This limits women control over production and management decision that consequently affects productivity, income and food and nutrition security. While there have been some efforts to improve the situation through law and policy interventions such as National Platform for Action in 1997 based on the Beijing Declaration and Platform for Action

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<sup>6</sup> For instance, World Bank, 2012; Bezabih, Holden and Mannberg, 2012; Peterman, Quisumbing, Behrman, & Nkonya, 2010, <http://www.worldagroforestry.org/downloads/Publications/PDFS/BC13222.pdf>.

<sup>7</sup> Transforming Gender Relations in Agriculture in Sub Saharan Africa, Cathy Farnworth, Melinda Fones Sundell, Akinyi Nzioki, Violet Shitvutse, and Marion Davis, Stockholm Environment Institute, 2013.



(BDPFA)<sup>8</sup> and the Gender equality Act 2014 of Malawi<sup>9</sup>, their impact gets neutralized by the existence and adherence to customary law, especially among tribal communities. Even if they are willing to invest, access to financial services is a distant reality for women that is also attributable to these factors, such semi-nomadic nature of the tribes, and low levels of literacy and education.

Land tenure relations define the way people own and/or rent land to others if they choose not to cultivate it themselves. In smallholder agriculture, land is undoubtedly the farmers' most important asset as it is often the only means of livelihood they possess. Ownership of land is therefore important in explaining differences in farmers' resource endowment, the types of production technologies they adopt and the types of investment undertaken. As mentioned, in Kenya and Malawi, one of the major constraints women face in agricultural production is their limited control of land resources and this also limits the ability of women to engage in agricultural investments because of their lack of collateral to secure investment resources including finance. It is also a disincentive to productive agricultural activity because of the ever-looming risk of loss of land in the event that the matrimonial relationship breaks<sup>10</sup>.

#### ***4.1.3 Feminisation of poverty: Dual Workload on Women***

As in the case of Africa and the rest of developing world, women play a key role in agriculture and associated processes in Kenya and Malawi too. Out of the total workforce in agriculture about 70% are women<sup>11</sup>. This proportion can be even more imbalanced during the dry spells when men in these communities have to move out of their habitats in search of water for their cattle. While women carry 'half of the sky' and half of the burden of poverty, there has been a disproportionate increase in the number of women who are impoverished and foods insecure. While this may be a global phenomenon, that the traditional role of men as “bread winners” has undergone changed over the years, in Africa and in many other drought prone areas where communities depend on agriculture and animal husbandry, most able-bodied men have been migrating from rural areas in search of employment to distant towns. In Kenya and in Malawi also this has thrust the women squarely into the land tilling and food production role, apart from her traditional role of child rearing and household errands etc. The change however does not get demonstrated in the area of resource entitlement and allocation. She still has no ownership of the land she tills, leave alone the food she produces and the livestock she keeps. It is interesting to note that although female headed households experience greater economic stress than male headed ones, given that the female headed households pay more attention to food security and food needs of children in particular.

<sup>8</sup> [http://www.unwomen.org/~media/headquarters/attachments/sections/csw/pfa\\_e\\_final\\_web.pdf](http://www.unwomen.org/~media/headquarters/attachments/sections/csw/pfa_e_final_web.pdf)

<sup>9</sup> <http://malawi.unfpa.org/news/2016-2020-gender-equality-act-implementation-plan-launched>

<sup>10</sup> Sophie WanjikuKhasacha, *Feminisation of Poverty and Women in Development in Africa*, <http://www.csus.edu/hhs/capcr/docs/2005%20conference%20proceedings-papers/sophia%20wanjiku.pdf>

<sup>11</sup> *The Role of Women in Agriculture*, SOFA Team ad Cheryl Doss, ESA Working Paper No. 11 -02, march 2011, FAO, <http://www.fao.org/docrep/013/am307e/am307e00.pdf>

In the Maasai tribes in Kenya, when males are away for cattle rearing, entire responsibility of maintaining the farms and pastures falls on women in the households. This added responsibility and tilling in the farms does not bring along landownership. In many cases this has in fact led to males abdicating from their responsibility of tilling the land or contributing in household level chores. This counteracts as dual workload for women.

#### ***4.1.4 Social norms, polygamy and social status of women***

Gender relations in tribal communities in Dedza and Kajiado are characterized by polygamy that is quite prevalent and socially acceptable. Most men have more than one and at times four wives and average family size is very big too. The implications of this social practice can be seen in fragmentation of family assets, basically land and livestock. In polygamous families, women naturally can command only diminutive control over resources and remain dependent on the male head of the household. Another downside of polygamy is its impact on the upbringing of girls, wherein they are most of the time groomed only to aspire to become the first and senior most wife. In the tribal communities of Dedza and Kajiado regions this phenomenon has come to impact the opportunity for educational and professional development of young girls and women. Consequently, young girls are lagging behind in education and this also presents constraint for empowerment of women.

#### ***4.1.5 Illiteracy and limited decision making power***

Very few women in the present generation in the identified tribal regions have completed primary schooling, most of them being illiterate. In Malawi, it was found that only a negligible number had reached grade seven and had left schooling after that. It is noteworthy that the education levels among males are also not any better and its only for the past few years that these tribal communities have realized the importance of education.

Prevalent gender relations and lack of control over resources are also directly linked to huge amount of deficit in the decision-making powers for women. It was observed that although women are consulted during the process of decision making pertaining to agriculture and finances, final decision traditionally rests with the males. Some instance of change in this trend can be seen in the communities that are getting increased exposure to educational facilities and opportunities for professional development. For instance, women in the Kapesi village in Dedza region have defied social norms and are sending their daughters to residential schools in far off towns for getting education beyond primary and middle levels. This change can be attributed to the mobilization among women and their increased ability to influence decisions pertaining to girls. Interestingly, such change is a product by proactive role played by women and men's role is limited to providing only a dormant consent for a rather 'insignificant' matter that means development and empowerment of women is not on the agenda in the male world.

