Synthesis of Climate Change, Gender, Youth and Nutrition Issues in Uganda

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BACKGROUND

Emerging evidence suggests that working towards multiple objectives, including those related to mitigating and adapting to climate change, increasing gender equity and youth inclusion, and improving nutrition increases the chances of interventions to achieve their goals and the likelihood that they have long-lasting positive impacts across a range of development objectives (Tallis et al. 2019, Yavinsky et al. 2015). Conversely, interventions that do not follow a more integrated approach may miss tradeoffs across well-being outcomes, exclude vulnerable groups, or even increase the marginalization and vulnerability of others and ultimately might fall short of their objectives. To address this problem and favor the integration of the mainstreaming themes in IFAD operations, a team of researchers at the International Food Policy Research Institute developed a conceptual framework for understanding the linkages between climate change, gender, youth, and nutrition within the larger context of resilience for development drawing on different bodies of literature on these topics (Figure 1). Resilience is particularly suited to develop a coherent, inclusive and rigorous method to plan for interventions and to analyze on-going interventions that work at the intersection of multiple disciplines. Resilience is integrative by construction; it facilitates collaboration among experts of different disciplines and combines relations among human and natural systems.

Central to the concept of resilience are people's capacities. This puts an emphasis on how interventions and programs can support the building of capacities for different groups of people to achieve specific well-being outcomes. People's capacity to respond to shocks and stresses and to negotiate for their preferred solutions determines the range of viable responses. Existing capacities also influence the type of impact that interventions have on households' wellbeing and the potential for people to fully take advantage of interventions.

Gender and age are critical social distinctions that influence vulnerability, capacities, impacts, and the feasibility of interventions. In particular, women and youth often have different needs and preferences from others in the community or other individuals in the household and typically have less bargaining power and control over resources. Other social distinctions also strongly influence resilience and capacities, including ethnicity, class, race, caste, and sexual orientation among many others.

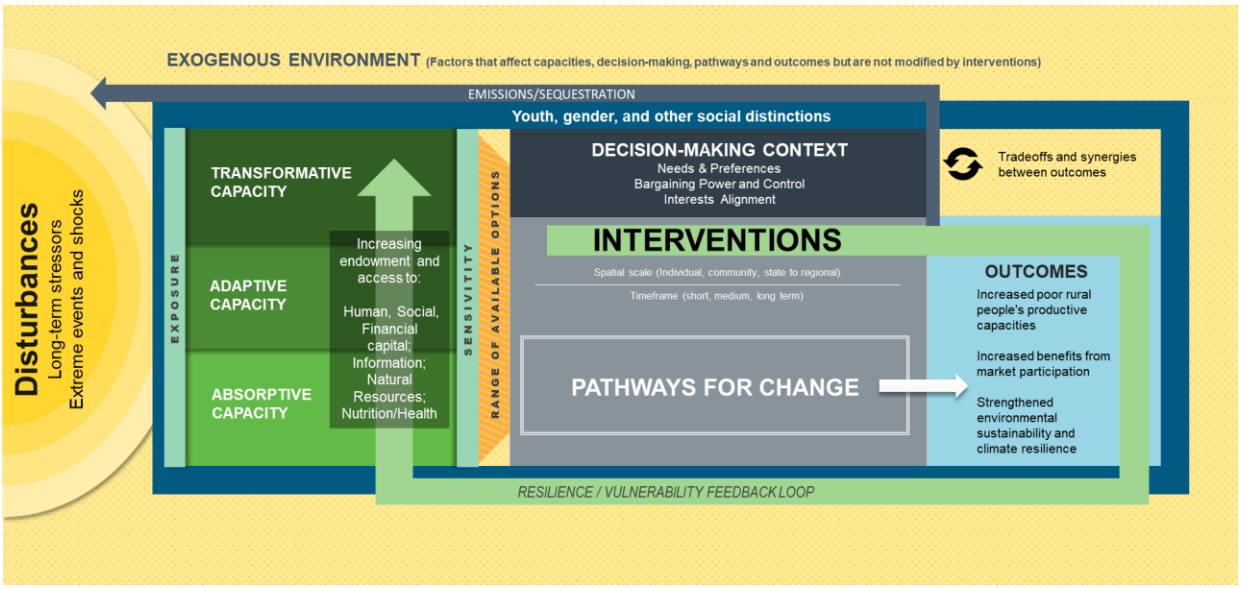


Figure 1. The Climate Change, Gender, Youth and Nutrition integrated analysis framework

Drawing on this framework, the IFPRI mainstreaming team has engaged with IFAD missions in four sub-Saharan African countries (Ethiopia, Ghana, Malawi and Uganda) to generate lessons for the mainstreaming of climate change, gender, youth and nutrition in IFAD's operations. The IFPRI team engaged with IFAD missions at various stages of the project cycle to test the applicability of the framework to the mainstreaming process.

In July 2019, the IFPRI mainstreaming team joined an IFAD mission in Uganda for the design of the National Oilseeds Project (NOSP). The goal of this engagement was to facilitate the inclusion and integration of the mainstreaming areas in the project design and implementation plans. This experience made clear the importance and advantages of a mainstreaming team to work embedded in the project planning phase. This report situation analysis that the team used to support recommendations on entry points for more integrated mainstreaming of climate change, gender, youth and nutrition in the design of the NOSP.

CLIMATE CHANGE

Uganda experiences relatively humid conditions and moderate temperatures throughout the year, with mean daily temperatures of 28 °C with the average monthly temperatures ranging from a minimum of 15 °C in July to a maximum of 30 °C in February. The highest temperatures are observed in the North, especially in the North-East, while lower temperatures occur in the South.

Historical data indicate that during the period the 1975 to 2009 average temperature during the two rainy seasons (March–June and June–September) has warmed more than 0.8 °C. This transition to an even warmer climate is likely to amplify the impact of decreasing rainfall and periodic droughts and will likely reduce crop harvests and pasture availability. A significant warming has been measured in Uganda for instance the Uganda's National Adaptation Programme of Action (NAPA) cites an average temperature increase of 0.28 °C per decade in the country between 1960 and 2010, being January and February the most affected by this warming trend, averaging an increase of 0.37 °C per decade.

