

Final Report

Consultations on Agri Inputs Subsidies Reforms



Institute of Research and Dialogue for Peace
Ikigo cy'Ubushakashatsi n'Ubusabane Bigamije Amahoro

info@irdp.rw

January, 2022

Contents

CHAPTER 1. INTRODUCTION AND BACKGROUND	4
1.1 Introduction.....	4
1.1.1 Organization’s Profile and Experience	4
1.1.2 Areas of interventions	4
1.1.3 Relevant achievements in agriculture research	4
1.1.4 IRDP Citizens’ dialogue participation Approach	5
1.2 Background.....	6
1.2.1 Development Context.....	6
1.2.2 General Context.....	9
1.2.3 Problem Statement.....	9
1.2.4. Objectives of the assignment.....	10
1.2.5. Scope and tasks.....	10
1.2.6 The justification of assignment and the role of IRDP	11
1.2.7 Expected Deliverables and Outputs	11
CHAPTER 2. METHODOLOGICAL APPROACH.....	12
2.1 Introduction.....	12
2.2 Consultation engagement methods.....	12
2.2.1 Group Analysis Method.....	12
2.2.2. Situation Analysis of agriculture inputs subsidies	13
2.2.4 Consultations at district levels.....	15
2.2.5 In-Depth Consultation with technical and official personnel	16
2.2.6 Study challenges.....	17
2.2.7 Analysis of information from consultations.....	17
2.2.8. Reporting.....	17
2.2.9. Covid-19 Control and Protocol during consultations.....	18
CHAPTER 3: KEY CONSULTATION FINDINGS	19
3.1 SWOT analysis for the agriculture inputs subsidies program	19
3.2 Farmer’s perceptions on contribution of the input subsidy	20
3.2.1 The changes induced by the input subsidy program.....	20
3.2.2 Performance of subsidized crops in terms of production	23
3.2.3 Positives in the management/implementation of the subsidy program.....	25
3.2.4 Negatives in the management/implementation of the subsidy program	26
3.3 Farmers’ readiness and self-reliance	28
3.4 Farmer’s willingness, ability and capacity to purchase inputs.....	30
3.5 Strategies to continual inputs usage after reforms.....	31
3.5.1 Strategies to acquire unsubsidized inputs.....	31
3.5.2 Strategies to build up resilience	32
3.5.3 Strategies to ensure these gains continue to grow	34
3.6 Targeting to implement subsidy reforms	34
3.6.1 Targeting farmers.....	34

3.6.2 Targeting crops.....	35
3.6.3 Targeting type of fertilizers	35
3.7 Envisioned gradual reduction of input-specific subsidies	35
3.7.1 Farmers' contribution levels in the envisioned subsidy reductions.....	35
3.7.2. Appropriate measures to bridge the input subsidy gap.....	36
3.8 Timing of subsidy Reforms.....	38
CHAPTER FOUR: DISCUSSION AND DATA ANALYSIS.....	39
4.1. The noticed changes induced by the input subsidy program	39
4.2 Farmers' readiness and self-reliance	41
4.3 Farmer's willingness, ability and capacity to purchase inputs.....	42
4.4 Positive and negative facts in the implementation of the subsidy program.....	42
4.5 Strategies to implement subsidy reforms and ensure procuring the unsubsidized inputs.....	44
4.6 Targeting	45
4.7 Farmers' contribution levels in the envisioned reductions of subsidy cost.....	46
4.8 Appropriate measures to bridge the gap triggered by input subsidy reductions.....	47
4.9 Timing of subsidy reforms	48
CHAPTER 5. CONCLUSIONS AND RECOMMENDATIONS.....	49
REFERENCES.....	56
ANNEXES.....	<i>Error! Bookmark not defined.</i>

CHAPTER 1. INTRODUCTION AND BACKGROUND

1.1 Introduction

1.1.1 Organization's Profile and Experience

The Institute of Research and Dialogue for Peace (IRDP) is a Rwandan based think tank and a peacebuilding organisation created in 2001. With a mission "Towards a National and Regional class Research Institute (think tank) and Peace-building Organization striving for lasting peace as a cornerstone for sustainable development through Research and Dialogue". IRDP is known internationally as a leading Research Institute and works with International Universities and Research Centers, International NGOs. Among others we can mention Lincoln University, University of London, Leeds University, (UK). In Belgium with Universite Saint-Louis in Brussels, Universite Catholique de Louvain. In South Africa, Stellenbosch University and the International Center for Transitional Justice, ICTJ. In USA, we are partners with USC Shoah foundation, Ohio State University, Massachusetts University. IRDP generates evidence based and Participatory research for change. In this perspective, IRDP is dedicated to provide neutral spaces for a democratic society development by creating formative and participatory community dialogue, Open spaces for policy dialogue and developing through community dialogues allowing communities to discuss sensitive issues they are facing.

1.1.2 Areas of interventions

IRDP WORKS under three areas of intervention:

- **Socio-economic development** with focus on *agriculture* and environment research and human capital development.
- **Governance and social protection** with focus on Leadership, Citizen's satisfaction and participation, social dialogue, Youth leadership and skills development, Global and regional governance.
- **Peace-building Memory and social cohesion**, including conflicts, healing and trauma, memory and intergenerational transmission and dialogue, Arts-based approaches in education, healing and peacebuilding.

1.1.3 Relevant achievements in agriculture research

- 2017: Crop Intensification Programme (CIP) Satisfaction Survey, with the financial support of Ikiraro Cy'iterambere Project. The study surveyed 1500 farmers in four provinces and Kigali City, 20 sectors from 10 districts across the country.
- 2019: Determinants of inorganic fertilizers and improved seeds and extension services support for agricultural productivity in Rwanda, a study financed with the support of Ikiraro Cy'iterambere/ Palladium Group and CNFA. The study reached out 1817 across ten districts including Gatsibo, Kirehe, Musanze, Burera, Nyamasheke, Nyabihu, Ruhango, Nyanza, Kicukiro, Gasabo.
- 2020: Conduct policies reviews and developed the agriculture policy briefs from the study on determinants of inorganic fertilizers and improved seeds and extension services

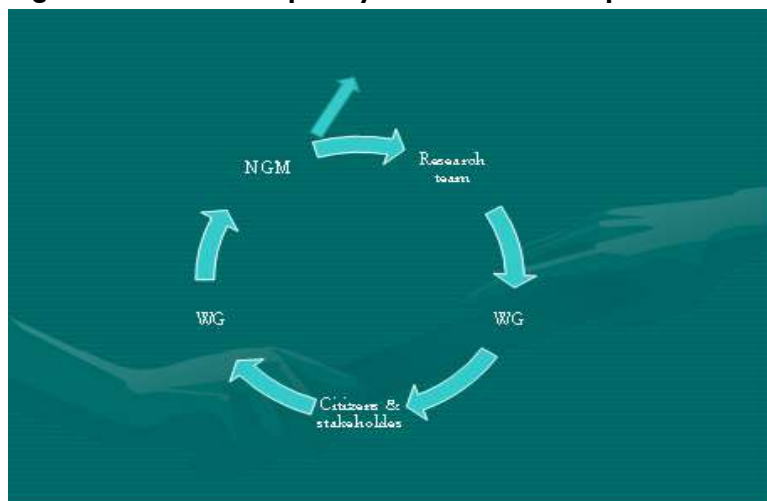
support for agricultural productivity in Rwanda, project commissioned by CNFA Hinga Weze project and conducted by the Institute of Research and Dialogue for Peace (IRDP).

