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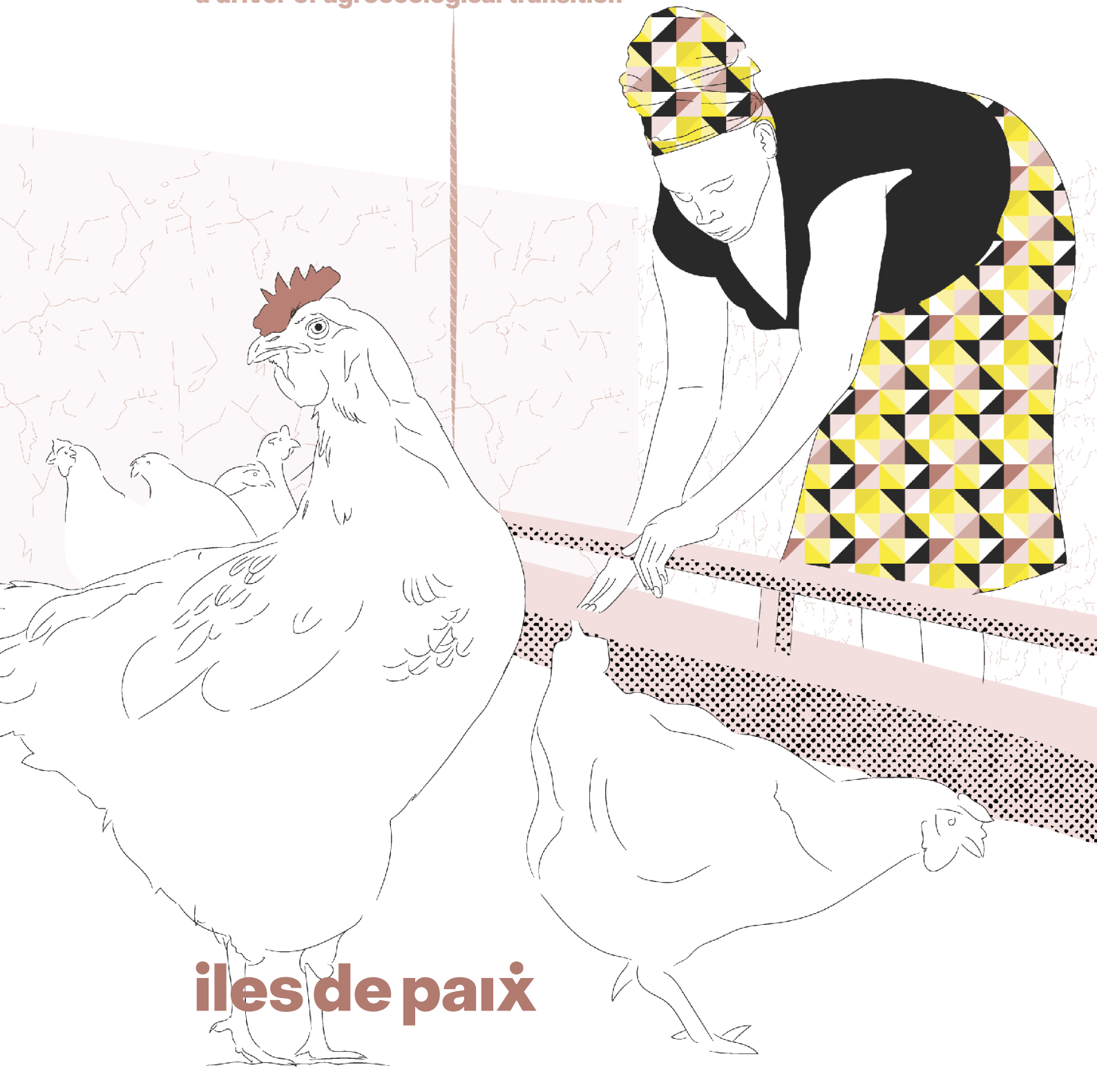
FARMERS' **ALTERNATIVES 04**

Livestock Integration

Integrating crop and livestock farming: a driver of agroecological transition



iles de paix

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ACKNOWLEDGEMENTS AND CONTACTS

The information presented in this report is a result of the work Iles de Paix and its partners, JESE, KRC and RCA in Uganda.

WRITTEN BY
Blandine Arvis

WITH ASSISTANCE FROM
Lieven Peeters, Iles de Paix
Philippe Van Gerwen, Iles de Paix
Stéphanie Laloux, Iles de Paix
Olivier Genard, Iles de Paix

COORDINATION
Olivier Genard, Iles de Paix

CHIEF EDITOR
Marie Wuestenberghs
Iles de Paix, 37 rue du Marché, 4500 Huy
Belgium
info@ilesdepaix.org

GRAPHICS
Marmelade srl
soleil@marmelade.be

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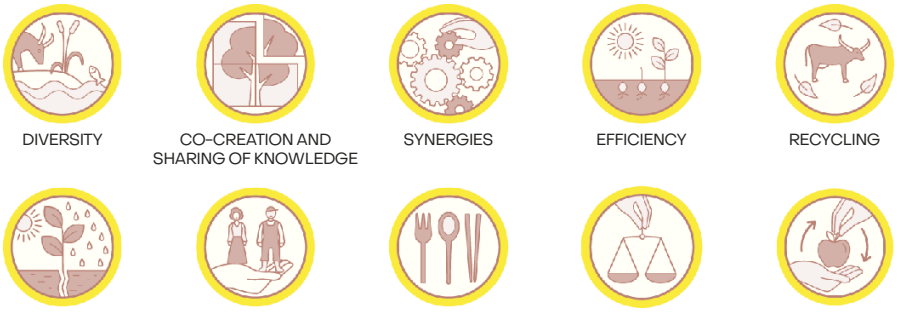
1 Leveraging the agroecological transition through farm-level integration

Iles de Paix, an NGO specialized in rural development support, has designated the promotion of sustainable food systems as its core mission. To achieve this on a local level, Iles de Paix has opted to support the transition to agroecology as the most efficient means to improve livelihoods, fulfill the 'right to food', enhance autonomy, care for the environment, and preserve family dignity.

Agroecology is one of several concepts relating to sustainable and climate-smart agriculture that have emerged in the last decades to tackle hunger in developing countries. It is widely agreed that what distinguishes agroecology is a combination of technical innovations and social dynamics, making it suited to small-holder farming communities where subsistence farming is the norm. According to the FAO, agroecological approaches typically draw from these ten elements[1]:

The 10 elements of Agroecology



In practice, seamlessly integrating the social and technical aspects of agroecology is a challenge for development partners, as it entails multi-faceted interventions. For instance, livestock is an explicit pillar of two elements at least (diversity and recycling) but is seldom mentioned in agroecological methods.

In Western Uganda, as part of its approach in the Mpanga Super Farmers Program + (see page 5), Iles de Paix (IDP) progressively introduced support for integration of small livestock into the farming systems. Coming on top of the established support for soil conservation practices, crop succession, intercropping, and social dynamics (especially Participatory Action Research [PAR] and Integrated Farm

1 FAO, 2018, The ten elements of agroecology. Guiding the transition to sustainable food and agriculture systems.

WHAT SCIENTISTS SAY

"The scientific literature on agroecology has not yet integrated livestock systems; only 5 percent of the indexed studies concerning agroecology deal with livestock. […] The key features underpinning agroecological livestock systems are an increased use of biodiversity, the integration of crops and livestock within a diversified landscape and a recoupling of the major element cycles."[2]

Planning [IFP][2]), integration of small livestock has proven to be a catalyst for rapid and effective agroecological transition, making a real difference in livelihoods and empowerment.

Without losing sight of the fact that locally specific approaches are indispensable to effective applications of agroecology, this publication aims to showcase the key benefits of livestock integration into farm planning as a tool to kickstart the agroecological transition. It collects best practices and success stories from the MSPF+ program and strives to answer these key questions: How does the combination of the Integrated Farm Planning (IFP) approach and small livestock integration boost agroecological transition? What is the tangible impact for families (nutritional, financial, in terms of overall resilience)? What specific techniques have proven successful? What enabling factors are needed to ensure long term sustainability of livestock integration, and under what conditions can the successes be replicated?

INTEGRATION OF LIVESTOCK INTO FARM PLANNING

- Practical considerations
- Success stories
- Benefits derived from livestock integration, at farm and program scales

BEST PRACTICES AND CONDITIONS FOR SUCCESS

- Promote a one-health approach
- Create structures for knowledge transfer
- Involve local authorities

CHALLENGES AND OUTSTANDING QUESTIONS

- Animal health and sustainability post-program
- Scaling up: leaving no one behind

2 PAR is a collaborative research cycle which involves the participants directly affected by the issues the research aims to solve. IFP is a family-led and visual co-investment planning method. These methodologies are described in detail in CAP Farmers' Alternatives N°2: Co-creation of Agroecology Knowledge, edited by Iles de Paix, available on ilesdepaix.org

3 Jean-François Soussana, Muriel M. Tichit, Philippe Lecompte, Bertrand Dumont. Agroecology : integration with livestock. International Symposium on Agroecology for Food Security and Nutrition, Food and Agriculture Organization (FAO). INT., Sep 2014, Rome, Italy. 409 p.

2 MSFP+ programme, by the numbers

The Mpanga Super Farmers + programme is a 5-year (2022-2027) project with the overall goal of enhancing the economic, environmental and social performance of farmers involved in sustainable family farming in the Mpanga River Catchment; it builds on the Mpanga Super Farmers programme, implemented from 2017-2021.

MSFP is implanted in the Rwenzori area in Western Uganda. The region's agricultural potential is among the highest in the country but is affected by unsustainable land management practices. The widespread use of slash and burn, stone quarrying, and unsustainable intensification have led to heavy soil degradation, with up to 140 tonnes/ha/year of soil lost in the Rwenzori Mountains[4]. This has negative consequences on the flow and water quality of the Mpanga river. With the lack of fertilization and the high rate of soil degradation, yields per hectare have noticeably weakened.

Compounding these issues, an ever-increasing share of food produced in the Rwenzori area is exported to neighboring districts, to Kampala, or abroad. Rural households increasingly market their produce and buy their food, likely due to cash requirements. These factors contribute to a food insecure situation. Despite its agricultural potential, Western Uganda has high levels of child stunting (44% in under-fives[5]) and chronic malnutrition (32%[6]).