The frequency of hot days in the country has increased significantly while the frequency of cold days has decreased.

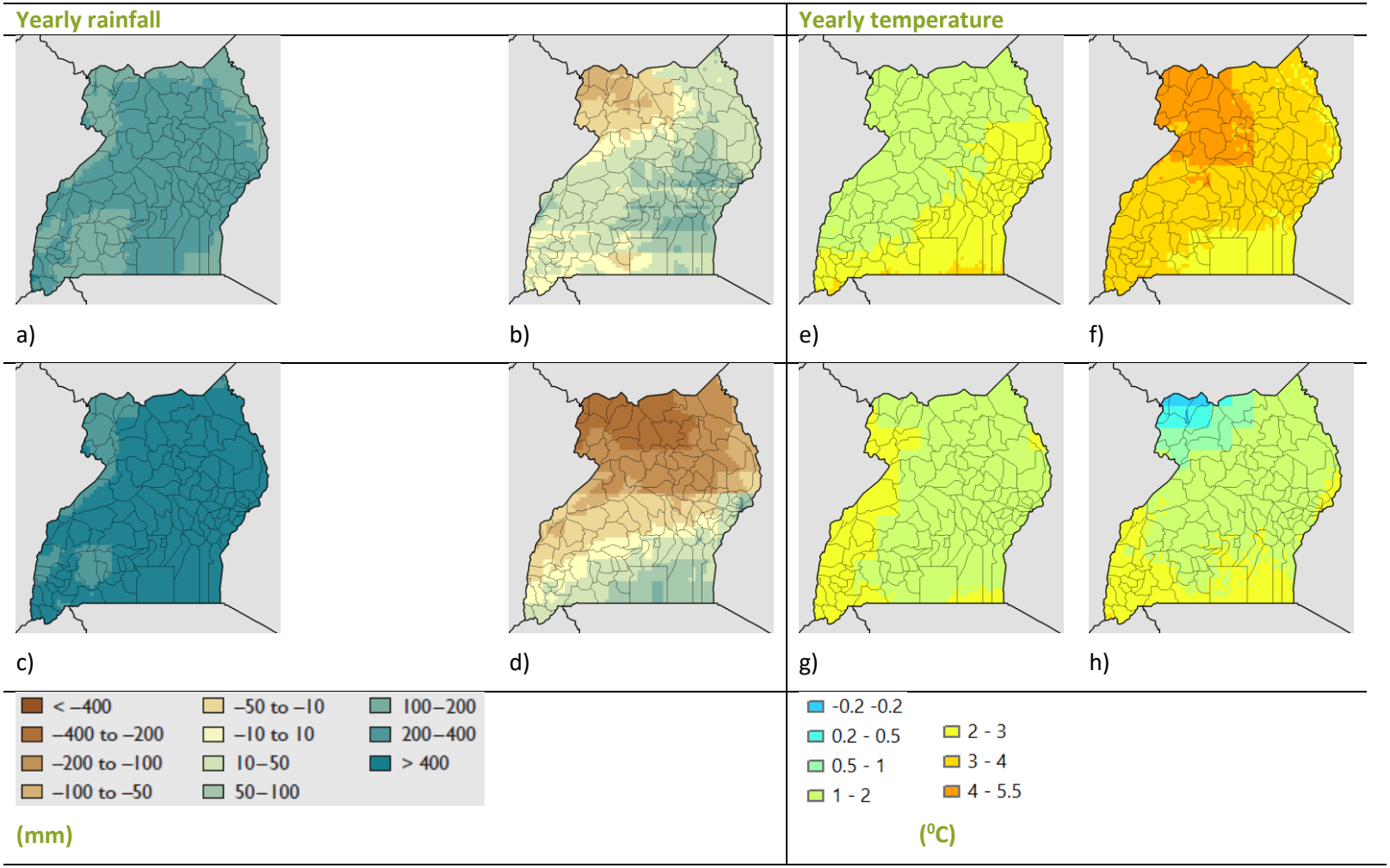
The annual rainfall totals vary from 500 mm to 2800 mm; mean annual rainfall ranges between less than 900 mm in the driest districts to an average of above 1,200 mm per year in the wettest districts located within the Lake Victoria Basin, eastern and the north-western parts of Uganda (37, 38). Precipitations have a bimodal distribution in the south to central parts of Uganda, with two rainy seasons (March–June and October–January), while northern-easterly region experiences one long rainy season. Floods and droughts are the most frequent weather hazards. For instance, the cattle corridor, located in the dry-land region, is prone to drought, while the northern region is especially vulnerable to both floods and droughts.

Time series indicate that rainfall, on average, has been decreasing. Several analyses find an overall decrease in average rainfall of about 12% during the past 34 years in Uganda, with the greatest decreases in the regions of central and western Uganda. Furthermore, during the period 2000–2009 rainfall has been, on average, about 8 percent lower than rainfall between 1920 and 1969.

Climate projections based on data from Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC) using Representative Concentration Pathway (RCP) 8.5 scenarios indicate the possibility of an increase in the country's average temperature in the order of +2.5 °C in the next 50 years (Figure 3, panels e-h). Projections for the next 80 years point to a possible increase of 4.5 °C.

Many climate models predict an increase in short rains (September – November) as global temperatures rise (Figure 3, panels a-d). However, the Horn of Africa region has become observationally drier during the 20th century. This drying trend against the projected increase in rainfall place East Africa into an apparent climate paradox which is generally considered as an indication that more accurate model simulations and an improved understanding of the geophysical processes governing the rainfall over East Africa is necessary. Given these inconsistencies and the errors in climate models' ability to simulate the current climate, whether or not the future climate in East Africa will become wetter as a result of climate change is an open question.

