Progress report on a TC module

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

TC module:	**Promotion of nutrition-sensitive potato value chains in East Africa** (Uganda country package)
Project number:	**16.0110.3**
Contract number:	**81209374**
Term:	10/2017 to 06/2022
Report number:	5
Reporting period:	10/2021 to 6/2022

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List of abbreviations

ASSP	Agriculture Sector Strategic Plan
BugiZARDI	Buginyanya Zonal Agricultural Research and Development Institute
CD	Community Dialogue
CIP	International Potato Center
CUSP	Civil Society in Uganda Support Programme
DLS	Diffused Light Store
EGS	Early Generation Seed
EREPP	Elgin Regional Potato Platform
FFBS	Farmer Field Business School
GAP	Good Agricultural Practice
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
ha	hectare
IDDS	Individual Dietary Diversity Score
IFDC	International Fertilizer Development Center
KASPPA	Kapchorwa Seed Potato Producers Association
KaZARDI	Kachwekano Zonal Agricultural Research and Development Institute
KWESPPA	Kween Seed Potato Producers Association
MAAIF	Ministry of Agriculture, Animal Industry, and Fisheries
MIFA	Mengya Integrated Farmers Association
mt	metric ton
NARO	National Agricultural Research Organization
NDPIII	Third National Development Plan
PDM	Parish Development Model
PNSP	Promotion of Nutrition-Sensitive Potato Value Chains in East Africa
RAC	Rooted Apical Cutting
UPP	Uganda Potato Platform
WASWAPA	Wanale Seed and Ware Potato Association

1 Brief description

Sector	Rural development and agriculture
Program	Not applicable for global program and country package
Program objective	Not applicable for global program and country package
Date of last report	31.12.2021
Module	**Country package:** Promotion of Nutrition-Sensitive Potato Value Chains (PNSP) in East Africa
Module objective	**Country package:** The potentials of a nutrition-sensitive promotion of the potato value chain are utilized in selected regions (improved productivity, sector coordination, and dietary diversity).
Reporting period	10/2021 to 06/2022
Changes in the area of intervention of the module during the reporting period	☐ significant ☐ minor ☒ none
Changes in the donor landscape during the reporting period	☐ significant ☐ minor ☒ none
Achievement of module objective	**Country package:** Progress toward objective achievement **Objective 1**: Increase productivity of 8,000 small-scale potato producers. This was achieved through increased adoption of GAPs (Good Agricultural Practices) by farmers, strengthening of seed potato production through establishment of screenhouses, and supporting of BugiZARDI to produce EGS materials and training of seed multipliers, the project contributed to improved potato productivity from 18.5 metric tons per hectare (mt/ha), compared to 12.5 mt/ha at baseline.

	Objective 2: Strengthen coordination in the potato value chain. Through public-private dialogue platforms, the project was able to contribute to implementation of seven (7) recommendations/strategies obtained in the Agriculture Sector Strategic Plan (ASSP). To implement and achieve these strategies/recommendations 22 measures/activities were agreed upon. Of these 22 measures 18 are under implementation and the project successfully contributed to the implementation of nine (9). **Objective 3**: Improve the dietary diversity of vulnerable groups in Eastern Uganda. The project contributed to the improvement of dietary diversity of vulnerable groups especially women aged 15 – 49. This was achieved through training mothers in basic nutrition, conducting community outreaches, cooking demonstrations and dissemination of nutritional messages through radio messaging, SMS, BCC materials and nutrition champions.
Module is on schedule	☒ yes ☐ no
Risk assessment	There was a prolonged dry spell that lasted at least two months, starting in October 2021:[1] Farmers reported reduced yields for season B. Agro-input costs, especially for fertilizers, started rising in 2021B, which was caused by several factors, such as the disruption of the fertilizer supply chain and the Russia-Ukraine war. Fertilizer prices have doubled, and the accessibility of fertilizer has also been affected.
Proposals for module adjustment	None

2.0 Positioning of the module

2.1 Updated positioning of the module

The project is aligned with the Third National Development Plan (NDPIII) and the Development Strategy and Investment Plan (DSIP) of the Government of Uganda. In the ASSP 2020/21-2024/25, potato is now among the 12 priority crops. The project supported the Uganda Potato Platform (UPP) to coordinate completion of the ASSP for potato. This plan was submitted to the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF). The final version was used for inclusion of potato into the MAAIF

[1] Uganda National Meteorological Authority (UNMA), 2021; https://www.researchgate.net/publication/23772543_Fertilizer_trade_and_pricing_in_Uganda; https://www.fao.org/3/cc0553en/cc0553en.pdf

strategic plan 2020/21-2024/25, known as the Agro-Industrialisation Programme, with multiplication of improved potato seed as one of the key priorities identified for farmers in the sector.

The potato sector enabling environment was also hampered by some lack of clarity at the policy level, particularly on potato certification and inspection. Until 2020, there were no official potato-specific guidelines or protocols in place to determine the quality of seed potato, which meant that small-scale farmers could not be sure about the quality of the seed they were buying on the market. As such, the work to develop seed potato certification and inspection guidelines, which was spearheaded by MAAIF and supported by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) through the International Potato Center (CIP), was both timely and important. During this reporting period, the PNSP project has taken on the next steps to support additional pilot testing of this protocol, and training of local seed inspectors is now finalized and ready for sign-off by the Permanent Secretary of MAAIF.

2.2 Other development measures in the module's specific area of intervention

Donor	Area of intervention / project objective	Synergies achieved at the results levels (outcome and impact)
GIZ-CUSP	Strengthen governance and build capacity in leadership within established potato farmer associations and other related organizations.	The Civil Society in Uganda Support Programme (CUSP) has provided support to the Elgon Regional Potato Platform (EREPP) in strengthening governance of both the platform and district associations. This has resulted in the establishment of the platform coordination office.
Grainpulse Ltd	Promote crop-specific fertilizers.	Participated in open days, during which farmers were able to access quality fertilizers and technical guidance.
CIP	Strengthen Uganda's seed potato regulatory frameworks and improve potato productivity.	CIP supported review and refining of the Seed Potato Inspection and Certification Protocol. CIP also participated in development of the Potato Variety Catalogue and the GAPs Guide for Potato Production Uganda.
Public tissue culture laboratories –	Produce in vitro potato plantlets and rooted apical cuttings (RACs).	Provided early generation potato planting material to seed potato producer associations.