1.1.4 IRDP Citizens' dialogue participation Approach

In partnership with other non-governmental organizations, IRDP advocate for policy changes using all established mechanisms, but has its original and own strategy of citizens' dialogue participation. The purpose of this approach is to create a neutral space where the actors open the debate, with the facilitation of researchers, to identify the priority challenges that the society is facing in order to devise new plausible directions. The IRDP produces researches that are relevant, that provide practical solutions which technically generate strong and politically informed proposals for change and makes sure to analyze who, how, when and what to achieve change. To that end, it prior establishes a smart power mapping to determine influential decision makers, supports/allies, neutral/unknown and opponents/blockers; balances insider and outsider approaches; chooses a good toolkit; integrates research and communication from the beginning; thinks about external context, determines when to advocate and well tailors or frames the message to key groups to influence. To be holistic and inclusive, IRDP adopted the Participatory Action Research that offers a framework for collective research where social actors contribute through their knowledge of the issues at stake while researchers facilitate debates and channel ideas. This approach is relevant since: it is participatory through consultation mechanisms at different levels; it is inclusive and establishes links between grassroots actors, national and international actors; it combines research and action, seeking a better understanding of fundamental issues; it is flexible with the possibility of adapting the approach to meet local needs and the context of the moment; it creates the neutral space to achieve the goals of building consensus on priorities; it establishes a solid base of values and skills for the promotion of local capacities.

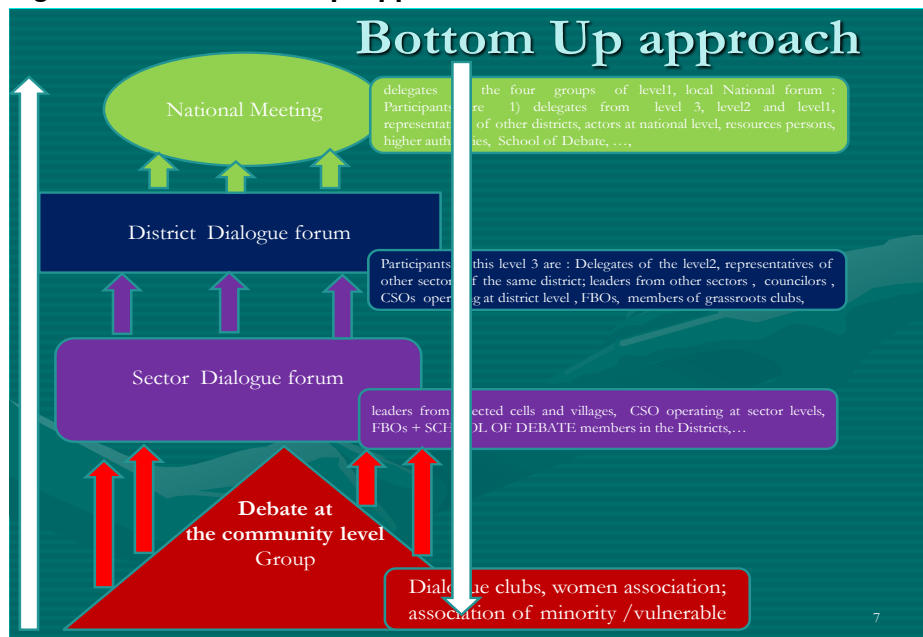
The charts below show the process/path followed in the Participatory Action Research and bottom-up approach by IRDP:

Figure 1. IRDP Participatory Action Research process



The approach also disposes a uniqueness of functioning of the collaboration between citizens and policy makers from the grassroot to national level as pertained in the chart below. The chart represents the contribution of IRDP: in normal situation, a dialogue that starts in the very local communities/Villages goes up to the district and ends at the National level.

Figure 2. IRDP Bottom-Up Approach



However, for the present assignment, the consultations with stakeholders on seeds and fertilizer subsidy reform was performed at district level. The participants were selected from all district administrative levels to ensure the composition of each participant's group respects the diversity.

1.2 Background

1.2.1 Development Context

Rwanda has undergone several development phases starting from the immediate post-Genocide against Tutsi in 1994 period which focused much on recovery; the early 2000s where the Vision 2020 was elaborated giving a blueprint for a new Rwanda embarking on economic development aspirations and post-2010 a period that intensified efforts to lay foundations for sustained growth through investing in human capital, developing basic infrastructure and expanding access to various services.

The next phase of Rwanda's long-term development is focused on transformation of the entire economy and society. There is a need to continue the journey towards self-reliance through a private sector led growth and transformation economic model. In the next 3 decades, the country will make long-term investments in future endowments: enhanced human capabilities, strong innovation and technological capacity capabilities, socioeconomically integrated forms of urbanization, and effective and accountable institutions of governance.¹

¹ Vision 2050

The country today is on a transformation path from a low income to a middle-income country. Between 2000 and 2016, Rwanda's economy grew by 7.9 per cent per year on average, so that by 2016 it was more than 3.5 times larger than in 2009. In the same period, GDP per capita increased from \$242 to \$729, and the poverty rate fell from 60.3 to 39.1 per cent. Life expectancy at birth has increased from 48.2 years in 2000 to 64.5 years in 2015, while the child mortality rate dropped from 183/1000 to 42/1000. The youth literacy rate increased from 77 per cent in 2010 to 85 per cent in 2015. Financial inclusion increased from 48 per cent in 2008 to 89 per cent by 2016, while mobile phone ownership increased from 6 per cent to 65 per cent between 2006 and 2014. Exports have seen rapid growth from a low base, with 13.2 per cent growth p.a. between 2000 and 2016, while imports grew on average by 10 per cent p.a., such that imports and exports increased their combined share of the economy from 31 to 48 per cent.

As the country transforms into a knowledge-based economy, agriculture remains the backbone for sustained economic growth, providing high quality livelihoods, and living standards for the population. The historical experience from Western Europe, the United States, Japan, and later in Taiwan, South Korea, China, and India, suggest that agricultural development was the precursor for subsequent industrial and service-based growth. Arguably, agricultural surplus underpinned human development and economic factors necessary for subsequent economic and social development. In this perspective, Rwanda's agriculture is central for creating growth, jobs, exports, and livelihoods necessary to transform the economy to knowledge based middle-income economy.²

The agriculture sector of Rwanda is quite a dominant sector of the economy of Rwanda. It contributes 29% of the national GDP and 68% of the labour force are employed in Agriculture. The Government of Rwanda has witnessed high and steady rates of economic growth nationwide averaging five to six percent (5-6%) over the last two decades, where the agriculture sector has contributed significantly.

The National Strategy for Transformation (NST1) and the Government Program for 7 Years (2017-2024), hinges on this past performance and lays the foundation for accelerated transformation and economic growth to propel Rwandans to a higher standard of living. NST1 prioritise the modernizing agriculture and improving its productivity to drive agriculture growth. The Priority Area 4 NST1 of Promoting industrialization and attain a structural shift in the export base to High-value goods and services with the aim of growing exports by 17% annually. Emphasize on prioritizing the value chains that will be identified and developed. A pro-active investor targeting will be made to attract the right anchor firms with market linkages for each priority economic value chain. The priority value chains of focus will include agro-processing, construction materials, light manufacturing, meat and dairy, leather, textiles and garments, horticulture, tourism (including MICE tourism), knowledge-based services, logistics and transport.³

In order to spearhead the transformation of agriculture set by NST1, the Ministry of Agriculture and Animal Resources (MINAGRI) is implementing the Strategic Plan for Agriculture Transformation (PSTA 4 2018 - 2024).

