

Policy Brief

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Enhancing crop-livestock integration for more inclusive development in Rwanda



EXECUTIVE SUMMARY

The National Agriculture Policy in Rwanda aims to stimulate economic growth by agricultural intensification – i.e. through the production of high value commercial crops and modern livestock management. Strong cooperation from farmers is necessary as the transformation from subsistence to commercial-based agriculture would involve over 95 per cent of the rural households for whom farming is the primary source of income.[1] However, despite continued policy efforts to transform the agricultural sector, many farmers do not have the resources required to realise intensification. Typically, farming in Rwanda consists of a mix of crop and livestock productions – i.e. interactions involving the sharing of resources between crop and animal productions. This form of farming system is known as mixed crop-livestock farming (Box 1). Therefore, the policy promoting a broad-based and rapid transformation of rural livelihoods needs careful assessment of how mixed farming (in its various forms) could be leveraged into highly productive but also climate resilient and nutrition sensitive agriculture.[2]

Key policy messages

A more distinct and targeted policy approach is required to help smallholder farmers smoothly transition from subsistence to commercial-based farming, by recognising their differing capacity to make investments and take on risk.

- Focus on the wider production environment and enabling access to productive resources beyond high-yielding varieties and chemical inputs
- Invest in alternative non-commercial inputs and methods that are widely adopted and used by smallholder farmers
- Broaden the crop-livestock integration options to those better suited for smallholders

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Detailed research was conducted in two communities – rural and peri-urban villages – in the district of Rwamagana in the Eastern Province, to explore how the integration between crop and livestock productions contributed to agricultural intensification for smallholders in Rwanda. Mixed methods approach consisted of a review of historical agriculture policy archives from 1962 to 2017, household surveys (n=169) and in-depth life history interviews (n=47). Data collected were used to assess how mixed farming can be both commercially viable but also sustainable in meeting the livelihood needs of smallholder families.[3]

BOX 1: A MIXED CROP-LIVESTOCK FARMING SYSTEM

Mixed farming at the on-farm level allows mixing and sharing of productive resources between crops and livestock systems. For example, soil nutrients are recycled through animals feeding on plant and crop residues and then organic manure fertilising the soil for further crop production. There are five key types of characteristics of mixed crop-livestock farming.[4]

- Sources of animal feed
- Importance of organic manure
- Source of farm labour
- Importance of crop residue feeding
- The role of animals as functional livelihood assets (e.g. as savings account)

In this research, we found evidence of intensification through crop-livestock integration amongst the farmers who had better access to productive assets and resources. On the other hand, economically more vulnerable farmers faced considerable difficulties in keeping up with the competing and growing demands of intensive crop farming and home consumption. This is the leading reason why they maintained low but highly diversified production. Moreover, we found overlapping patterns of integration amongst smallholders but found varying strategies and practices reflecting the differential capabilities and livelihood priorities of farmers (Box 2).

FOCUS ON THE WIDER PRODUCTION ENVIRONMENT AND ENABLING ACCESS TO PRODUCTIVE RESOURCES BEYOND HIGH-YIELDING VARIETIES AND CHEMICAL INPUTS

Currently, crop and livestock intensification strategies in Rwanda are based on genetic improvements and the use of high-yielding varieties. However, the genetic material is only as good as the other factors such as ideal growing and rearing conditions which allow full expression of its yield potentials. Ensuring an environment for optimal production means, for instance, careful soil fertility management and provision of clean and secure space for farm animals, all of which comes at a varying cost and risk to farmers. Given the higher cost of modern inputs, farmers whose livelihood resources are limited would have to bear greater risk in investing in intensive production. Therefore, it is crucial to take into account the significant variations in crop-livestock integration practices and their trade-offs.

1. Soil fertility management – organic fertiliser

Dairy cows were crucial for the high integration of crop-livestock farming. Cows provide the essential organic manure for soil fertility management that all farmers in the villages rely upon. However, the majority of the villagers – irrespective of their economic standings – cannot produce enough to meet their soil fertility demands. While financially better-off farmers can afford to buy extra manure from other cow owners, the others resort to using manure collected from goats and chicken and applying near the plant's root-base or selectively on priority crops while neglecting others. Such practices show resilience in response to the shortage of organic fertiliser. However, their level of integration is low (Box 2), and the long-term impact on soil quality and crop productivity is questionable.