Figure 3. Predicted change in rainfall and temperature based on four climate models, 2000–2050

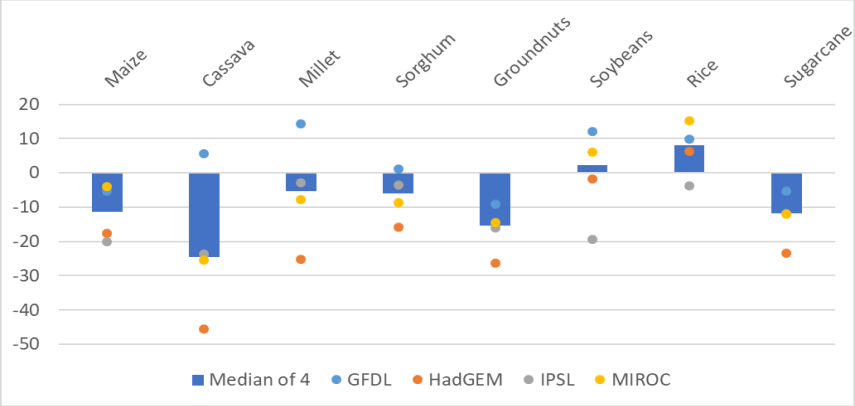


Source: Authors based on Müller and Robertson (2014).

Notes: a and e) GFDL = Geophysical Fluid Dynamics Laboratory; b and f) HadGEM = Hadley Centre Global Environmental Model; c and g) IPSL = L'Institut Pierre-Simon Laplace; d and h) MIROC = Model for Interdisciplinary Research on Climate. Simulations are based on Representative Concentration Pathway 8.5.

Keeping in mind the existing uncertainty in climate projections, we analyze the projected effects of climate change on some of Uganda's major crops. Figure 4 reports the projected changes in yields for eight crops and four different climate models. Even though we do not have projections for sesame, we can use the effects on millet and sorghum as rough proxies. According to GFDL projections sesame could be not negatively affected by climate change but all other climate models show a decrease in yields. Groundnut is negatively affected under all climate scenario while soybean fairs better than all other crops. Given the climate projections of GFDL and MIROC, yields appear to increase but using the other two climate models (HADGEM and IPSL) yields are expected to decrease.

Figure 4. Percentage change in yields due to climate change based on four climate models, 2000–2050



Source: Devised by authors based on Rosenzweig et al. (2014) using weights from MapSPAM harvested area (You et al. 2014).

Notes: GFDL = Geophysical Fluid Dynamics Laboratory; HadGEM = Hadley Centre Global Environmental Model; IPSL = L'Institut Pierre-Simon Laplace; MIROC = Model for Interdisciplinary Research on Climate. Simulations are based on Representative Concentration Pathway 8.5.

One of the main challenges being faced by the oil seed producers is the late on set of rains and late cessation of the first season that results in replanting in some cases or late planting and harvesting of the produce. The late harvesting results in drying challenges and thus increased post-harvest losses. Farmers also complained about the increasing risk of droughts and prolonged dry spells that adversely impact their yields. The rainfall variability is compounded by the low accuracy of the climate information being disseminated to the framers.

The priority reflected in Uganda's Nationally Determined Contribution (NDC) is adaptation. The country aims to reduce vulnerability and address adaptation in agriculture and livestock, infrastructure and water sectors, among others. The strategy to build climate change resilience includes the scaling-up of sustainable land management and climate smart agriculture.

Given the particularly uncertain climate outlook for this region of Africa, it is essential that farmers are given the necessary support and information to develop flexible adaptation and contingency plans. A range of technologies are already being promoted and implemented in the country. Among these are: integrated soil fertility management, agro-forestry, crop diversification, conservation agriculture (crop rotation, mulching, green cover crops and low- or no-till), intercropping legumes with other crops, water management practices and adaptable planting times. These practices, which are climate smart agriculture practices already indicated as viable adaptation option in the country's NDC, must be evaluated considering crop specific performance given soil and other local conditions. Furthermore, to ensure crop

performance and to protect farmers' livelihoods and the implementation of important instruments like crop insurance, the availability of climate information and early warning systems is necessary.

The priority actions that NOSP can contribute to in the agriculture sector include expanding climate information services and early warning systems, climate smart agriculture practices, expanding value addition and post-harvest handling and storage, encouraging agro-forestry and water use efficiency.

Uganda intends to follow a climate resilient and low carbon development pathway. The priorities for mitigation include the forestry and wetlands sectors.

GENDER

Agriculture is the main occupation of women in Uganda—72% of all employed women and 90% of all rural women work in agriculture, compared to 53% of rural men (Garcia 2006). Women play a prominent role in planting, weeding, harvesting, post-harvest processing, storage and food preparation, while men focus on land clearing and marketing of high value crops. Food crops (such as plantains and tubers) are typically controlled by women while men tend to have greater control over cash crops and income (Kasente et al. 2001; Garcia 2006). Other studies confirm that women are at a disadvantage in terms of crops sold in formal markets that generate higher revenues, while maintaining more control over lower-revenue crops (Njuki et al. 2011). Moreover, Peterman et al (2011) find persistent lower productivity on female-owned plots and among female-headed households, after controlling for a range of socio-economic variables, agricultural inputs and crop choices with important differences based on crop choice, agroecological zone, and biophysical characteristics. De la Ocampos et al. (2016) attribute differences in productivity largely to differences in crop choice and factors of production, including women's labor constraints, and lack of access to agricultural inputs and extension.

Promotion of non-traditional exports, such as oilseeds, is considered an important agricultural development strategy for the country, given risks of over-reliance on world markets for traditional cash crops like coffee, tea and cotton (Kasente et al. 2001). However, investments in value chains for non-traditional exports, like oilseeds, have important gender implications given women's more limited involvement in cash crop farming. In particular, there are inherent risks to women's empowerment with commercialization of traditional food crops that they control, like groundnut and sesame.