## **Leadership development can play a vital role in women's empowerment!**

*In Mkwaira, one is welcomed by the contagious energy and vivacious smile and leaves a lasting impression. Her presence enlivens the entire milieu.*

*Women like Teresa Stephano are definitely exception to the subjugation meted out to women and her story makes us believe that empowerment of women can be realized by developing leadership skills and generating confidence among women. One feels welcomed in the village by the contagious effervescence that Teresa exudes. With the limited formal education that she has received till grade 6, she is a born learner, a leader and a fighter who takes life and its challenges in her stride. Snickering away all the hardships, her leadership gets further impetus by her innocuous confidence.*



*Teresa hails from Mkwaira village in Dedza, Malawi. All of 32 and a mother of 3 boys and a girl and has been vice president of the village committee that determines the needs of community. She is also activity involved with other such community based organisations that work for in the development of her village and are involved in community development initiatives.*

*An instinctive leader and an ardent mobiliser, she has garnered support from many development organisations for her village and has been a forerunner in conflict management at community as well as at household levels. She states, 'it's the disparities of various kinds – power, money and control – that leads to conflicts in all societies, there will be no conflicts in the village if these inequalities are minimized. Similarly, family life will also be more peaceful and enjoyable if women are recognized as equal partners by their husbands and given the respect that they deserve'.*

*Teresa is also an active member of many other committees in the village – family planning, resource management and so on. Her extemporaneous energies have been catalysts in mobilizing women in the village and making them aware about the importance of education. In a largely male dominated society, her presence as a leader, cannot go unregistered.*

*While she candidly mentions the need for material support such as special suits for women for harvesting, her impeccable sense of concern for community she belongs to doesn't distort her vision for an egalitarian society, where women have access to education and can exercise control over their lives. “ she says the work initiated through the current project has given wings to her imagination and she wants to explore this to the fullest, in the benefit of the community she belongs to.*

#### *4.1.6 Lack of Access to Health facilities*

Health is a largely overlooked area in impecunious tribal communities, and women's health is definitely the last priority. While tribal communities rely mainly on the traditional ways of healings, virtually nonexistent health care system further skews their access to health facilities. For instance in Kapesi village, as per the discussions held with the local community, primary health facility is located 15 kms away and a hospital with trained medical practitioner is not available until they transcend the periphery of at least 40 kms. Frail and expensive public transport system institutes further barriers to access to health facilities. One such stark example of such marginalization of women is relatively slower progress achieved in case of women when it came to prevention of HIV. With the focus of the development organisations on the endemic of HIV in the African continent, some progress has been achieved over the past few years in this area, however, lack of access to health facilities for women, lack of control over decisions pertaining to motherhood as well as the social stigma and structural barriers have thwarted such progress in case of women. Frail health conditions, coupled with a virtually nonexistent health system attenuate productivity of women on and off farms.

#### *4.1.7 Frail Political representation*

Traditionally, women have been kept at bay from any substantive decision making powers at family, community and village level also. With the decentralized government structures making representation of women mandatory in local self governance, there have been signs of improvement in this situation. But ensuring actual participation in decision making still remains a challenge given that the President's, who more often than not is a male, decision in the committees normally prevails, and a woman even if she is a treasurer or a Vice President, is not able to defy the power dynamics. This also implies that there is a need for building capacity and confidence of women who are in the roles of political representation.

As discussed, status of women in the tribal and rural communities in Kenya and Malawi is a reflection of the socio-cultural norms that reinforce exclusion of women from the development process. Illiteracy, lack of access to basic facilities such as health and education, constrains in accessing financial resources by themselves and prevalent system of polygamy, are the Achillesheel to be conquered to make any efforts towards empowerment of women reap results.

## **4.2 Climatic Challenge to Agricultural Productivity and Food Security**

Changes in the climatic patterns expose tribal communities that rely on farming and animal husbandry to a variety of vulnerabilities. Unpredictability and erratic nature of climate significantly escalate household vulnerability through dwindled production in the farms and loss of livestock and consequently their food security. Increasingly erratic rainfall patterns create difficulties for farmers who rely on seasonal cues to plant their crops. For example, many farmers use animal behaviour patterns to predict when the rains are coming, but climate change has significantly altered the

synchronization of these natural events. While it may not seem absolutely normal, each day of delay in rains and sowing/planting may potentially cause about 1.5% of decrease in the production.<sup>12</sup> Such adversities are much more pricklier for the 96% farmers in sub Saharan Africa having no access to irrigation facilities.

There are rural and tribal communities across the globe that have been dealing with the belligerent climatic conditions and even the changing climatic behaviours, but very often they are coerced by this phenomenon into adoption of unsustainable practices in their endeavour to cope with the rapid changes. Disposing of farms implements and consumption of seeds saved for sowing are examples of such practices that are detrimental to long-term food and livelihood security.

In addition to delayed rains the phenomenon of climate change has also manifested in either prolonged delays in rains causing droughts as well as floods in areas that are normally not flood prone. Both droughts and floods not only have ramifications for the household level food security and wellbeing but have also impacted the developing economies of global South. In Kenya for instance an estimated loss of 16% of GDP was recorded in the year 2000<sup>13</sup> that was directly attributable to drought in that year. Segregated data in this regard points that negative economic trends are even more prominent at local level among impoverished tribal communities. Studies have found that there are decreased income levels between 30 to 70% across all classes and increase in the number of families living in poverty. Prolonged droughts put higher pressure on natural resources, substantial increase in deforestation due to increased charcoal production, logging and forest grazing.<sup>14</sup>

Similarly, in addition to loss of livelihoods and livestock, contamination of water, communicable diseases, lack of fuel wood and rising price rise that affect peoples access to food, floods also cause migration among farming communities, indentation to the agricultural infrastructure, soil infertility and the devaluation of agricultural land. :

#### ***4.2.1 Changing rain patterns***

General climatic and geographical conditions have always been quite challenging for the tribal people in Dedza and Malawi. Scarcity of rains has affected not only farming but also cattle rearing forcing them to migrate from to distant places to explore water resources to keep their cattle alive. Over the past few years, changes in the rain patterns have come to jeopardize their livelihood condition even more ruthlessly.

Even a slight variation in the quantity and timings of rains has an extrapolated and proportionately higher impact on agriculture in the semi-arid zones of Dedza and Kajiado. Few crops such as maize

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<sup>13</sup> Hezron Mogaka, Samuel Gichere, Richard Davis and Rafik Hirji, Climate Variability and Water Resources Degradation in Kenya Improving Water Resources Development and Management, World bank Working paper no. 69, 2006

<sup>14</sup> *ibid.*



and legumes that are cultivated in these regions remain vulnerable to the variation in the amount of rains received in a given period. Further, unpredictability of rains have been disturbing farming related decisions of the community in these regions leading to consequences for their livelihood security both in long and short term.