² PSTA4

³ NST1

PSTA 4 aims to transform the agriculture sector from a subsistence to a knowledge based, market oriented and green sector, and places a strong focus on the role of the private sector to drive the agriculture growth.

One of the priorities of PSTA 4, is to create an enabling environment, which among others, involves reforming policies and regulations, creating responsive institutions, defining and coordinating public sector involvement that creates favourable climate for private sector investment in agriculture.

The Rwandan smallholder farmers confront with many challenges which prevent them to maximize their agriculture output necessary for the increasing of their incomes. One of the most challenges they face is the lack of financial resources required to purchase improved inputs. The GoR adopted some strategies which will help smallholder farmers increasing their production and one the most strategies is to subsidize inputs. Specifically, the subsidy voucher system grant farmers access to certified fertilizers and improved seeds and was expected to have direct effects on the agriculture productivity which will lead to increase in farmers' income and consumption expenditure.⁴

Subsidies for intermediate inputs represent considerable transfers from government to farmers and, are implemented on a large scale in many developing countries to primarily achieve objectives of (1) national food security and (2) raising incomes for the poor and constrained farmers.

The subsidies for inputs in agriculture eventually help constrained households to overcome cost burdens and participate in markets.⁵ The policy on inputs subsidy in Rwanda was adopted since 2009 and have since increased the adoption of the use of inorganic fertilizers and improved seed particularly hybrid maize. Subsidy has been extended to small scale irrigation where a system of matching grant is applied. The PSTA 4 has planned to revise the current subsidy scheme to make it more targeted and sustainable smart subsidy programme will concern fertilizers, improved seeds and will propose the targeting of some farmers like the poorest and most vulnerable households. Thus, PSTA 4 advocates for an assessment of existing subsidy models, and to choose the best one (MINAGRI, 2018). In that regard, studies were conducted and different proposals were made. To get them implemented, massive consultations with stakeholders is required. In fact, the revision of input subsidy model has to be endorsed by the Cabinet requiring consultations in the following terms:

“To ensure best use of Cabinet” s time, proposals submitted for consideration by Cabinet must be complete and ready for Cabinet to make a decision. They should show their rationale, ensure all issues have been considered, all relevant information presented, and all consultations made. Ensuring proposals are as comprehensive as possible means that decisions can be taken swiftly, and are likely to achieve the best policy outcome.”(PMO, 2009).

⁴ <https://www.semanticscholar.org/paper/Subsidies-inputs-policy-implication-in-Rwanda-Mulinga-Niyonsaba/fea0effa76a070c024e2ed865bc4fbc72f3e30a0>

⁵ <https://ideas.repec.org/p/ags/iaae18/277469.html>

The Alliance for a Green Revolution in Africa (AGRA), in support of the implementation of PSTA 4, has provided a grant to MINAGRI to reform and operationalize policies and regulations related to agricultural inputs and markets so as to improve the Enabling Business Environment of Agriculture (EBA). Therefore, MINAGRI has recruited the IRDP to conduct consultations on agri-inputs subsidies to build consensus on the new orientation on the subsidy policy.

1.2.2 General Context

Farm input subsidies are assumed to improve agricultural production and productivity for small resource poor farmers in developing countries by promoting the use of improved farm inputs, mainly inorganic fertilizers and improved seeds. This is expected to contribute to increased income from produce sales, improved food security at household and national levels, and consequently, contributing to poverty alleviation. The national policies and strategies in Rwanda, such as Strategic plan for Transformation of Agriculture (PSTA4), and National Strategy for Transformation (NST1) have many elements in common geared to support of agricultural investments and modernization, through both the public and private sectors.

Smart agricultural input subsidies have often been used in Rwanda to improve the affordability of agricultural inputs for smallholder farmers; reduce the social costs arising from rural-urban income disparities with broader goals of raising agricultural production and food security. The introduction of subsidies was monitored under the Crop Intensification Program. As a result, the crop productivity has increased, for instance, the production of maize and wheat has increased by 6-fold, and that of Irish potato and cassava has tripled (CIP strategies,2011).

Since then, several adjustments have been made into the subsidy program from the voucher offered to farmers to current standing shares as catered by farmers and by the government. However, the subsidy program seems to be no longer feasible and sustainable in long run, at one side farmers claim for continuation and include more crops in the subsidy program, while the government sees that serving everyone increases the subsidy bill by the government adds more burden. Thus, improving the seeds and fertilizer subsidy scheme, through voicing the stakeholder in space between farmers and the Ministry of agriculture on possible adjustments in the existing seeds and fertilizers' subsidy scheme is highly needed.

1.2.3 Problem Statement

Several adjustments have been undertaken in the agriculture inputs subsidy program to support farmers to enter the inputs market. These changes were made into the subsidy program from the voucher offered to farmers to current standing shares as catered by farmers and by the government. However, the subsidy program seems to be no longer sustainable in long run, at one side farmers claim for continuation and inclusion of more crops in the subsidy program, while the government sees that serving everyone increases the subsidy costs and adds more burden. The Institute of Research and Dialogue for Peace (IRDP) has conducted successfully two research projects namely crop intensification program (CIP) satisfaction survey-2017 and the determinants of inorganic fertilizers and improved seeds and extension services support for agricultural productivity in Rwanda. Both studies revealed the main challenges regarding the uptake of inputs among smallholder farmers in Rwanda.

These challenges were attributed to many factors including the low purchasing power of farmers, the delays in the delivery system, low quality of inputs provided (failure to grow), low knowledge and mindset of farmers among others. Over time, the IRDP has gained experience in engaging the citizens and sensitizing them on issues concerning improving their livelihoods and eradicating poverty. Therefore, this assignment is perceived as a good opportunity to get opinions from stakeholders engaged in agriculture sector on possible input subsidy reform options to increase effectiveness and efficiency, thus inform the policy makers about the preferred scenarios for future implementation.

1.2.4. Objectives of the assignment

General objective

The core objective of this assignment is to support MINAGRI in building consensus on the policies on agriculture input subsidies, to increase their effectiveness and efficiency. Engaging stakeholders in discussions on input subsidy reforms will enable the Ministry to explore possibilities for the farmers to increase their contribution in subsidy cost and be prepared for future self-reliance, by taking into consideration different crops under subsidy scheme.

Specific objectives

- a) Conduct a thorough situational analysis of the agricultural inputs subsidies policies;
- b) Prepare the topics for consultations, identify a list of stakeholders to be consulted and undertake the consultations;
- c) Produce the consultation report that reflect the alternative ways to sustain the use of improved agriculture inputs while thinking of reducing subsidy costs paid by the Government;
- d) Propose an inputs subsidy reforms for the Government to improve the efficiency of input subsidies;
- e) Propose an implementation plan of the proposed reforms on input subsidies.