Donor	Area of intervention / project objective	Synergies achieved at the results levels (outcome and impact)
KaZARDI & BugiZARDI		
Microfinance institutions (Microfinance Support Centre, Centenary Bank)	Provide agriculture credit to farmer-led institutions.	Sensitized farmers on the available financial products.
Food for the Hungry Uganda (FHU) Project funded by USAID	Mobilize the community for uptake of critical health and nutrition services in integrated outreaches.	Enhanced awareness on nutrition and dietary diversity.
Tulima Solar funded by USAID	Promote clean energy-saving technologies.	Boosted year-round vegetable and potato production using solar-powered irrigation.
FABI Seed Project	Build the Capacity of National Plant Protection Organizations (NPPOs) in inspection and diagnostics for certification of seed potato.	Trained some seed potato multipliers, as well as National Agricultural Research Organization (NARO) and MAAIF representatives, on the use of field-deployable Loop-mediated Isothermal Amplification (LAMP) assay for *Ralstonia* and virus diagnosis in potato.

3 Developments in the area of intervention

In February 2022, the Government of Uganda launched the Parish Development Model (PDM), which is a multi-sectoral strategy to improve the incomes and welfare of Ugandans by bringing services closer to the people. It is an extension of the approach to development as envisaged under the NDPIII, with the parish as the lowest administrative and operational hub for delivering services nearer to the people, hence fostering local economic development. The main target of the PDM is subsistence households that operate across the entire agricultural value chain. The model will support key farming enterprises,

including potatoes. Under the initiative, each parish will receive 100 million shillings in the current financial year to start the implementation of the program. Kween and Kapchorwa have already prioritized potato as one the key enterprises to be promoted under the PDM with key focus on advisory, seed potato production and multiplication. The district production departments of Kween, Kapchorwa, and Mbale have also committed to promoting the FFBS model and incorporating FFBSs into the PDM.

4.0 Achievement of objectives and changes to risks

4.1 Assessment of objectives, target groups, results hypotheses, and indicators

The table below summarizes the key project results achieved as per each objective, based on the annual survey conducted in October-November 2021. Although no additional annual assessment was conducted, some indicators have been updated based on results achieved as of June 2022 recorded through regular data collection on training numbers.

Module Objective: Improve productivity, sector coordination, and dietary diversity

Indicators	Values	Is the target value achievable within the term?	State of implementation, issues, milestones etc.
Module Objective Indicator 1 Average productivity of 8,000 small-scale farmers (k) (30% women) has increased by 40%	***Baseline value:*** p: 12.5 mt/ha k: 0 ***Target value:*** p: 17.5 mt/ha k: 8,000 ***Actual value:*** p: 18.5 mt/ha k: 8,220	Yes	The project has trained 8,220 farmers on GAPs for potatoes. Training was completed in January 2022. The 2021 annual assessment indicated an improvement in potato yield from 12.5 mt/ha at the baseline to 18.5 mt/ha, representing a 48% increase.
Module Objective Indicator 2 Out of the defined measures/activities a, number of the recommendations/strategies that have been adopted within the public-private	***Baseline value:*** a: 0 u: 0 ***Target value:*** a: 15 u: at least 7 ***Actual value:*** a: 22	Yes	Of the 22 defined measures/activities derived from the 7 recommendations adopted by UPP, a total of 18 are being implemented, two (2) out of which are fully completed and 16 are still

Indicators	Values	Is the target value achievable within the term?	State of implementation, issues, milestones etc.
dialogue platform for national sector coordination are being implemented.	u: 18		being implemented. This is further elaborated in Section 4.2 of this report.
Module Objective Indicator 3 The diversity (d) of the food of 7,000 people (p); 40% are women aged 15-49) has improved, measured through the *Individual Dietary Diversity Score* (IDDS).	***Baseline value:*** d: 3.1 ***Target value:*** d: 3.6 p: 7,000 ***Actual value:*** d: 6.0 p: 16,135	Yes	As of June 2022, a total of 16,135 farmers (11,410 female, of whom 9,941 [87.1%] were aged 15-49; 4,725 male) have been reached with nutrition messages through FFBS training and community outreaches. Based on the 2021 annual survey report, 57% were women aged 15-49 years. The IDDS of women aged 15-49 improved from 3.1 at baseline to 6.0.
Output A. Indicator Indicator A.1: 8,000 potato smallholders (k; 30% women) apply 70% (u) of 25 "good agricultural practices for sustainable potato production" (p), as defined by the project (crop rotation, adaptation to climate change, use of quality seed potatoes, etc.), in two successive planting times.	***Baseline value:*** p: 25 u: 11 (42%) k: 0 • Women reached (in %) out of the target group reached: 0 ***Target value:*** p: 25 u: 18 (70%) k: 8,000 • Women reached (in %) out of the target group: 30% (2,400)	Yes	As of January 2022, a cumulative total of 8,220 farmers (5,630 female [68%]; 2,590 male), against the target of 8,000, have been trained on GAPs for potato. The 2021 annual survey report indicated that farmers are now applying 19 (76%) out of 25 GAPs, up from 11 (42%) at baseline.

Indicators	Values	Is the target value achievable within the term?	State of implementation, issues, milestones etc.
	Actual value: p: 25 u: 19 (76%) k: 8,220 farmers • Women reached (in %) out of the target group: 68% (5,630)		
Output B Indicator **Indicator B.1:** At least 10% (q) of the 8,000 potato farmers (k; at least 30% female farmers) in the project region that have been trained to use seed potatoes that comply with national quality criteria.	***Baseline value:*** q: 0 ***Target value:*** q = 800 k = 8,000 ***Actual value:*** q = 411 (5.9%) k = 6,996 • Share of female farmers using seed potato that comply with the national quality criteria: 274 (3.93%)	Yes	According to the 2021 annual survey report, at least 411 (5.9%) of the 6,996 farmers trained reported using quality seed potato, up from zero at baseline. Given the long-term nature of the seed multiplication process, a revised target of 5% was proposed in the 2021 report. The share of female farmers using seed potato that complies with the national quality criteria was 274 (3.93%).
Indicator B.2: 70% (q) of 800 potato farmers (Y) that have been trained (at least 30% female farmers) indicate that the marketing opportunities for their products have been improved.	***Baseline value:*** q = 0 Y = 0 ***Target value:*** q = 70% (560) Y = 800 • Share of female farmers trained (in %): 30% (240 women)	Yes	As of January 2022, the project had cumulatively trained 6,663 farmers, 4,770 (71.6%) of whom were women, on marketing through a FFBS training module. An additional 45 marketing committees have been established and trained during the reporting