*“Out of the total yield, we normally save six sacks per person annually and one extra for guest and visitors, for household consumption, and the rest is sold in market. We purchase other essentials with that amount. Over the past couple of years, the quantity of maize that we save is either in excess or falls short at the end of the year, which is due to the altered timings of sowing that are contingent on rains. Change in the rain patterns has distorted our planning for food and subsistence. The anxiety that is caused due to the erratic rains is unsettling, disillusioning youth from agriculture and animal husbandry”*

Alteration in the timings of rain spells have also impacted the lives of tribal communities engaged in farming and livestock management. Malawi for instance used to experience the rainy season from October onwards through three to four months, but past few years rains have been arriving as late as in December, negatively impacting the cropping patterns and frequencies. Lack of predictability adds to further to their woes. Of late, Malawi has also seen withering away of one rainy season altogether that is disastrous for agriculture, livestock and consequently food security.

It is widely understood that floods and droughts destroy and erode assets which are the very means for adaptation. When their frequency and intensity increases, farmers are left with no time to recover from previous impacts through either asset accumulation or acquiring the skills and knowledge necessary for adapting to future climate changes. Consequently, farmers are being subjected to continuous hunger and deeper cycles of poverty and vulnerability.

Changes in rainfall have resulted in changes in the growing seasons as well as in crops grown. For example, maize used to be grown in November, but it is now being grown in December. One farmer explained: “In the past we used to plant our crops after the first rains, but since we started experiencing frequent droughts and floods we are planting our crops much earlier. This is to allow the crops to meet the first rains with the hope that they will mature before the end of the rainy season and to prevent the crops from being washed away by the floods. Instead of planting a local variety of maize, we have opted for hybrid maize that takes a shorter period to mature.” Clearly, farmers are now uncertain of when to plant.

Farmers now opt for short-season hybrid maize varieties because the growing season is shorter. Rainfall patterns have hindered the growing of long-season local indigenous maize varieties. There has also been a noticeable increase in diseases such as malaria, cholera and dysentery associated with changes in rainfall patterns, and this has created health challenges that are particularly affecting women. One female farmer described the workload that comes with caring for the sick and

maintaining household hygiene. Daniel in Dedza region say, “we now travel longer distances to fetch water and spend most of the time in health centres instead of working in our fields.”

#### ***4.2.2 Extreme weather conditions and impact on health and individual productivity***

Changing rainfall patterns and higher temperatures have forced farmers to shorten the growing season and switch to more expensive hybrid crops. Frequent droughts and floods are eroding assets and knowledge, leaving people more vulnerable to disaster. Climate change has a direct link with health and women's ability to contribute to household level finances. In places like Dedza, an upsurge in malaria and cholera requires men and women to spend more time tending to the sick and less time working their fields.

#### ***4.2.3 Soil erosion and reduction in arable land***

Unseasonal and erratic rains have also caused flood like situations in Dedza region of Malawi. In hilly areas such floods have not only affected the mobility and caused outbreak of diseases, but have also had sever impact for soil both upstream and downstream. In the plains, soil fertility has reduced and in upstream regions there has been soil erosion in mammoth proportions. All of these have directly resulted in threats to livelihood of tribal communities that have inhabited in these regions and have been primarily dependent on the produce from the local farming.

#### ***4.2.4 Overall impact on food security and economy***

Climate change is also impact general food security situation at national level for many countries, and also has detrimental impact on agrarian economies, especially in rain fed agricultural systems. Countries' dependence on imports of food grains and staples is likely to increase because of the low and erratic production. It is predicted that Kenya will experience country-wide losses in the production of key staples. There seems to be large uncertainty about the magnitudes of the country-wide staple production losses. These vary between minus 10–55% depending on the scenario, crop model and GCM run. Trade in cereal production is likely to increase as a result of climate change to satisfy internal consumption. Under climate change, maize and total cereal imports would be much higher for two out of the three scenarios examined, by between 21 and 44%. Prices of key staples are likely to increase and this will dampen demand for food, as affordability of nearly all agricultural commodities—including basic staples and livestock products declines under climate change. As a result, per capita calorie availability in Kenya is likely to decline under all climate change scenarios. Lower food accessibility due to increased commodity prices is likely to translate in increases in malnutrition, especially of young children. Climate change is likely to increase the number of malnourished children in both 2025 and 2050. Without climate change, child malnutrition levels are projected to decline from 19% in 2000 to 15% by 2025 and 11% by 2050.

#### ***4.2.5 Maladaptation***

Maladaptation is an *outcome of efforts to adapt that either results in increased vulnerability to climate change or undermine the ability to adapt in the future*. Very often impoverished community



resort to quick solutions to deal with the challenges posed by the climate change. For instance, in Kajiado cutting down and burning trees to make charcoal for financial benefits is a common site. However, this practice is incrementally destroying the ecosystem of the region and making it more vulnerable to climate change impact.

The impact on climate change in economies with largely small and rainfed agriculture is acute and there is a need to combat this phenomenon using sustainable practices. While there are engineering technologies and chemical solutions available for enabling increased production, most reliable are those that are eco friendly, low cost, based on simple technologies and are easily replicable. Capturing the rainwater, managing it and making it available for agriculture as well as for other household purposes in the dry season, has been the focus of GRAVIS' interventions in Kenya and Malawi. Further benefits from rainwater harvesting have been leveraged through judicious use of the available land and water in the area.

## **5. Mainstreaming Gender and Building Climate Change Resilience:**

Creation of structures for water resource management is the key aspect of the project being implemented by TechnoServe and GRAVIS in collaboration with the local partners in Africa, and the same was executed ensuring mainstreaming of gender aspects into agriculture and allied activities. Selection of the type of structure was done based on the topographical features of each region taking cognizance of the environmental and climatic conditions. In Dedza region that has hilly terrains, seepage wells were constructed to accumulate and store water and check dams have been made to prevent soil erosion and floods. In Malawi's Kajiados region *khadins* were constructed to replenish water and soil for agriculture.

Intervention through community led traditional Indian innovations were facilitated through the technical supported rendered by GRAVIS. Management of rainwater resources was operationalized primarily through construction of various water conserving structures that help to check erosion, allow storage of water as well as its judicious use for cattle, for farming and for other household purposes. In Kajiado region of Kenya, the project is being implemented through Masai Dairy Cooperative established in 1997 that has a membership of about 4600 Masai women. The multi-stakeholder engagement is facilitated through a sustained process of regular interaction between community, community organization and external facilitator of the interventions along with the community leaders. In Malawi, CADECOM, an affiliate of the Caritas, is the main implementing partner. Understanding of and familiarity with the local context and existing rapport with the community has been a major and most critical contribution brought about by these collaborations.



