EBAFOSA
Ecosystem Based Adaptation for Food Security Assembly

GENDER DISAGGREGATION ON UPTAKE OF ECOSYSTEMS BASED ADAPATATION (EBA) APPROACHES AMONG VILLAGE SAVINGS AND LOANS ASSOCATION COMMUNIAL COOPERATIVES- UGANDA

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Photo 1 Nsonga VSLA group peer to peer training by fellow member on the different beans agronomic practices

INTRODUCTION

Women constitute approximately 50 percent of the agricultural work force in Sub-Saharan Africa, yet they manage plots that are 20 to 30 percent less productive on average. The country-specific extent and determinants of this gender gap are of major importance as a source of income inequality and aggregate productivity loss[1]. Uganda's agricultural sector is the main source of livelihood in Uganda, employing 72 percent of the working population of which women constitute 77 percent. This implies that an effective strategy to enhance gender equality is to enhance productivity of the agriculture sector by climate proofing it and ensuring incomes can be maximized through value addition especially at the informal levels. This will then have a direct knock-on effect on increasing potential earning to the majority women in the sector. In addition, a disaggregation of gender allows for the identification of gender specific salient features and key success factor critical for effective uptake of climate action solutions of Ecosystems Based Adaptation approaches (EBA) applicable in agriculture and realization of beneficial impacts for the different genders.

Agriculture contributes over a quarter of Uganda's GDP and a large amount of its exports. Nonetheless, low levels of production and productivity plague the sector, owing to inadequate agronomic practices like lack if value

1 Investigating the gender gap in agricultural productivity: evidence from Uganda. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/172861468184777211/investigating-the-gender-gap-in-agricultural-productivity-evidence-from-uganda

addition that causes postharvest losses of up to 40%, coupled with the effects of climate change, which has put Uganda on a dangerous path of losing potential food crops of up to $1.5billion by 2050. (Ugnada Green Growth Strategy, 2017). In Uganda agriculture is the main source of livelihood with 72 percent of the working population engaged in the sector (UBOS, 2020). The country's vulnerability is exacerbated due to its high level of poverty and its high dependence on 'climate sensitive' sectors like agriculture, water, fisheries, tourism, and forestry. The country is at high-risk to natural disasters such as flooding, drought, and landslides caused by climate change due to anthropogenic activities, however, its topographic diversity and highly marginalized segments of the population, make it additionally vulnerable. With a rate of urbanization of 5.4 percent, a growing proportion of the population lives in urban areas putting pressure on existing infrastructure as well as scarce available land; a diminishing natural resource[2]. Uganda can enhance the agriculture sector resilience through promotion of nature based solutions of Ecosystems-Based Adaptation approaches (EBA), particularly concerning sustainable land usage, usage of EBA practices of mulching, usage of organic mature, planting improved seeds, timely usage of climate information and intercropping of gardens.

GENDER DISAGGREGATION AND EBA APPROACHES:

"Ecosystem-based Adaptation is the use of biodiversity and ecosystem services, as part of an overall adaptation strategy, to help people to adapt to the adverse effects of climate change…it aims to maintain and increase the resilience and reduce the vulnerability of ecosystems and people in the face of adverse effects of climate change." CBD 2009

Ecosystem-based Adaptation has been proposed as a particularly significant adaptation strategy for smallholder farmers who often lack the resources and capacity to access other adaptation options, such as the adoption of new technologies that require external inputs (e.g., improved seed varieties, irrigation systems or increased fertilizer and pesticide use) or participation in farm insurance (Harvey et al., 2017). Ecosystem-based Adaptation (EbA) is the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change (CBD, 2010)maximize co-benefits across sectors and avoid unintended negative consequences on ecosystem services. Section 3 examines the links between biodiversity and climate change mitigation with a particular focus on land use management activities and reducing emissions from deforestation and forest degradation. The section explores the potential contribution of biodiversity conservation and sustainable use to mitigation efforts and suggests ways in which co-benefits can be enhanced. Finally, the section examines the potential positive and negative impacts of mitigation activities on biodiversity (e.g. renewable energy technologies . Ecosystem-based Adaptation (EbA), involving the conservation, sustainable management and restoration of ecosystems are cost-effective solutions that can help people adapt to the impacts of climate change. Examples of such nature-based solutions to climate change include sustainable agriculture, integrated water resource management and sustainable forest management3. In Uganda, the decline in forest cover is expected to continue, principally due to need to increase agricultural land for crops growing and livestock and cutting for fuel wood.

2 https://climateknowledgeportal.worldbank.org/sites/default/files/2020-06/15464-WB_Uganda%20Country%20Profile-WEB_v1.pdf
3 https://www.iucn.org/resources/issues-briefs/ecosystem-based-adaptation

Cumulatively, the cost of land degradation in the country is estimated at 17% of GDP every year and the urgency to integrate the gender into the solutions process, to ensure those that principally engage in land-based action like agriculture etc., that are a leading driver of degradation can take up approaches that work with nature to reverse degradation is key. Nature based solutions (Nbs) of EBA- approaches is the solution to reserve those anthropogenic activities. According to NEMA only 10% of Uganda's population have access to electricity and 89% rural Ugandans use firewood to cook which has been a struggle for the country to reverse this alarming trend4. A 2020 Global Forest Resources Assessment by the Food and Agriculture Organization (FAO) estimates Uganda's total forest area at 9 percent of the country's land size (240,000sq km or 92,664sq miles), compared with 24 percent forest cover in 1990 – a loss of more than 30,000sq km (11,583sq miles) of forest in 25 years due to unsustainable or illegal trade in forest products and the expansion of agricultural land, among other factors5.

Climate change is already having an influence in Uganda, as the frequency and intensity of disasters grow. These effects, however, are not felt in the same way by everyone. Due to disparities in Ugandan society, women face more risks and bear a bigger burden in terms of their ability to respond to and adapt to climate change. Women in Uganda face gendered structural inequities across economic, political, environmental, and social systems as a patriarchal nation. Women's inequality is exacerbated by cultural norms that govern gender roles and, all too frequently, place women in a subordinate position to males. These cultural norms can be observed reflected in the three NDC priority sectors (UNDP, 2020). In addition, Uganda will need to define costs and impacts of climate actions including nature-based solutions (NBS); elaborate potential domestic financial instruments for NDC implementation, establish national emission factors based on the latest Intergovernmental Panel on Climate Change (IPCC) guidelines for the waste sector in the second Nationally Determined Contribution report[6]

According to the Closing the Potential-Performance Divide in Ugandan report , Agriculture is the most important economic sector for the majority of Ugandans and is crucial to overall growth. However, it faces a number of structural challenges, including a high proportion of smallholders engaged in rain fed, low-yielding agriculture; increasing population density on arable land; tenure insecurity; a lack of access to financial resources; poverty; poor infrastructure; and low educational attainment.