Constraints. While women are increasingly involved in the cash crop production, including in the oilseed sector, they lack control over income and benefits from it given men's control over marketing activities (Garcia 2006; Vorley et al. 2015). Other constraints to women benefiting from oilseed production relate to their lack of ownership of land, greater risk aversion, lack of access to inputs (like seed), and labor burden. Production of certain crops, such as soybean, and post-harvest processing practices using traditional methods are particularly labor intensive (Kasente et al. 2001; Vorley et al. 2015). Women's priorities to increase their participation in oilseed value chains include access to labor-saving technologies, access to finance, and group formation and strengthening (Vorley et al. 2015). Women also tend to lack access to agricultural information as well as information on climate change and climate-smart practices compared to men (Katungi et al. 2008; Kisauzi et al. 2012), which can limit their successful participation in commercial oilseed production.

Data shows that 31 % of households across the country are female-headed and the rate is only slightly lower in rural areas at 30 % (UNHS 2017). Female-headed household often have particular vulnerabilities related to lack of access to family labor for agricultural production, weaker social networks, and limited

access to resources and information (Katungi, et al. 2008). Widows in Uganda are considered to be particularly vulnerable due to social norms, which limit their control over physical and financial resources (UNHS 2017). Married women often have more access to resources and family labor but may be at a greater disadvantage in terms of other aspects of empowerment such as decision-making and mobility.

In terms of access to and decisions on credit, 66 % of women report having access to credit from any source, with the most common sources being friends or relatives (41.3 %) and group-based micro-finance (31.8 %). Most women have input into the decision to borrow (69.4 %) and how to use the loan funding (73.3 %) across all loan sources. Reasons for taking loans were similar across men and women, according to UNHS data (2017). Primary reasons for both men and women include: to smooth consumption (reported by % of men and 25 % of women who borrowed), to pay education expenses (26 % of men and 23 % of women), and to purchase inputs/capital for non-farm enterprises (19 % of men and 18 % of women) (UNHS 2017).

Women Empowerment in Agriculture Index. The Feed the Future baseline survey conducted in 2012, showed an overall WEAI score of 0.86. The measure of individual empowerment without considering the gap in scores between men and women (the 5DE) shows that 57.8 % of women achieve empowerment (5DE score of 0.80 or above). Among women who did not achieve empowerment, access to and control over productive and financial resources (credit), time burden, and community leadership appear as the domains where women have the lowest scores. Women are much more likely to achieve adequacy in the domains of production decision-making and control over income. Sixty-one percent of women achieve gender parity with the main adult male decision-maker in the household. Baseline WEAI data were analyzed in relation to other development outcomes. Findings show that women in households with moderate to severe hunger are significantly less likely to achieve adequacy in autonomy in production, ownership or control of assets, control over the use of income, and satisfaction with leisure time, while women in households with moderate to severe hunger are significantly more likely to achieve adequacy with respect to access to and decisions on credit. The correlation between hunger and access to and decisions on credit is likely related to credit being used to smooth consumption among the most vulnerable agricultural households rather than for productive purposes. Women with higher decision-making scores have statistically lower levels of wasting of children under 5 years.

Similarly, with respect to decisions on the use of income from these activities, results show that women that participate in cash crop farming report having input into most or all decisions related to income from this activity (91.8 %). These results suggest that increasing women's involvement in cash crop farming would lead to other gains in terms of decision-making over production and income. DHS data from 2016 show similar results with 91 % of currently married women participating in decisions about the use of their earnings (53 % make decisions on their own, and 38 % make decisions jointly with their husband).

In terms of specific decisions related to agricultural production and expenditures, WEAI data show that the majority of women are involved to a medium or high extent in decisions related to getting inputs for agricultural production (79 %), the types of crops to grow (85 %), whether to take crops to market (75.8 %), minor household expenditures (90 %), major household expenditures (65.6 %), own wage or salary employment (86.9 %). DHS data show that currently married women (age 15-49) participate in household decisions either alone or jointly with their husbands on their own health care their own health care (74%) and visits to their family or relatives (72%) than in decisions about making major household purchases (64%) (FtF FEEDBACK, 2015).

While the results for Uganda related to women's participation in production decision-making and income decisions are promising, women's actual influence in production and income decisions may vary by crop and the level of profitability. More disaggregated analyses at the crop level and at various stages of

commercialization are needed to understand gender roles in and benefit from cash crop value chains, including oilseeds.

Given that there are various dimensions of women's empowerment in agriculture, interventions in the sector are likely to have different impacts on these various aspects. Commercialization of oilseeds is no exception. In particular, positive and negative impacts are expected to occur. Hypotheses include:

1) Commercialization of oilseeds traditionally controlled by women as food crops (i.e. groundnut and sesame) will reduce the share of household income and assets that women control.

2) Similarly, commercialization of oilseeds may reduce women's involvement in decisions related to production of and income received from these crops. The use of the Gender Action Learning System (GALS) should mitigate this negative impact to some extent.

3) New labor-saving technologies and services introduced by service providers will save women's time—particularly for those women already involved in oilseed production and processing. Women not previously involved in oilseed production may see their labor burden increase if they are adding new activities to their existing workload.

4) Incentives and capacity building to increase women's active participation in and leadership of farmer organizations and service provision (agronomists, machine operators etc.) will increase women's leadership roles in the community.

YOUTH

Agriculture and related jobs are likely to dominate the employment opportunities for rural youth for the foreseeable future, making the welfare of youth closely tied to trends in agricultural development. Environmental risks related to climate change, land fragmentation and degradation, therefore, pose considerable risk to young people whose livelihoods will depend on agriculture (Brooks et al. 2019). Investments in agricultural research and development and agricultural infrastructure are essential to mitigate these risks and protect rural livelihoods into the future (ibid). Wage labor in the agri-food system will also become an increasingly important source of employment for youth (Dolislager et al. 2019).

Young people under the age of 35 are also more likely to migrate for reasons including: following family, income, marriage, and education (UNHS 2017). Increasing land scarcity due to high population growth will likely drive employment and migration decisions of rural youth into the future (Yeboah et al. 2019). Therefore, policies are needed to increase youth access to land and security of tenure in order to sustain agricultural productivity growth and drive rural transformation (ibid).