To support the construction of sustainable food systems around Fort Portal, a major city in the Rwenzori region, IDP launched a program promoting a transition to agroecology in several areas around the city, back in 2017. The building blocks for initiating an agroecological shift are:

Building blocks for an agroecological shift

Upstream social dynamics

- Select motivated farmers to engage within the program
- Form groups and appoint Farmers Innovators to enhance cross learning
- Organise demand-based trainings on good agronomic practices

Productive aspects

- Integrated Farm Planning
- Livestock Integration
- Applying soil conservation practices
- Introducing kitchen gardens and improved cooking stoves

Downstream dissemination and market support

- Participatory Action Research
- Marketing associations
- Value chain support (milling unit, improved varieties)
- Awareness-raising targeting consumers in Fort Portal

4 Karamage, F., Zhang, C., Liu, T., Maganda, A., & Isabwe, A. (2017). Soil Erosion Risk Assessment in Uganda. Forests, 8(2), 52.

5 Hivos, 2021. Uganda Food Change Lab: Planning for the future food system of Kabarole district.

6 World Bank, 2022, In Uganda: Low access to essential goods, high food insecurity, with slightly improved conditions among the poorest.

Socio-economic data

IDP operates in three intervention zones (40 villages) with varied climate, soils, and farming systems: Kabambiro, Karangura, and Kicwamba.

Karangura

450 households

Beneficiaries

7.5 years

Start of the programme 7,5 YEARS ago

Soils

Black loams and red clay loams, medium to high fertility but problems with soil depletion. Peaty loams with low potential on upper hillsides.

Terrain

Hilly terrain with sometimes steep slopes.

Typical farming systems

Plantain, coffee, Irish, peas.

2 acres

Avg farm size

Proportion of farmers with...

Cows	17 %
Goats	89 %
Pigs	16 %
Chickens	61 %

Kicwamba

450 households

Beneficiaries

2 years

Start of the programme 2 YEARS ago

Soils

Black loams and red clay loams, medium fertility, thin and lixiviated soil layer in areas.

Terrain

Lowlands and some gentle undulation, proximity to crater lakes.

Typical farming systems

Plantain, beans, vegetables, and livestock (pastoralist tradition in the lowlands)

1.4 acres

Avg farm size

Proportion of farmers with...

Cows	2 %
Goats	71 %
Pigs	27 %
Chickens	59 %

Kabambiro

300 households

Beneficiaries

7.5 years

Start of the programme 7,5 YEARS ago

Soils

Mix of sandy and clay soils, often acid, with pockets of black loam, low to medium fertility.

Terrain

Flat to gently undulating landscape.

Typical farming systems

Maize, cassava, robusta coffee

2.2 acres

Avg farm size

Proportion of farmers with...

Cows	9 %
Goats	38 %
Pigs	49 %
Chickens	57 %

A few numbers

As of 2024

1200 families have established their integrated farm plan and begun to implement it.

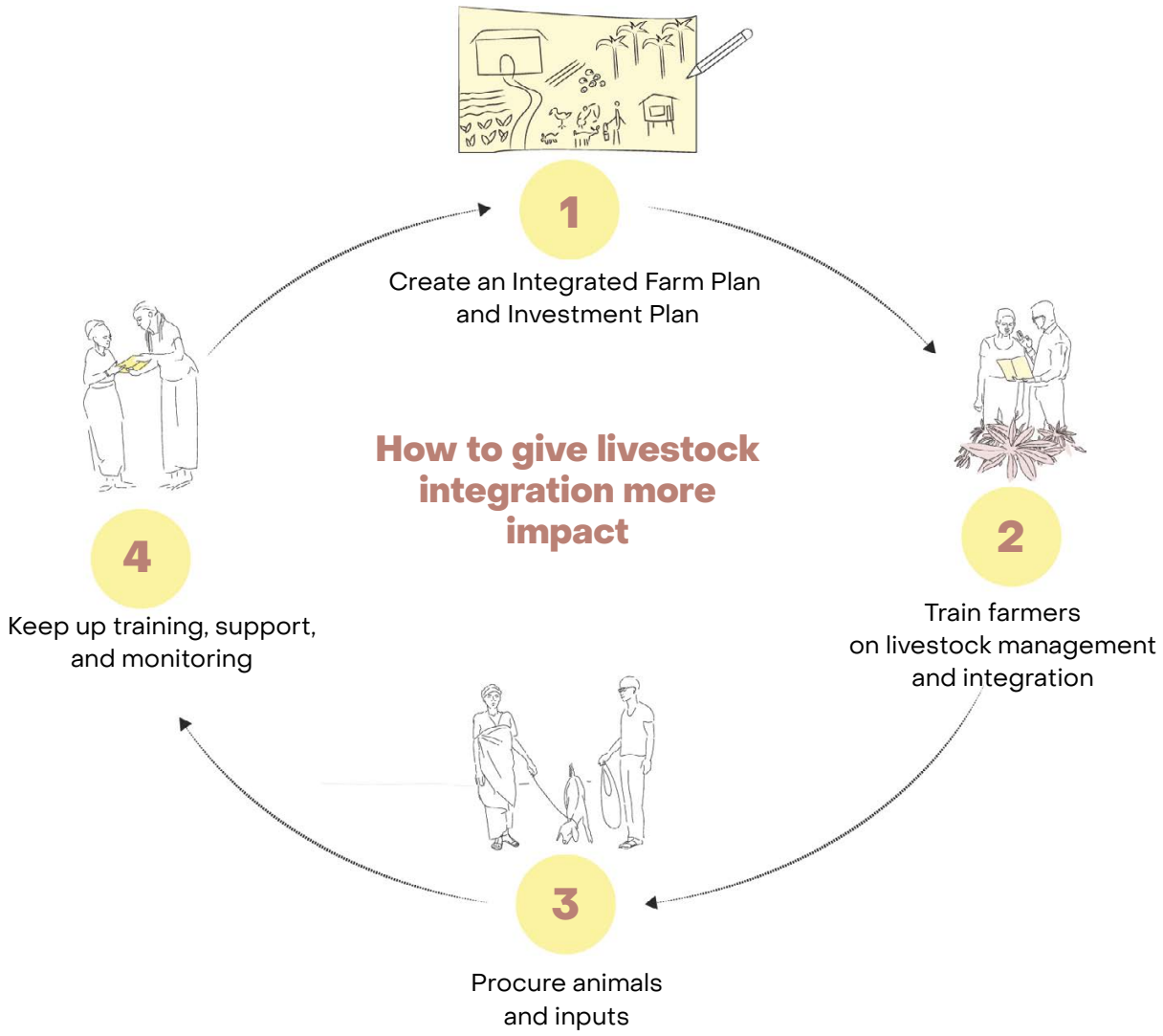
At least **60%** of the 1200 families have received small livestock.

500 anti-erosion trenches dug, with an average between 2 and 3 per farm.

200 improved kitchens.

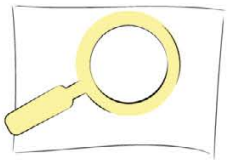
3 Process of livestock integration

Integration is one of the pillars of agroecology, and livestock is a key component due to its role in recycling organic matter. The MSFP+ program has brought an innovation in leveraging the IFP (see explanation below) to give livestock integration more impact. Over time, the positive impact of supporting farmers in owning and raising livestock has stood out. It also emerges that integrating livestock from an early point in the program provides more benefits to kickstart the transition compared to introducing livestock at a later stage. Here we outline the process followed by the program for integrating livestock into a family farm.



How it works

1 CREATE A FARM PLAN
AND TRANSLATE IT INTO AN INVESTMENT PLAN



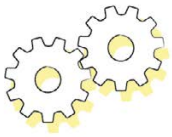
> **Integrated Farm Planning (IFP)** is a methodological approach that creates empowerment, encourages integration, and fosters collaboration within the family. It centers on drawing an image of the farm in its current state, and an image of the farm that the family aspires to have. Integration is made easier by visualizing the interaction between farm components and by sequencing the addition of new activities or practices (e.g., need to have built shelter and planted grasses before acquiring livestock). For more details on the IFP approach, please refer to CAP Farmers' Alternatives N°2.

The family gets together to discuss their vision for the farm. This leads to drawing a detailed, pragmatic map of the farm in its current state, and another map of the aspirational farm in five years' time (duration of the program). Through this discussion, the family build a common vision of their future and share out the responsibilities for turning it into reality. Field officers, while they should not intervene in decision-making, provide guidance based on best agroecological practice. They can help identify where the gaps in terms of feasibility are, and estimate the costs and tools needed. Once the family has agreed on a farm plan, the future vision is converted into an action plan composed of very specific steps. Each of these steps are detailed in terms of the costs, the equipment, and the revenue.

Example of an investment plan

Entreprise	Activities	Inputs/ Requirements/ Ressources	Quantity	Amount	Source
Coffe Farming	> Land preparation > Holing > Buying coffee seedlings > Planting coffee seedlings > Weeding > Buying bio inputs > Spraying > Trenching > Harvesting	> Hoe	> 2	> 24 000	> VSLA > Beans > Maize > Coffee sale > Goats
		> Secateurs	> 1	> 10 000	
		> Money	> 200 000	> 200 000	
		> Wheelbarrow	> 1	> 160 000	
		> Tarpaulin	> 2	> 120 000	

Each action is then planned and implemented jointly by the program and the family, following the principle of co-investment. For instance, the program may provide the materials for building a shelter while the family provides labor. This co-investment scheme builds ownership and puts the emphasis on active participation. In practical terms, the program operates with a "package" sum for each household (indicatively, the sum may reach up to 800 000 UGX[7], or about 205 EUR, but is flexible based on family characteristics and needs). Part or all of the sum may be allocated to the various improvements the farmer wishes to make under the investment plan, but always with a co-investment principle built-in. By design, some expenses are excluded (such as cows). Farmers that are designated as "Model Farmers" have a larger or unlimited envelope so they may implement many techniques. In exchange, they agree to share the results of the trials and invite other families to share the knowledge in training meetings.



What to consider:

> Leave room for expression – The family may face unforeseen cultural or religious constraints, so it is important that they express themselves freely, without being influenced by the field officers. For example, Muslims would not raise pigs; Adventists would not raise rabbits; some peoples would not raise fish.

> Sharing is caring - Sharing out the tasks among family members and allocating uses for revenue in advance is especially important when gender roles are rigidly assigned, such as men having exclusive ownership of the sale of cash crops and hence decision-making power over the use of revenue. The IFP has proven to be a powerful tool on gender.

> Timing is important - Animals may not immediately generate revenue, while incurring feeding costs. The timing for procuring the livestock should consider the cost of feed (cheaper during harvesting; costlier during dry season); avoid traditional holidays when animals may be slaughtered; and periods when extra costs, such as school fees, may arise.

7 This represents slightly less than the average annual farm income of 900 000 UGX for smallholders, according to Uganda's Annual Agricultural Survey (2019).