Indicators	Values	Is the target value achievable within the term?	State of implementation, issues, milestones etc.
	Actual value: q = 57.5% (3,147) Y = 5,473 • Share of female farmers trained that indicated marketing opportunities: 35.6% (1,121 women)		period. This brings the cumulative total to 170 marketing committees established and trained at FFBS level, each comprising five members.
Output C **Indicator C.1:** The knowledge concerning family nutrition of 13,000 people (p), of whom 30% are women aged 15-49, that were reached through all information formats of the project has increased by one step on a five-tier scale (s).	***Baseline value:*** p = 0 s = 2 • Women aged 15-49 reached (in %): 0% ***Target value:*** p = 13,000 s = 3 • Women aged 15-49 years reached (in %): 30% (3,900) ***Actual value:*** p = 16,135 s = 4.6 • Women aged 15-49 years old reached: 9,941 (62%)	Yes	An increase in knowledge on a five-tier scale was noted, from 2 at baseline to 4.8 in 2021. During the reporting period, 3,582 people (2,453 female, 2,054 [83.7%] of whom were aged 15-49; 1,129 male) were reached with nutrition messages through FFBS and community outreaches. Since 2018, the project has reached 16,135 people (11,410 female, 9,941 of whom were of reproductive age; 4,725 male) with nutritional messages.
Output C **Indicator C.2:** 80% of the people that have participated in "Community Dialogues" (CD) (at least 40% women aged 15-49) state that they implement	***Baseline value:*** X = 0 ***Target value***: X = 80% (10,400) • Share of females (in %): 40% (4,160) women aged 15-49 years out of the 80% (10,400)	Yes	The 2021 annual survey report indicated that, of the 12,553 people who had participated in community dialogues as of 2021, 10,193 reported to have implemented knowledge acquired on nutritional

Indicators	Values	Is the target value achievable within the term?	State of implementation, issues, milestones etc.
acquired knowledge on nutritional diversification.	***Actual value:*** X = 81.2% of 12,553 (10,193) • Share of females that participated in CD/FFBS module and indicate an application of the acquired knowledge = 80.9% of 7,887 (6,380).		diversification. FFBSs and outreaches registered 16,135 people reached with nutrition messages (11,410 female, 9,941 of whom were of reproductive age; 4,725 male).
Output D **Indicator D.1:** Stakeholders along the complete potato value chain, including 30% women, have adopted a total of 7 recommendations/ strategies (e) in the frame of the public-private dialogue platform for national sector coordination.	**Baseline value:** e = 0 • Participation of women (in %): 0% ***Target value:*** e = 7 • Participation of women (in %): 30% ***Actual value:*** e = 7 • Number of participating stakeholders (absolute): 11 • Participation of women (in %): 27%	Yes	From the 7 actionable recommendations adopted from the ASSP, 22 measures/activities were planned, 18 are under implementation and nine (9) have been explicitly supported by the project, and UPP. During the reporting period, steering committee meetings were organized to review and validate the outcomes of some of the recommendations implemented, such as development of the Potato Variety Catalogue and the GAPs Guide; these were attended by an average of 11 actors, 27% of whom were women.

Indicators	Values	Is the target value achievable within the term?	State of implementation, issues, milestones etc.
Indicator D.2: 70% of the stakeholders (i), thereof 30% women, evaluate the national exchange of learning as good or very good.	**Baseline value:** i = 0 • Number of stakeholders that participated in platform meetings: 0 • Women that participated (in %): 0% ***Target value**:* i = 70 • Women that participated (in %): 30% ***Actual value:*** i = 100 • Number of stakeholders that participated in platform meetings: 11 • Women that participated (in %): 27%	Yes	100% of participants evaluated the exchange of learning as good.

4.2 Measures/activities implemented during the reporting period

Output A: Small-scale potato producers apply GAPs for sustainable potato production.

Indicator A.1: 8,000 potato smallholder farmers (30% women) apply 70% (u) of 25 GAPs for sustainable potato production (p), as defined by the project (crop rotation, adaptation to climate change, use of quality seed potatoes, etc.) in two successive planting times.

During the reporting period, the project contracted 33 FFBS facilitators (9 female: 24 male) for season 2021B. Of these, eight were public extension workers. These facilitators supported the establishment of 72 FFBS learning sites for GAPs. The learning sites were used to demonstrate the use of quality seed, fertilizer application, pest and disease management, harvest, and post-harvest handling. These FFBSs facilitated the transfer of good agricultural technologies and knowledge-sharing among potato farmers. To ensure effective training and adoption of potato GAPs, the PNSP staff periodically conducted field support visits for facilitators and FFBSs, especially during demonstration site establishment; a review meeting; and practical training sessions.

A total of 1,224 people (936 female, 288 male) completed the trainings in potato agronomy curriculum for season 2021B. This gives a cumulative total of 8,220 (5,630 female; 2,590 male) farmers that have been trained in the FFBS program.

To reinforce the training efforts, the project promoted phone-based short message service (SMS) texts to facilitate potato GAP advisory. The potato GAP messages were periodically sent to farmers' phones in alignment with the potato cropping calendar. During the reporting period, 722 smallholder farmers (478 female; 244 male) periodically received messages on potato GAPs. This gives a cumulative total of 5,351 farmers (female 3,188; male 2,163) who have received phone messages on GAPs during the entire project period: 1,074 (581 female; 493 male) in 2020, 3,555 (2,129 female; 1,426 male) in 2021, and 722 in 2022. These SMS texts complement GAP knowledge attained during FFBS trainings. For sustainability of the digital advisory service, partners have made a commitment to discuss this during their departmental planning meetings.

The integrated approaches promoted due to COVID-19 restrictions enabled potato GAP knowledge saturation, and as a result, adoption and utilization of potato GAPs have improved. The 2021 annual survey report indicated that 19 (76%) out of 25 recommended potato GAPs have been adopted by farmers, up from 11 (42%) at baseline. For untrained[2] (wider community) farmers, only 11 (44%) out of the 25 recommended potato GAPs were being practiced. However, some GAPs, such as thinning (0%), use of quality seed potato (5.9%), crop rotation (30.1%), and dehaulming (24.7%), were poorly adopted, which was attributed to limited access to quality seed, limited land, and the need for quick money by famers. Thinning as a GAP for potato was not adopted because it was not applicable.

[2] 100 untrained farmers and 388 trained farmers (project participants) participated in the survey.