Table 1: Status in Employment by Age

Age groups	Paid employee (not casual labourer in agriculture)	Paid employee (casual labourer in agriculture)	Self employed	Contributing family workers	Others	Total
14-17	17.5	9.7	40.3	30.4	2.2	100
18-30	36.8	8.1	46.5	8	0.7	100
31-59	26.4	7.7	62.1	3.4	0.4	100
60-64	15.6	11	69.9	3.1	0.4	100
15-24	34.6	9.1	41.3	13.9	1.1	100

Source: UNHS 2017.

Educational attainment is increasing over time, suggesting that young people are being educated at higher rates than in the past. Between 2012/13 and 2016/17, the percentage of persons aged 15 years and above that lacked any formal education dropped by 9 percentage points from 21% to 12% (UNHS 2017). The main reason for leaving school was lack of funding/not affordable (68% for boys and 65% for girls). Ten percent of both boys and girls left school because their parents decided to take them out or they had a calamity at home. Four percent of girls also left due to pregnancy. Overall, only 6% of both boys and girls left school because they reached their desired education level (UNHS 2017).

It is often argued that youth present opportunities for agricultural transformation given special characteristics, qualities, motivations, and abilities. While these claims are widely made, there is currently no research to support the notion that youth are more innovative, creative, and more likely to adopt new agricultural technology like improved seeds, fertilisers, irrigation and mechanisation; engage with value chains, integrate ICTs into their livelihood activities, or seize new business opportunities as service or input providers (Sumberg and Hunt, forthcoming).

Despite limited evidence about the economic or transformative benefits of investing in rural youth, addressing the needs of this large and growing demographic is essential from a social equity and long-term sustainability perspective. Agricultural value chains both on-farm and off-farm could offer promising career opportunities for young Ugandans, if appropriate information and start-up resources were available for rural youth.

Investment priorities for rural youth depend on the level of transformation of the country and the existing opportunity structure (Arslan et al. 2019). Opportunities for rural youth vary by local context depending on the natural resource base, market access, social norms, and preferences, as well as household characteristics (RDR 2019; Sumberg et al. 2019). In countries, like Uganda, with low levels of rural transformation, investments should focus on building the capacities of rural youth through investments in infrastructure and education and on increasing the productivity, connectivity, and agency of youth in agriculture (Arslan et al. 2019; RDR 2019; Sumberg et al. 2019). Commercialization should increase the rural opportunity structure for youth to participate in and benefit from agricultural transformation.

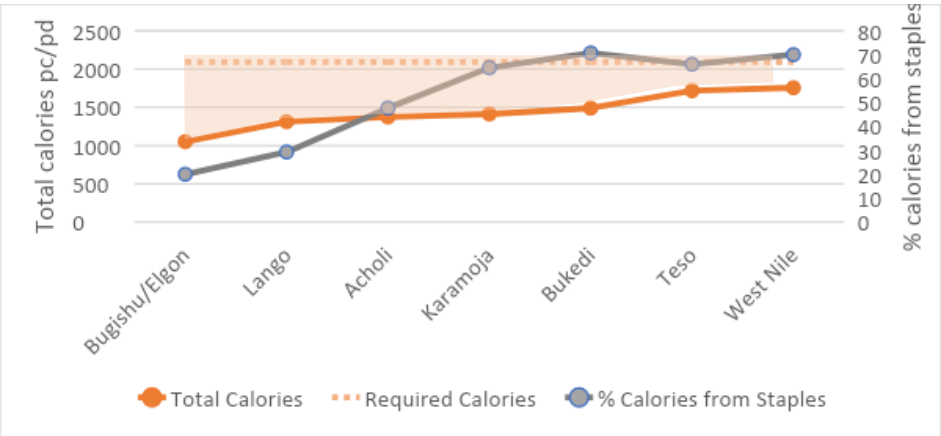
Programs targeted at increasing the opportunities for rural youth should consider gender differences in constraints and needs by young men and women. Young women and men experience the transition to adulthood differently depending on the level of structural and rural transformation of the country (Doss et al. 2019). Research using sex-disaggregated data across 42 countries shows young women are more likely to have transitioned into domestic and reproductive roles and less likely to be in school or employed, and less likely to own land (ibid).

The NOSP offers an opportunity to assess youth opportunities and engagement in the process of commercialization. During field visits, smallholders in the NOSP areas described education as the most important thing for the youth and were concerned about consistent ability to pay school fees and disruptions to their education. Some youth groups visited was not explicitly or predominantly made up of youth and thus did not likely address their particular needs or priorities. The older generations were maintained as group members with the justification that they pass on knowledge and provide guidance to other members who are youth. Youth farmer groups have been formed at schools as part of GoU guidelines. These groups consisted of young girls and boys who were trained in agriculture and farming techniques and engaged in practical demonstrations and field work. VODP2 also conducted trainings and field work as a pilot in two schools and reported generating positive results in informing young farmers about benefits and production/harvesting techniques of oilseeds and in increasing their interest in agriculture sector.

NUTRITION

The UNHS 2016/17 Report provides per capita estimates of calorie consumption by food group based on household consumption estimates. Figure 2 shows that total calorie consumption and the shaded orange area of the figure shows the food energy gap for each sub-region, which is the gap between average population dietary energy requirement (ADER) for Uganda, which is 2091 calories per person per day, and per capita consumption in that sub-region. Most sub-regions face significant estimated food energy gaps. Only Teso and West Nile are just above the cut-off, though it is likely that some proportion of their populations do fall below. For those with higher calorie consumption, the share of calories from staples tends to be higher.

Figure 2: Calorie gap and share of calories from staple foods



Source: UNHS 2016/17 Report (UBOS, 2018). Required calorie estimate is from FAO's 2012 SOFI estimates of Adequate Dietary Energy Requirement (ADER) for Uganda.