List of pros and cons by animal

	+	−
 **Goats**	> Feed on grasses/plants that are more readily available, on agricultural waste > Relatively low cost compared to cattle	> Provide income around twice a year with kids > Local breeds are not productive for milk nor is goat milk customary in the area, goats kept only for meat
 **Chickens**	> Egg-laying provides regular income > Small enough to be used for nutrition occasionally > Droppings have high nitrogen content, applied directly on fields	> Too cold to raise chicks in some of the intervention areas > Productive breeds (for eggs) are imported, local breeds cannot compete > Often raised with formulated feeds
 **Rabbits**	> Do not take up much room	> Prone to foot and mouth disease
 **Pigs**	> Feed on leftovers > Produce large litters > Provide abundant manure	> Smell > Prone to African Swine Fever
 **Beehives**[8]	> Demand little maintenance > Provide pollination co-benefits > Honey is a higher added-value product than eggs or milk	> Require specialized training compared to other animals. > Hives should be kept a distance from the home, requires large plot
 **Cows** NB: no direct financial support from the program	> Provide the most manure, excess can be sold > Produce milk for regular income	> Large amounts of feed and fodder needed for cows can be difficult to procure during the dry season > Require larger housing space

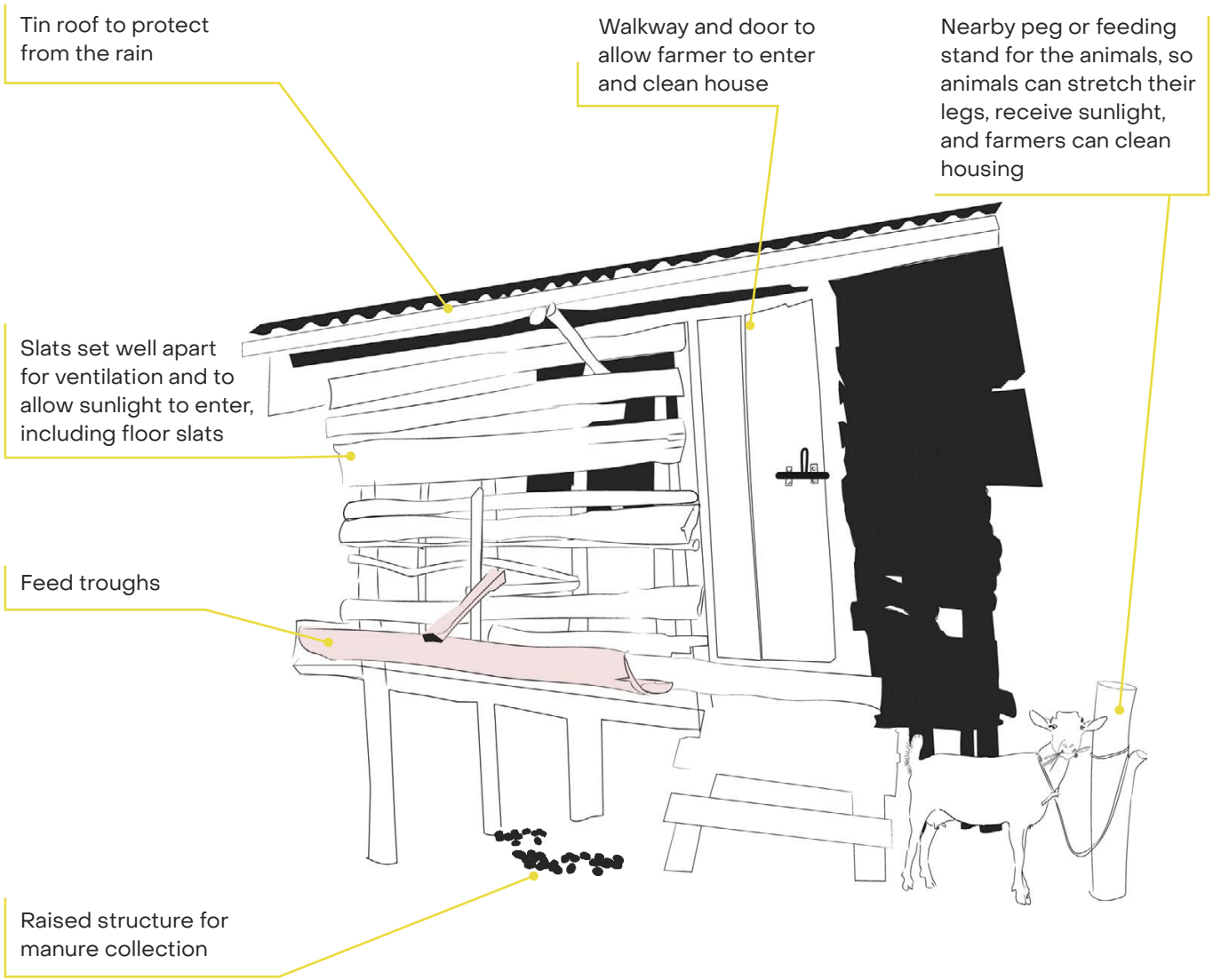
8 Though apiary has co-benefits within an agroecological model and was proposed as an alternative to families that did not wish to integrate livestock, it is not brought into full focus here as the dynamics are different and could influence the clarity and logic of the narrative.

2 TRAIN FARMERS ON THE DIFFERENT ASPECTS OF LIVESTOCK MANAGEMENT WITH EMPHASIS ON INTEGRATION

After deciding to bring in livestock, farmers receive training on livestock management and prepare for the integration of the livestock within their farming systems. Trainings provide information on appropriate techniques while questioning on-farm integration, in the following areas. In parallel, farmers must also be trained on the agronomic practices central to agroecology: inter-cropping, crop rotations, trenching to prevent erosion, tree planting, etc. These are explored further in CAP Farmers' Alternatives N°3[9].

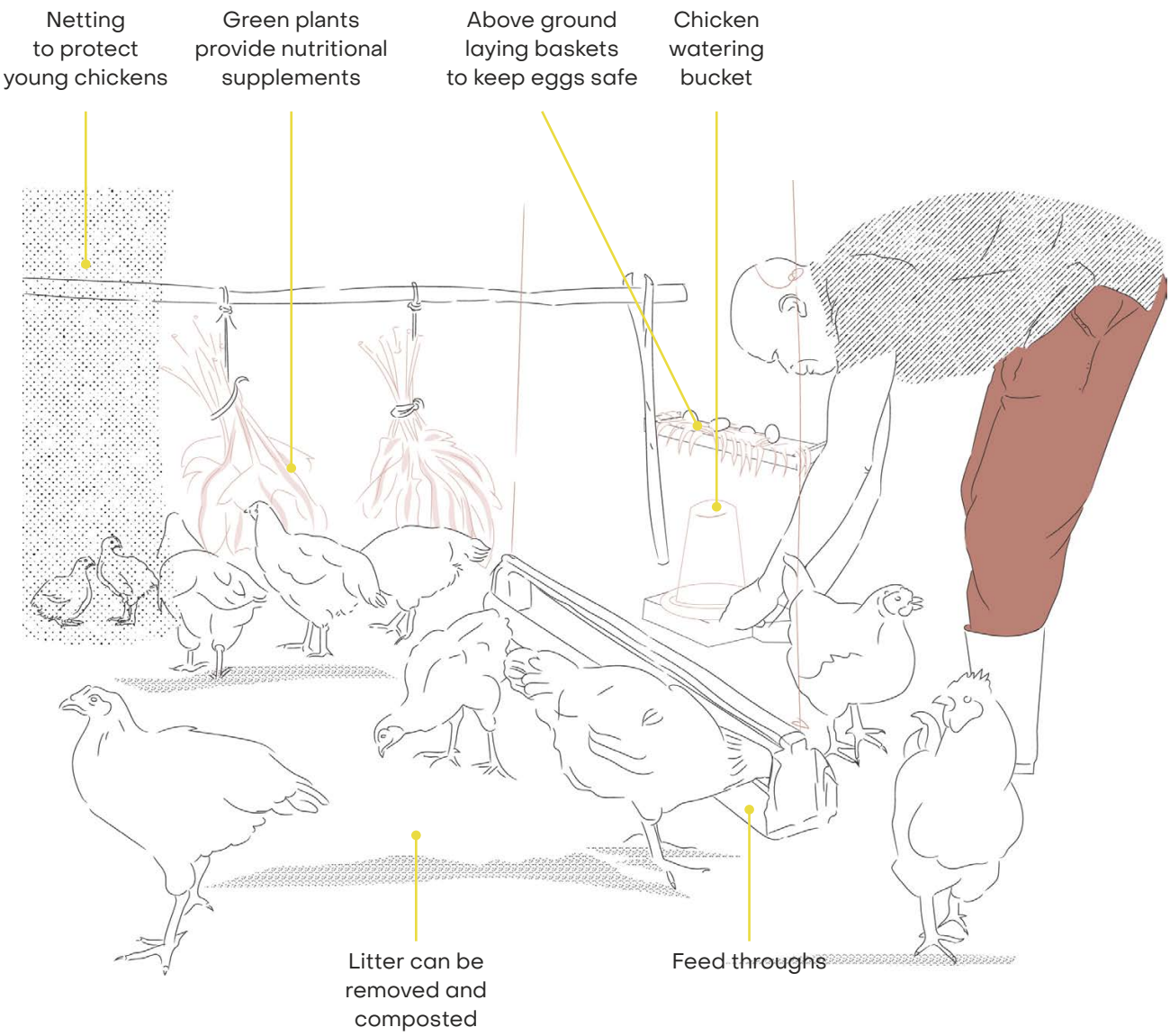
Some of the signature techniques implemented by MSPF+ are presented below.

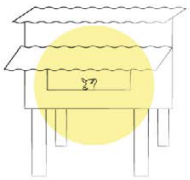
A breeding building for goats



9 CAP Farmers' Alternatives N°3: Soil fertility management, a reality check. Published by Iles de Paix, available on Ilesdepaix.org.

A livestock housing for chicken





Livestock housing

QUESTIONING ON-FARM INTEGRATION: *Should the animals be raised in zero-grazing (intensive) or semi-extensive (controlled grazing)? Where can the shelter be built? How can the manure be easily collected?*

IN PRACTICE: The program promotes zero grazing systems for the goats (and controlled grazing where possible and desired by farmers), in response to land availability constraints. This system provides multiple benefits: the animals are sheltered and mostly kept inside, which protects them from disease, prevents damage to crops, saves time and labor, and eases manure collection. Livestock shelters are usually placed closed to the home for surveillance. In most cases, materials are provided by the programme and labor by the farmers – but in exceptional cases (aging farmer, supporting local skilled labor) the program may contribute to labor costs. MSFP+ developed blueprints for livestock housing on stilts, to avoid issues like flooding and improve hygiene. Animal manure and urine goes through the loose floor slats onto the ground, where it can be easily collected. Rabbit cages are also elevated, with gutters to collect urine and dropping. For poultry, the cages are large, well ventilated and easy to clean.