## **5.1 Mainstreaming Gender**

While gender mainstreaming in agriculture was not identified as one of the objectives in the project, the need to operationalize a participatory plan and aspiration for sustainable outcome for the community require ensuring participation of women in any direct intervention with the community. There are a number of ways through control of women over the entire process was enabled while also ensuring that men do not feel alienated and generate adverse impressions.

### **5.1.1 Women Leading the Change**

In Kenya, leadership of women through promotion of cooperatives has been optimized by the project. Based on the bottom up approach for community development, Maasai Dairy Board is the key decision maker as regards the nature of interventions needed in the community. This dairy cooperative which was promoted by its patron Ms Helen Kaizeri who identified its need and relevance for the empowerment of women, is built on the philosophy of continuous struggle to bring in sustained change in society. The Maasai Dairy Women's Cooperative is a model having potential to inspire all women enterprises that has grown beyond only the financial gains. Such Cooperatives have played the role of a catalyst in the lives of many rural women in Kajiado. An all women thirteen members committee governs the cooperative and these members are elected from the members from various villages.

An educationist by training and profession Ms Helen Kaezeri started the Maasai Women Milk Cooperative as a movement to respond to the plight of powerless tribal women in Kajiado county. Not only they had no control over financial resources at household level and any say in decision making at community level, their self esteem was also low, as mentioned by Ms Kaezeri. Women never figured as a crucial group for any decision to be taken, nor were their opinions carried any value in the eyes of decision makers.

Collection and sale of milk produce was identified as the most viable vocation that women could get engaged with by optimizing the resources that they possessed. Since most Maasai households had large cattle herds, and the milk of cows was not being used, the cooperative mobilized and encouraged women to collect and sell milk. This is facilitated by seven collection centres having the facility to measure and grade the milk with a centralized cooling facility.

Coordinated and collective marketing of the milk is a crucial aspect of this enterprise that has lent not only viability but profitability as well to the endeavour. At present, with a membership of about 5000 women, the quantity of average milk collected per day has gone up to 30,000 liters. Considering the success of endeavour, market and local government alike have come forward to support this initiative. Milk collected at seven different centres is processed in a coolant that have been provided by the local government and sold to the milk federation that in turn reaches out to end consumers. The quantity and quality of the milk deposited is registered and members are paid accordingly at the end of each month.

### ***Creation of drought resistant communities through water conservation***

*Water resources are critical to not only agriculture but animal husbandry too. Semi arid Kajiado region is encountered with acute water shortage in dry seasons and poses a challenge to cattle rearing. Management of water resources plays a centripetal role in creation of drought resistant pastoralist communities.*

*Identifying this need TechnoServe Kenya facilitated the adaptation and transfer of knowledge on water resource management from GRAVIS to the tribal community in Kajiado. Structures such as Khadin innovated by GRAVIS in the Thar were remodeled to suit the local conditions in Kajiado to ensure availability of ample water for agriculture and for cattle even during the dry season. This has been of particular use to the women members of the milk cooperative given the direct implications of water availability for cattle on the milk produce*

The movement that was initiated with the aspiration of financial empowerment of women has over the years altered the gender dynamics in tribal region. With enhanced bargaining power in decision making at various levels, Masasai women in the tribal areas have witnessed an improved quality of life, be it access to educational facilities for their children, better food and nutrition for family or demand and provision for better health services for themselves.

Involvement in the dairy cooperation has instilled a lot of confidence among women. Interaction with the women from other villages located far off has inculcated a sense of solidarity among women having common issues to deal with. Exposure to the outer world beyond four walls has enabled exchange of ideas and augmented their worldview.

#### ***5.1.2 Qualitative change brought about in the lives of women***

Water fetching for the household and the cattle has traditionally been a woman's job. In Kajiado a woman spends atleast 4-5 hours in fetching water, and children are also involved in this. There was only one large pond in the periphery of about 20 kms from where several villages fetch water for drinking washing and for cattle. With the harvesting rainwater and creation of environment friendly structures such as small and large ponds only by manipulating the landscaping people in this tribal area can have sufficient water for their own use and for cattle too. Table above shows the reduction of the time spent by women and the distance covered by women in fetching water. This has had direct impact on the women's ability to participate in social activities and undertake creative and productive endeavours. Time saved in many villages, is invested in not only socializing and social interaction but has also instilled confidence among women. In Dedza, creation of such structures has improved the chances of young girls attending schools.

**Table 1 Changes recorded in first six months of dam operation<sup>15</sup>**

Average distance reduced to source of water for herders	4.85 km
Time saved in taking cattle for water for all households	47 days
Money saved in water expenses for cattle during dry season for all households	4.6 million KSH
Average increase in income per month for each woman from milk sale	36%
Reduced expense on animal drugs for each household	81%

**5.1.4 Collective bargaining : Asserting their right to health and education services from state**

Project interventions have also resulted in enhanced confidence among women to demand better services for themselves and the community. A vibrant group of women who are mobilized for a common goal are able to effectively bargain with the others stakeholders, local government and even the development agencies. Identifying the significance and the financial viability of the initiative, local government has provided the Collective with a processor/coolant that helps preserving the milk from the point of collection to the time it reaches the end consumer, imparting further viability of the to the business of a perishable good. Similarly, the groups of women who are mobilized together in the form of a collective have also been negotiating successfully with the county government for enabling access to health services for women in vicinity and also improving educational facilities.

**5.1.5 Leveraging community based institutions: ensuring sustained participation of women**

Women's participation in the decision making at community level was also enabled and encouraged through their membership in the village development committees (VDCs). These VDCs, in consultation with all the villagers developed rules and sub rules to implement the projects as that included identification of the adequate site for the structures, ensuring involvement of all the villagers in the process, ensuring the quality of work, monitor the work to complete the same within the given time frame, discuss and resolve the problems at village level. These VDCs had atleast 50% of women members and this made sure that concerns of women while deciding upon the location and distribution of benefits arising out of these interventions are taken on board. Mobilising and building the capacity of these VDCs has also ensured sustaining the impact of the project interventions beyond project period. The process also involves helping women take informed decisions about the creation of water resources and water, land and soil conservation structures in and around villages and farms. Women's effective involvement in community level decision-making has also resulted in enhancement in their capacity to take decision making.

**5.1.5 Facilitation of financial services to women through cooperatives**

The cooperative in collaboration with other partners has been making steady attempts at provision of financial services and other supports for women and the rest of the community. The cooperative has negotiated with the prospective aid agencies on behalf of tribal women for procuring loans for the enterprises that women are interested in and this has also motivated women to venture into various enterprises, although the outcome of these efforts is yet to be seen.