WOMEN, MEN AND YOUTH INVOLVEMENT IN THE USE OF NON-EBA FARMING APPROACHES

In the growth of agriculture, women and youth play critical roles. According to research conducted by the Food and Agriculture Organization (FAO), women, youth, and men play vital roles in agriculture around the world by producing, processing, and distributing the food we consume (National Organic Agriculture Policy, 2019) Women in rural areas, in particular, are responsible for much of the world's output (from 50 to 80 percent of food). Despite their significance to global food security, women and youth are frequently overlooked and undervalued in development strategies[7].

Both women and the youth often have limited access to services, credit, technologies, training, knowledge and information and agriculture markets. They have limited control over household income from agriculture. They

4 https://www.theguardian.com/society/katineblog/2009/jun/25/uganda-deforestation
5 http://www.fao.org/forest-resources-assessment/2020/en/
6 The **NDC Support Programme** https://www.ndcs.undp.org/content/ndc-support-programme/en/home/our-work/geographic/africa/Uganda.html
7 Ibid P.25

poorly participate in decision-making processes and farmers' cooperatives. According to the Uganda National-Organic-Agriculture-Policy.

Young people show serious indifference and disinterests to organic farming, raising concerns of who the future farmers shall be. A large majority of present farmers are aged over 50 years with only about 25% having attained formal education above primary level. Efforts to build a critical mass of skilled manpower is facing challenges of high levels of HIV and AIDs infection which continues to reduce the productivity of those already supplying the agricultural labour force[8].

ECOSYSTEMS BASED ADAPTATION APPROACHES IN UGANDA

Ecosystem-based adaptation (EbA) is an approach that is becoming increasingly popular and well-tested. Uganda, which is already using EBA approaches , is at a political crossroads in terms of maximizing the benefits of this approach as its climate change policy takes shape (Seddon et al., 2016). According to the Research results from the Mountain EbA Project, Uganda implemented at mountain Elgon by International Institute for Environmental and Development[9] EBA approaches measures implemented under the project in Uganda include:

- Improved water retention through roadside drainage bunds and run-off retention drains.
- A gravity flow engineered irrigation scheme, combined with reforestation,
- Soil and water conservation and riverbank restoration to create a hybrid grey-green solution to catchment-scale water management.
- Tree-planting using an agroforestry approach to stabilize soil and reduce landslides
- Other EBA –approaches implemented in Uganda;
- Soil conservation measures that enhanced soil productivity, fertility and moisture retention, and reduced erosion
- Agroforestry measures that reduced landslides
- Fuel-efficient cooking stoves, which reduced deforestation and air pollution
- The planting of indigenous drought-tolerant grass, enhancing the grasslands' capacity to store carbon.
- EBA farming practices including soil and water conservation, planting of drought and disease resistant seed varieties, irrigation of crops,
- Use organic fertilizer
- Intercropping of cassava with beans, maize, ground nuts
- EBA approaches farming practices in Uganda; soil and water conservation, planting of drought and disease resistant seed varieties, irrigation of crops
- Ecosystem based approaches (EBA) to adaptation in the forest sector include conservation, sustainable management,agroforestry.

8 National Organic Agriculture Policy. https://www.agriculture.go.ug/wp-content/uploads/2020/09/National-Organic-Agriculture-Policy.pdf

9 Ecosystem-based approaches to adaptation: strengthening the evidence and informing policy Research overview and overarching questions https://pubs.iied.org/sites/default/files/pdfs/migrate/17623IIED.pdf

- Ecosystem based approaches (EBA) to adaptation in water sector include promoting water conservation for better agricultural production, rainwater harvesting and water reservoirs protection in areas with dams for providing water for local populations

GENDER DISAGGREGATION BENEFICIARIES OF EBA APPROACHES APPLICATION IN AGRICULTURE- UGANDA

Ecosystem Based Adaptation (EBA) is a technique that combines a variety of approaches to enhance development through ecosystem management. Although the importance of ecosystems and the services they provide is becoming more widely recognized, there are still concerns about the costs of implementing EBA projects linking them to gender disaggregation data for beneficiaries of EBA approaches. This necessitates a concerted effort to investigate nature-based adaptation solutions, their cost effectiveness, and how the flow of co-benefits may be enhanced so that government and non-government organizations invest in them(Rizvi et al., 2015)the Directorate-General of Global Affairs, Development and Partnerships (DGM.

Gender issues in the context of EBA – approaches application in agriculture in Uganda include the following;+

Is based on the conservation, restoration and sustainable management of ecological functions and processes (e.g., nutrient cycling, soil formation, water infiltration, carbon sequestration) and sustainable management of biodiversity (e.g., genetic, species and ecosystem diversity).

GENERAL OBJECTIVE OF THE GENDER DISAGGREGATION

The objective of the study is to establish the beneficial impact of climate action solutions of EBA to different genders as each face vulnerability differently and establish critical factors for successful uptake.

METHODOLOGY

The study focused on areas where UNEP- EBAFOSA Uganda Village Savings and Loan Associations (VSLA) activities have been ongoing for the last 2 years. VSLAs are communal cooperatives that convene willing members engaged in diverse income activities for the purposes of financial savings & investments. Through this work, these VSLAs are being empowered to integrate climate action solutions like EBA, clean energy value addition, etc., as tools to climate proof their production and by this, increase productivity of their farms, increase earnings, savings, and be better positioned to invest more in expanding application of these climate action solutions. In each community, the study looked at female-only and mixed VSLA groups in Uganda.