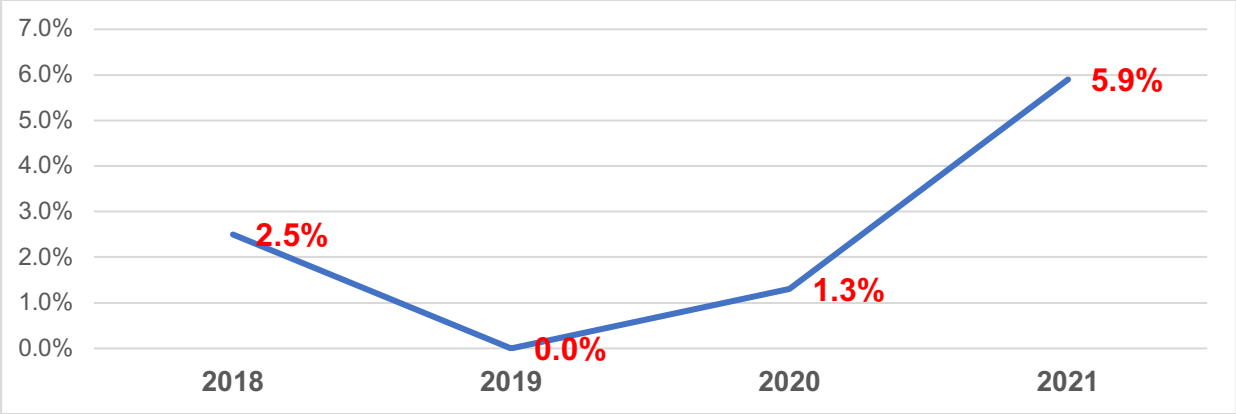
Output B: Business relations between potato farmers and the upstream / downstream sectors have improved

Indicator B.1: At least 10% of the 8,000 potato farmers (at least 30% female farmers) trained in the project region use seed potatoes that comply with national quality criteria.

Indicator B.2: At least 70% potato farmers who have been trained (at least 30% female farmers) confirm that their marketing opportunities have been improved.

Based on the 2021 survey report, 5.9% of the 6,996 trained farmers reported accessing and using clean seed potato, up from zero at baseline. In comparison with untrained (wider community) farmers, none (0%) reported having accessed seed potato. The increase is attributed to improved adoption of GAPs, positive selection, and linkages with available seed producers.

Figure 1: Percentage of trained farmers using certified seed by year



During the reporting, PNSP staff continued providing technical backstopping for the four seed producer associations, i.e., Mengya Integrated Farmers Association (MIFA), Wanale Seed and Ware Potato Association (WASWAPA), Kapchorwa Seed Potato Producers Association (KASPPA), and Kween Seed Potato Producers Association (KWESPPA), on seed potato quality assurance, screenhouse management, and efficient utilization of screenhouses. The team also trained the associations on effective utilization of diffused light stores (DLSs). In season 2022A, 4,700 plantlets were ordered from Kachwekano Zonal Agricultural Research and Development Institute (KaZARDI) by three associations, and these are expected to be planted by the end of July 2022. Although farmers expected to receive the plantlets much earlier, by April 2022, this was delayed because farmers currently rely on only one supplier of tissue culture plantlets (KaZARDI). Agromax, a company that had been providing a similar service, had a problem with contamination of its tissue culture laboratory and was not operational during this period. This has affected the seed production cycles and effective utilization of the seed potato infrastructure. To address this challenge, the project has helped build the capacity of Buginyanya Zonal Agricultural Research and Development Institute (BugiZARDI) by supporting the establishment of four screenhouses and DLSs. BugiZARDI can now produce RACs, which farmers can access at a relatively cheaper price. However, BugiZARDI has limited capacity to produce tissue culture plantlets due to the lack of a fully equipped laboratory at the station.

In 2021B, KWESPPA harvested a total of 13,000 potato mini-tubers, resulting in a cumulative total of 74,174 potato mini-tubers generated from the four seed potato associations. These mini tubers were replanted and will be multiplied for two more seasons to produce basic seed potato. WASWAPA has already harvested 6.7 mt of pre-basic seed, which has been replanted to generate basic seed. The projected production of pre-basic and basic seed potato is summarized in the following table.

Potato mini-tubers harvested per screenhouse/association and potential pre-basic and basic seed

Association	Mini-tubers harvested (number)	Pre-basic (mt)	Projected basic seed (mt)
KASPPA	23,886	Became contaminated	-
MIFA	20,800	8.32	58.24
WASWAPA	16,488	6.76 (harvested)	46.70
KWESPPA	13,000	5.20	36.20
Total	**74,174**[b]	**20.28**	**141.14**

a. The pre-basic seed showed bacterial wilt symptoms in the field and therefore could not be multiplied further as seed.

b. One mini-tuber produces 0.4 kilograms (kg) of pre-basic seed, as observed in Wanale; 1 kg of pre-basic seed produces 7.0 kg of basic seed potato.

Through the Local Subsidy Agreement with BugiZARDI for production of EGS, the 55,018 mini-tubers produced in 2021B were replanted in season 2022A to produce pre-basic seed but have yet to be harvested. Similarly, the 2.3 mt of pre-basic seed harvested from apical cuttings in 2021B was replanted to produce basic seed, which is expected be harvested by July 2022. This can be sold to both ware potato farmers and seed multipliers. However, BugiZARDI plans to increase production of RACs and

tissue culture plantlets as a business, and these can be supplied to individual seed multipliers and seed potato associations. To promote the use of quality seed and foster linkages between seed producers and ware producers, four (4) radio talk shows were aired on OPG FM and Step FM for the *Lumasaaba*-speaking audience and on Elgon FM for the *Kupsabiny*-speaking audience. The exercise involved some of the key stakeholders in potato value chain in Elgon which include District Agriculture officers (DAOs), seed potato multipliers, and farmer representatives, NARO-BugiZARDI and IFDC – PNSP staff. In addition to the radio talk shows, one dialogue meeting on how to improve seed potato production in Elgon region was held and was attended by different key stakeholders on seed potato including DAOs of Kween, Kapchorwa and Mbale, seed potato multipliers representatives, NARO-BugiZARDI and EREPP. The key outputs of the meeting included NARO-BugiZARDI's commitment to intensify production of Rooted Apical Cuttings (RACs); production to be done on an order basis of two months in advance from seed multipliers; DAOs to lead and coordinate seed potato production; and EREPP together with UPP to lobby MAAIF to expedite approval process of seed potato inspection and certification protocol.