1.2.5. Scope and tasks

The IRDP worked with MINAGRI through the Directorate of Agriculture Modernization to conduct community and stakeholder's consultations on the proposed new orientations on agriculture input subsidies to come up with a new subsidy approach that continues to support adoption by small holders but also reduce the burden on government with a better targeting of the subsidy. Informed by the studies conducted by IFPRI, World Bank, IRDP and IKIRARO on agriculture input subsidies, The IRDP reviewed the agriculture input subsidy policy and agreed with MINAGRI on the key messages to be taken to the consultations. These messages constitute the base to conduct consultations with key stakeholders in all the districts. Further, IRDP identified the lists of stakeholders to be consulted under this consultancy, taking in consideration the restrictions due to COVID 19. The consulted stakeholders include farmers, institutions and key informants operating in the agricultural sector:

- Farmers 'Organizations in priority crops,
- Agro dealers;
- Fertilizer's suppliers/importers; Local fertilizer

- Seeds Producers;
- Local leaders;
- Rwanda Private Sector Federation (PSF);
- Institutions and Ministries members of Economic Cluster;
- Institutions and Ministries members of Social Cluster;
- Local NGOs

1.2.6 The justification of assignment and the role of IRDP

Farmers, as well as policy makers' opinions regarding subsidy programs are to be integral in the process of inputs subsidy reforms and implementation of the forthcoming orientations. Embarking on their indigenous knowledge, ability, and their preferences, while studying context specificity around districts and commodities in the subsidy program is among key factors to be considered to ensure that all aspects were considered during consultations. In this regard, these consultations by engaging farmers and other stakeholders were informative on reform options to increase their contribution in input subsidy where possible and be aware of where the government can be supportive. The IRDP served as a neutral facilitator to involve farmers, stakeholders and high-level leaders for the better refinement and adaptation of the subsidy program.

1.2.7 Expected Deliverables and Outputs

The MINAGRI expects that IRDP:

1. Submit an inception report showing the understanding and methodology and timeline of activities for approval by the Director General Agriculture Modernization;
2. Conduct consultations with identified stakeholders based on agreed key messages
3. Prepare consultation report using the guiding questions attached to the ToRs: The report has highlight areas of concurrence and areas of disagreement on the messages received from stakeholders.
4. Submit the final report and the proposed reforms and their implementation plan after incorporating the comments.
5. Proposes alternative ways to sustain the use of improved agriculture inputs while thinking of reducing subsidy costs incurred by the Government.
6. Proposes subsidy reforms for the Government to improve the efficiency of input subsidies
7. Organize a validation workshop at MINAGRI
8. Enrich the subsidy review study with validated ideas
9. Prepare a Cabinet Paper using the enriched study document

CHAPTER 2. METHODOLOGICAL APPROACH

2.1 Introduction

Based on the nature of the study, the participatory approach that gathers the views and opinions of various stakeholders was adopted. Key stakeholders were clustered following their characteristics and interests, and they include local farmers, suppliers of seeds and fertilizers, institutions among others. Leading discussions into these clustered spheres enabled the IRDP to gather diverse information that enlighten to policymakers about possible scenarios of the contribution level of farmers to the subsidy and adequate orientations agreed by all stakeholders, and hence develop appropriate implementable recommendations concerning seeds and fertilizers subsidy reforms. To satisfy this need, the IRDP worked in close collaboration with the team designated by the ministry of agriculture and animal resource (MINAGRI) and the management of AGRA at all the stages of the assignment.

2.2 Consultation engagement methods

Pragmatically the grassroot consultations were carried out in two steps namely, plenary sessions that involved all stakeholders (farmers in five commodities, district and sector agronomists, agro-dealers, seed multipliers), and the separate small groups discussions that hosted those stakeholders in their respective cluster. It is very important to note that the audio-visual component, which has been integrated into IRDP approach to strengthen and complement the product of our research was used during the exercise. In addition to faithfully keeping the points of view emerging during the debates and the atmosphere in which the dialogue takes place, it constitutes a powerful tool for enriching the interactive dynamics that is built around the image. Likewise, it is a tool that accounts for the fidelity of what we return to various actors.

2.2.1 Group Analysis Method

The group analysis method involves three stages was adopted to better understand from the stakeholders' views, the potential reforms options and real effects in the input subsidy program. a) First phase involved (the Story), the IRDP ensured that suggested stories solely focused on seeds and fertilizers' subsidies with true stories directly involving the narrator (stakeholders). The presentation of the different story proposals and the choice procedure allowed to get a good general idea of the concerns of participants. The retrieval of further detailed information was gained using the narratives by stakeholders; choice of analysable stories, subsidy issues as seen by the narrator, informing questions which triggered the stakeholders to provide additional information to the group and also to take distance in relation to experience, and thereby promotes reflexivity. b) Second phase (the interpretations), the trained researchers had the primary role to facilitate the participants during the consultations to express themselves without fear and listen to participants whose points of view sometimes diverge sharply from theirs. These interpretations were progressively noted by the facilitators and the researchers parallelly trying to organize. c) Third phase (the Analysis), during the analysis, the IRDP has organized loads of interpretations offered, in a clear and coherent way taking up all the work of the group and showing its strengths, but also and above all its strains, the main criterion for the structuring of interpretations was its relevance to the content and its ability to reveal its strong and contrasts axes about subsidy scheme.

2.2.2. Situation Analysis of agriculture inputs subsidies

The situation analysis was established using a mixed- methods approach that includes: SWOT analysis for the assessment of the current situation of inputs subsidy policies/strategies, review and analysis of relevant studies/ reports and consultations with selected key stakeholders at Policy level.

2.2.2.1 SWOT Analysis

SWOT analysis is a key tool, which the team applied in conducting the situation analysis. Results of SWOT analysis was identified using the desk review and the holding key stakeholder consultations. The SWOT analysis as a tool was used to scan strengths, weaknesses, opportunities and threats whose results are normally used in the process of assessing the situational analysis, by identifying the gaps in terms of weaknesses and threats (if any) and highlighted the strengths and opportunities of the agricultural inputs subsidy policies in Rwanda. The SWOT results are as presented in annex 1.

2.2.2.2 Assess the current situation of inputs subsidy policies/Strategies

The research team reviewed the national level development frameworks including but not limited to: Vision 2050; NST1; and Agriculture input policy; Agriculture sector development strategy (PSTA4) and other relevant strategic documents and studies. The assessment also included review and analysis of relevant studies reports published by the National Institute of statistics of Rwanda (NISR), Development Partners (FAO), MINAGRI partners, and independent Agriculture researchers to capture secondary data on input subsidies, which include but not limited to the following: Crop Intensification Program (CIP) Citizen's Satisfaction survey– 2018 (IRDP); Determinants of inorganic fertilizers and improved seeds usage along extension services support for agricultural productivity in Rwanda- 2020 (IRDP & Ikiraro Cy'Iterambere (Palladium Group) & CNFA)), Rwanda agriculture sector situational analysis (IPAR sector review report); agricultural household survey 2017 (NISR, 2018) and other reports developed by FAO and IFPRI among others.

2.2.3. Consultations with selected key stakeholders

The consultations were carried out following the IRDP citizens participation approach/methods in conducting dialogue. Prior to engaging them, the IRDP prepare the topics/message as key guiding talks during consultations, these topics were then validated by MINAGRI and AGRA as stipulated in terms of reference. In addition, in collaboration with the MINAGRI team, the IRDP selected the potential key stakeholders to be consulted.