The gender disaggregation impact data was collected through interviews and utilized qualitative and quantitative data gathered through a mixed-methods approach from a selected range of sources as indicated below. The methodology that was employed therefore included: The first stage of the gender disaggregation data development was identification of village savings and loans associations, development of questionnaire, identification of stakeholders. Respondents and participants in the study were selected by simple random sampling based on cluster groups. The cluster groups comprised of project beneficiary communities, VSLAs leaders, EBA program staff

DATA COLLECTION METHODS

The methods used for this study include site visits, trainings, repetitive observation, focus group discussions, participatory meetings and literature reviews.

The main methods and tools that the data collection team used include.

i. Desk review: Key project documentation, reports produced by the project, and information from relevant websites, among others were reviewed.

ii. Interviews: Face to face/telephone with the Village savings and loans association members, chairpersons and leaders of committees.

iii. Field visits in the five VSLAs and meeting members.

iv. **Interviews** at household levels were conducted in order to obtain a better understanding of the factors driving the quantitative gender gap in agricultural productivityarming communities in Buganda kingdom engaged through the structure of cooperatives called Village savings and loans association (VSLAs) were interviewed to ensure accountability. VSLAs included

v. **Observation** Repetitive observations were conducted during trainings of the studied population during the trainings and visits on the gaps and activities conducted

vi. The content analysis was important in exploring ecosystem-based adaptation threats, benefits and key opportunities during the interviews and VSLAs members on farm trainings, by mentioning common threats to EBA services, benefits

STUDY POPULATION

The study was held in Buganda Kingdom among VSLAs engaged through the structure cooperatives called VSLAs to ensure accountability of Kyaggwe county and Bulemezi County in the districts of Mukono, Buikwe and Luwero districts. Interviews were collected within the village savings and loans associations (VSLAs);

- Suugu Agalyawama Women group located in Buikwe district
- Ggera Fortune Women group Buikwe district
- Nsonga Village Saving and loans association, Mukono district
- Mukama Mulungi village savings and loans association, Luwero district in cattle corridor.
- Twekembe Women group Nakifuma located in Mukono district

GENDER SPECIFIC BARRIERS TO EBA- UPTAKE ENCOUNTERED BY MEN AND WOMEN FARMERS

Men farmers in Sugu Agalyawamu women group identified 3 barriers to EBA uptake, while women in Ggera Fortune women group, Mukama Mulungi VSLA and Twekembe Women group identified 4 barriers. Of the 7 identified barriers, both men and women identified 5 similar barriers in the five VSLAs which were interviewed. Table 4 provides a list of barriers faced by men and women farmers. The following are the main barriers identified in the five study groups.

(Table 1 List of EBA uptake barriers identified by men and women farmers using Focus Group Discussions (FGDs

Barriers to EBA- Uptake	Sugu Agalyawamu women group (FGDs)		Mukama Mulungi VSLA (FGDs)		Nsonga VSLA (FGDs)		Ggera Fortune women group (FGDs)		Twekembe Women group Nakifuma (FGDs)		Total Number of Focus Group Discussions (FGDs) Identifying Barrier		
Insufficient resources	Men FGDs	Women FGDs	Men FGDs	Women FGDs	Men FGDs	Women FGDs	Men FGDs	Women FGDs	Men FGDs	Women FGDs	Men FGDs	Women FGDs	All FGDs
Limited access to land by female famers	3	5	3	4	2	6	1	6	---	4	10	25	35
Mistrust of the youth by the women and men in the Village savings and loans association (VSLA)	3	6	1		1	9	2	5	---	5	7	25	32
Limited land by the VSLA	2	5	1	1	2	2	1	4		3	6	15	21
Lack of or limited access to EBA information	4	5	4	8	6	3		6	1	2	15	24	39
Lack of/limited number of Agriculture extension officers				5	6	2	2	1	1	3	9	11	20
Short and Long dry spells threat the preference of the season			7	9	2	4	3	3	-	6	12	22	34

BARRIERS TO UPTAKE OF ECOSYSTEM BASED ADAPTATION IDENTIFIED BY MEN AND WOMEN FARMERS

- Insufficient resources by youth to establish the EBA inputs enterprises shops to enable VSLA members access agricultural inputs of crop fertilizers, irrigation machinery services, solar dryer services at one stop centre. Youth were advised to join the village saving and loans association so that to increase on their savings to enable barrowing.
- Limited access to land by female famers, with over 90% of men owning land, women are left vulnerable to conduct the EBA measures they need, men stop women from implementing some of the EBA Approaches of digging trenches, agroforestry, planting long maturing crops like cassava, men thinking that the women will own the land. The solution for this challenge women came up and cooperated around the solution of EBA Cassava Garden communally owned by the VSLAs. This has enabled women learn new EBA approaches, skills and it has boosted togetherness. In addition, women started vegetable backyard gardens where they used organic manure, chicken dropping, crop rotation and breaking of the soil to enable aeration.
- Mistrust of the youth by the women and men in the Village savings and loans association (VSLA) youth feel uncomfortable to join the groups of women and men who almost at the age of their parents, youth have been left out because they don't have money to save on weekly basis, lack land to conduct agriculture, mistrust of the VSLA loans they borrow. This has limited their uptake of EBA Measures, Therefore, this is encouraging VSLAs to integrate youths in communal solar dryer activities.
- Limited land by the VSLA, Land is the most important factor of agricultural production in Uganda and its security enhances food and nutrition but due to land fragmentation (Mwesigye & Barungi, 2021) most families own small plots that are shared amongst family members and its difficult to implement EBA-approaches. VSLAs are highly composed of women who have small plots of land, this limits their EBA intake. Women were encouraged to rent land as a VSLAs/ as group for farming.
- "EBA Cassava multiplication gardens have helped women, who don't own land, we have been able to plant cassava, beans and ground nuts as a group, those gardens have acted as learning centre for women and this has enabled my members to also practice EBA at their homes. For example, establishing Backyard vegetable gardens, agroforestry, intercropping, drying agriculture crops using solar drying technology" Zaina Namuli Ntulume – Chairperson Sugu Agalyawamu Women group.
- Lack of or limited access to EBA information, most of the farmers don't receive EBA Measures information for them to practice on their farms, Ggera Fortune women group, Nsonga VSLA and Sugu Agalyawamu group identified lack of EBA information as a barrier. Because even on radio farmers don't receive this information. The solution to this barrier is to provide regular EBA trainings to the farmers to enable them to increase their production, encouraging men to share radio talk shows with women, men and women listening to agricultural radio shows will widen their knowledge.