Nutrition

QUESTIONING ON-FARM INTEGRATION: *What native plants can the animals feed on? Do I grow enough feed or collect enough plant residues on my plantation for the animals to feed on? What supplements do they need? Is it necessary to buy formulated feeds?*

IN PRACTICE: Because of the lack of available land, most farmers use zero-grazing systems. Goats and cows are often fed with native plants, which were already grown on the farm or on neighboring farms (yam stems, banana peels and leaves, banana flowers). Some may have been introduced as part of the agroecological transition (napier grasses, calliandra branches, mucuna beans, lablab). Many farmers also use greens as supplements to keep the animals healthy (desmodium, rosemary, lemongrass). Owing to feed scarcity during the dry season, zero-grazing is difficult to manage with larger animals like cows.

The recommendations should be adapted to the animal breeds that will be brought in. For instance, native chicken breeds are usually left to forage in the gardens, while improved breeds are fed with maize or formulated feeds (market-bought, to stimulate growth and egg-laying). Pigs are fed with yam stems and leaves, avocados, household leftovers.

Hydration

QUESTIONING ON-FARM INTEGRATION: *Is there a water source, including for the dry season? Is the water quality monitored? Is there enough water to fulfill domestic needs, livestock needs, and crop needs?*

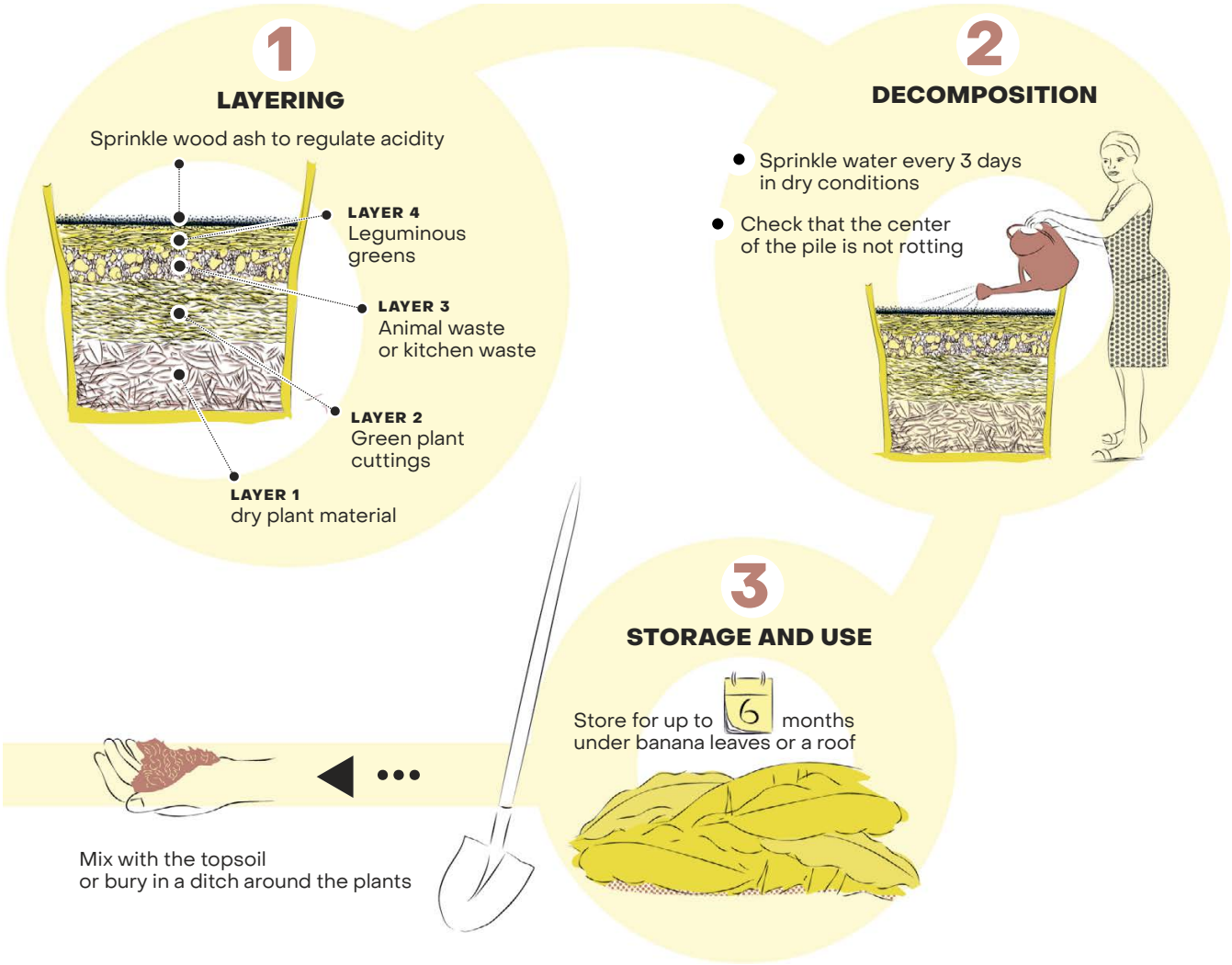
IN PRACTICE: This component is often neglected. Farmers should identify how they will water the animals, especially during the dry season and in zero-grazing systems. A government program helped some farmers dig tanks to collect the runoff from the roof of the house during the rainy season. The water is channeled through a pipe, and the tank covered by a tin roof.

Recycling animal waste

QUESTIONING ON-FARM INTEGRATION: *Where and how should the manure be stored while it decomposes? What plots should be fertilized first? What uses are there for the urine?*

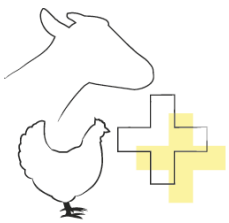
IN PRACTICE: Manure is collected from the livestock housing and often heaped in pits about 1-2 feet deep, adjacent to the kitchen garden or amid the crops. Manure is 'applied' prior to the onset of the wet season, either in a ring around the coffee trees, or buried in the soil at regular intervals and covered to ensure decomposition. Litter from chicken coops is applied directly, while goat manure is often composted in pits. A minority of farmers apply actual composting techniques. Compost is made by layering different types of organic materials in a heap and letting the heap decompose without rotting. The resulting dark brown earth fertilizes the soil, improves soil structure and increases water retention. The compost is deemed ready when small shoots start to appear. The programme emphasizes application of manure on kitchen gardens, but extra amounts will be spread on the coffee and banana plantations.

Manure pit : animal waste is layered with plant cuttings and leguminous greens and placed in a pit between the rows.



Finally, some also collect animal urine for use in pesticide concoctions. Rabbit urine has high levels of nitrogen and can be used as a pesticide or diluted for use as a fertilizer.

As part of the training on waste management, farmers were also taught to separate plastic/ non-breakable from organic waste, and some can collect extra revenue from returning the plastic bottles to resellers in the city.



Disease identification and management

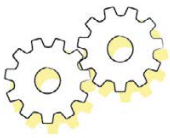
QUESTIONING ON-FARM INTEGRATION: *How much will animal health cost? Where can I access medicine and veterinary advice?*

IN PRACTICE: Livestock health is a key and difficult part of animal management. Farmers can be trained in recognizing symptoms of ill health for different species and encouraged to call veterinary services in case of issues. In one sub-county, some farmers were trained to scout disease and report to the local officials. In Uganda, each sub county has one veterinary officer and one agronomist. This means that state services can hardly cover the needs of the 10 to 15 000 households in the subcounty. The program should consider the accessibility of veterinary services and drugs within its design.

3 PROCURE LIVESTOCK, EQUIPMENT, AND INPUT

In Karangura, the area where animals were brought in at the earliest stage of the program, the animal procurement process was coordinated with local authorities. Animals were sourced locally by known suppliers and had to obtain a certificate of health and comply with vaccination requirements. To this end animals were vetted by the sub-county veterinary officers and kept under observation for two to three weeks. Once the animals have cleared the surveillance and are sent to the farmers, there is another two-to-three-week window during which the animal can be replaced by the supplier if its health deteriorates.

At farm-level, before supplying the animals, the shelter needs to be ready and fodder plants available in sufficient quantity.



What to consider

> Whether to use improved livestock breeds - Improved breeds are generally more productive (meat, eggs, milk) but less rustic. This makes them more fragile and often costlier to feed. For instance, chicken farmers often raise improved chickens but still keep a few local chickens, which are smaller and kept free range, for family meat consumption. This decision depends on the potential of the local breeds.

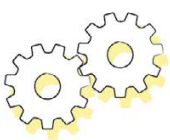
> Protocols for sourcing animals while minimizing risk of disease.

4 CONTINUE TRAINING SUPPORTING, AND MONITORING

Training continues throughout the lifetime of the program, not only through program officers but also thanks to community relays: farmer innovators, model farms, and knowledge sharing in Village Savings and Loans Associations (VSLA groups; see page 23 for an in-depth description). Monitoring is carried out by the field officers, with each family being visited on average once per quarter in routine visits.

One point on which farmers continue to depend on external support is disease management. Two strategies can be adopted at program level: either include animal health specialists among the field officers (as in Karangura) or establish a relationship with the government extension services relating to livestock to ensure they will provide necessary support (medication, vaccines).

In addition, in Karangura, a pilot program replicated a village reporting structure for human health, but for animal health. One representative per village was trained in animal surveillance, in order to report any cases of animal disease. These community animal health officers can act as relays to make up for lack of human resources to manage animal health at the sub-county level.



What to consider

> How many field officers are needed?

> What is the level of support from government extension services? Will additional support be needed from the program?