2.2.3.1. Sample districts and selection of participants

The consultations employed a consultative approach with no one left behind being in the niche of subsidy program, and for this, the IRDP used the citizen dialogue and Participatory action research approach. The thorough engagement of various participants envisaged to gather diversified perceptions and views among stakeholders. During the consultations stakeholders in all districts were physically consulted, to accomplish this task, four districts served as centers host for adjacent districts:

Table 1. Districts Consultation's roadmap

Date	Venue (Host Center)	Participating Districts
Thursday, 25/11/2021	Kayonza/East Land Hotel	<ul style="list-style-type: none"> ▪ Kayonza ▪ Nyagatare ▪ Gatsibo ▪ Kirehe ▪ Ngoma ▪ Rwamagana ▪ Bugesera ▪ Kigali city
Monday, 29/11/2021	Musanze/Fatima Hotel	<ul style="list-style-type: none"> ▪ Musanze ▪ Burera ▪ Rubavu ▪ Nyabihu ▪ Rulindo ▪ Gakenke ▪ Gicumbi
Wednesday, 1/12/2021	Karongi/Golf Eden Rock Hotel	<ul style="list-style-type: none"> ▪ Karongi ▪ Rusizi ▪ Nyamasheke ▪ Rutsiro ▪ Ngororero
Friday, 3/12/2021	Nyanza/ Heritage Hotel	<ul style="list-style-type: none"> ▪ Nyanza ▪ Huye ▪ Gisagara ▪ Nyaruguru ▪ Nyamagabe ▪ Muhanga ▪ Ruhango ▪ Kamonyi

2.2.3.2 Key messages, which guided the consultations

1. After a short period of continuation with current subsidy rates, the Government should gradually reduce input specific subsidy rates using profitability as the guiding principle;
2. Gradual reduction of input-specific subsidies over time: modest annual reductions of 5-10 percentage point should be considered, while carefully monitoring profitability of specific inputs at market price as the guiding principle. Here the IRDP should approach this by asking how much money in frw to be gradually reduced per unit of inputs;
3. Additional “social protection element”: due to the ISP equity objective and the intent to also address the very poor and vulnerable households an additional “social protection element” in form of a 100 percent subsidy could be introduced. The IRDP shall explore all possibilities to include the subsidy as a component of social protection as may be reckoned by the stakeholders themselves. Reference to consultations propose appropriate means to formalize it since it is basically done ad-hoc basis;
4. No explicit targeting: the option of targeting specific farmer categories was explored. However, except for the “social protection element”, no explicit targeting of the ISP is recommended. While “smart targeting” seems to be an attractive design element at first sight to increase efficiency and reduce the fiscal burden, the experience and evidence in other SSA countries have not been promising.
Likewise, the IRDP is expected to assess the criteria of identifying potential target vulnerable households to benefit the subsidy, how administer and how to ensure the management of these inputs;
5. Integration in comprehensive approach: the ISP is not sufficient to significantly increase use of improved seeds and fertilizer in Rwanda. Complementary public investments and policy measures are needed and should be further increased while the ISP budget is being reduced gradually. The task was to explore from the key informants and other stakeholders/respondents on what are potential options to channel investments by the Government to bridge the gap that may be inflated by the input subsidy reductions;
6. Integrated and strategic approach is needed to increase fertilizer and seed use to the envisioned levels in Rwanda

2.2.4 Consultations at district levels

The grassroot engagement include all small-scale farmers in five commodities namely maize, paddy rice, wheat and beans to ensure the information retrieval in the reality, needs, and concerns of small-scale farmers and to explore stakeholders’ experiences and feelings, since we assume that as their experience varies from one crop to another, while their feelings on subsidy levels differ input by input. This is also to foster the inclusiveness of all farmers and ensure their voice on possible adjustments in the seeds and fertilizers’ subsidy scheme based on real context. Besides, other stakeholders at district level included district and sector officials working in the agriculture sector, agro-dealers, fertilizer suppliers, seed producers within these districts’ boundaries. Moreover, the consultation themes under each cluster were developed according to participant’s category and relations in the subsidy scheme.

During the district consultations, the discussions aimed at but not limited to: assessment of the positive aspects and benefits to be retained within the seeds and fertilizers subsidy scheme; examined which subsidized crops to be sustained that generated more income to farmers able

to be self-financed; associated challenges faced by farmers that make some crops covered by the subsidy program underperforming; appropriate strategies to identify specific farmers' profiles for smart targeting and how much can different categories of farmers differ in affordability on inputs costs to inform how the government be supportive; explore which fertilizers have good scope to be revised and which ones need to be retained based on certain imposed criteria; and assess how willing and ready are farmers and other stakeholders to embrace new agreed reforms as well as complementary government investment to ensure the continuing uptake of agricultural inputs.

Conducting consultations with key stakeholders enabled to understand the dynamics of the seeds and fertilizers subsidy program in their respective districts, dig deeper into specified similarities and differences in terms of commodity and district context-specific and per category of participants while trying to understand the challenges and positive traits to consider while informing the subsidy reforms. As a matter of fact, these research aspects intend to feed an envisioned subsidy approach that continues to support adoption by smallholders but also reduce the burden on the Government with better targeting of the subsidy.

2.2.5 In-Depth Consultation with technical and official personnel

The IRDP organized and conduct key informant interviews with officials and/or technical staff and management teams drawn from relevant stakeholders with the use of a consultation guide with open-ended and probing questions. The discussions were held with selected stakeholders mostly the identified experts from the Ministry of Agriculture and Animal Resource (MINAGRI) together with technicians from Rwanda Agricultural Board (RAB), National Agricultural Export Development Board (NAEB), Private Sector Federation (PSF) chamber of agriculture,

Ministry of Finance and Economic Planning, Ministry Local Government, large suppliers (importers), private fertilizer company and distributors of fertilizers and improved seeds in Rwanda as well as Local Administrative Entities Development Agency (LODA) to explore on issues related to social protection and wealth quintile categories. The sessions with key selected officials, technical staff, stakeholders shall help the IRDP to gather views and opinions on potential subsidy reform orientations drawing from their experience in design, implementation, regulations, and strategies about inputs subsidies in agriculture development. It will also enable to learn more about the future implications of these reforms on the use of inputs to the overall corps of the citizens and the impact on crop production.

Table 2. List of key informants

II. Key informants	
Institution	Name
Fertilizer's importer/ suppliers	YALA
	ETG
	ONE ACRE FUND/ TUBURA
	APTC
Private Fertilizer company	ENAS
Seeds Multipliers/suppliers	RUMBUKA SEEDS LTD
	UNION TWIBUMBE

Private Sector Federation (PSF)	Agriculture Chamber
Exporters	Garden Fresh
	African Fresh Product Ltd
NGO Farmer Federation	RDO
	Urugaga Imbaraga
Public institutions	MINAGRI
	RAB
	NAEB
	MINALOC (Vice Mayors through Webex)
Financial institutions	BK Tec-House
	Kenya Commercial Bank

2.2.6 Study limitations

The study was pure qualitative, there was no quantitative analysis done to allow more understanding in terms of quantity of inputs use or the measure of impacts of the subsidy program.

2.2.7 Analysis of information from consultations

The deductive thematic analysis was used to retrieve information from the consultations conducted through the Group Analysis method and Key informants' interviews. The individual declarations were transcribed, organized in codes, thus defining themes.

The IRDP organized loads of interpretations offered, clearly and coherently taking up all the work of the group and showing its strengths, but also and above all its strains. The main criterion for the structuring of interpretations was the information relevance to the content and its ability to reveal its strong and contrasts axes following the study focus. Besides, a situational analysis using SWOT analysis tool was performed to examine the state of current input subsidy scheme to inform the future reforms. Furthermore, the IRDP undertook a thorough analysis of the information gathered from secondary sources to triangulate with the findings from the consultations.