2. Soil fertility management – chemical fertiliser

The use of chemical fertiliser amongst farmers is mainly associated with the government-sponsored Crop Intensification Programme (CIP) and *Tubura* (the local name for One Acre Fund project, which means “to grow exponentially”). The farmers participating in the prioritised production schemes of maize and rice, for example, received chemical fertiliser and hybrid

seeds at a discounted rate. Besides government-sponsored crops, however, farmers rarely purchased fertiliser to use on other staple crops.

3. Peri-urban farming

In the peri-urban village, farming and animal rearing are limited by the size of the land available for farming, the tolerance of adjacent neighbours, and other income sources. For instance, although economically better-off families have access to more land and rear a more significant number of animals, agriculture is not a priority as they engage in more off-farm activities (Box 2). On the other hand, for the households with lesser means, farming was of primary importance, but their production conditions were extremely precarious – e.g. having access to only a tiny kitchen garden and without a proper animal shed.

INVEST IN ALTERNATIVE NON-COMMERCIAL INPUTS AND METHODS THAT ARE WIDELY ADOPTED AND USED BY SMALLHOLDER FARMERS

Farmers universally practise crop residue feeding due to the shortage of grass production and high costs of commercial feeds. Therefore, there is a great interest from farmers to receive more technical training in feeding management and support in the mechanisation of crop residue processing machines in order to save time and improve labour efficiency.

1. Feeding management under zero-grazing regime

All dairy farmers in the villages practice zero-grazing: a feeding regime that involves cutting and carrying fodder grass from field to the animal shed. However, in both villages, none of the farmers can grow enough grass to meet their feeding demands. Wealthier families bought grass and other commercially available concentrate feeds such as maize and rice bran to fill this gap. Others, who cannot afford to purchase feed, have to forage wild grass from public areas such as waysides and from unmaintained neighbours' plots (Box 2). While sourcing grass this way may seem like a cheaper alternative, it is more time and labour intensive to collect sufficient quantity of feed to maintain productivity for smallholder farmers.

2. Using crop residues as alternative feed

To counter the general lack of grass production, all farmers in the villages fed crop residues to their animals. Banana peels, maize and sorghum leaves and husks and rice straw were among the most popular crop residues used for animal feeding. Only very few of the economically better-off farmers treated their crop residues for nutrition enhancement or for extending its storage life (e.g. silage).

BROADEN THE CROP-LIVESTOCK INTEGRATION OPTIONS TO THOSE BETTER SUITED FOR SMALLHOLDERS

Economically vulnerable families rely heavily on small livestock production. However, there is a lack of research funding for and commercial interest in investing in the genetic improvement of local breeds. Moreover, farmers face multiple challenges in keeping safe their animals against theft and providing clean and adequate space within the limitation of the household compounds.

1. Improving genetic potential of local breeds

For small ruminants such as goats, the options are limited to a local breed that is solely reared for meat. Currently, there is no government plans to invest in genetic improvements of indigenous goat breeds.[2] However, the importance of small ruminants cannot be overlooked as they are uniquely adapted to low resource environments and offers economic safety net to smallholder farmers (Box 2).



BOX 2: CROP AND LIVESTOCK INTEGRATION MATRIX

		LOW*	HIGH*
Crop-livestock integration ↑	HIGH	<p><i>One to two cows</i></p> <ul style="list-style-type: none"> Primarily for manure Lack of access to affordable feed (low milk production) Rely extensively on forage grass and crop residues <p><i>Goats & chicken</i></p> <ul style="list-style-type: none"> Fast reproduction but quickly sold to cover household expenses 	<p><i>Three or more cows</i></p> <ul style="list-style-type: none"> Highly productive and profitable intensification <p><i>One to two cows</i></p> <ul style="list-style-type: none"> Small number of productive breed Herd limited by access to pasture requiring substantial investment
	LOW	<p><i>One-cow</i></p> <ul style="list-style-type: none"> Maintaining low productivity but resilient production e.g. families with many dependents Lack of access to affordable feed and labour <p><i>Goats & chicken</i></p> <ul style="list-style-type: none"> Appreciated for organic manure 	<p><i>One-cow</i></p> <ul style="list-style-type: none"> Intensification and investment are not a priority, but for self-sufficiency e.g. have off-farm jobs and keep animal for savings <p><i>Goats & chicken</i></p> <ul style="list-style-type: none"> Fast reproduction but quickly sold for household expenses
	NO	<p><i>Rural areas</i></p> <ul style="list-style-type: none"> Highly insecure livelihood, e.g. landless, rental housing, large number of dependents Social safety net required <i>Indagizanyo</i> and <i>Girinka</i> could help but need support until the end of successful delivery and pass-on of offspring 	<p><i>Peri-urban areas</i></p> <ul style="list-style-type: none"> Working professionals Not interested in farming Financially able but not interested in farming But for those interested – lack of space and security to rear livestock
		Socioeconomic status →	