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<sup>15</sup> TechnoServe's corporate presentation on the project based on the analysis conducted half way through the project.

There are other initiatives being enabled by the Cooperative in collaboration of the county government and/or aid agencies that contribute towards improvement in the quality of life for the tribal communities in Kajiado. Provision of solar lanterns is one such initiative that has brought about a marked change in the community life. Remote tribal areas without electricity are now lit up in evenings and are witnessing increased social interactions and economic activities. There is enhancement in social and economic status of women that is enabled through availability of various amenities.

All these efforts have directly resulted in better standard of living, food security and improved nutrition for the families in this region. These interventions have demonstrated the direct linkages between empowerment of women and social and economic well being of the community and society as a whole.

## **5.2 Adaptation to difficult climatic conditions and climate change**

As mentioned earlier, the tribal communities of Dedza and Kajiado regions in Malawi and Kenya, respectively are constantly confronted with the water scarcity either because of less rainfall or absence of management of water resources. Recent changes in the climatic patterns have further aggravated this situation. There are a number of ways by which water resource management is being enabled through construction of water conserving structures.

### **5.2.1 Water conservation and management for dry seasons**

Water scarcity challenges *Picture 1* Seepage well dug by the community are being addressed through enabling efficient management of water resources. Seepage wells are being constructed in identified villages in Dedza to accumulate water for agriculture, small ruminants that people have and for other household purposes. These seepage basins are also sources of safe ground water and get recharged during raining seasons. These wells are typically 12 feet deep, considering the water table, and have a diameter of 12 feet as well. Six groups of different families take turns to work eight hours every day to dig the well in about three weeks.



*Seepage well dug by the community*



*Seepage well after the masonry work—ready to store rain water*

Going by the international norm of 40 liters of water per capita per day (LPCPD), the project in a limited period enable availability of water for people for approximately 6360 days. Even when divided among the community, this water becomes the lifeline in the dry season.

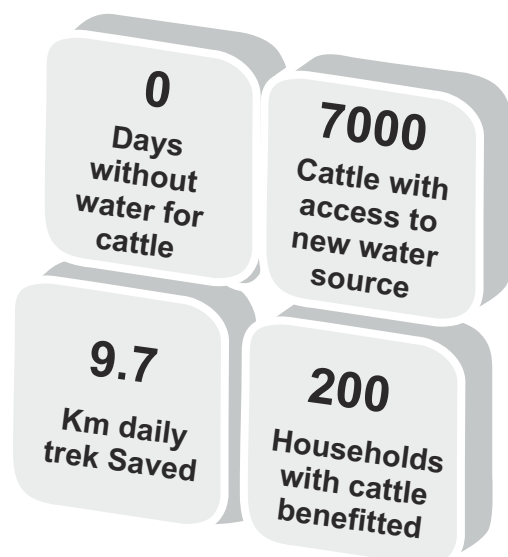
**Table 2 Quantity of water made available through rainwater harvesting structures**

RWH Structures	Kenya	Malawi	Water holding capacity (range)	Water holding capacity (average)	Total
Seepage Wells		8	11555-22944	19000	151629
Community Nadi	6		1000-18000	12000	58000
Small Nadi	7		4000-6000	5500	38000
Khadins/Modified Khadin	3		1800 - 3000	2300	6800
<b>Total</b>	<b>24</b>			<b>254429</b>	

After the masonry work, the well is quadrated with a low wall and is covered properly to prevent pollution by insects, dirt and other pollutants. With the use of electric pumps, water is made directly available in the fields. These wells are being constructed in the topographical regions that can be classified as plateau since these regions have reasonably high water table as well as the capacity to create structures that can withhold water from on season to another. These water sources also get recharged during season to make water available during dry spells. In Kajiado region, *Khadins* are being used to accumulate rainwater which is being used for livestock and agriculture even in dry season.

### 5.2.2 Water for cattle

recognizing the need to cater to the pastoralist community, especially in Kenya, nadis were built at the community land with a view to making water available for cattle at shorter distance from their place of stay and in dry season as well. Nadis filled with one rain withhold the water for months and have been quenching the thirst of cattle.



### 5.2.2 Addressing soil erosion and floods for ensuring food security

In relatively hilly terrains of Dedza region, where rains have been causing soil erosion upstream and flood like situation downstream, creation of check dams has been resorted to. These check dams neutralize the force of water preventing the erosion of the soil and also floods in plains. Like in the case of other structures local resources are being tapped to create these structures and women's groups takes a lead in arriving at decisions regarding locations and timings for construction works to be initiated.

Two upstream and 3 downstream checkdams were constructed in Malawi. These checkdams and Khadins have not only helped in retaining and in fact enhancing the fertility of land by retaining water in the soil for longer period, and consequently enabling farming activities for prolonged period as well as availability of fodder for livestock in the hilly area. Innovative practices such as multi-cropping in single field, have also contributed in availability of diverse crops in one go while also conserving the fertility of the soil, subsequently improved agricultural produce and decreased vulnerability in the families.

### 5.2.3 Associated agro-horti processes for food security and nutrition

Soil and water erosion are directly associated with the extreme climatic conditions in many areas. Flash floods and scarce vegetation both can cause erosion of soil. Similarly, retention of moisture content in soil is a challenge especially in the hilly terrains. While the structures were used to the capture and store water, introduction of silvi pastures and agro-horticulture units have also contributed towards combatting the impact of climate change on the arable land. With the creation of silvi pastures, availability of fodder has improved. Agri-horti units have been created in the surrounding areas of the seepage wells, khadins and other such structures with technical support of GRAVIS.

**Table 3 Technical support provided for agro-horti units and sampling plantation units**

	AHU		SPU
Mango	200	Bamboo	38
Lemon/Orange	80	Banana	13
Guava	40	Napier Grass	127
Tangerine	80	Sugar Cane	50
<b>Total</b>	<b>400</b>		<b>228</b>

These agri-horti units are enabling the production of vegetables and fruits in the land moistened because of the retention of water, ensuring food security for people. Availability of diverse food is an integral component of food security. By leveraging the exiting resources, the project is also building community resilience to fight climate change. Keeping climate change in view GRAVIS has introduced several techniques an innovative agricultural practices for enhanced productivity suitable for the semi-arid zones. The guidelines prepared for creation and monitoring of these agri-units take into consideration the need to involve women in decision making pertaining to distribution of benefits.