"Women don't own and control radios in the home, most times we would want to listen to agriculture talk shows but men move with their radios to the centres, most times men tune in political talk shows and music, this has hinded us from listening to agriculture shows which train EBA Practices, however thanks to UNEP-EBAFOSA Uganda EBA

trainings they have helped to break the gap, now we can learn from our fellow farmers the different EBA practices we don't know and we are also able to share what we know best "Alibakiriza Recheal – small scale farmer in Ggera Village Buikwe district.

- Lack of/limited number of Agriculture extension officers, In Nsonga VSLA, Ggera Fortune women group farmers lack of or having few vast trained agricultural officers was identified as a barrier to uptake between women and wen because of difficulties in accessing services as reported by farmers during monitoring period.
- Short and Long dry spells threat the preference of the season. Farmers belonging to Nsonga VSLA, Sugu Agalyawamu Women group, Mukama Mulungi VSLA, Twekembe Nakifuma Women group highly depend on rain feed agriculture, hinder their production because in the previous season rainfall was not enough to allow mas planting of crops.
- "The soil is so hard and very hot most of the beans intercropped with cassava have dried due to the long dry spell of June – July and August season. If we are given small solar irrigation machines on credit, we can pay back and we carry out agriculture all year round." Namutebi Oliver Woman farmer in Nsonga Village
- Targeted actions may also be needed to overcome gender-based barriers to resource access and control for gender, for example by engaging with community leaders who make land-use decisions, to ensure that EBA measures do not exacerbate existing inequalities. Finally, there may be a need to channel resources on a priority basis to groups that are typically excluded, such as women's groups or village savings and loans associations (VSLAs) to ensure that they can meaningfully participate in the planning and implementation of EBA measures.

Addressing the key barriers to the uptake and scaling up of Ecosystem-Based Adaptation (EbA) and building resilience within communities will require innovative and catalytic approaches and solutions

ADDRESSING GENDER SPECIFIC BARRIERS TO UPTAKE OF EBA

Project interventions including content of training was targeted at addressing these gender specific barriers to uptake of EBA and are addressed in the subsequent sections of this report.

How many in total were trained on using EBA and the type of EBA areas they were trained in?

- Gender disparities in access to critical agriculture and rural resources, knowledge, opportunities, services, and markets was identified during this study among women mostly. It explores the existing gender relations and gaps in the various sub sectors of agriculture, and their possible causes and impact on food and nutrition security and makes policy recommendations to address them.
- Rural men and women have different access to productive resources, services, information, and employment opportunities, which may hinder women's productivity and reduce their contributions to agriculture, food security, nutrition and broader economic and social development goals[10].

10 http://www.fao.org/3/ca3883en/ca3883en.pdf

- Findings presented in this section present the data on gender of those who have benefited from the EBA approaches in their village savings and loans association and communities.
- Ecosystem-based Adaptation (EBA) offers a variety of natural solutions for dealing with the effects of climate change. By reducing society's vulnerability to natural hazards, improving the availability of ecosystem services essential to support livelihoods, and protecting biodiversity through sustainably managing ecosystems, EBA interventions generate a wide range of significant social, economic, and environmental co-benefit.

Table 2 EBA approaches trained to the farmers in the village savings and loans association

Number of VSLA members trained in EBA Approaches	**Diversification of crop varieties**	**Mulching**	**Intercropping**	**land fallowing**	**Planting drought resistant varieties**	**Climate information services**	**Use of solar dryers technologies**	**Use of crop residues**	**Agri Value addition**	**Vegetable home gardens, use of animal residual**	**use of soil conservation practices**	**Planting in Lines**
Sugu Agalyawamu women group	15	30	10	0	30	0	30	30	30	20	30	30
Mukama Mulungi VSLA	0	0	0	9	30	0	30	18	30	5	5	5
Nsonga VSLA	20	20	30	20	30	20	30	28	20	10	20	30
Ggera Fortune women group	10	10	10	5	17	10	17	17	17	10	5	17
Twekembe Women group Nakifuma	0	0	15	0	27	15	27	15	15	4	15	30
Total	45	60	65	25	134	45	134	108	112	49	75	112

Gender disaggregation of trained members

Table 3 Number of members by Gender trained in Particular EBA approaches per VSLA

VSLA members trained in EBA approache	**Sugu Agalyawamu women group**		**Mukama Mulungi VSLA**		**Nsonga VSLA**		**Ggera Fortune women group**		**Twekembe Women group Nakifuma**	
group	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Diversification of crop varieties	4	11	0	0	2	17	2	8	0	0
Mulching	4	26	0	0	3	17	2	8	0	0
Intercropping	4	6	4	5	3	27	2	8	0	15
Land Fallowing	0	0	4	5	3	17	1	4	0	0
Planting drought resistant varieties	5	25	12	18	3	27	2	15	1	26
Climate information services	00	00	0	0	3	17	2	8	1	15
Use of solar dryers technologies	5	25	16	15	3	27	3	14	0	15
Use of crop residues	5	25	10	8	3	25	3	14	0	4
Agri Value addition	4	26	13	17	3	17	3	14	1	14
Vegetable home gardens, use of animal residual	2	18	2	3	2	7	0	10	0	4
use of soil conservation practices	4	26	2	3	2	18	2	3	0	15
Planting in Lines	4	26	2	3	4	26	3	14	1	29

Table 4 provides a further breakdown by gender trained of women and men in the village saving and loans association trained. Female adult population engaged and participated highly in the trainings which were conducted on farm and off farm during meetings and visits. Number of Gender trained divided by EBA- Practice multiplied by 100 percent. Gender disaggregation data is obtained by;

$$\frac{\textit{Number of members of a given gender trained in EBA Practice (Table 3) Multiplied (×) 100\%}}{\textit{Total number of members in VSLA (Table 2)}}$$