* The low and high represent the bottom and top 30 per cent of the sample households' wealth ranking. The middle-group data is not presented here but can be found in [3].



2. Ensuring a secure and safe environment for peri-urban livestock production

Currently, small livestock are raised in household backyards. Particularly in peri-urban areas, issues arise with neighbours due to noise and hygiene concerns (and the potential risks of transmission of zoonotic diseases), as well as the lack of security and protection against theft of small animals, which were a severe impediment for investment amongst smallholder farmers.

CONCLUSION

Smallholder farmers are managing and working under highly unstable and variable conditions, and their chance of intensification depends on flexible production arrangements and support in primary livelihood needs and affordable commercial services. The agricultural transformation policy must carefully assess the potential ramifications that the current intensification plan poses to the different members of the farming population in Rwanda. Therefore, we recommend refining agricultural policy to help smallholder farmers smoothly transition from subsistence to commercial-based farming by recognising their different capacities to make investment and bear risk. Taking into account the diversity and complexity that arises from integrated production systems will ensure a more inclusive and resilient agricultural transformation process in Rwanda.



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Policy recommendations

Improve organic manure management both at the community and household level

Currently, there is no specific policy intervention for increasing the supply of organic fertiliser other than the transferring of cows through the Girinka programme and the recommendation to use household compost pits. The actual manure production, however, depends on the quantity and quality of feed more than the number of cows distributed. Specific extension strategies and policy interventions are urgently needed to address the shortage of animal feed and integrated soil fertility management (e.g. organic, vermicomposting) at the community and household levels.

Continued support in subsidised inputs is needed for a foreseeable future

The current adoption rate of chemical fertiliser and hybrid seeds is maintained through subsidised price support. This observation suggests relatively weak private and market incentives of farmers purchasing inputs. Therefore, the government's plan to liberalise input markets (i.e. to terminate subsidisation schemes) should be gradual and exclusive to those farmers who could afford the market price. On the other hand, continued support in subsidised inputs along with other social protection measures such as cash transfer is necessary for ensuring the viability of intensive production amongst the vulnerable farming households.

More research and a new policy strategy are needed for the peri-urban (and urban) farming

Currently, peri-urban planning and regulations are not conducive to farming activities, and they put a considerably high strain on the smallholder farmers. New land use and planning legislation and strategies addressing the needs of peri-urban agriculture could

help foster more agri-business investments and create farming jobs for smallholders and landless farmers.[5]

Making the intensive one-cow production system more affordable

Under the current zero-grazing practice, sourcing of affordable and high-quality feeding is the biggest concern and a bottleneck to increasing the intensity of production and livestock development for smallholders. More competitive local feed options and markets – other than the commercial feeds such as maize and rice bran – need to be available and affordable to serve small-scale livestock producers. For instance, establishing community fodder banks and the production of perennial fodder trees could relieve seasonal peak demands and serve multifunctional purposes (e.g. animal feeding, soil protection, biofuel, and income).

Invest in genetic improvement of small ruminants and product diversification

A community-based goat breeding programme through the existing farmers' cooperative and association networks could substantially reduce the research costs and time for scaling up.[6] Also, more diversified product development and marketing of wool, hide and milk from small ruminants could help diversify the pathways of integration options for farmers.

Protect the livestock assets through a district-wide identification system and community surveillance

A district-wide animal identification system could potentially help to track the lost or stolen animal. Moreover, we can foster community surveillance and enforcement mechanisms such as establishing rapid communication channels between the village leaders and key contacts in the local value-chains (e.g. market vendors and butchers).