2.2.8. Reporting

After consolidating the findings of information from aforementioned sources and analysis, the IRDP proceeded to the preparation of the report which reflects the alternative ways to sustain the use of improved agriculture inputs. The report also highlights the areas of concurrence and areas of disagreement on the messages received from stakeholders, and further propose the alternative subsidy reforms for the government to improve the efficiency of input subsidies as well as implementation plan for agreed reforms on Agricultural inputs subsidies. Besides, the consultants prepared a draft cabinet paper which was later finalized by the Ministry for the submission to the cabinet.

2.2.9. Covid-19 Control and Protocol during consultations

Considering the current situation of the COVID-19, the consultations abide to all preventive measures as ascribed by the cabinet. The meeting rooms were hotel halls with capacity to host a number of participants, which allowed social distancing, and other measures in place. During the key informant interviews, we designed the online forms that encompass the guiding questions and were shared with some key informants (especially from the ministry of agriculture and agencies) to avoid more contacts. Other measures observed during the consultations at district level included:

- The team from the IRDP and MINAGRI, together with key stakeholders all wore the face masks as required and recommended by Ministry of Health (MoH) in Rwanda and World Health Organization (WHO);
- During consultations, required social distancing (1-meter) between participants in consultations meeting was observed
- All participants and researchers used hand sanitizers during the discussions and avoiding contacts and exchanges of materials.
- During the key informants' interviews, the online questionnaire and online interviews were applied to avoid physical contacts where necessary.

CHAPTER 3: KEY CONSULTATION FINDINGS

3.1 SWOT analysis for the agriculture inputs subsidies program

The research team used the SWOT tool to conduct the situational analysis of the agriculture inputs subsidies program in Rwanda. A summary of the SWOT analysis for the agriculture inputs subsidies program presented in table 3 portrays the strengths, weaknesses, opportunities, and threats, which are likely to influence the future implementation of the subsidy program. Strengths and weaknesses represent respectively positive and negative characteristics of the Rwandan agriculture inputs subsidies program, while opportunities and threats are external trends that are likely to influence future outcomes within the agriculture inputs subsidies program.

Table 3. SWOT Analysis

<p><u>STRENGTHS</u></p> <ul style="list-style-type: none">• Fertilizers and seeds are sold to farmers at lower cost than the market price• Inputs are availed to farmers on timely basis• The subsidy program encourages farmers to use inputs• Farmers were sensitized on the importance of using inputs• Through the program, farmers are trained and they have adopted new technologies including fertilizers use, improved seeds use and small-scale irrigation• Increased the number of agro- dealers at local levels, hence easy input accessibility• Reduction of fraudulent actions in fertilizer and seed business• The SNS system is a good platform for stakeholders in agriculture sector to reach all farmers	<p><u>WEAKNESSES</u></p> <ul style="list-style-type: none">• Payment delays leading to huge arrears.• It is expensive for the suppliers as they have to monitor and collect the delivery note on their expenses.• The suppliers are the ones who take all the business risks e.g. insurance, rent etc.• Blanket supply of fertilizers such that the type of fertilizers provided under subsidy may not suit the soils in the respective agroecological zones.• There is no assessment of the cultivated land to identify the types of fertilizer required• Connectivity issues that cause delays in input delivery
<p><u>OPPORTUNITIES</u></p> <ul style="list-style-type: none">• The government of Rwanda has good will and commitment to support the agriculture sector in general and farmers in particular.• The Nkunganire system can be updated and incorporate more components such as agriculture financing, insurance.• Mobilization of more farmers to use inputs for increased fertilizer and improved usage in the country	<p><u>THREATS</u></p> <ul style="list-style-type: none">• Inflation of the currency as importers buy inputs in US\$ and sell in Frw• Topography of Rwanda due to the steep slopes and acidic soils is a very strong factor for consideration in planning for inputs use.• Climate change• Rwanda is land locked, hence the high transport cost of imported agri-inputs leading to high costs.

Source: Author, 2022

3.2 Farmer's perceptions on contribution of the input subsidy

In establishing the farmers' perception of the contribution of the inputs subsidy, the research considered the following aspects: the changes induced by the input subsidy program since its inception; the roles played by agricultural inputs subsidy program to post-program usage of improved inputs; assessing what goes well and what does not flow well in the management and implementation of the subsidy program, and how the farmers rate the performance of the subsidized crops in terms of production.

3.2.1 The changes induced by the input subsidy program

The respondents appreciated what they have achieved following the initiation of (or under...) the subsidy program, stating how the agriculture productivity has improved proportionally with the improvement of the use of agriculture inputs in different crops covered by the subsidy program. During the discussions, farmers and other participants acknowledged that the program was a learning platform that stimulated the mindset/attitude change and acquisition of new knowledge. The knowledge was mainly acquired through participating in some research initiatives and mutual learning among farmers. The research ascertained that the following changes have been realized as a result of the input subsidy program:

3.2.1.1 Farmers' knowledge and attitude change

Thanks to the subsidy program, farmers show considerable progress in mindset (attitude) shift and knowledge acquisition in the areas of Good Agriculture Practices (GAP), planning and financial literacy and savings, technical capacity among others. The knowledge was acquired through different modes of learning and knowledge sharing including mobilization through extension agents, farmer to farmer learning, agro-dealer-farmer learning/knowledge exchange, and demonstration plots. During discussions, farmers stated that they have acquired knowledge in GAP, mainly through participation in research and training activities conducted by farmers, agro-dealers, and RAB, farmers learned proper application of fertilizers (in terms of dosage and timely application, proper plant spacing techniques and moderate use of pesticides. For planning, farmers learned how to plan for an agriculture season with timely acquisition of inputs, planning for needed inputs in their farm and able to estimate the needed inputs for the whole season. They acquired skills in budgeting and planning for their investment in farming operations throughout the season, and they are able to calculate the investment based on inputs and do calculate the benefit. In terms of financial literacy, farmers adopted saving culture and they are able to know the best price for their produce as they able to calculate the price-based inputs and other investments made in the production process. Skill in harvesting and post-harvest management were acquired as well, particularly in harvesting practices, farmers know the right time for harvesting for many crops that they grow (e.g.; they know very well when maize are mature to be harvested), know different indicators for checking the quality of produces in order to meet the market demands and standards (e.g; the good size of Irish potatoes to be sent on the market). Moreover, they learned good practices for storing their production and know how to use the available equipment (facilities) for the storage.

Besides, farmers confirm that the subsidy program transformed them into agriculture researchers in the way that farmers can select different seeds or fertilizer and try them all to compare productivity levels. This production change has pushed many hesitant famers to register for

Nkunganire program. Under these participatory research schemes, farmers mobilize others to adopt the use of improved inputs. This finding was corroborated by agro-dealers who affirm to have become part of the extension agents through demonstration plots and inputs use guidance, hence increased farmer knowledge and skills on good agricultural practices. In addition, farmers acquired skills and knowledge about the appropriate time for fertilizers application and the amount (and type) of fertilizers to be used as per the crops' nutrients demand; on how to assess the quality of seeds through proper choice of good quality seeds.