Table 4 Percentage Gender disaggregation of trained women and men on EBA

Practices computer with data from table 2 and 3

	EBA- approaches trained to the farmers in the VSLA									
VSLA members trained in EBA approaches	**Sugu Agalyawamu women group**		**Mukama Mulungi VSLA**		**Nsonga VSLA**		**Ggera Fortune women group**		**Twekembe Women group Nakifuma**	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Diversification of crop varieties	26.6	73.3%	0	0	15	85	20	80	0	0
Mulching	13.4	86.6	0	0	15	85	20	80	0	0
Intercropping	40	60	0	0	10	56.6	20	80	0	100
land fallowing	0	0	44.4	55.5	15	85	20	80	0	0
Planting drought resistant varieties	1..6	83.3	40	60	10	90	11.7	88.23	3.7	96.3
Climate information services	0	0	0	0	15	85	20	80	6.6	93.3
Use of solar dryers technologies	16.6	83.3	53.3	50	16.6	83.3	17.6	82.4	0	100
Use of crop residues	16.6	83.3	55.5	44.4	10.7 .	89.2	17.6	82.4	0	100
Agro Value addition	13.3	86.6	43.3	56.6	15	85	17.6	82.4	6.6	93.3
Vegetable home gardens	10	90	20	30	20	70	0	100	0	100
use of soil conservation practices	13.3	86.6	20	30	10	90	40	60	0	100
Planting in Lines	13.3	86.6	20	30	13.3	86.6	17.6	82.3	3.3	86.6

Access to EBA materials and are using EBA techniques - percentage of women, men

Global food production is sufficient to feed the world's population. However, due to structural factors that limit the equal access of men and women, boys and girls to food, this does not result in global food security. In 2017, the estimated number of undernourished people in the world increased to nearly 821 million (one out of nine people), from around 804 million in 2016. Although men also participate in EBA practice implementation, most of the burden is borne by more women because men tend to dodge most the activities of the garden, value addition compared to women. In addition, men most times come during the saving time and date, they take group income generating activities for only women. However, women's regular participation enabled them to have access 100% access to cassava cutting, solar dryer usage, seeds. The VSLAs supported by UNEP – EBAFOSA are women led groups. VSLAs located in rural areas for example Nsonga VSLA, Sugu Agalyawamu women group women and Ggera Fortunee women group members have access to land to conduct EBA practices. Thank their counterpart other VSLAs located in land fragmented town areas VSLAs located in sub rural areas include Mukama Mulungi VSLA, Twekembe Women group Nakifuma. Those two VSLAs prefer value addition because they are near town area.

Table 5 Percentage of women and men access to inputs

	Access of agricultural inputs by VSLAs									
Percentage of women, men impacted	**Sugu Agalyawamu women group**		**Mukama Mulungi VSLA**		**Nsonga VSLA**		**Ggera Fortune women group**		**Twekembe Women group Nakifuma**	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
Access to EBA material	66.6	13.3	23.3	36.6	83.4	6.6	64.7	11.7	6.5	1
Access to land	66.6	13.3	16.6	66.6	10	33.3	29.4	100	0	6.5
using EBA -Techniques	63.3	3.4	23.3	10	86.6	6.6	41.1	0	25.8	0

The number of women accessing EBA material increased in Village savings and loans association (VSLAs) of Sugu Agalyawamu women group were women access land 66.6% and EBA- material of cassava cutting and other VSLAs in rural areas like Ggera Fortune Women group and Nsonga VSLA women dig on the land of their husbands, because they have a responsible of feeding the family and men go for trading and finding agricultural markets of the produce.

how have they benefitted from the EBA in terms of total amount of acreage covered by EBA, the value chains they grow using EBA, the EBA techniques being applied.

Measuring costs and benefits of EBA approaches is difficult (Baig et al., 2016)the Directorate-General of Global Affairs, Development and Partnerships (DGM, Ecosystem-based Adaptation (EbA) exploits biodiversity and ecosystems as part of a bigger adaptation strategy to give effective nature-based solutions to climate change. It not only helps with climate change adaptation, but it also helps with biodiversity conservation and local economic development[11] EBA uses biodiversity and ecosystem services as part of an overall adaptation strategy to help people and communities adapt to the negative effects of climate change at local, national, regional, and global levels.

A total of 139 actors, representing a total of 20 acres of land, benefited from EBA trainings and are set to apply these to cover all this land. During the study's it was observed that farmers were picking the techniques trained and some of them started practicing EBA Approaches on their land, however, some of the EBA approaches started with Joint Multiplication Garden of cassava were they intercropping it with beans and ground nuts. The benefits cut across the five VSLAs supported by UNEP-EBAFOSA, and these benefits were experienced different for the different genders and the youth. For example, the majority of those who cultivate farms are women, but landowners are men. So, while the women have an interest to safeguard and increase yields, the men have an interest in ensuring that their lands remain productive so they can continue leasing it out for women farmers to cultivate and pay some rents. The youth are more interested in intervening along the value chain as suppliers of EBA inputs – but not necessary in farming. In addition, they cannot afford to own land. Consequently, the impact of the EBA interventions was perceived differently. The women were more focused on how EBA knowledge can help them to enhance their yields to safeguard their incomes. The men were more interested on how EBA can ensure the productivity of their land is

11 Cost and benefits of ecosystem based adaptation https://www.preventionweb.net/publications/view/49051

maintained in the long run, so it continues earning them rent income from leasing it out for farming. The youth were more interested in learning how EBA can be leveraged to create enterprising opportunities in the manufacture of EBA inputs like organic fertilizer and marketing it to local farmers. By this, there was differentiated impact of EBA by gender.

Gender differentiated EBA impacts

The impacts of climate change affect people differently, depending on their gender as well as a range of other factors, including age, ethnicity, Indigeneity, socio-economic status, and disability.

Gender norms influence the roles and responsibilities that people take on in their households and communities. Land for production is owned by men and women gender only utilize the land to carryout agriculture for home consumption only.

Working time, women are more likely to work longer hours than men when both paid and unpaid work is taken into account. Moreover, when in paid employment, on average, women work fewer hours for pay or profit either because they opt to work part-time or because part-time work is the only option available to them.