4 Success stories

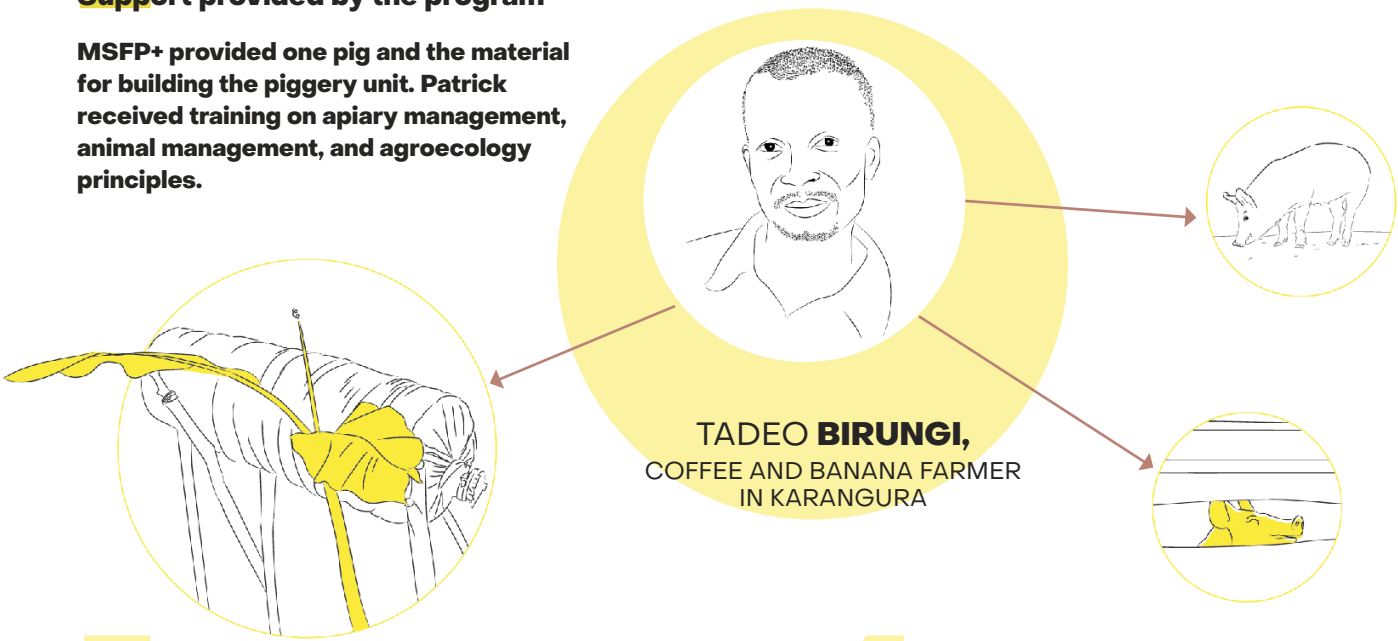
1 Initial situation and challenges

- Family of 7.
- Steep terrain susceptible to erosion.
- Plantain & coffee not doing well.
- Has been beekeeping for 10 years but struggling to expand.
- Financial difficulties.

Tadeo's Integrated Farm Plan

2 Support provided by the program

MSFP+ provided one pig and the material for building the piggery unit. Patrick received training on apiary management, animal management, and agroecology principles.



TADEO **BIRUNGI,**
COFFEE AND BANANA FARMER
IN KARANGURA

3 How do the different agricultural activities interact?

- Manure has much improved matoke production, providing additional revenue.
- Trenches dug against erosion, lined with forage grasses.
- Pigs fed with yam stems and sweet potato leaves given by neighbors.
- Bees pollinate avocado and other nearby trees; tall trees provide shade for bees and protect land against erosion.
- Since piggery and plantation allow him to cover expenses, he can focus on developing his apiary project: saves money from every sale of honey to buy a plot and establish a larger apiary.

4 What are the tangible impacts for the family?

"The quality of the bananas has really changed. That's why I moved the piggery unit to the top of the hill; this plantation below is well established, I would like the upper part to benefit from it. I sold at much better prices: a bunch of plantains for 40,000 UGX."

"Income has increased; the sale of piglets enabled me to pay the children's school fees."

"I would like to become a "model farmer" in pig farming and beekeeping."

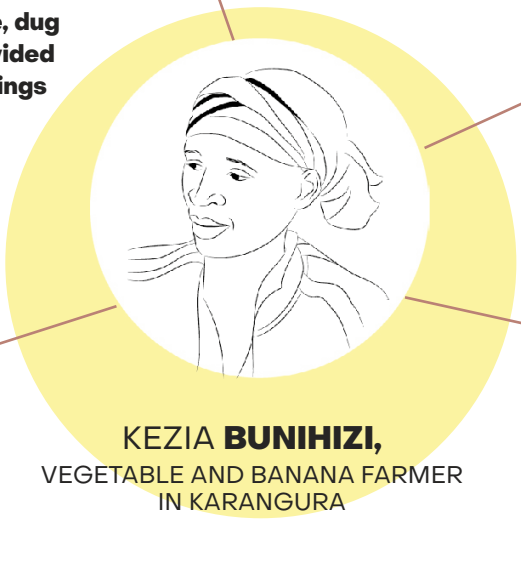
1 Initial situation and challenges

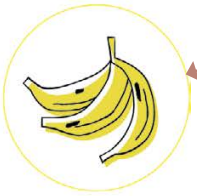
- Family of 4.
- 0,25 acres of land.
- Single mother with low revenues and no laborers.
- Animals lived in the kitchen, poor hygiene around home.
- Financial difficulties; could not afford lunch for children at school.

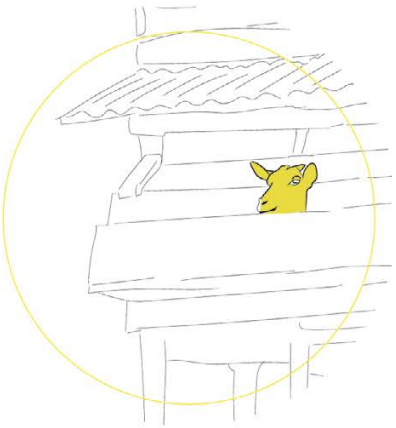
Kezia's Integrated Farm Plan

2 Support provided by the program

MSFP+ provided one goat and assisted with construction of the goat house, dug trenches within the plantation, provided assistance with animal health, trainings on agroecology.







KEZIA **BUNIHIZI,**
VEGETABLE AND BANANA FARMER
IN KARANGURA

3 How do the different agricultural activities interact?

- Animal residues from goats and chickens are used for the kitchen garden to fertilize, and in the preparation of concoctions against pests.
- Trenches help hold water; soil remains moist and provides water retention even in the dry season. They stop the ground from moving.
- Garden is very well integrated, with intercropping of cassava, beans, sugar cane.
- Medicinal grasses intercropped within the plantation help keep animals healthy.

4 What are the tangible impacts for the family?

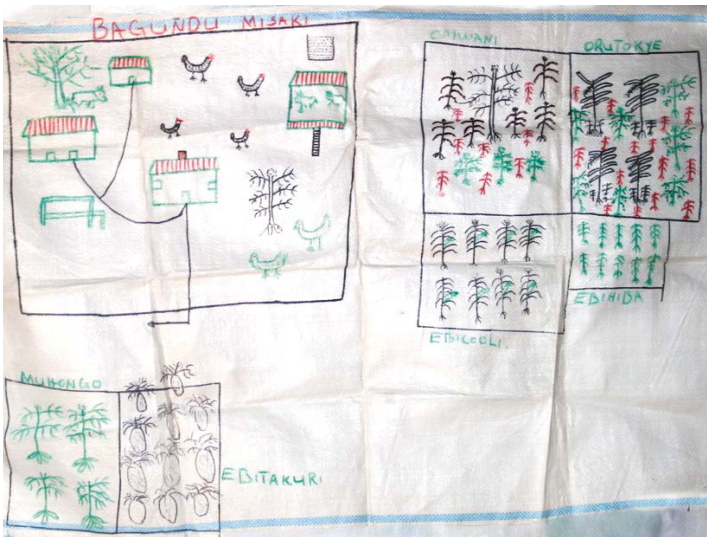
"Before bringing the manure, vegetables were not performing well. Now there is definite improvement in the performance."

"The revenue increased; now with the savings I have plastered the house, I can pack lunch for my children when they go to school and I can invest in my business".

"People are learning from me now".

1 Initial situation and challenges

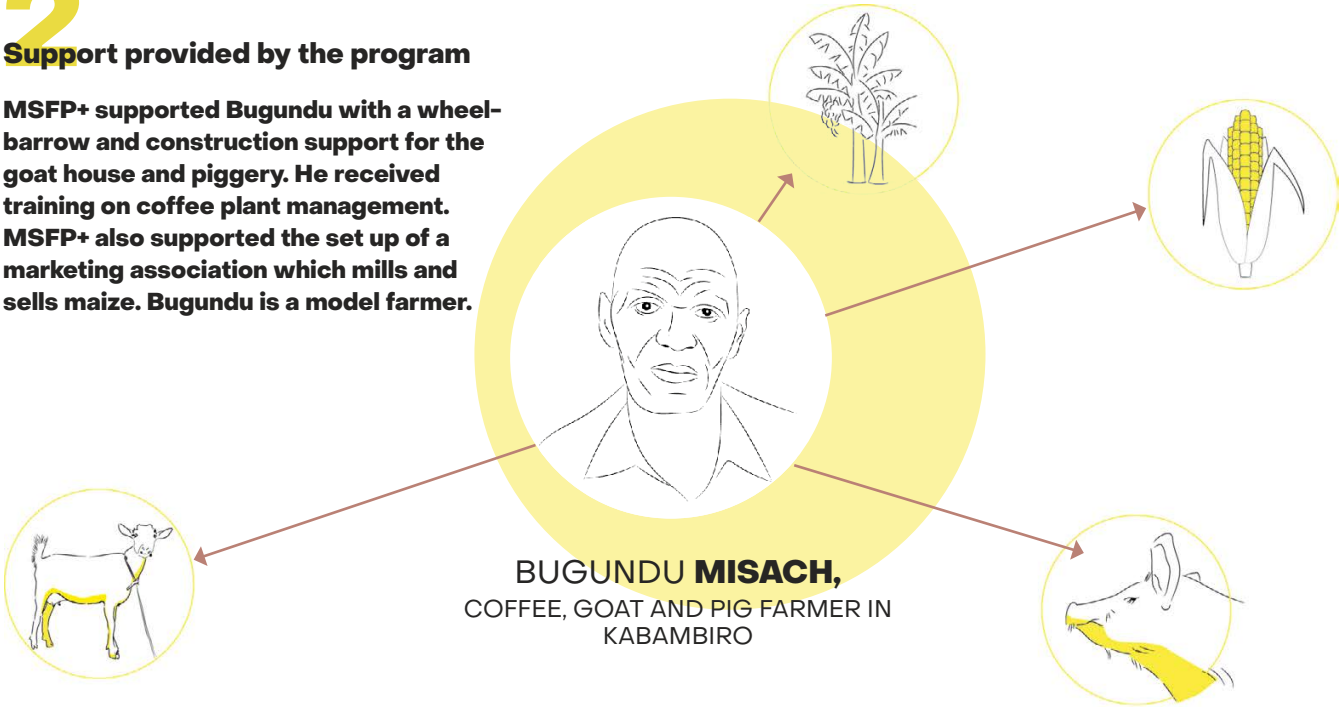
- 5 household members and 4 acres.
- Banana plantation wiped out by disease, replaced with coffee plantation, which also faced issues with coffee wilt.
- Soil productivity is weak in the area.



Bugundu's Integrated Farm Plan

2 Support provided by the program

MSFP+ supported Bugundu with a wheel-barrow and construction support for the goat house and piggery. He received training on coffee plant management. MSFP+ also supported the set up of a marketing association which mills and sells maize. Bugundu is a model farmer.