### ***5.2.3 Community at the centre of action***

After the initial interaction with the community regarding the need and benefits of the seepage wells, the viability of these structures were discussed with the community leaders and especially women. Number and location of these wells were decided based on a series of discussions with the local community, community based organisations and local aid agencies working in the area. It was ensured that the wells are evenly spaced out to enable people to fetch water at the shortest possible distance. Similarly, the decisions to create structures for preventing soil erosion and flooding and *khadinds* have also been taken through structured discussions with the community.

The impact of these constructions on agriculture and increased productivity has started manifested in food security and financial empowerment among the community. Interest in getting children educated in a largely uneducated community where first generation in the families have started going to middle school, is partially attributable to increased resilience among community to crises caused volatile climate.



*A silvi - pasture unit*



*Farming through seepage well*

### ***5.1.3 Democratic decision making ensuring belongingness***

In addition to the technical support to the direct interventions, GRAVIS has also provided technical support for the processes that were adopted towards executing the interventions. Based on the Gandhian philosophy of democratic decentralisation, community based groups were formed to discuss, deliberate and decide on various aspects of project planning, execution and monitoring. GRAVIS has facilitated the formation of village development committees in each project village. Meetings of such the village committees and the dairy cooperative board are not limited to discussions around procurement of milk but have expanded to encompass the social, cultural barriers and the financial issues such as access to market and technological advances too. Women in the tribal belt of Kajiado now find themselves in a large expanse of opportunities for skill development, educational advancement and even jobs. There is definitely increased assertion among the women about their rights and they find themselves better equipped to generate effective demands for health and educational facilities from the county. Most of the children including young girls have also started attending schools regularly.



*Village Development Committees were formed in the villages in Dedza region of Malawi. The initiation of intervention was done taking the local community on board through the local implementing partner. It required regular communication with the community and several sessions to communicate the need and the potential benefits of the rainwater harvesting structures in the region. In order to ensure that the decisions relating to the construction of the structures and the sharing of benefits emanating from this construction are taken in a democratic manner ensuring effective participation of women as well. Guidelines for constitution of these committees were prepared in discussion with the community and were adopted by the villagers. The process that entailed presence of at least 80% of villagers in a general assembly where the leaders were selected from to represent people in the village development committee. Such VDCs had the mandate to call for meetings at the village level and form rules and regulations for the use of water, amongst other issues. Role of VDCs was crucial in adopting and enforcing guideline and norms for use of structures, natural and common property resources, distribution of water for crops as well as domestic purpose.*

#### **5.2.4 Judicious use of community water resource**

In addition to ensuring availability of ample water, efforts are also being made to encourage judicious use of water for agriculture and household purposes. While innovative techniques are being introduced to optimize the available land and water in agriculture, guidelines for community sharing and responsible use of water have also been discussed with the community. This bottom up community water management system which is primarily being executed and monitored by the community, also ensures community ownership of these endeavours and hence making them sustainable.

Water conservation and management support being provided through multi-stakeholder engagement has resulted in some substantial outcomes that have positively impacted the community life in tribal regions in Malawi and Kenya. As mentioned, people find themselves in a situation where there is availability of water even during dry season and land and soil are also being conserved. All of these have on one side improved the agricultural productivity and on the other have saved women from drudgery, one of the most prominent and crucial way the project interventions are bringing in qualitative changes in the lives of women in this region.



*Crops being grown in low lying areas in dry season too*

Selection of terrain appropriate structures that have been altered in sizes and shapes for enhanced utility, is a crucial aspect of the project. For instance the size and bund for khadins has been increased keeping in view the rainfall, which is more than what is received in arid zones in India.

## **6. Thar Desert in India, Dedza and Kajiado in Africa: Different yet Similar**

GRAVIS has been working closely with the rural communities of the Thar Desert in India for more than four decades now. Integrated community development approach of GRAVIS provides the opportunity to look at the water scarcity and other issues within the larger socio-economic and cultural context. This extensive experience that has kept getting enriched by traditional wisdom and technical innovations also presents an opportunity to draw some comparisons between the Indian, especially in the Thar and African, in Dedza and Kajiado, scenarios.



India and the African countries of Malawi and Kenya share the burden of similar social, economic and financial problems. Scarcity of financial resources, however, gets compensated by the abundant natural resources that India, Malawi and Kenya have. Kenya and India seem to have progressed on economic front, while Malawi continues to feature as a least developed country. Dedza region in Malawi, Kajiado in Kenya and the Thar region in India are inhabited by impoverished communities who are primarily dependent on farming and livestock for livelihoods, and have been languishing for survival in the difficult geographical and climatic conditions. High climatic volatility further adds to their vulnerability. Despite these hardships, these communities have been demonstrating resilience against all odds.

Issues that emanate from gender disparities seem to define the social texture of these communities. While socially acceptable polygamy keeps women at a disadvantageous situation as regards gender relations, historical social oppression of women is an equally daunting challenge in rural communities of Thar desert. While the deprivations and the disempowerment is the common phenomenon, few social practices and norms stand out in these communities. For instance, on comparison one finds that gender roles are not as sharply segregated as in the case of rural India where women are expected to remain indoors and only men can venture out and carry out responsibilities that require travelling outside and interacting with others. It was noticed that mobility in Africa is not as much a gender issue as in the case of rural communities in India.

Although there are certain barriers for women to participate in decisionmaking, their mobilization may not have typically gender related obstructions. It was perhaps because of this that women have been able to take de facto charge of many development initiatives at community level that may be a distant reality in rural communities in the Thar region of India. Nonetheless, the approach in both the contexts remains that of ensuring increased and effective participation of women in decision making and mainstreaming gender into all the interventions.