- Lack of access to land was cited as a limitation to female members economic empowerment, In Sugu , Mukama Mulungi group. Limited land by female farmer's limit access to loan services from banks, micro financial institutions, as Land is used as collateral security on such loans. This means that women are more dependent on village saving and loans associations as means of access to credit. Access to land by male farmers enables them easily access loans from microloan institutions and agricultural inputs like solar irrigation machines and crop fertilizers.
- Men control marketing of agriculture products crops, Where Women have access to land and farm crops like cassava, beans, pumpkins and ground nuts such as Mukama Mulungi VSLSA, Nsonga VSLA, women tend to be highly involved in the production farming stage. for example, Women are involved in land preparation, planting, weeding, irrigation and harvesting, it is men that take the cassava chips to the market or to the milling machine.
- Women's engagement in EBA - Cassava growing leadership in the Village saving and loans association is highly dominated by women out of the five VSLAs supported three of them have female committee leaders; Once a woman is leading our cassava gardens, she will be able to mobilize and manage fellow members." Ruth Nambi Sugu VSLA member. Women leadership of those committees has performed highly better than that of men because women don't miss sitting and monitoring of the cassava gardens. The barrier that prevent men from performing better is that men have many activities and responsibility to carry out, they find it difficult to put their time in VSLA activities. Other members explained that women being leaders of the EBA cassava committees, solar dryer committees gives women experience not only VSLA committee leadership, but also speaking out, giving opinion in committee on which crop varieties to plant next season, EBA Measures to use during dry spell, this has enabled them become solution providers.

  " Sugu Agalyawamu Women group members requested that women should be granted opportunities to study leadership to enable them lead more group committees, this will enable their community

have gender equality." Sugu Agalyawamu members.

The village saving and loans association EBA Cassava garden is fully managed by women through a dedicated committee which were selected by the VSLA members through a democratic process It has produced numerous benefits beyond the production of cassava, beans, ground nuts and vegetables. Having received training in nature based solutions of EBA Approaches, the women are producing enough to sell, after adding value on cassava using solar drying technology, providing them with a new source of income. This has enhanced their decision-making power within the household, offering women more independence and the ability to acquire assets, including mobile phones, radio, which increase their access to information. With the male heads of households spending less time away with livestock, the household tasks are better distributed, and it has been observed that girls are attending school more than before but due to COVID-19 second lockdown this stopped them from schooling.

How have the farmers benefitted from EBA approaches?

- Contribution to climate change mitigation by reducing emissions from ecosystem degradation.
- EBA has enabled integration of a variety of disciplines for example solar dryer centers to reduce post-harvest losses[12]
- Decentralizing of solar dryer to enable rural farmer's dry their agri produce through cooperating around the solution of solar drying centres as well as development of leadership both male and female in the VSLAs[13]
- EBA has enabled food systems in the farming system. Male and female farmers are able to contribute the cassava value chain from the garden to the marketplace[14]
- Women have been at forefront of domesticating the Climate Action Market Incentive Guide which enables farmers grow crops in an organically, no use of emission to dry the food, use of solar dryers.
- Help increase their food security due to the communal EBA- Cassava gardens intercropped with beans owned by village savings and loans associations[15]
- Increase or diversify their sources of income generation of the village savings and loans associations by establishing EBA Cassava gardens owned by the group[16.]
- Low implementation and labor costs, because labour is communal provided by VSLA members
- Increase influence and participation of women in decision making processes
- Increased capacity and knowledge of people that may enable them to establish resilience strategies
- EBA approaches uses nature-based approaches to "help farmers adapt" to the current and future impacts of climate change. This has enabled Increased income from crops like beans, groundnuts intercropped with cassava well as providing new income opportunity from commercial sale of cassava chips organically grown by farmers in the VSLA groups boosted by value chain development[17].

12 Vegetable value addition by Sugu VSLA https://drive.google.com/drive/folders/1GsXAlYUsxqryhc3tYy5sCTfXE4eT18Bd?usp=sharing
13 Testimonial role of committees to VSLA https://drive.google.com/file/d/1OSNj3gZLKz55prjQ3AQLzp0S8S2tEE7D/view?usp=sharing
14 Cassava value addition VSLA training. https://drive.google.com/drive/folders/1zQZGWKQOtS-NjU7OnQZ48PCUANw9M4Lg?usp=sharing
15 EBA Cassava farming at Nsonga VSLA https://drive.google.com/file/d/1n8VoHqTf8qH6qOtT1hky-TgeZh_AoSID/view?usp=sharing
16 Nsonga VSLA members EBA cassava training https://drive.google.com/drive/folders/18yCJBvwmfpJn5-BzTWY43kFTO2SCcUem?usp=sharing
17 EBA training to farmers and testimonials https://drive.google.com/drive/folders/1B0VAfiw41QGrWr0dXcNe326rc5jC8Qkh?usp=sharing

Figure 1Ggera VSLA trained on EBA Approaches

Figure 2 Nsonga VSLA intercropping beans with cassava

Figure 3 Vegetable garden established by Mukama Mulungi female members

Figure 4 Sugu VSLA Agriculture produce dried using solar dryer

Figure 5 VSLA members of Sugu inserting a cassava tray in the solar dryer

Gender differentiated EBA key success factors

A gender-responsive approach to EBA is one that actively promotes gender equality, by acknowledging gender differences and tackling discriminatory policies, practices, and norms. To access these benefits, the different genders had different key success factors and specific needs and sensitivities that need to be covered to ensure optimal uptake. These were as follows:

- Human-centric. EBA emphasizes human adaptive capacity or resilience in the face of climate change. Both men and women need to work together for EBA measures to be implemented properly.
- Draws on local and indigenous knowledge mainly of weather forecasting and implementation of tradition EBA measures like conservation agriculture, use of animals, insects and trees, wind and change in rainfall partners to predict he rains. Therefore, traditional knowledge about how best to do this should thus be drawn upon when implementing EBA.
- Harnesses the capacity of nature to support long-term human adaptation. It involves maintaining ecosystem services by conserving, restoring or managing ecosystem structure and function, and reducing non-climate stressors. This requires an understanding of ecological complexity and how climate change will impact ecosystems and key ecosystem services.

Involves longer-term 'transformational' change to address new and unfamiliar climate change-related risks and the root causes of vulnerability, rather than simply coping with existing climate variability and 'climate-proofing' business-as-usual development.

EBA approaches should use participatory processes for programme design and implementation. Stakeholders should have the right to influence adaptation plans, policies, and practices at all levels, and should be involved with both framing the problem and identifying solutions.