Table 2 breaks down estimated per capita calories consumption by food group within each sub-district. Overall, staple food consumption makes up a higher than optimal share of the diet, and nutrient rich foods are greatly under consumed. The Uganda Nutrition Action Plan 2011 sets a target of 75% of calories coming from foods other than staples. Only Bugishu/Elgon meets this target, but it also has the lowest per capita calorie consumption across all food groups. Of interest to NOSP, the share of calories from nuts and pulses is very low. For most sub-regions considered, improving diets will require increasing the

amounts of nutrient-rich foods while maintaining the quantities of staples consumed. While for Lango and Bugishu/Elgon, improving diets will require increasing consumption of all food groups. While increased production of nutritious foods like oilseeds may increase supply and decrease prices, participation on high-value supply chains can also disincentivize consumption as people prefer to sell for profit, such as in the example of quinoa among indigenous Peruvian communities (McDonell, 2016).

Table 2: Estimated per capita calorie consumption, share of calories by food group

	Staples	Nuts & Pulses	Vegetables	Meat, Fish &	Fruits	Milk	Oils	Sugar	Total
Bukedi	70.7	2.1	2.6	2.1	7.4	1.0	2.7	5.1	1489
Bugishu/Elgon	20.0	0.9	7.4	3.1	22.9	3.1	7.0	11.6	1051
Teso	66.0	1.7	3.7	2.2	5.4	1.9	3.9	4.3	1717
Karamoja	64.5	0.4	4.8	2.3	0.9	1.7	5.0	3.0	1412
Lango	29.3	1.7	2.1	2.4	10.0	2.3	15.6	6.3	1312
Acholi	47.7	1.4	3.4	2.0	5.4	0.8	11.2	3.7	1373
West Nile	70.0	1.7	3.5	1.7	2.6	0.2	3.5	3.7	1755

Source: Table created by author; data extracted from UNHS 2016/17 Report (UBOS, 2018).

The inadequacy of diets of children from six months to two years in Uganda is a major challenge. An alarming 15% of children overall received both sufficient diversity and meal frequency to yield a minimum acceptable diet in 2016 (UBOS & ICF, 2018). This rate falls to an alarming low of 2.5% of children under-2 receiving a minimum acceptable diet in Acholi, where stunting is also very high. Other sub-regions with high prevalence of stunting and wasting also have very low rates of adequate child feeding, except for West Nile which is above the national average for minimum diet adequacy but still suffers among the highest rates of stunting and wasting, suggesting that non-diet factors like health shocks may be exacerbating child nutrition outcomes.

Stunting and wasting. Based on the 2016 Uganda Demographic and Health Survey (2018) data collected in 2016, national stunting prevalence is 29% nation-wide. In Uganda, stunting is associated with rural residence and low levels of mothers' education. In the target areas, Bugisu, Karamoja, Acholi and West Nile experience higher stunting rates than the national average by between 2 and 7%.

Wasting is higher than the national average in all NOSP targeted sub-regions except for Teso, by between 2 and 7%. In particular, Bugisu, Karamoja, Acholi, and West Nile all have wasting rates of 9-10%, which is extremely high. In particular, in Karamoja and West Nile the prevalence of severe wasting is nine times higher than what would be expected in a well-nourished population (UNICEF-Uganda, 2018). Furthermore, in West Nile, wasting increased from 6.2% to 10.4% from 2011 to 2016. While in Karamoja, wasting increased from 7.1% to 10% from 2011-2016 (UBOS & ICF, 2012, 2018; UNICEF-Uganda, 2018).These statistics suggest that these areas have experienced major population-wide health or income shocks, and national-wide analysis finds that wasting is correlated poverty (UNICEF-Uganda, 2018). In Karamoja during this same time period (2011-2016), the proportion of the population relying on subsistence agriculture increased from 6% to 51%, highlighting the need to better understand the vulnerabilities associated with shifts in livelihoods approaches (UNICEF-Uganda, 2018).

Drivers of food and nutrition insecurity. Some national studies provide additional insights on the potential drivers of food security and nutrition problems in the North. In particular, the source of household income and women's role in food production and marketing play a role in nutrition outcomes (Azzari et al., 2015; Kirk et al., 2018; Whitney et al., 2018). For instance, women's control over which crops are produced supports them to deliver diverse diets for the family (through own consumption) and fulfil

cash needs (through small-scale sales) (Whitney et al., 2018). While animal foods are an important part of a healthy diet, only ownership of small ruminants appears to influence nutrition outcomes in Uganda (Azzari et al., 2015). And finally, non-agricultural self-employment (in contrast to wage labor) seems to support better nutrition outcomes (Kirk et al., 2018).

MAINSTREAMING IN THE NOSP, UGANDA

The IFPRI team joined the Uganda mission and design team to support mainstreaming in the NOSP. Through this engagement, the IFPRI team helped the IFAD mission by applying a mainstreaming lens to the process of stakeholder engagement, preparing the project's SECAP, and by suggesting components, project activities, and indicators for monitoring and evaluation to be included in the project plans. The IFPRI team identified clear entry points for mainstreaming activities and suggested a series of activities that weaved mainstreaming in the project operations (see the appendix for details). Specific areas of engagement included:

- Situation analysis for each mainstreaming topic
- Develop a protocol for stakeholder engagement/assessment using checklist linked to framework
- Meet each component lead to define mainstreaming activities (shown in Figures 2-4)
- Review the logframe to identify indicators for monitoring mainstreaming outcomes
- Provide recommendations for evaluating the impact of the NOSP, including mainstreaming activities and outcomes