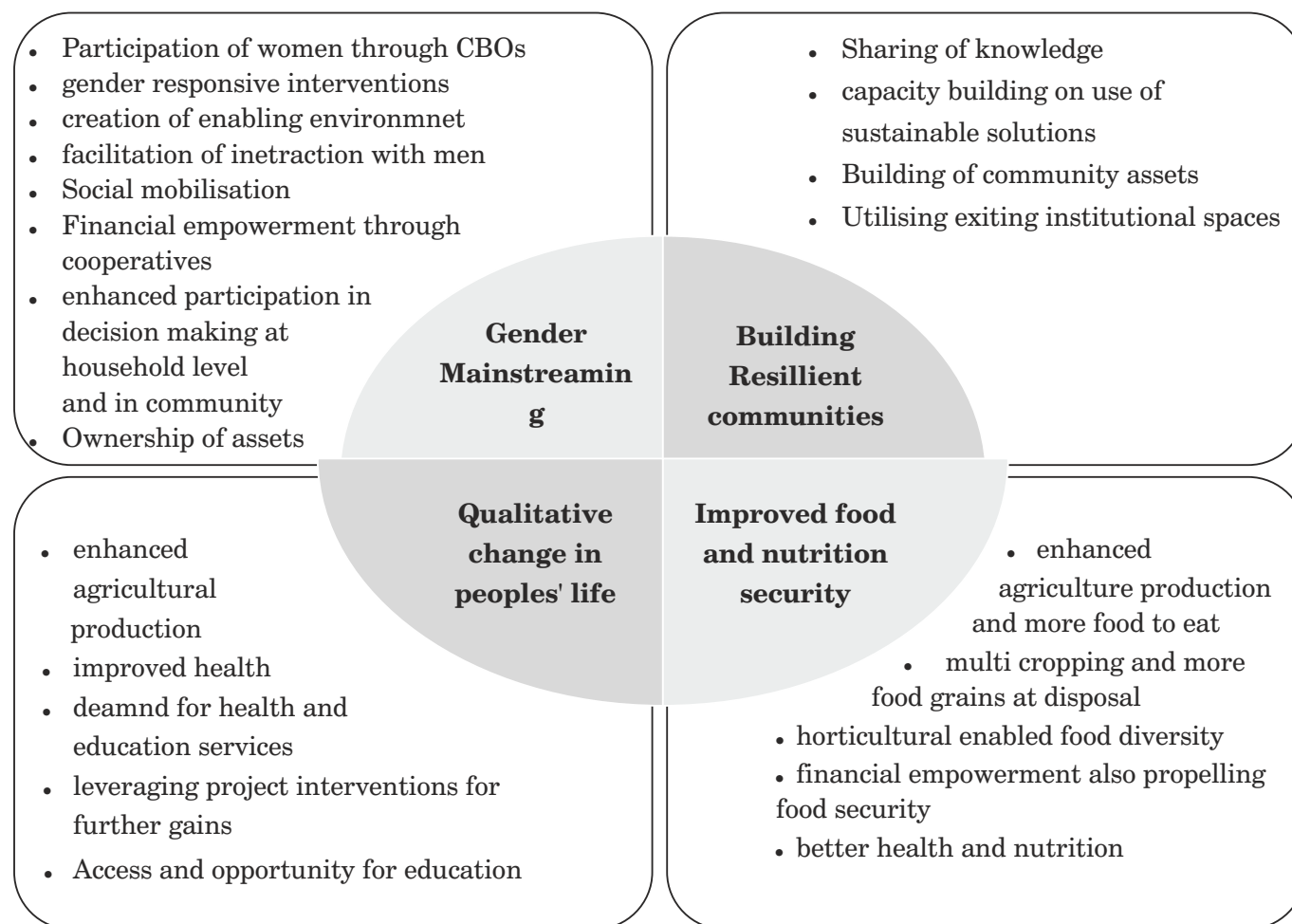
In case of climate related exigencies, of late both in Malawi and in Kenya have witnessed its impact in terms of variance in rainfalls, floods and prolonged dry seasons and even complete absence of rains during raining seasons, but extreme climatic conditions and perennial droughts have always been the characteristics of rainfed agriculture in the Thar region. Complete lack of rains has always rendered the rural communities in drought prone Thar region susceptible to food and water insecurity.

Availability of abundant natural resources also distinguishes the identified African regions from perennial drought prone Thar region of India. In Dedza region of Malawi and Kajiado region of Malawi rains are not as scanty as in the Thar. Being a desert even the soil is also sandy and saline in most areas. Salinity of ground water in many areas have also made it difficult for people to rely on that. Although management of available resources is crucial in both the cases, in Africa it's more of a problem of conservation and management, while in Thar desert availability of water itself is an issue.

The diversity in the nature of issue, however, does not undermine the gravity of the problems that communities in all these regions are confronted with. In all the regions, people have not been able to access the benefits of the developments that have taken place in the mainstream economies and have remained at the margins as regards health and education services too. The project interventions built on the philosophy of decentralized community participation may potentially propel inclusive and sustainable growth in all the regions. Community mobilisation with special emphasis on women hence remains the major strategic focus, along with the transfer of technical know how on the water conservation techniques.

## **7. Designing gender mainstreaming project interventions in the agriculture**

Gender mainstreaming and climate change resilience are widely discussed issues with varied connotations and repercussions for the community work. It is important to articulate its implications and specify the ways and mean through which gender mainstreaming and climate risk reduction is proposed to be integrated within the on going interventions in the identified regions. The project took cognizance of the criticality of sustainability and inclusivity and continued to adhere to gender responsive strategies as against designing and executing only women centric interventions. Gender mainstreaming, that entails gender sensitive and responsive mechanisms, was found to be more relevant and sustainable way towards ensuring gender empowerment. Inclusion of men in the gender related dialogues, was one of the crucial elements of gender mainstreaming. In some circumstances, specific attention to the women's needs may be perceived as a threat to social and cultural norms that consider men as a natural guardian and more powerful. Regular interactions with men along with the groups of women avoided any such apprehension. In African context, absence of men from community action may also dampen the motivation of men and even abdication from their responsibilities. Hence the need for proportionate responsibilities and prevent additional burden for women was emphasized and getting males involved at the outset itself achieved the same. There is also a need to tread this path carefully and keep ensuring at every stage that women are able to voice their opinions and participate in decision-making effectively.



The multi-stakeholders project that was envisioned to ensure availability and access to food and water was able to achieve improved quality of life for the people in the identified areas. While management of water was the central theme of the project, it was driven by the key tenets of empowerment of women through financial security, effective participation in decision making, execution and monitoring roles; enhanced food security through increased productivity and financial security and building of community resilience, that were some of the key highlights of the project.