Based on the above, seed potato production in the Elgon region is progressively improving. However, a lack of official potato-specific quality assurance guidelines and capacity has been a gap, precluding the efforts of seed potato producers to be appreciated by the seed market. As a strategy for strengthening the quality assurance of seed potato, PNSP, with support from MAAIF, CIP, and UPP, completed the field validation and testing of the Seed Potato Inspection and Certification Protocol. Similarly, during the reporting period, PNSP supported MAAIF to train 21 (5 female; 16 male) seed potato inspectors, 17 of whom were district agriculture extension staff from Eastern and Southwestern Uganda. This will contribute to the decentralization of seed potato inspection services to minimize the costs and strengthen the process. Farmers were advised to register their seed potato businesses with MAAIF. UPP was given the role of mobilizing and submitting the details on all seed potato multipliers to MAAIF.

During the reporting period, 1,190 farmers (910 female; 280 male) were successfully trained on marketing in 2021B through the FFBS. Cumulatively, 6,663 farmers, 71.6% (4,770) of whom were women, have been trained on marketing through the FFBS curriculum. To ensure a sustainable marketing process, the project promoted a farmer-led marketing approach through the establishment of marketing committees at FFBS level. During the reporting period, 45 marketing committee representatives (26 female; 19 male) were trained on marketing strategies. Cumulatively, 170 marketing committees have been established and trained in potato marketing. The committees have facilitated linkages with formal and informal markets.

As a mechanism for fostering a sustainable marketing system, the project continued to build the capacity of the FFBSs to actively participate in the marketing process. According to the 2021 annual household survey, 3,147 farmers, representing 57.5% of the 6,996 trained farmers, reported that their marketing opportunities had improved; of these, 36.5% were women. This improvement was attributed to the

marketing skills gained by trained farmers, which include proper sorting and grading of potato, harvesting of mature potato after dehaulming, and identifying markets before harvesting. However, the contract marketing of potato did not go well because of mistrust and a lack of respect of terms set by both parties. This halted the process, and farmers and off-takers are currently discussing areas of improvement.

Additionally, to foster linkages among potato value chain actors, three open day events were held in Kapchorwa, Kween, and Mbale. These were attended by 219 participants (127 female; 92 male), including farmers, traders, agro-input dealers, the Microfinance Support Center, district agricultural officers, political leaders, and seed producers. After the meeting, four (one female; three male) farmers opened bank accounts with the financial institutions.

In 2021, the project established 10 low-cost ware potato store models on a cost-share basis with 10 individual FFBS farmers who were selected based on their interest and capacity to co-fund. The farmers had started utilizing the stores, and success stories were being reported. To understand the profitability of the stores, a cost-benefit analysis study was conducted in 2022. The study results indicated a cost-benefit ratio of 1:2, meaning that for every U.S. $1 invested in the storage of potato using the ware potato store, the farmers will receive U.S. $2 in return value throughout the life expectancy of the store, which is estimated to be 10 years. The study also revealed that, by storing potatoes for an extra month, a farmer can earn a 50% price increase per kilogram; the ware potato can be stored for at least two months, depending on the variety.

To promote the low-cost ware potato model store within the FFBS, the project facilitated a learning visit for 298 FFBS marketing committee representatives to ware potato stores. This was also aimed at facilitating linkage between FFBS and ware potato hosts. Some of the actions agreed upon included lobbying the government to prioritize the construction of the stores through the PDM.

Module Objective Indicator 2: Strengthening coordination of the potato value chain

Output D: Public-private potato sector dialogue is strengthened at national and regional levels
Indicator D.1: Stakeholders along the entire potato value chain, including 30% women, have adopted a total of seven common recommendations/strategies in the frame of the public-private dialogue platform for national sector coordination.
Indicator D.2: 70% of the stakeholders, 30% of whom are women, evaluate the national exchange of learning as good or very good.

The project has been progressively supporting both the national and regional potato platforms in Uganda, with the aim of strengthening coordination within the potato sector. During the reporting period, the project supported both UPP and EREPP to organize coordination meetings. At the national level, three steering committee meetings were organized, aimed at facilitating the development of UPP sustainability strategies, as well as review and dissemination of platform documents. On average, the meetings were attended by 11 members of the platform, 27% of whom were women.

The project also supported implementation and completion of the actionable recommendations that were agreed upon in 2021. Of the 22 defined measures adopted by UPP, a total of 18 recommendations are under implementation two (2) out of which are fully completed and 16 are being implemented, 12 measure/activities have been directly supported by PNSP project. During the reporting period, the project facilitated meetings to review and validate the Potato Variety Catalogue and the GAPs Guide for

Potato Production. Both the catalogue and the GAPs Guide have been finalized and are in circulation through UPP. UPP has sold some copies of the Potato Variety Catalogue and secured advertising space for potato sector stakeholders at a fee.

Similarly, the project facilitated MAAIF to conduct pretesting and validation of the seed potato inspection and certification protocol and training of 21 seed potato inspectors (five female; 16 male) on new seed potato inspection guidelines. Of these seed potato inspectors, 17 were district agriculture extension officers and four were MAAIF inspectors. This was aimed at building the capacity of the district agriculture officers and agricultural extension officers at the subcounty level to support MAAIF in the inspection and certification process of seed potato producers, which will contribute to decentralization of seed potato inspection services to minimize the costs and strengthen the process. Since these inspectors were identified and trained at the community level, they can support timely inspections and can easily be reached by seed multipliers for technical guidance. This will reduce the cost of inspections and improve the accessibility of certification services in the community. They will start the process of quality assurance through local seed inspection in season 2022B.

The status of actionable recommendations under the ASSP as per the end of the project are listed in the table below.

Strategic objective	Output completed	What was done in 2021B/2022A
SO1: Strengthen institutional, legal, and regulatory framework	• Seed Potato Inspection and Certification Protocol finalized. • One National Potato Strategy developed (ASSP). • Harmonize and adopt a Good Agricultural Practices Guide for Uganda. • Contributed to training 8,220 farmers on potato GAPs. • Trained 36 extension workers (facilitators) in potato agronomy.	• Facilitated MAAIF to conduct pretesting and validation of the Seed Potato Inspection and Certification Protocol. • Supported the development and validation of a harmonized GAPs Guide for Potato Production.
SO2: Enhance decentralization of seed production, multiplication, certification, and distribution	• Support operationalization of screenhouses for production of EGS, backstopping four seed producer associations.	• Conducted technical backstopping sessions for four screenhouses in Elgon region.

Strategic objective	Output completed	What was done in 2021B/2022A
SO4: Capacity building, information management and dissemination	• Potato Variety Catalogue production in place. • Inspect and certify seed crops for distribution	• Supported development and validation of the Potato Variety Catalogue. • Supported training of 21 seed inspectors (five female; 16 male), 17 district extension workers, and four MAAIF inspectors on seed potato inspection
SO7: Improve funding to the Potato Industry	• Increase government budgetary allocations to the potato sector.	• UPP signed a Memorandum of Understanding (MoU) with MAAIF to take on the role of coordination in the potato sector. Therefore, UPP will potentially receive some resources from MAAIF for continuation of sector coordination activities.