[...] "We are becoming researchers as well, I set my own beans trial with appropriate fertilizer dosages, there were a lot of reservations about my trial from my neighbors, later after harvesting, the plot produced high yields and other farmers were convinced by my practices in the trial and learned from me" [...] (Quoting a farmer from Rubavu)

Furthermore, the program has increased technical capacity among all the SNS users, for instance the agro-dealers practiced the digital applications of SNS and guide farmers to use inputs more efficiently and effectively. The same, farmers gained knowledge and skills in registering in Smart Nkunganire electronically. Moreover, they learned to plan and save for their agriculture season since there is more profit than before.

In regard to mindset shift, the implementation of the subsidy scheme has greatly contributed to learning and understanding the benefit of using fertilizers and improved seeds amongst farmers. This mindset shift was stirred through continual mobilization, practical field demonstrations and the differences observed in crop production among users and non-users. Farmers progressively changed their mindset which is reflected by increased interest and commitment in the use of inputs. Among persistent doubts overcome by farmers through Nkunganire program, the farmers used resist to adoption since they thought that the synthetic fertilizers deteriorate the soil quality, the research noted that previously, some farmers used to say that inorganic fertilizer reduces the soil capacity to produce but with Nkunganire program farmers understand very well that the soil should be fertilized to increase soil nutrients and fertility for healthy crops. This tendency was affirmed by the district agronomists who witnessed that previously, they use to beg farmers to apply fertilizers and to use improved seeds but currently, there is minimum of mobilization across the country since towards the beginning of the season, farmers themselves approach agro-dealers for early registration in SNS, and for search of ministerial announcement.

[...] "a participant shared the initiative in their locality called "Mfasha gutangira nanjye nkomeze." The initiative is based on the principle that farmers help each other in the group to get the basic capacity to afford the cost of inputs and then over time people can sustain themselves and be able to afford the needed inputs" [...] (Quoting a farmer from Karongi).

This initiative echoes the ownership that is evolving among the farmers since they affirm that the government has built up a base for them to sustain the continuity. The participants revealed how the start of Nkunganire program in Nyagatare was not received well, there was a say that the "rain" is the only fertilizer needed in Nyagatare, in other words, if there is rainfall, there is no need to use fertilizers according to the farmers. However, with time Nkunganire program served in mobilizing farmers and progressively they started to use good inputs and increased maize productivity (7t/ha) which was not previously preferred.

3.2.1.2 Improved availability and accessibility of farm inputs

As a result of the subsidy program, the participants revealed that agro-dealers were trained across all districts such that there is an agro-dealer in each sector, which is within a walking distance for most farmers. The increased number of agro-dealers resulted in improved input accessibility as well as improved availability of good quality agri-inputs. According to them, without agro-dealers, the implementation of the subsidy program would have been a failure. Their remarkable contributions include timely access of quality inputs by the farmer from their place at an affordable price, free coaching and guiding farmers on the use of inputs, increased use of inputs and productivity through mobilization and guidance. This is also done alongside with providing free technical support to farmers by assisting them to register in Smart Nkunganire System and MOPA. Consequently, the subsidy program is recognized as crucial for both farmers and inputs business actors since it led to increased sales of inputs and continual investments in input business by agro-dealers.

3.2.1.3 Improved production of crops under the subsidy program

Farmers are grateful to have a subsidy program as the program helped them to increase their productivity compared to before, as they affirm to be aware of the difference between their productivity before and after using improved inputs. A tangible example is for wheat producers in Musanze District, Nkunganire increased productivity by 4 times, where before on 1 ha, farmers used to harvest one bag while nowadays they harvest 4 bags and above. Increased production of crops such as maize and rice has also been noticeable by participants in all provinces, this is mainly linked to the availability of hybrid seed especially for maize in the Northern province. For instance, increased use of fertilizers on Irish potatoes led to increased production from as low as 2 tones/ha to 20-25 tones/ha in the districts of Rubavu, Musanze, and Nyabihu. In Nyagatare district, the rice farmers stated that they used to grow rice without fertilizer and the return was so low, however, the subsidy program helped to apply fertilizers and shift from 3t to 5.5t/ha". The program contributed to the increase of production of maize in Kirehe district as well. According to farmers in the district, before the launch of subsidy program the productivity was estimated at 1 ton/ha of maize, afterwards some farmers reach 5-7 tons per hectare.

By that time, maize had low value on the market (40frw/Kg), and farmers preferred sorghum (230Frw/Kg). With the program's achievements, the maize value at the market has considerably increased (350-400 frw/kg), consequently many farmers are involved in maize cultivation and do benefit more from various maize products, such as fresh maize, maize flour, porridge and cattle feed among others.

3.2.1.4 Improved food security and livelihoods

The increase in the use of the modern inputs stirred changes into household food security countrywide. According to respondents, the program has brought considerable change in local crop production and availability of diversified commodities, this has led to change in diet composition and behavior amongst households. Besides, this rise in production has allowed farmers to enter the market and the accessibility of different food produced locally has become easier.

The districts and sector agronomists have confirmed this, by mentioning maize, Irish potatoes, rice, wheat, and beans as crucial commodities in ensuring household food security. They stated that these are crops claimed on the market and with potential to keep generate more income for farmers once more efforts are invested.

[...] *“Subsidy program has improved lives in our district, before farmers used to buy food from Uganda but now, we have enough food for families and we are even able to sell the surplus and get income”* [...] (Quoting a farmer, Nyagatare)

3.2.1.5 Increased investment in agriculture

The study established that the subsidy program has led to increased investment in agriculture, on one hand, the access to the inputs has enabled the farmers to reduce uncertainty on crop productivity, this has encouraged farmers to do more investment since they are sure of returns. On the other hand, business actors (agro-dealers & inputs suppliers) confirmed that implementing the subsidy scheme is a viable platform for doing business because of the certainty of clients (farmers), thus investing more. The quote below is an indication of how the program increased the numbers of people using inputs as well as those who sell them.

[...] *“Nkunganire program improved people’s mindset towards using improved seeds and mineral fertilizers, this can be proved by the number of agro-dealers involved in distribution of inputs within our district, before only 4 agro-dealers were available, but today they are more than 50 in our district”* [...] (Quote from agro-dealer, Rubavu)

3.2.2 Performance of subsidized crops in terms of production

3.2.2.1 Crops performance by comparing the situation before the subsidy program

Participants rated crops performance by comparing the situation before the program was introduced and the situation during the program. Below are instances of performance per crop:

Maize: The use of inorganic fertilizer and improved maize seeds is widespread in Rwanda, as a result of the subsidy program. Improved maize seeds include hybrids and OPVs with different traits and characteristics adapted to the particular agroecological conditions, such as higher yield potential and/or higher tolerance to drought and crop diseases. Before the program, some parts in the North (eg: Burera) didn’t grow maize and they use to get maize from the Eastern province. With the program, maize is available in all parts of the Northern region. Currently maize is grown in all parts of the country, and there is an increase in production and maximization of inputs (seeds). Initially, farmers were using 1Kgs of seeds to harvest 100Kg, now they are using 1Kg of seed to harvest 200-300Kgs. The productivity improved from less than 1t/ha to 4-5t/ha.

[...] *“In our area, we did not cultivate maize before introduction of the subsidy program because of on-field thieves were frequent, but now we do cultivate because almost everyone in the community have planted maize and the productivity is high, therefore no one can steal maize”* [...] (A farmer from Gakenke)

Due to skills obtained through the SNS, farmers wait for the maize to reach physiological maturity before harvesting, thus reducing postharvest losses and controlling aflatoxin. Nkunganire led to increased Maize productivity at the extent where farmers who used to cultivate for subsistence nowadays produce for the market.