Reliance on traditional wisdom and comprehensive approach guided by the Gandhian philosophy of democratic decentralization and community empowerment informed the project planning as well as execution. The project presents a replicable model of knowledge sharing and creation of climate change resilience in gender responsive manner, and opens up many opportunities for exchange between India and Africa. While there is a lot that has been achieved, there is much more that needs to be done for creation of climate change resilient rural agrarian communities and economies, while also pursuing the goal of gender equity in all spheres of life



Gender mainstreaming in any social development endeavour also entails creation of a conducive environment as well as institutional support systems for women. For instance, like in India, and elsewhere, childcare and household chores largely remain woman's/mother's responsibilities, very often making it challenging for them to balance between the work and home. Going further, in addition to making men more responsive towards this need, it is important to propose alternative childcare arrangements. Community solutions seem most feasible in the context of tribal communities in Kenya and Malawi. While the idea of men being equal partners in caregiving is laudable, community childcare institutions have come to be much more pragmatic and acceptable solutions. This has also drawn men into caregiving and has facilitated opportunities for women to explore avenues for professional development.

*Community based childcare system (CBCCS) in Kapesi village of Malawi has been quite popular among the rural community. Care, food and pre school education is provided in these centres at nominal onetime fee of Rs 1000 Kwacha per child. While this may seem like a small community initiatives, it has enabled women to continue to put in hard work in the fields without being worried about their children's safety and care. With pre school education, children also able to graduate to formal schooling after they turn 5, also abating their chances of dropping out.*

Provision of health services for women remains a major concern in Malawi and in Kenya. Integrated community development approach calls for a comprehensive set of interventions that could synergistically enhance and sustain the impacts. Given the frail health delivery system in the African countries, provision of health services such as checkups, and basic medication and referrals assume a lot of importance.

Development and execution of climate smart solutions must continue for the climate change vulnerable communities of Dedza and Kajiado. It is required to increase the pace of execution within the overall limitations of climate related obstructions and administrative delays. Far-reaching impact of all the solutions introduced in these areas can be gauged only after completion of the construction of most of the planned structures. Abundant availability of natural resources also provides a wonderful opportunity to scale up these interventions and construct suitable structures for water resource management in various regions.

The identified regions also present a wonderful opportunity for more horticulture and agri-horti units. In the subsequent phases specific attention can be paid towards supporting the community in initiating horticulture. Success of horticulture have direct implications for household level food security, financial gains and, if managed by women, financial empowerment for women.

Agroforestry is one of the proven strategies that may help subsistence farmers reduce their vulnerability to climate change. Intentional use of the local trees in the cropping system to increase farm productivity, diversify income sources and provide environmental safeguards. Incorporation of agroforestry in the design of the project plan may lead to many climate resilient outcomes including



prevention of soil erosion, as well as availability of fodder for the livestock. Both the regions in question also present apt opportunities in terms of land, climate and precipitation, for the same.

Trainings of community, especially women on community resource management, organizational aspects, conducting structured meetings, gender mainstreaming and innovative agriculture practices and climate resilient solutions can help building capacity among the community and empowering them to combat climate change.

Given the recent floods and drought situation in various areas in many parts of Kenya and Malawi, the interventions in future must also focus on disaster risk management and community level disaster preparedness in to order to rule out possibilities of any efforts being made annulled by any natural disasters. Exploring collaboration with the local government and other agencies must be retained as a key component of the strategy and closer collaboration must be further invigorated. This should also be linked with the creation of community resource groups in the intervention areas that can be capacitated over a period of time to lead the community water resource management systems. Ingraining these inputs can inform the process of designing robust withdrawal strategies at the village level.



**Annex 1**

**Checklist to ensure gender mainstreaming in agriculture intervention projects**

*There are a number of ways through gender mainstreaming and gender integration into community development projects can be facilitated. While recognizing women empowerment may not be focus or the goal of the project, it become extremely important to ensure that entire population, especially those who are less privileged socially and economically also get an equal share in the benefits arising out of the interventions.*

Key areas of attention for gender mainstreaming in case of the rural development projects based on agriculture, food and water security related interventions, are the following:

Stage of the Project	Key elements of mainstreaming and integrating gender
<b>Conceptualisation of project</b>	<ul style="list-style-type: none"> <li>• Understanding of the sociocultural milieu especially in the context of gender</li> <li>• Familiarity with policy and legal framework pertaining to the issue being addressed and their gender dimension</li> <li>• Examination of all the interventions in light of their impact on women and girls</li> <li>• Goal of long term sustainable empowerment of women must be kept in mind</li> </ul>
<b>Design of the project</b>	<ul style="list-style-type: none"> <li>• Participation of women in the preparation of de</li> <li>• Women's participation on execution and monitoring must be ensured</li> <li>• Platform for interaction between men and women must be created</li> <li>• Financial as well as social empowerment to be kept in view</li> </ul>
<b>Project plan</b>	<ul style="list-style-type: none"> <li>• Timings of interactions and interactions must suit women</li> <li>• Gender roles as exist in that society must be taken into consideration</li> <li>• Consultation with women's group before finalizing plans for execution</li> <li>• Provision of support services for child care and health support</li> </ul>
<b>Project implementation/ execution</b>	<ul style="list-style-type: none"> <li>• Ensuring atleast equal participation of women in all community based interventions</li> <li>• Enabling participation of women in all processes relating to execution</li> <li>• Place and timings to enable participation of women</li> <li>• Identification of women leaders and encouraging them</li> <li>• Enabling women friendly environment and support services</li> </ul>
<b>Monitoring of the project implementation</b>	<ul style="list-style-type: none"> <li>• Community based organisations responsible for monitoring the execution must have atleast 50% women</li> <li>• Monitoring meetings to be scheduled keeping in view women's availability</li> <li>• Concurrent discussions with women's groups</li> </ul>
<b>Follow ups and Sustained impact</b>	<ul style="list-style-type: none"> <li>• Follow up meetings with women's groups</li> <li>• Leveraging existing enabling provisions in law and policy</li> <li>• Evaluation of the interventions in the light of their impact on socio economic status of women</li> </ul>





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## ACRONYMS

USAID	United States Agency for International Development
GRAVIS	GraminVikasVigyanSamiti
FTF	Feed the Future
I-AIB	Indi-Africa Innovations Bridge
GDP	Gross Domestic Product
BDPFA	Beijing Declaration and Platform for Action
CBCCS	Community Based Child Care System
CADECOM	Catholic Development Commission in Malawi



Gramin Vikas Vigyan Samiti (GRAVIS) or Center of People's Science for Rural Development is a non-governmental, voluntary organization that takes a Gandhian approach to rural development by working with the poor communities to enable them to help themselves. Since its inception in 1983, GRAVIS has worked with over 60,000 desert families across over 1300 villages in India reaching a population of over 1.3 million, and has established over 2,900 Community Based Organizations (CBOs). Through its dedicated field work, as well as its research and publications, GRAVIS has come to occupy a leading position amongst the voluntary organizations in India.



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