BUGUNDU **MISACH,**
COFFEE, GOAT AND PIG FARMER IN KABAMBIRO

3 How do the different agricultural activities interact?

- Chicken residues used for concoctions against pests on the coffee plantation.
- Pigs are fed with maize bran (milled by the marketing association) and avocados.
- Shade trees are planted around the coffee (ficus, avocado, mango, etc.) and provide fruits, leaves as nutrition for the animals, and enrich the soil through leaf decomposition.
- Vegetables and medicinal plants are inter-cropped with matooke and coffee, which helps feed the entire family with the home garden.

4 What are the tangible impacts for the family?

"The training on coffee management has made a huge difference; I used to have issues with pests. Now I can harvest early, and sell for better prices".

"With revenue from the coffee, I have bought new land and extended my farm".

"Even at 64, I'm still heathy and able to work. Maybe it's thanks to the healthy food from my garden !".

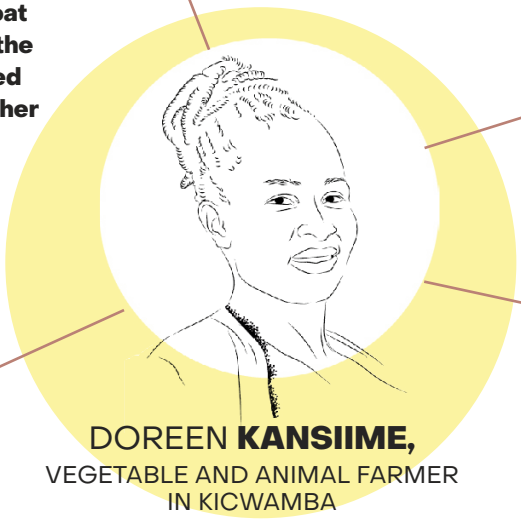
1 Initial situation and challenges

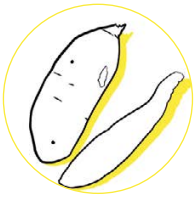
- 7 people in family.
- 0,25 acres of farm.
- Live in the flat lowlands, traditionally pastoralist.

Doreen's Integrated Farm Plan

2 Support provided by the program

MSFP+ supported in building the goat house and coached her for making the piggery and chicken housing, planted Napier and Caliendra, and included her in a VSLA group.





DOREEN **KANSIIME,**
VEGETABLE AND ANIMAL FARMER
IN KICWAMBA

3 How do the different agricultural activities interact?

- Animals are fed only with what is grown on the farm: maize for chickens, yam stems, banana fibers, caliendra, etc.
- Concoctions which act as pest repellents are made from chili and cow dung.
- The many animals provide enough manure to fertilize both plots of land; wheelbarrows can be used in this flat area.

4 What are the tangible impacts for the family?

"Goats are now sleeping in good housing, so we are able to collect manure and apply it in the fields, so the yield increased".

"Before, we had no joint plan. Now, we sit as a household, bring ideas, and come up with something good for the home".

"I am part of a marketing association for vegetable products. Through it, we are able to sell at a better price than with the middlemen".

5 What is the added value of livestock integration?

Agroecology is both an individual practice and a social dynamic, whose benefits are shared more widely. These collective benefits include more resilient ecosystems, healthier soils and water bodies, improved health through reduced exposure to harmful chemicals for communities and consumers and valued local cultures.

IN THEIR WORDS

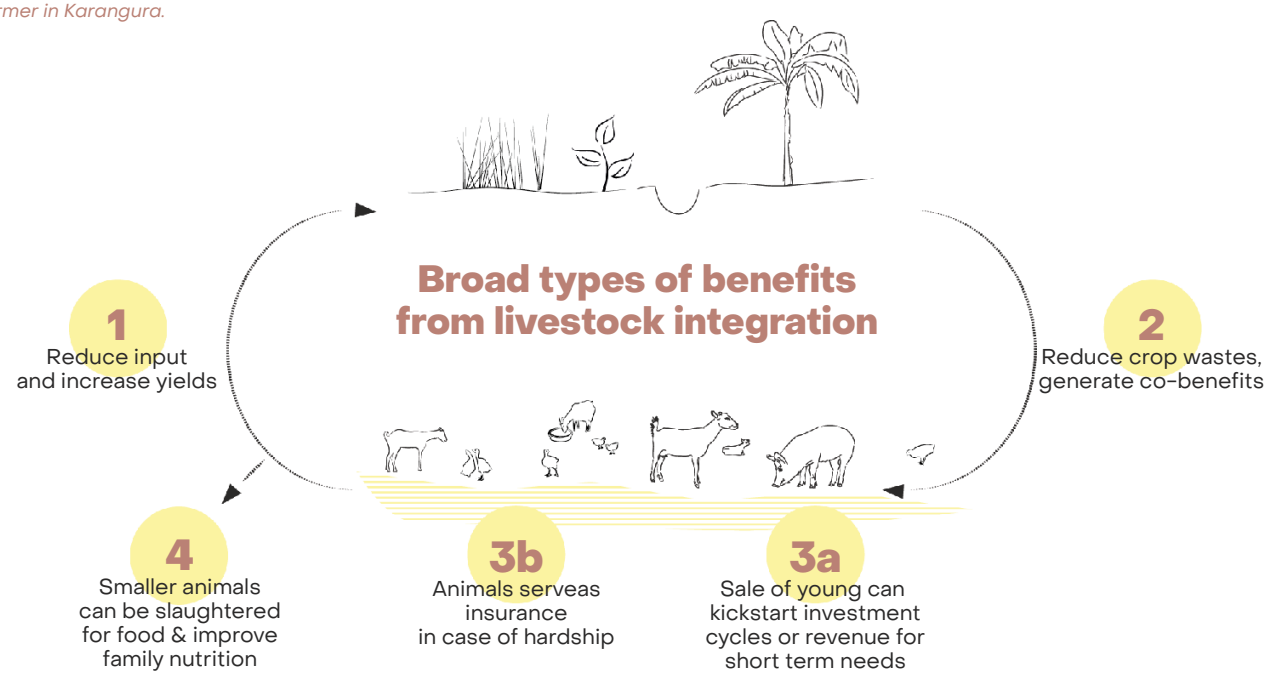
"I used to buy inputs, but since I have access to manure, the revenue that went to meet those costs is converted to other uses on the farm."

Kwirabuke John,
farmer in Karangura.

In the MSFP+ program, livestock integration was only one part of the puzzle, combined with the IFP methodology and with implementation of other agroecological principles. As shown in the success stories, provided that enterprises are engineered to mutually reinforce each other, livestock integration can add value to agroecological systems at farm level. It is efficient from a programmatic perspective in supporting the social shift that underpins agroecology.

From farmer perspective

From the testimonies, five broad types of benefits from livestock integration emerged.



1 Reduce input and increase yields

Farmers collects droppings from the animals and use these to fertilize the fields. In some cases manure is used fresh, in others composting techniques are applied. Farmers reported significant increases in yields and crop quality when using manure as fertilizer. In rare cases where farmers were buying synthetic fertilizer prior to owning livestock, these costs are cut and can be invested in other areas of the farm. However, most farmers do not have enough fertilizer to cover their entire plantation, so kitchen gardens are prioritized.

Bees provide the additional benefit of pollinating flowers.

Some farmers also collect the urine from the animals by digging small trenches underneath the livestock housing. Urine can be simply diluted (rabbit urine) and sprayed to repel pests, or mixed in with other ingredients (chili pepper, onions, tomato leaves, etc.) in a concoction and used as the basis for a home-made organic pesticide. These concoctions are often prepared as a group, with each member bringing part of the ingredients and the mixture being shared out. The pesticides have been successful enough in one case for the group to trial an organic label.

IN THEIR WORDS

"You cannot take for granted the green color of these bananas; it is due to the manure used as fertilizer"

Majidu April,
Karangura

2 Crop co-benefits encourage adoption of virtuous practices

Thanks to the IFP methodology, farmers can plan to maximize the synergies between livestock and vegetation. Many of the plants sown in an agroecological perspective can be 're-purposed' as animal feed. This in turn gives an incentive to implement these techniques, which may otherwise be seen as a burden. Three types of co-benefits are observed with native species: anti-erosion, inter-cropping for soil fertility or pest repellents, and waste reduction.

Co-benefit between livestock and crop production

Use for crops or soils	Use for livestock	Examples in the context of Western Uganda
> Stabilize the ground when planted on the banks of dug-out trenches or steep hillsides.	> Serve as fodder for goats, pigs.	> Napier grasses, Calliandra trees.
> Push or pull effect to draw pests out from the main crops	> Act as supplements for chickens, goats, pigs; used in traditional medicine to treat sick animals.	> Desmodium, lemongrass, lemongrass, rosemary, aloe vera, chili pepper.
> Intercropping to improve soil health		> Desmodium, mucuna beans, lablab.
> Residues that are abundant and have no specific use in the field (note: residues should not be taken from the field to the detriment of soil cover in the rainy season).	> Serve as fodder for cows, goats (banana leaves), pigs.	> Banana peels, yam leaves and stems, banana leaves, banana flowers.

3 Increase financial resources

Aside from the benefits linked to diversifying sources of income, livestock represents a form of low-level rural investment that contributes to financial security. On one hand, smaller animals such as chickens and rabbits generate regular income (chickens through sale of eggs and meat, rabbits through sale of meat) which can be injected into VSLAs or meet household spending needs. Larger animals like goats or pigs provide income when their young are sold, about twice a year, but also act as a form of insurance against financial hardships. In case of liquidity problems at a given time – if school fees come due, harvests fail, or if the price of a commodity like coffee or banana is driven down at harvest time and risks being sold at a loss – these larger animals can as a last resort be sold off. For farmers, this is preferable to having money in the bank and paying fees.

The same logic holds when considering large expenses that are mandated by the farm plan. Because livestock is an "indivisible" form of capital whose value increases over time (considering the livestock is acquired when small), it is an enabler for investment cycles – somewhat like a personal savings association. Biira Meleena from Kicwamba explains: *"From the VSLA, we got a loan. We bought onion seedlings, then we planted the onions. When we harvested and sold, we used the money to buy the mother cow. Then this provided money to buy the pigs."* Several examples show that when supported with one or two animals, farmers often manage to invest to expand into other species or increase the herd size.

This is verified by the attitude of farmers, whose ambition once they reach a critical stage with one or two functional livestock enterprises is always to expand their livestock operation. When farmers have capital, they prefer to inject it into new livestock rather than use banks.

4 Improve nutrition for the family

Most farmers cannot afford to buy meat for their family. However, some of the farmers who owned several rabbits or chickens and had been trained on the detrimental effects of malnutrition for children decided to occasionally slaughter one of their animals for the family. Improved-breed chickens and cows can also provide milk and eggs for regular consumption, significantly boosting nutrition.

In addition, manure application boosts the productivity of kitchen gardens, giving the family access to healthy vegetables. Finally, if new revenue comes in, hunger and nutrition are the first issues addressed: for instance, providing lunch for children when they go to school.