The study found that sustainable ecosystems will be enriched by involving a full range of capacity development that is beneficial to both gender groups at local and national level. These aspects will form part of the social empirical data aspects that will be taken up to inform pro-SDGs policy implementation leveraging EBA as a solution, on the data for policy aspects of this work.

According to (Rizvi et al., 2015)the Directorate-General of Global Affairs, Development and Partnerships (DGM EBA practice should be linked to strong community value chains to enhance monetary income for farmers. In addition, there is also a need for increased focus on both subsistence and commercial crop enterprises, including stimulating increased crop diversity. The value chains stated in (Table 4) are those grown communally by the VSLAs not there individual farmers.

Table 5 value chains they grow using EBA, the EBA techniques being applied by VSLAs farmers

VSLAs implementing EBA practices	**Sugu Agalyawamu women group**	**Mukama Mulungi VSLA**	**Nsonga VSLA**	**Ggera Fortune women group**	**Twekembe Women group Nakifuma**
Value chains grown using EBA approaches	Cassava Vegetables i.e. Africa Egg plants, Nakatti.	Pumpkins Vegetables Cassava	Cassava Beans i.e. NARO Beans 2 Ground Nuts	Cassava Beans i.e NARO Beans 2 Vegetable i.e. Africa Egg plants, Sukuma wiki. *Pumpkins*	Cassava Vegetables Matooke and coffee
EBA Techniques applied	Mulching Intercropping Organic farming Solar drying using solar dryer technology Vegetable compound gardens. soil and water conservation measures,	soil and water conservation measures, Use of insect traps in the pumpkin gardens.	Mulching soil and water conservation measures, Intercropping cassava with beans, cassava with ground nuts Organic farming Climate information use Use of traditional climate knowledge during dry spell to start planting	Mulching Soil and water conservation Intercropping cassava with beans. Organic farming Climate information service use. Planting disease and drought resistant cassava varieties	soil and water conservation measures, Intercropping cassava with beans
Amount acreage covered by EBA	3 acres covered in cassava Vegetables one acre	2 acres of pumpkins 3 acres of cassava Vegetables are grown on subsistence level by VSLA members	7 acres of cassava 2 acres of beans (Harvested) 3 acres of ground nuts intercropped with cassava	5 acres of cassava 2 acres of beans intercropped with cassava Pumpkins half an acre of land Vegetables of sukma wiiki and Africa Egg plants are grown on the subsistence level	3 acres of cassava Vegetables for home consumption 2 acres of

CONCLUSION

This work addressed the gender dimensions needed to drive uptake of EBA, with a focus on 2 key aspects. First, were the beneficial impacts of EBA as experienced by different genders; and second, was the key factors that need to be in place to ensure the different genders benefit from EBA as above. These two sets of analysis then provide empirical data and lessons to inform on the gender success factors in the implementation of pro-SDGs policies across different sectors leveraging on climate action solutions of EBA. Accordngly, the key distinguishing benefits of EBA by gender were – women prefer EBA to enable them enhance farm yields; men prefer EBA to enable them enhance land productivity; while youth prefer EBA to enable them in product development to trade in EBA inputs. On the key success factors / barriers, for example, to women the key barriers covered on the need to be able to afford land to lease for EBA farming. This meant that they needed the cooperatives to continue operating and to increase their yields and earnings to then increase their savings so they can afford to lease land. The other barrier related to the need to ensure compatibility of EBA with home care duties. Consequently, they preferred inputs packaged in such a way that they can easily be portable for farm use. This meant an opportunity for young people keen on establishing EBA inputs enterprises. The youth also needed capital for establishing the EBA inputs enterprises and this meant the urgent need to ensure they also engage in the communal cooperatives to mobilise affordable capital for EBA enterprise actions. EBA –approaches benefits to the farmers trained organised under the CBS-PEWOSA Cooperative arrangement women leadership. VSLAs include; Sugu Agalyawamu women group, Mukama Mulungi VSLA, Nsonga VSLA, Ggera Fortune women group and Twekembe Women group Nakifuma. Those VSLAs benefited environmentally, economically, and social and culturally

Table 6 EBA approaches applied and multiple benefits to the farmers

EBA approaches	**Location/ VSLA trained / implemented**	**Environmental**	**Economic**	**Social and cultural**
Use of organic mature	Sugu Agalyawamu women group Mukama Mulungi VSLANsonga VSLA Ggera Fortune women group Twekembe Women group Nakifuma	Increased soil stability, productivity, fertility and moisture retention and less soil erosion Harvest of organic food stuff	Increased market potential of the harvest.	Improved health benefits Increase in community cohesion and resilience as farmers help each other
Soil and water conservation		Enhanced forest ecosystem from reduced influx of communities environmental sustainability Enhanced clean water which helps to regulate the climate Reduced erosion. Increased water infiltration and storage. Improved air and water quality.	Reduce on weeding costs	Protection of ecosystems for generations

EBA approaches	Location/ VSLA trained / implemented	Environmental	Economic	Social and cultural
Agroforestry		Enhanced soil stability, productivity, fertility and moisture retention. Limited soil erosion Provision of shelter for other plants, especially coffee and banana Trees act as wind breakers	Increase in income from enhanced agricultural productivity from increased soil fertility.	Enhanced food security which improve human healthy. Increased community solidity and resilience, as farmers help each other
Intercropping		improve farmers' livelihoods, facilitate adaptation of coffee production to climate change and contribute to biodiversity conservation.	Increased yields	

ANNEX

List of Village savings and loans association trained by EBAFOSA Uganda.