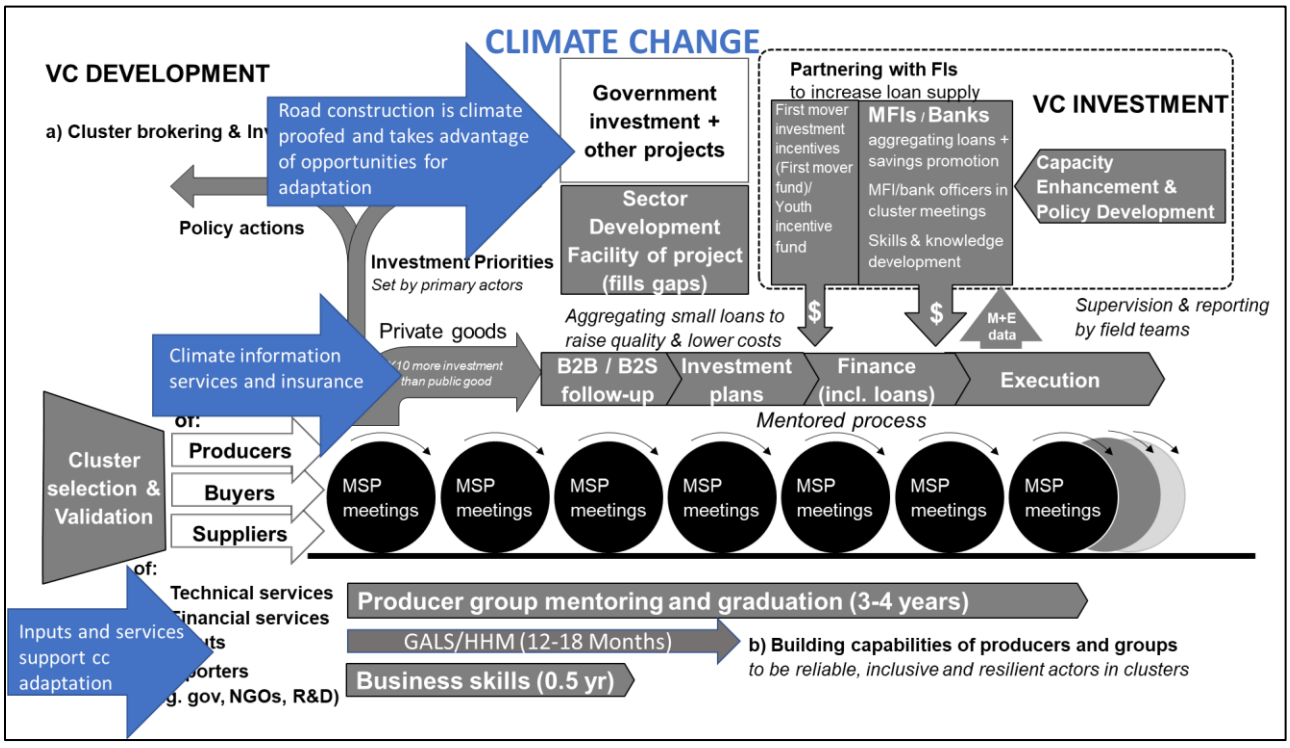


Figure 2. Climate Change additional activities

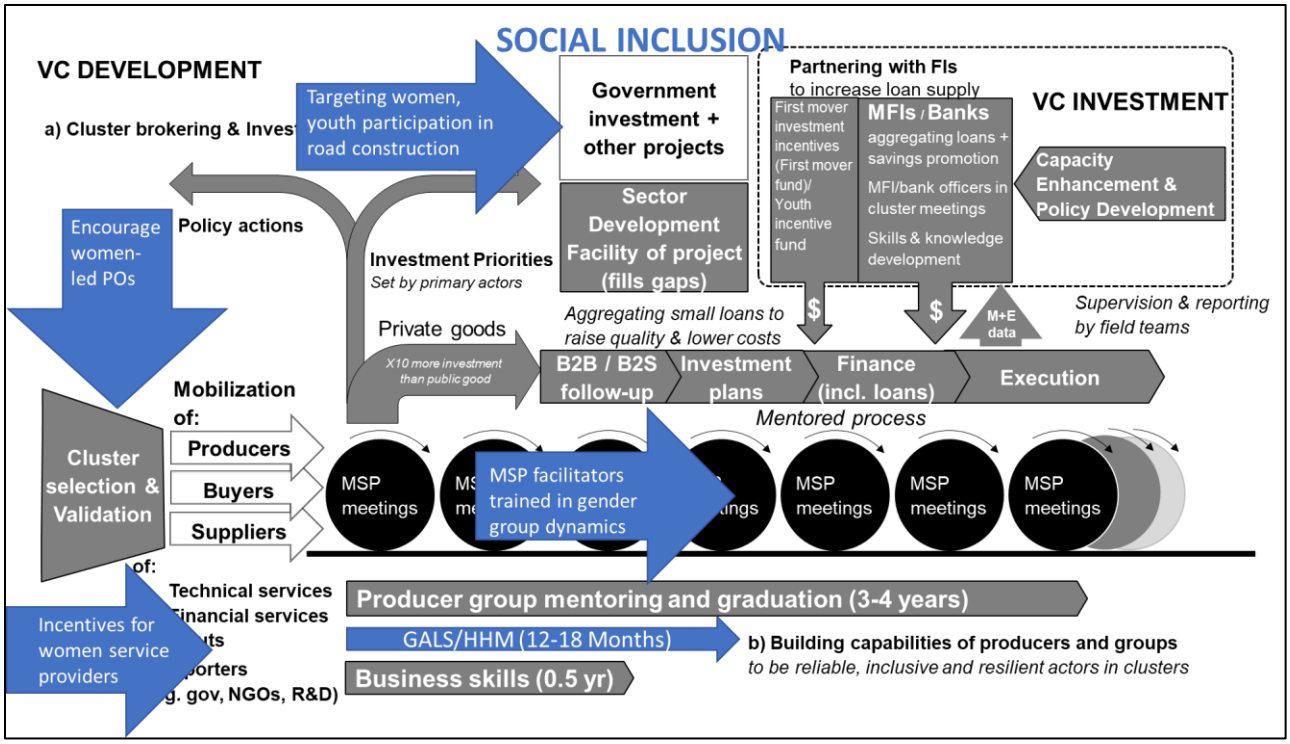


Figure 3. Gender and youth additional activities

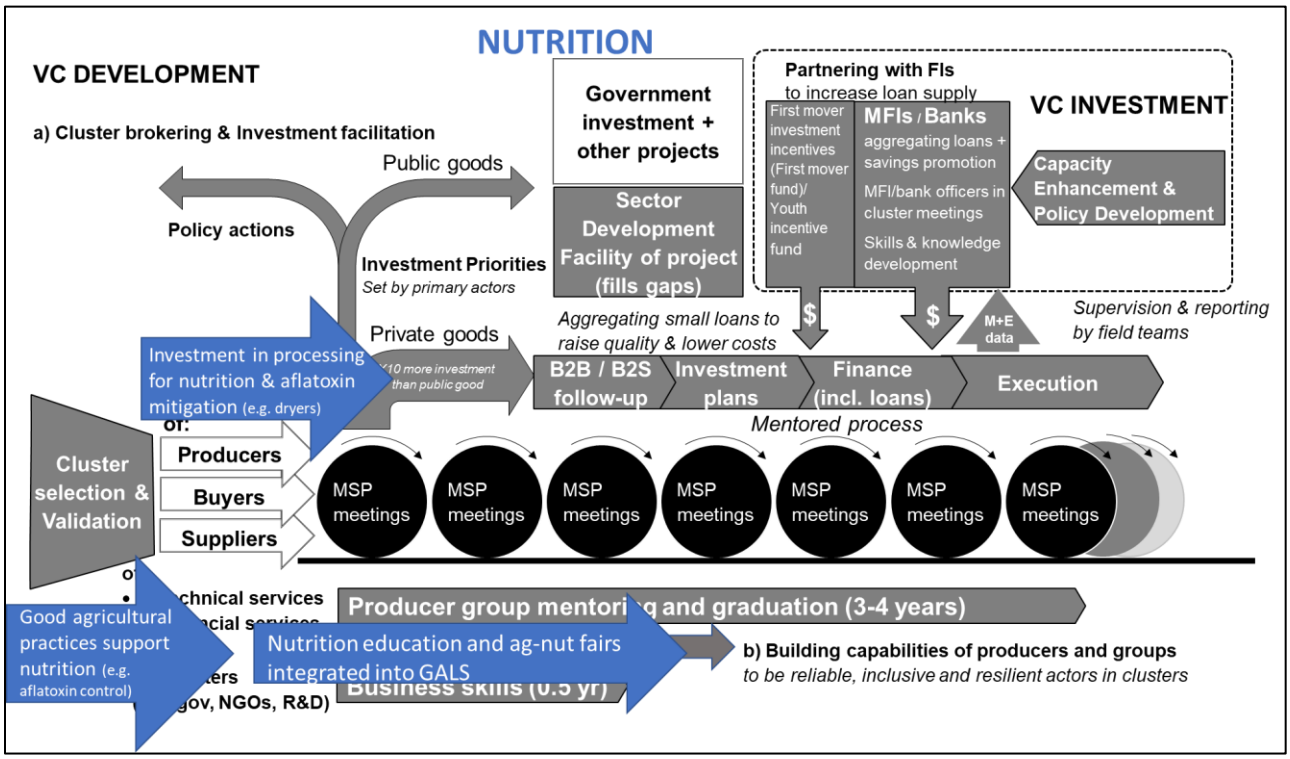


Figure 4. Nutrition additional activities

Recommendations for the NOSP project design and implementation

- Conduct a social diagnostic assessment within each hub to identify social dynamics that should be addressed in the design and implementation of the project. Through this assessment high risk communities with a critical gender imbalance will be identified and intervention approaches will be tailored to mitigate these risks.

- Ensure social inclusion in farmer organizations as part of the stakeholder platforms as well as trainings, information/extension, demonstration to farmers. This may include specific targets for women-led groups in areas where women's active participation in mixed groups is limited and where women prefer this approach. All facilitators/brokers should be trained in gender dynamics to solicit input from women and youth and other marginal groups in mixed groups to ensure that their priorities are reflected in investment plans and selection of services.

- Use of Household Methodologies (GALS and HH Mentoring) to ensure women's participation in household expenditure decisions. The GALS also includes nutrition and climate change. The methodologies will enable farmers to identify common areas of gender inequality limiting women's and youth's development specifically in value chains and household/community progression.

- Provide incentives to increase women's and young people's participation in and benefit from service provision, including mechanization. Increasing the participation of women in the provision of the services envisaged, either as auxiliary or technical, will build the capacity of women along the value chain to participate in and benefit from the commercialization effort.

- Promote good agricultural practices and technologies that are environmentally sustainable, and nutrition- and gender-sensitive. Promotion of renewable energy such as dryers that use crop residues instead of fuel wood to avoid deforestation, precision fertilizer application to increase resource efficiency, integrated soil fertility management and crop rotation and diversification.