5 Requires little or no additional labor

Agroecological practices often require more manual labor, which can be a barrier. According to the MSFP+ farmers, inserting livestock into their system barely increases the workload. Many have set up systems to optimize the caretaking, feeding animals on the way to their fields.

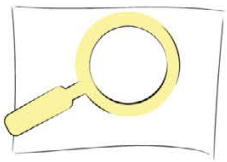
From a program perspective

Livestock integration within the IFP helps ...

Drive farmer engagement & ownership: The Integrated Farm Plan (IFP) encourages farmers to fulfill their vision and to invest methodically, sometimes starting with small animals to move towards bigger ones when their income has increased. The co-funding approach, combined with tailoring the support to needs expressed by the farmers themselves, drives engagement among the families. Livestock may provide returns within a few months, and these tangible, short-term results encourage adoption of agroecology.

In fact, this adhesion is required to avoid seeing the animals sold off quickly after the program begins and before any dividends can appear.

Create conditions for financial stability: There is a close link between financial stability and the capacity and willingness farmers have for implementing new, sustainable practices. Experience shows that in times of financial need, farmers are forced to sell their harvests at low prices to generate cash, further weakening their capital base. Since the onset of the program, households have been encouraged to form Village Savings and Loan Associations (VSLAs), which contribute greatly to financial stability. Members can pool savings regularly and take out loans when liquidity needs arise, creating a financial buffer. In the same vein as VSLAs, owning livestock reinforces the 'savings and investment' mindset within communities. Animals are seen as an investment, which may pay off after some time, and as a form of capital. Some livestock, such as egg-laying hens, provide regular capital well suited to saving in a VSLA. *"My chickens lay 30 eggs in two or three days. I sell for 12 000 UGX (3€) and use 6 000 UGX (1,5€) to buy feed. I can set aside 6 000 UGX (1,5€), and this balance goes to the VSLA." – Butuloamu Luka, farmer in Karangura.*



> **VSLA Groups** – From the onset, households are encouraged to join together in Village Savings and Loan Associations (VSLAs) with up to 30 members each. VSLAs are mostly composed of beneficiary families but are also open to other families. Six trainings were dispensed on the principle and functioning of VSLAs.
>
> The group meets on a weekly or bimonthly basis to save and lend money to fellow members. Group leaders are elected to manage the financial and day-to-day operations. Savings are placed as "shares", and there is a cap on the number of shares a single farmer can purchase (example: 5 shares worth 5 000 UGX (1,3€) is the cap). Loans are paid back with interest (1 or 2%). At the end of the year-long cycle, members share out the total (initial savings + interest accrued) according to the number of shares purchased. The group is dissolved, and a new group can take shape.
>
> Different concepts are contained within the VSLA: savings; loan concept; welfare fund (when members have emergency needs (social needs, burial, etc.), the amount can be donated on a non-refundable basis if voted unanimously, or loaned interest-free and returned within a month).

IN THEIR WORDS

"Since I am a single mother, it was difficult for me to cope. Now, I see that even as a woman I have a role to play in developing agriculture and spreading the techniques I learn. People actually admire me, they admire our VSLA group for what we do in agriculture. When they see my home, people think that there is also a man there".

Kezia Bunihizi,
farmer in Karangura.

Promote a one-health approach: One health is a public health management approach which emphasizes the linkages between the health of people, animal health, and environmental health. It arose with the re-emergence of infectious diseases and zoonoses. Here, the proximity between humans and animals, combined with high population density, raise the health risk. Prior to being trained on animal management, many farmers who owned animals kept them inside their kitchens or houses, so livestock housing has brought a marked improvement. Conversely, healthy animals start with healthy humans, so livestock integration should be accompanied by basic hygiene training (hand-washing), alongside animal health and zoonotic prevention.

Empower women and youth: A baseline survey in 2017 prior to project launch found that participative decision-making was not a common practice in the households and that men traditionally manage decision-making for going to market (where, at what prices), especially for cash crops (coffee and bananas). Men are typically taken up with trading or motorcycle taxiing, while women stay at home and are more involved in the daily labor on the plantation. The problem may also exacerbate when dealing with livestock; it may be easy to agree on the sale of rabbits and chickens, but more difficult with cows and goats. This balance of power can be problematic as it gives women less say in investment decisions.

In response, field officers have seen that the IFP is a powerful gender tool. First, because it forces an inclusive discussion with all family members. Once approved, it holds everyone responsible for their task by asking specific question: where will we get the money from, who will do it? Pre-tagging money in the investment plan leaves less room for gender issues to crop up.

Additionally, when women are involved in looking after smaller animals and empowered to make financial decisions about these, it may be a first step to joint income management. Field officers also report that VSLA group meetings and trainings often see more women, empowering them through the knowledge they accumulate.

6 Conditions for success/best practices

In this chapter we outline the elements that upheld the success of MSFP+ relative to livestock integration which we recommend replicating in similar programs.

INVOLVE LOCAL AUTHORITIES IN THE PROCESS FROM THE BEGINNING.

In Uganda, the relevant local authorities include a technical wing (veterinary and agronomic officers) and a political wing. Working in tandem with the local authorities is pivotal in several respects. Working with officials at the smallest effective scale (sub-county level in Uganda) meant having direct access to communities and a clear path for farmer mobilization during the launch phases. The sub-county buildings were later used for trainings in this case, in a win-win scenario since the veterinary and agronomic officers themselves benefit from capacity building through some of these trainings.

This close relationship is particularly important for the livestock component. The sub-county was necessarily involved in providing animal health certificates for the livestock. In two of the areas, the program relies exclusively on the sub-county extension officers to support farmers with medication and vaccines. Collaboration with the local authorities for law enforcement may also be useful, especially as a deterrent on theft. For instance, problems encountered at the onset of the program with farmers selling off livestock immediately were handled through the officials.

Local authorities are kept engaged through joint training and quarterly monitoring meetings. In Karangura, a quarterly NGO Forum has been constituted, targeting NGOs working within the same perimeter. The aim is to ensure that their interventions do not spatially overlap nor promote contradictory actions. In this case, some MSFP+ beneficiaries also received support in digging water tanks or planting trees from other programs, which enhances the synergies.

CAREFULLY SELECT FARMERS to identify those who will bring value to their households, and ultimately, communities. A set of four criterion were used here:

- Own land or have access to it.
- Be an *active farmer.*
- Willingness to cooperate with other members.
- Socioeconomic criteria to identify the most vulnerable and poorer households were used in 2 areas; if applying this criteria, it is important to also include slightly wealthier households, to encourage cross learning.

For the “urban youths” portion of the program, the selection criteria differs. Recruitment campaigns were carried out over the radio:

- Age bracket 18-35.
- Out of school, no formal employment.
- Access to agricultural means (improve conditions rather than starting from scratch.

PLAN FOR THE LONG TERM

MSFP+ is a five-year program which has been extended once. Thinking in the long term is key to perennity of the impacts and means spending time on the ground. As shown in part 3, a "preliminary phase" which includes training and preparing infrastructure for livestock should precede the actual acquisition. Mindset change among beneficiaries takes time. Field officers explained that a few years ago, poultry raising was not considered a business, while now many farmers seek out poultry for some additional revenue. But this change was years in the making (7+). For the impacts to perdure after the funding ends, farmers must have become autonomous in applying the techniques, and have formed strong groups to mutually reinforce each other.

CONSIDER AND PROMOTE SYNERGIES AT COMMUNITY LEVEL

The entry point for diversification is the synergy between different enterprises within a farm; this helps ensure, for instance, that climate shocks do not cause harvest failure, is propitious to proper nutrition, creates positive reinforcement between different activities, etc. Similarly, diversification within the community reinforces its functionality. For example, livestock reproduction requires that one of the farmers own a male – other farmers may contribute to its upkeep. One of the intervention areas promotes the use of indigenous seeds, so several multipliers were appointed within the program to progress towards autonomous production. In Kabambiro, several beneficiaries started a milling factory so that farmers could become self-sufficient for maize bran.

This aspect also underlines the importance of fostering a collaborative spirit among farmers.

IN THEIR WORDS

"From the VSLA, I got a loan to help me put up the poultry coop. The VSLA is one of my social points; when I'm stuck on a problem, I go to our Friday meeting, and the comments I get help me solve the problem"

Kwirabuke John,
farmer in Karangura.

CREATE STRUCTURES WHERE THE FARMERS CAN WORK TOGETHER

Part of the impulse for switching to agroecological systems relies on social dynamics. In MSFP+, farmers were grouped into Village Savings Loan Associations (VSLAs), which ended up taking on a social role far beyond collecting savings. Farmers interact through their VSLA groups, with weekly or bi-monthly meetings during which they discuss the obstacles they face and solutions some may have found, prepare concoctions against pests, and sometimes receive training. In some cases, farmers mutualize labor for digging trenches or uprooting wilted coffee trees, for instance. Fostering a group structure from the beginning appears essential; the VSLA format creates engagement and trust due to the monetary commitment. Marketing associations bring together more farmers in order to obtain higher selling prices for their products. Given that farmers accept the price given by middlemen in 70%[10] of cases, these associations are an efficient value-adding instrument.

Designating model farmers, farmer innovators and agro-ecology centers (experimental fields set aside by model farmers to test new techinques and help train their peers) act as beacons for the community helps foster ownership of the techniques. Model farmers benefitted from extra support compared to other beneficiaries, making it possible to showcase and experiment with more crop and livestock combinations. In Kabambiro, 8 agro-ecology centers were set up with various farmers. These centers are well known to the local communities and the extension officers. In addition, these knowledge transfer chains reduce the strain on project officers.

10 Baseline surveys from 2018

7 Challenges and points of attention

Risks linked specifically to animal health and welfare

RISKS OF THEFT. Several cases of animal theft have been reported in the intervention area, causing a blow to farmers. Losing an animal means losing a large amount of capital at once, as well as losing the benefits from synergies with other enterprises. Some farmers mentioned that thieves were more likely to be known to the family than not. This raises the possibility that significant disparities in income between farmers within a single village is conducive to theft.

MITIGATING ACTIONS: This will depend on local custom. In the intervention areas, very few families own dogs. This is explained by the risk of bites to neighbors and passerby, in areas with high population density and lots of passage. Most farmers keep livestock housing in a perimeter close to their house. More well-off farmers can erect solid walls around a compound including their house and livestock areas; others plant dense thickets of fast-growing plants around their property. In addition, working with the sub-county or the police act as a deterrent to thieving.

LONG-TERM ANIMAL HEALTH IN ZERO-GRAZING. Livestock integration was among the innovations in the second phase of the program, so there is no feedback on the long-term effects of the zero-grazing systems on animal health. With many farmers wanting to expand their herd but lacking capacity to expand their housing space, overcrowding can lead to disease outbreak.