Village savings and loans association members who have received EBA training

Mukama Mulungi VSLA located in Luwero district – Kalungu village

Number	Name of members	Male	Female	Phone Number /contacts
1	Segujja Geoffrey	Male		778454361
2	Sebuliba Paul	Male		780783856
3	Kiyeya partruck	Male		782101577
4	Sauya Najjuma		Female	774953903
5	Lubega Steven	Male		784539348
6	Edward Gitta	Male		772461570
7	Bettu Gitta		Female	789108624
8	Semakula Irine		Female	778186785
9	Harriet Kakiryo		Female	774252900
10	Fredrick Kakiryo	Male		777800233
11	Ndawula Nuruh		Female	776758163
12	Anold Sembuuze	Male		772040037
13	Nakawesa Allen		Female	781381624
14	Nanjobe Christine		Female	708137514
15	Sentumbwe patrence	Male		782567787

Number	Name of members	Male	Female	Phone Number /contacts
16	Nassezi Joweria		Female	708208575
17	Namitala Sarah		Female	788242635
18	Mbaizi Gerald	Male		776932518
19	Mubiru Rechard	Male		752607713
20	Muwonge Aida		Female	774799210
21	Namagembe spe		Female	751619541
22	Mwinike Rhona		Female	782786821
23	Naglunga Pheobe		Female	789108624
24	Kyando Salm	Male		788303579
25	Naggayi Margaret		Female	
26	Sewinabo Micheal	Male		
27	Senwagi Saul	Male		708816214
28	Wandera Moses	Male		
29	Chance William	Male		
30	Fred Mbayo	Male		
	Twekembe Women's Group Nakifuma located in Mukono district- Nankulabye village			
31	Ssesanda Trevor	Male		0700719034/0771469471
32	Kisakye Harriet		Female	753382733
33	Naiwumbwe Zaituna		Female	705368679
34	Nakiwala Faitha		Female	778934522
35	Nakiyemba Juliet		Female	708726101
36	Namugamba .M. Immy		Female	700719435
37	Namugambe Angella		Female	705938802
38	Namande Jane		Female	755064020
39	Nambi Ruth		Female	706762023
40	Najjuuko Janefrancis		Female	757372152
41	Nagmugambe Angela		Female	757326499
42	Namirembe Hadijja		Female	700971031
43	Eva Maalo		Female	700971031
44	Nuulu Kyaanda		Female	704300497
45	Annet Wagumba		Female	784933185
46	Namusisi Janat		Female	
47	Mayombwe Nakanjako		Female	
48	Ijumba Deborah		Female	
49	Lumala Millian		Female	

Number	Name of members	Male	Female	Phone Number /contacts
50	Nankumba		Female	
51	Mrs. Kisuule		Female	
52	Mrs. Magamba		Female	
53	Nkuusi Poline		Female	
54	Nalwanga Shakirah		Female	779683967
55	Kigenyi Andrew		Female	786437130
56	Babirye Zawedde		Female	
57	Babirye Nakabira		Female	
58	Namuli Esza		Female	
59	Nalwoga Shamim		Female	
60	Nalujja Sawuba		Female	
	Ggera Village savings and loans association located Buikwe district – Ggera village			
62	Nakabogo Betty		Female	770571132
63	Bakanansa Keti		Female	703492047
64	Alibakiriza Recheal		Female	
65	Nasanga Goretti		Female	701758366
66	Nabulime Catherine		Female	706667483
67	Nakonde Priscila		Female	
68	Nanyonga Annet		Female	774479730
69	Kayiga Geofrey	Male		751370746
70	Bengo Moses	Male		706977294
71	Nansubuga Betty		Female	703298015
72	Nakabogo Betty		Female	770571132
73	Namiya Harriet		Female	
74	Luutu David	Male		
75	Namutebi Justine		Female	
76	Namuddu Mariam		Female	
77	Ssempebwa Julius	Male		
78	Nakandi Lydia		Female	
	Sugu Agalyawamu Women Group located in Buikwe district – Sugu village			
79	Zaina Namuli Ntulume		Female	0756856332
80	Nambi Ruth		Female	756331123
81	Nansubuga Milly		Female	788374582

Number	Name of members	Male	Female	Phone Number /contacts
82	Rwantare Sarah		Female	788242184
83	Nakinsige Nuulu		Female	758836279
84	Naiga Nuayati		Female	703950369
85	Namuli Faridah		Female	785460993
86	Nabuma Sawuda		Female	704313742
87	Najjemba Nuulu		Female	701234847
88	Mutesi Nuulu		Female	708023157
89	Najjemba Azzena		Female	774307712
90	Mutesi Jowelia		Female	754135663
91	Nabatanzi Fatina		Female	758636711
92	Nankanja Safina		Female	781936295
93	Namubilu Madinah		Female	753221764
94	Nalwoga Abiba		Female	788127774
95	Nazziwa Annet		Female	759125361
96	Namusisi Beatrice		Female	774504187
97	Bagara Aiddah		Female	778109210
98	Kayya Derick	Male		779644339
99	Nayima Molini		Female	751911137
100	Ssebadduka Ibrah	Male		753362261
101	Namwanje Jalia		Female	
102	Bisaso Hakim	Male		
103	Muwanika Kalimu	Male		
104	Nakalyowa Faridah		Female	
105	Namutebi Jane		Female	
106	Naantogo Jalia		Female	
107	Namugenji Shadia		Female	
108	Nakafu Sophia		Female	
Nsonga Village Saving Loans and Association list located in Mukono district – Nsonga, Katwe, Lugala villages				
109	Birungi Agnes		Female	0756751213/0774901104
110	Nolla Male			0751898731
111	Ssekamatte Ronald	Male		0751543150
112	Wanyale Abdulatif	Male		0756660661
113	Nabayego Annet		Female	

Number	Name of members	Male	Female	Phone Number /contacts
114	Namutebi Oliver		Female	0755029071
115	Akia Sarah		Female	
116	wanbowa Tracy		Female	
117	nakafu Trinity		Female	
118	mbekeka Josephine		Female	
119	Nakame Mariam		Female	0759122948
120	Katerega Mastula		Female	0752417285
121	Katerega Faridah		Female	0753139898
122	Nakate Daisy		Female	0702154814
123	Nakiyinji Catherine		Female	
124	Mirembe Gertrude		Female	
125	Nantongo Florence		Female	
126	Nakazzi Madinah		Female	
127	Nakityo Eve		Female	
128	Namutoosi Jalia		Female	
129	Namuswe		Female	
130	Ndagire Lukwago		Female	
131	Nakasagga Victoria		Female	
132	Lule Agnes		Female	
133	Nakafu Edith		Female	
134	Nampeera Jacinta		Female	
135	Ssalonga Mayanja	male		0782449982
136	wasswa Henry	male		
135	kato Daniel	male		
137	kiwmbi Ahmed	male		
138	serwanga Rajab		Female	
139	Namutale Justine		Female	

Testimonial of EBA approaches for Village savings and loans associations

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