- Provide equipment and training to support greater aflatoxin control and awareness. In field practices aflatoxin control measures include selection of drought tolerant seed varieties and good agriculture practices to reduce crop stress. Managing moisture levels post-harvest with appropriate drying technology, such as simple drying racks, and improved storage facilities would also limit further contamination.

- Improve access to nutrition knowledge and health food culture through nutrition trainings and other awareness raising activities. This can be done through partnerships with existing programs to address challenges high levels of stunting, wasting and micro-nutrient deficiencies.

- Build capacity of facilitators/brokers in climate risk mapping/vulnerability assessments. Using downscaled future projections the existing adaptation strategies can be improved and options provided through the NOSP advisory services.

- Invest in the development of climate information services and R&D on drought tolerant varieties. The project can also promote different climate smart agriculture practices to contribute to the NDC priorities by scaling up practices such as minimum tillage, mulching and other soil and water conservation measures and improved water use efficiency and farm management.

- Ensure the design and construction of rural roads is informed by climate risk analyses. The downscaled climate risk models will be used in the risk mapping and integrate measures such as water harvesting structures and improved drainage.

- Incorporate sites for the land degradation surveillance framework and their operationalization to monitor the health of the soil and land use changes.

- Adhere to the SECAP and national environmental regulations in the development of the roads infrastructure. The impact assessments will have to be included in the budgets for the infrastructure development and approvals obtained from NEMA.

- Appoint dedicated staff for social inclusion and environment and climate change at management as well as implementation levels.

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