MITIGATING ACTION: When implementing zero-grazing, ensure animals spend time outside to receive sunshine and to clean housing. It would be useful to carry out a study to set a recommended number of animals (by species) per square meter of housing.

Limits in terms of “scaling up” and “scaling out” the approach

REQUIREMENTS FOR SUPPORTING PERSONNEL. As mentioned in CAP No 2, the IFP approach comes with a strong need for human resources to accompany the transition of farmers to an agroecological practice. Such a personalized process, where farmers are supported with training, materials, and encouraged through monitoring, is demanding in terms of time and knowledge. Here, two to three field officers were deployed per site to cover the 450 families, with support from the sub-county veterinary and agronomy officers for trainings. Vet officers provided extension services as normal for the families within the sub-county. This meant that each family could expect a visit between three and four times a year. By comparison, state extension services rely on one agronomy and one veterinary officer for 30 000 households. Yet even with this setup, the field officers sometimes lacked capacity to deploy all of the planned activities.

BARRIERS TO AUTONOMOUS DISSEMINATION. The logic behind PAR and model farmer approaches is to set in motion a movement, through which agroecological practices spread and reach new households, with minimal external support. There are encouraging signs that non-beneficiary families do learn from beneficiaries: some neighboring farms sport trenches and cover crops. The dissemination of livestock integration with other farm components, however, seems more difficult. The initial investment barrier can lead non-beneficiary farmers to 'lose morale' and give up on agroecological practices because of a perceived insurmountable gap with those who already own livestock. On the other hand, many farmers outside of the program already own one or two heads of livestock and could benefit from farmer-to-farmer interaction to learn about simple management techniques and integration. There is little feedback on this component, as the groups mainly involved beneficiaries, and interaction with neighbors are not structured by the program.

Field officers also raised the need for more research and capacity building to be done upstream, namely by public research organizations. Field officers themselves often apply what they have learnt from experience in their personal fields and through continuous learning in contact with research projects. Felix Kiiza, field officer at JESE, states that "*Upstream work in research and development is needed to make sure that people are exposed to agroecological concepts and that there is enough evidence to support the technologies. So that farmers are not firmly set in the conventional ways when we reach them.*"

Profitability

LARGE-SCALE LIVESTOCK REARING SUSTAINABILITY AND PROFITABILITY. Most farmers, once they had obtained a few heads of livestock, naturally sought to expand their operation and become larger scale breeders. However, whether the profitability increases with the number of animals is unclear. Indeed, feed and land availability remain constraints, and new health risks emerge with overcrowding of animals. Intensive and large-scale breeding also breaks up the synergies between the enterprises, as the plot becomes too small to feed the animal with crop residues and excess fertilizer must be sold. These synergies can still be established at community scale, but the potential is limited given the cost and impracticability of ferrying inputs. At time of writing, several farmers already had significantly scaled up their chicken operations (from 5 to around 25 birds) with the ambition of becoming large-scale chicken farmers, but not all were profitable. For cows, there are no example of dairy producers yet under the program; due to limited productivity of the local breeds, it is not certain that the cows would be profitable in the long term. Urban farming, where the animals are kept in semi-intensive systems and grazed during part of the day, seems an exception.

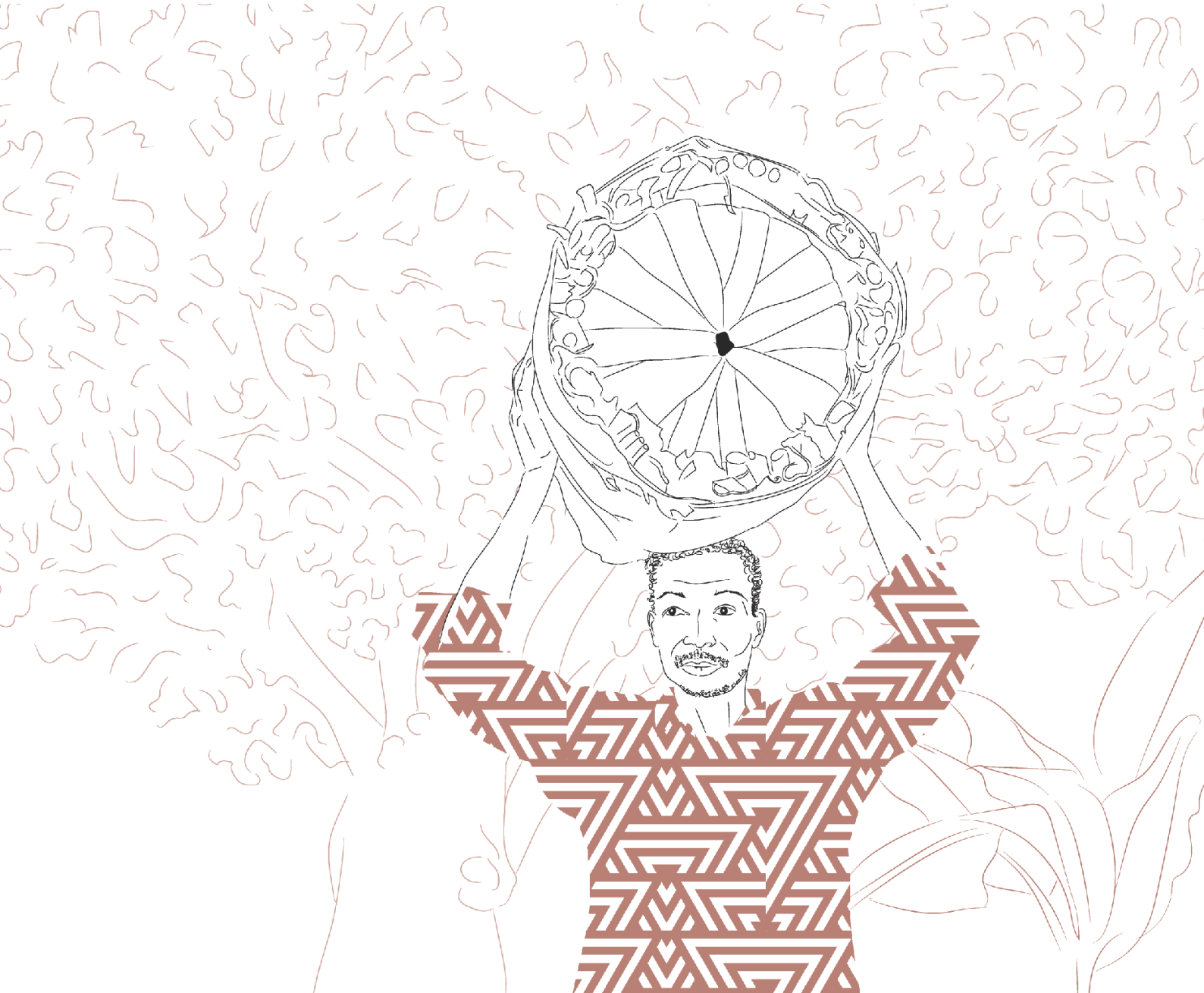
As a recommendation, it would be useful to develop references for profitability margins. The program already sets a target for the animal equivalents per acre, also taken as a maximum. It is clear, however, that farmers must also learn progressively through their own experiences and will adjust their ambitions as they go.

PRICE FLUCTUATION AND MARKET OPPORTUNITY. As highlighted earlier in the document, livestock is generally destined to be sold at market. Similar programs must ensure that there is a market for the species of livestock provided and that beneficiaries are able to meet the quality standards. In Karangura, an outbreak of foot and mouth disease (FMD) has forced closure of markets to livestock sale (except poultry, not prone to FMD) and may remain so on order from the government. Such conditions may make it harder for farmers to procure livestock, lower visibility on prices, and hamper market access.

Price reading is also an important piece of the puzzle. Most farmers sell to middlemen and must accept the price they set. A marketing association was formed in Kicwamba to bargain for better prices for fruits, vegetables, and grain – no attempts have been made with livestock at this point.

PROFITABILITY AND THE INTERACTION BETWEEN FARMS AND GARDENS. Many farmers reported very positive results following the support of the program on livestock integration and diversification. Many farmers also owned or rented plots of land ("gardens") distant from their "farms" (around the home), often managed more intensively and sometimes the primary source of revenue. The impact of diversification/integration on income is therefore not proven in all cases as farmers do not tend to clearly distinguish the share of income from their gardens and their farms. Other positive impacts, such as increased resilience, better nutrition, positive social dynamics, stronger role for women in the household, and better environmental caretaking remain even if income increase turns out to be negligible in some cases.

In addition, these plots are often managed very intensively, with less regard for regenerating the soil, and are located too far to be fertilized with manure. There is potential to spread some best practices from the farms to the gardens, for greater impact.



8 Conclusion

Since 2017, the MSFP+ program has launched a movement towards the agroecological transition in small communities in Western Uganda, based on cultivating social dynamics and providing continuous training on the different facets of agroecology. The approach is not a one-size-fits all solution but rather a patient tutoring which makes the most of existing resources and emphasizes participation.

The experience in Western Uganda has shown that the Integrated Farm Planning Approach, combined with the introduction of small livestock in family farming systems, is a powerful tool for enhancing farm-level integration, especially in areas with low soil fertility where organic inputs bring immediate benefit. Another key ingredient for success is fostering an investment mindset through VSLA groups and marketing associations, enabling farmers to take control of their future by planning ahead.

The difficulties that are to be anticipated in implementing similar programs include the risk of theft, relying on local authorities for veterinary care and animal health regulation (in contexts where public services may not be functional), and the intensity of human resources required to train and follow up with the households on a regular basis.

Far from letting the challenges intimidate them, the gratitude and pride of the farming communities involved in MFSP+ in Kabambiro, Karangura, and Kicwamba, is an invitation to reflect on and expand this approach to similar contexts.

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Barriers and opportunities for scaling up agroecology, Action Aid
https://www.actionaid.it/app/uploads/2018/04/Agroecology.pdf

In western Uganda, farmers in the Mpanga River watershed face the daily challenge of producing sustainably while improving their livelihoods. The Mpanga Super Farmers+ (MSFP+) program, led by the Belgian NGO Iles de Paix in collaboration with its local partners JESE, KRC, and RCA, supports these farmers by promoting agroecology and integrating small livestock into their farming systems.

With the support of the Integrated Farm Planning approach (IFP), this program encourages more resilient agricultural practices where livestock plays a key role: improving soil fertility, diversifying incomes, enhancing food security... The earlier this integration takes place, the greater the economic, environmental, and social benefits.

This publication captures the experience of Iles de Paix and its partners in Uganda, highlighting key lessons from livestock integration. An inspiring read for those committed to sustainable and integrated agriculture.

iles de paix

ILES DE PAIX NGO

37 rue du Marché, 4500 Huy – Belgium
T: +32 85 23 02 54 info@ilesdepaix.org https://www.ilesdepaix.org
Legal deposit: D/2025/3350/03