Other actions highlighted in the ASSP that the project has contributed to include training 8,220 potato farmers in GAPs, building the capacity of 36 extension workers in potato agronomy, and promoting DLSs and ware potato stores.

At the regional level, four coordination meetings were held, aimed at generating lessons and sustainability actions of the platform going forward; launching the EREPP strategic plan; promoting dialogue with potato traders; and developing a sustainability checklist. The meetings were attended by various stakeholders, including members of the platform; representatives of the district local governments of Kapchorwa, Mbale, and Kween and BugiZARDI; and potato traders. The key outputs of the meetings were the formation of two potato trader associations of Kapchorwa and Kween, which are currently operational, and the launch of the EREPP five-year strategic plan. The project sustainability checklist was developed, and the following were some of the key sustainability actions agreed upon: establishing and strengthening potato value chain actors' institutions such as ware potato traders'

associations; respective District Agriculture officers to oversee and coordinate seed potato production; Nutrition champions to be integrated to district health extension service.

Module Objective Indicator 3: Improve the dietary diversity of vulnerable groups in Eastern Uganda
Output C: The population in the project area, especially women aged 15-49, applies their newly obtained knowledge with regard to family nutrition.

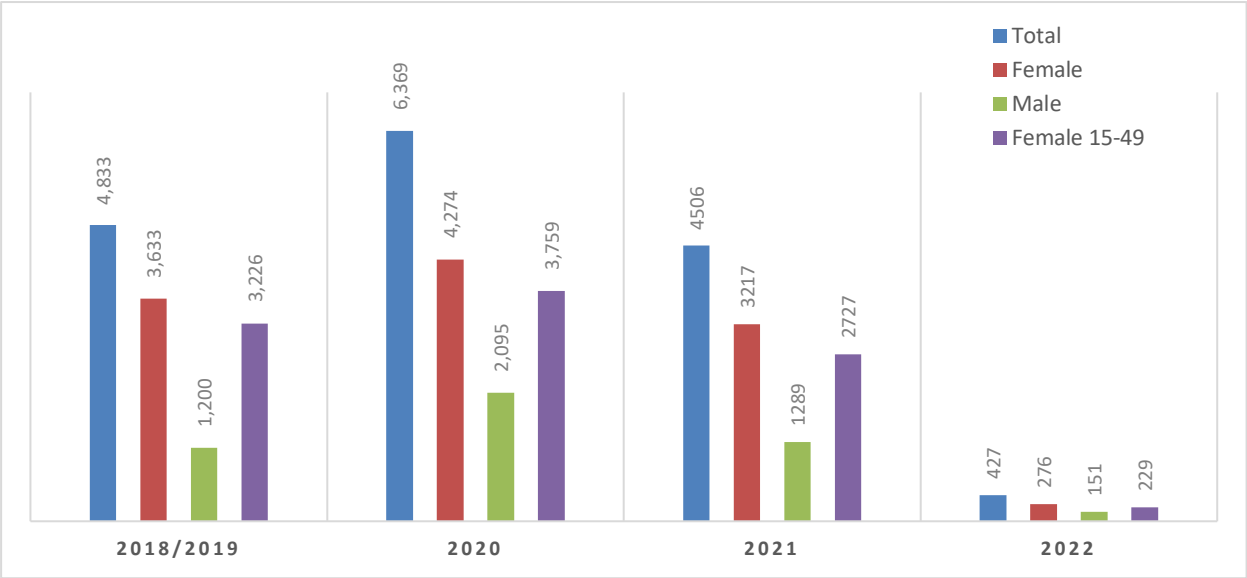
Indicator C.1: The knowledge concerning family nutrition of 13,000 people (p), of whom 30% are women aged 15-49, that were reached through all information formats of the project (mViazi, dialogue and coordination platforms, etc.) has increased by one point on a five-tier scale (s).
Indicator C.2: 80% (10,400) of the people that have participated in Community Dialogues (at least 40% women aged 15-49) confirm they utilize the knowledge on diet diversification.

The rollout of the grassroots food diversity campaign "*What does your family eat*?" was finalized. The campaign used community-based approaches, such as the community outreaches and nutrition champions, to disseminate nutrition messaging, in addition to media, such as radio for the wider community and SMS texts to FFBS farmers with registered mobile phones.

During season 2021B, a total of 72 kitchen garden demonstration sites were established at FFBS level. In addition, 71 cooking demonstrations were conducted through the FFBSs and 1,368 farmers (1,008 females, 864 of whom were aged 15-49 years; 360 males) were successfully trained on the nutrition curriculum through the FFBS model. Since 2018, the project has successfully trained an overall total of 8,513 farmers (6,405 females, of whom 5,691 were aged 15-49 years; 2,108 males) on the nutrition curriculum through the FFBS model.

During February and March 2022, three mega community outreaches were conducted in Mbale (Budwale), Kapchorwa (Sipi), and Kween (Binyiny). These were attended by 427 people (276 female, 229 of whom were aged 15-49 years; 151 male). Cumulatively since 2018, 7,622 people (5,005 females, 4,250 of whom were aged 15-49 years; 2,617 males) were reached with nutrition messages and services through community outreaches. This brings the cumulative number of people reached through both community outreaches and the FFBS model to 16,135 (11,410 female, 9,941 (87.1%) of whom were aged 15-49 years; 4,725 male). This is illustrated in the graph below.

No. of people reached with nutrition messages



PNSP continued to disseminate nutrition messaging through the FFBSs and the grassroots food diversity campaign, which includes community-based approaches; nutrition champions and outreaches; and media via radio and SMS to phones. To complement the trainings on nutrition at the FFBS level, the project continued sharing phone-based SMS texts. Within the reporting period, a total of 722 people (478 female; 244 male) received nutrition messages.

Similarly, since November 2021, PNSP has engaged three radio talk shows in disseminating nutrition messaging on: the first 1,000 days, particularly maternal nutrition during pregnancy and lactation; breastfeeding of infants; complementary feeding; and gender in nutrition. Nutrition messaging on COVID-19 continued to be integrated into the messaging as per the Ministry of Health's guidelines.

In addition to the two stations, already running the campaign (Elgon FM and Step FM), OPG FM was also included. OPG FM was included based on monitoring reports and recommendations from the district nutrition focal person and district agricultural officer of Mbale. One talk show was conducted, and 90 spot messages were run on OPG FM for the *Lumasaaba*-speaking audience in November 2021. From January 2022 to February 2022, four talk shows aired and 360 spot messages were run on OPG

FM and Step FM for the *Lumasaaba*-speaking audience and on Elgon FM for the *Kupsabiny*-speaking audience. A listenership survey was conducted in April/May 2022 to ascertain listenership and knowledge uptake of targeted audiences.

Campaign promotion materials were also distributed from February to June 2022 at outreaches. A total of 100 T-shirts were distributed to FFBS participants. Similarly, at the PNSP closeout event, 50 participants received hard copies and a flash drive of technical notes of all studies conducted by PNSP, FFBS agriculture and nutrition manuals and IPC cards, recipe cards, and an FFBS brochure. The participants that received the information included MAAIF, district agriculture officers, and district nutrition focal persons from Kween, Kapchorwa, and Mbale.

During the reporting period, a total of 28 nutrition champions were handed over to the district nutrition focal persons in April 2022. Each champion received a certificate of appreciation from the project for their service in the campaign. Lessons learned from the community-based approach were documented through plenary sessions at the handover meeting with the district nutrition focal persons and the nutrition champions.

As a sustainability strategy for promoting nutritional diversity in the communities, the project supported nutrition champions to draft the nutrition bylaws that were shared during the subcounty visits, and these were presented to the technical planning committees. A total of three sub counties were visited in three districts: Kaseko subcounty in Kween, West subcounty in Kapchorwa, and Budwale subcounty in Mbale. The bylaw in Kaseko was approved by the council to be enforced starting in July 2022. The other two subcounty councils had yet to debate the bylaws as of June 2022.

A qualitative study was also conducted to identify best practices, document challenges, and recommendations to adapt this community-based approach in nutrition education for future interventions. The study was completed in April 2022. Some of the key best practices highlighted included:

- The use of BCC (Behavior Change Communication) promotion material such as T-Shirts with pictures of different foods recommended for balanced diets, is critical to ensure that nutritional messages are communicated precisely to the target audience
- Leveraging local resource persons such as religious and cultural leaders to deliver key nutrition messages during community sensitization meetings was beneficial in achieving the project outcomes
- Nutrition champions played a critical role in providing community based nutritional extension services and this resulted in more target beneficiaries (over 16,000) receiving nutritional information.

The study also acknowledged that some aspects of nutrition promotion would have enhanced implementation. These were the limited promotion of animal protein such as rearing of small ruminants and poultry as well as support from the project in facilitating official district nutrition coordination meetings which would have helped with more regular coordination and sharing of synergies with other actors within the region.

Overall, the study findings showed that the PNSP project was able to improve nutritional knowledge of both project and non-project beneficiaries through radio messaging and community sensitization sessions. The key findings of the report and recommendations are summarized in the table below.

Key findings	Recommendation
About 73,120 beneficiaries were reached based on 2014 national population data focusing on the project intervention areas.	Elgon FM and OPG FM radio are the main radio stations listened to by the community in Mbale. Therefore, it is recommended that these two radio stations be used for community sensitization sessions, as other radio stations do not have wide coverage in the Elgon region.
The number of women receiving antenatal care at health facilities has increased. This has improved awareness of women on the importance of the first 1,000 days among mothers.	Interventions aimed at improving the livelihoods of project beneficiaries, in addition to other nutrition interventions, should be integrated so that the income obtained from livelihood activities can be used to buy nutritious foods that may not be readily available in a household, so as to improve the maternal and child dietary diversity.
The campaigns addressed gender issues, for example, budgeting for household food acquisition. These aspects require male involvement because it is a shared responsibility and thus cannot be conducted individually.	For sustainability of project intervention activities, nutrition circles should be formed among champions and beneficiaries. These nutrition circles could be used to sensitize the women and other community members on proper nutrition and feeding practices and to strengthen the ownership and continuity of project interventions, such as food demonstrations.

4.3 Implementation of measures to ensure the long-term effectiveness of the project

During the reporting period, a lesson learned workshop was organized, with the aim of generating project sustainability commitments from stakeholders. The discussions focused on key areas of the project, including seed potato production, sector coordination, and extension approaches promoted by the project. The workshop was held May 30-31, 2022, at Mount Elgon Hotel in Mbale and was attended by 54 participants, including the Commissioner of the Department of Crop Inspection and Certification (DCIC) of MAAIF, Paul Mwambu; Assistant Commissioner of Crop Certification, Dr. Asio Teddy; GIZ Head of the Rural Development Program, Luigina Blaich; NARO-BugiZARDI; district local government representatives; seed potato multiplication representatives; and private sector seed potato producers, represented by Agromax.

The sustainability actions and commitments from stakeholders are summarized in the table below.

Innovation	Action for sustainability	Owner/Responsible partner(s)/commitment
Integration of Nutrition and GAPs in Farmer Field Business Schools (FFBS) model	• Integrating the model into district local government operational plans and budgets. • Strengthening and expanding the capacity of local government extension workers and lead farmers/champions to continue supporting the farmer groups. • Popularizing the model in other sub counties where the model has not been implemented. • Integration of nutrition trainings under FFBS model	District production and health departments, development partners within respective local governments.
Seed potato production (EGS, RACs, seed	• Strengthening the production of tissue culture plantlets at NARO-	Agromax committed to establishing a tissue culture laboratory for production of potato

Innovation	Action for sustainability	Owner/Responsible partner(s)/commitment
multiplication, and established infrastructure)	BugiZARDI through partnership with Agromax. • Training, sensitizing, promoting, and marketing of seed potato. • Enhancing sector coordination and quality assurance (approval of seed potato inspection and certification protocol).	tissue culture plantlets in the Elgon region. Key stakeholders: • District local government • Agromax • IFDC and CIP • NAROs – BugiZARDI/KaZARDI • Seed potato multipliers • MAAIF
Sector coordination	• Recognizing UPP as a coordinating platform for the potato sector. • Broadening and strengthening membership, partnerships (capacity building of regional platforms, networking, resource mobilization). • Strengthening market linkages (packaging materials, market information, targeting partners, such as FarmGain, Alliance for a Green Revolution in Africa, and Kilimo Trust).	• UPP • MAAIF MAAIF committed to supporting UPP activities, especially by signing an MoU with UPP.
Behavior change and communication approaches for nutrition (nutrition champions, outreaches, community dialogues, etc.)	• Integrating nutrition activities into district and subcounty workplans and budgets.	District health department – lead district nutrition focal person and production department.

Innovation	Action for sustainability	Owner/Responsible partner(s)/commitment
	• Enacting nutrition bylaws and ordinances. • Leveraging airtime at the Resident District Commissioner (RDC) office and promoting radio programs for nutrition education. • Integrating the nutrition champions into the local government community-based health extension system.	

The district local governments and MAAIF were tasked to ensure that the actions are incorporated in the developments plans and are implemented. These actions will be monitored by the respective district production departments post the project.

4.4 Module term and time schedule

N/A

4.5 Costs incurred and reallocations

4.6 Assessment of results and risks

Risk	Rating*	Influence-ability*	Risk management measure taken
COVID-19	2	1	Standard operation procedures for COVID-19 were adhered to during the meetings by ensuring the use of hygienic practices, such as masks, handwashing, and social distancing.
Adverse weather conditions – prolonged dry spells	3	2	Weather forecast information was shared with farmers, and farmers were encouraged to use insecticides to manage pests. Water management/conservation strategies were

Risk	Rating*	Influence-ability*	Risk management measure taken
			promoted in GAP trainings to ensure efficient water utilization by plants.
Availability of certified seed	3	2	Current interventions in terms of basic seed potato production will reach maturity in 2022. To bridge this gap, a functioning system of local seed inspection is required. This will be resolved once the trained local seed potato inspectors start the inspection process.
Soil health (soil PH, fertility, diseases)	2	2	The project contributed to soil fertility enhancement trials and promoted GAPs, especially proper crop rotation and the use of clean seed.
High cost of agro-inputs, especially fertilizers	3	3	Farmers were encouraged to use organic manures and biopesticides.

* Scores: 1=low, 2=medium, 3=high, 4=very high

5.0 Overarching recommendations and lessons learned

5.1 Recommendations and reminders for the political dialogue on policies and priority areas

- Although the FFBS model gives an opportunity to less-advantaged people, especially women, to also participate in the learning process, successful implementation of the FFBS model depends on linkage with other value chain actors, such as seed producers, traders, and research and financial institutions. Integrating the model into district local government operational plans and budgets is important for sustainable implementation. During the lesson learned workshop, district production and nutrition departments stressed their commitment to incorporating the model into their operational plans.
- To control seed potato quality, a seed distribution traceability system is critical. There is a need to immediately start implementing the Seed Potato Inspection and Certification Protocol to regulate seed quality in the market. Although the project supported the training of seed potato inspectors, it will be necessary to continue organizing refresher training for them to build the capacity of the localized seed potato inspection system. Therefore, this should be incorporated into district development plans.
- In 2021, the project, together with some stakeholders at subcounty level, proposed bylaws in conjunction with the promotional activities of the nutrition champions. Although this process takes time given the legal requirements, support from the respective district local governments is still required for approval and enforcement of these bylaws.

- The PNSP project promoted nutrition champions as a behavior change communication approach. The project trained and worked with 28 nutrition champions, who played a critical role in disseminating nutrition messages within the community. Therefore, to ensure sustainability of this approach, district local governments should integrate these nutrition champions into the government community-based health extension system.
- A sustainable seed potato business needs commitment from various stakeholders, as well as patience and honesty from seed producer associations. However, a consistent supply of tissue culture plantlets is also needed, and this has remained a bottleneck. Therefore, strengthening the localized production of tissue culture plantlets at NARO-BugiZARDI through partnership with private actors, such as Agromax, is necessary for sustainability.
- The regional platform has so far achieved some milestones that will contribute to its sustainability, such as development and launch of a five-year strategic plan, opening of the coordination office, securing of some funding from GIZ CUSP. However, because the platform still in its initial stages, it still needs support from various actors for its sustainability. MAAIF, through the local governments, can directly support the platform by providing a budget to support platform activities.
- To ensure more diverse protein-containing diets, livestock should be included in the promotional strategies for dietary diversity. For effective growth, animal protein is essential.

5.2 Lessons learned that may be of interest for the country strategy and future programs

- Through the FFBS approach, adoption of GAPs has improved significantly. Ten of the GAPs reached 90% adoption or more; however, adoption of some GAPs, such as dehaulming and crop rotation, has improved but is still low at less than 30%. This is attributed to limited land for rotation, pressure to reuse the same piece of land for another cropping cycle, and the need for quick money. Therefore, not all GAPs are adopted at the same rate by farmers when the FFBS model is used. Some GAPs are easily adopted, and some are not. Thus, other strategies may be required to ensure effective adoption of those GAPs, such as establishment of bylaws to curtail selling of immature potato and more direct promotion and incorporation of ancillary or secondary crops into the potato cropping system.
- Using the demonstration method for promoting technologies at the FFBSs is effective. However, farmers' unwillingness to meet input costs because they are accustomed to handouts is an impediment, contributing to poor management of the learning sites by farmers.
- Although the FFBS model is an effective extension approach, many sessions (10 sessions for agriculture and eight for nutrition) need to be covered as per the curriculum. This makes it costly in terms of time, agro-input requirements, and extension staff facilitation. For further adoption of the approach, a trimmed down package may be appropriate for better scale up.
- A seed potato business needs other supporting sources of income because the process of producing certified seed is lengthy. Some of the current seed associations are engaged in

production and marketing of ware potato and other crops, such as onions, barley, and cabbage. They are also involved in a village savings and loan association, which serves as a source of credit for boosting the seed potato business.

- Acceptance of the potato platforms by key stakeholders will depend on what value they add to the sector. Broadening and strengthening membership, forming partnerships for capacity building of regional platforms, networking, and mobilizing resources are important for future growth
- Delivery of nutrition messages is effective when production and health departments are well-coordinated at the district level. This topic was discussed during the review meeting and more alignment can be achieved if both departments jointly plan and implement this through a District Nutrition Coordination Committee.
- Contract farming is a profitable business model, especially for potato farmers. However, its sustainability depends on the trust between the farmers (producers) and the off takers in terms of ensuring quality and respecting the agreements, which is currently lacking. Therefore, building strategies to ensure traceability of the products is critical in addressing trust-related issues. Strategies could include packaging and labeling, as well as transactional documents such as delivery notes and invoices.
- As a best practice, the project compiled and shared different project documents with various partners, i.e., MAAIF, Agromax, district production and nutrition departments, seed associations, CIP, and UPP/EREPP, for future replication of the approaches that were promoted by the project. Key documents shared included training manuals, infrastructure designs, list of FFBSs, reports, and nutrition communication materials.

6 Declaration (TC)

After a review of alternative options, the TC measure presented, and its modes of implementation are held to yield the optimal relationship between the purpose of the TC measure and the funds used.