[...] “Initially we would harvest green maize and consumed the whole produce as roasted maize due to low productivity, but now due to SNS, yield has increased, farmers are able to produce for both consumption and for the market. The farmers meet with traders such as IF with whom they engage in business on maize produce” [...] (cooperative representative, Burera)

Potato: in 2013, before the subsidy program was introduced, the potato yield in Northern and Western zones was 300kg/ha. However, after introduction of the subsidy program, the productivity increased to 18-23t/ha, while the price increased from 70-100frw/kg (in 2013) to 120 Frw/kg (in December, 2021) at Musanze district. The Farmers however, noted that the current price doesn't match the investment, in terms of the inputs procured (seeds and fertilizers),labour, the pesticides and post-harvest management. It was further noted that Nkunganire program led farmers to be market oriented as it facilitates them to get access to inputs. Irish potato farmers attested that Nkunganire helped many of them improve their income from potato farming, even to buy cars for transport. The seed multipliers affirmed that those farmers who procure certified seeds from them are able to produce 20 tons/ha. The production has increased; however, the market price remains a big issue. With the current prices, farmers can get around 50% of the investment. Farmers suggested that the price should be aligned with the investment.

[...] Irish potatoes have become business-oriented crops following the introduction of subsidy program. Before the subsidy program, our production used to be 2T/ha and now it is about 18T/ha and even reach 25T/ha.” This increase in productivity also led to a shift from home consumption to the production for extra for the market” [...] (A farmer from Musanze). [...] “Before the introduction of the subsidy program, the harvest was less 2t/ha. farmers in our locality used to group themselves to supply one truck. Currently one farmer can supply a full track of Irish potato or even two trucks because the production is estimated at 18t/ha. There is a noticeable livelihood improvement amongst potatoes farmers.” [...] (Cooperative member, Burera).

Wheat: the production has been increasing; however, the production is not satisfactory compared to the inputs/investment. Farmers grow wheat mainly for crop rotation, since wheat is a good rotation crop for Irish potatoes. The yield has increased a lot due to the subsidy program which stimulated the adoption of GAP. Farmers now have access to certified seeds, which are disease resistant and are high yielding. This has led to the maximization of the use of seeds. The production has increased from 1t/ha to 2t-2.5t/ha stated a farmer from Rulindo district.

[...] “I have a small plot where the production was around 400kg before the use of improved seed and fertilizer, but now the harvest is about 1000kg in the same plot after using improved inputs” [...] (A farmer from Burera)

Beans: with introduction of the subsidy program, the beans production increased from less than 10kg/0.5ha to 300kg-500Kg/ha. For climbing beans, the harvest increased from 700-900kg/ha to 2.2-2.4 t/ha stated farmers from Burera District. Farmers are still committed to keep increasing the production, according to them, prior to the subsidy program, farmers did not use fertilizers on beans and they thought that only Irish potatoes and maize require inorganic fertilizers and certified seeds, however, the use of DAP in beans produces better yield. There is shortage of beans certified seeds and majority of farmers use farm-saved seeds. Therefore, there is need for advocacy that beans seed can be availed locally to the farmers.

Rice: the unveiling of the subsidy program has led to the expansion of marshland, thus enabling farmers to produce paddy rice. The respondents acknowledge that the proper management of marshland and the use of modern inputs enabled them to increase rice productivity. A farmer from Bugarama has stated that before the program the productivity was 3t/ha, with the program, the productivity increased to 6.5t/ha.”

3.2.3 Positives aspects in the management and implementation of the subsidy program

The respondents identified the following elements as positive aspects appreciated throughout the management/implementation of the subsidy program:

- The subsidy program is inclusive for all categories of farmers and inputs suppliers. It offers a learning platform to farmers as extension agents usually reach farmers' proximity. This facilitated the farmers to improve upon the understanding of using agri-inputs, right seasonal planning, embraced best agriculture practices, and access to agricultural information. Through the subsidy program, farmers are organized into groups depending on their localities and thus, improved a lot in inputs delivery service.
- The program introduced the digitalization of inputs delivery service through “Smart Nkunganire System”. This brought about considerable improvements in farmers' registration and record keeping, permitting the right monitoring on the use of inputs and planning. The same technology improved service delivery and enhanced the capacity of farmers and other actors such as agro-dealers to engage with the use of ICT.
- The current implementation of the program enhanced the professionalization of agro-dealership. This helps in ensuring the quality and standards of agro-inputs as well as price harmonization and fraud avoidance.
- Due to the inclusivity of the program and opportunities for actors' interactions, stakeholder's (actors) collaboration is enhanced. This particularly helps in building internal (local) capacities in seed multiplication which was a big challenge as the whole system was relying on seeds importation.
- Demo plots in the village located by roadside help all farmers to understand the advantage of using inputs in their plots by their observation (they are able to distinguish how subsidies increase agriculture productivity when comparing their plots with those in the demo)
- The fertilizer's delivery system under the subsidy program is well organized and helps in the monitoring. Farmers are registered in the system while their inputs demands are registered, thus enabling the agro-dealers to deliver inputs based on records in the

system. Between Agro-dealers and suppliers, there is a specialized institution (APTC) that helps in the control on the misuse of inputs.

- The subsidy program introduced Twigire Muhinzi, which is an approach used in training extension agents to train others. The model has many components: An extension agent establishes a model farm (10m x 10m) with best practices, then farmers in the village learn from the demo plots. Another aspect is to establish Farmers Field Schools (FFS), the extension agents get incentives for training peer farmers on GAP. Another initiative that was introduced is to reward the best farmers at sector and district levels. All these were the best practices induced by the subsidy program to contribute to agriculture development at different level.
- Decentralization of agro-dealers to different sites for easy access to fertilizers by farmers. The overall timely issuance of ministerial guidelines of Nkunganire helps farmers in the planning for agriculture season based on their financial means.

3.2.4 Negatives in the management and implementation of the subsidy program

Consulted stakeholders face different challenges depending on their categories, below are key highlighted areas of improvement within the program:

Farmers:

- The rate of inputs use is still low and this is due to many factors including the low purchasing power of farmers, the unavailability of unsubsidized inputs due closed inputs market, the farmers who wish to get more fertilizers than what is required in the SNS do not have alternative market.
- Rented land is not captured in SNS since it's not registered on the users (rather on the owners) and it's hard to buy inputs if a farmer has additional rented land. This limits some farmers who own small pieces of land but have money to rent complementary farms
- Farmers have a big challenge of underpricing of their products at the market. The market price is too low such that farmers could not cover the cost of production.
- Poor storage facilities undermine negotiation capacity of farmers to get good prices since farmers are forced to sell their produce immediately after the harvesting period as they cannot manage to store and wait for increased market prices.
- Cost of basic seed is very high, the potato seeds (basic seeds) are not under subsidy program, yet the seeds are very expensive (700frw/kg), when they are multiplied, RAB instructs to sell them to farmers at 600frw/kg (which is expensive to them), hence farmers opt to keep their own seeds.
- Demand for inputs is higher than supply, there is a need for establishing two different places where farmers can access subsidized inputs but also unsubsidized inputs (at 100 percent) for those who can afford it.
- Pesticides costs are very high especially those applied in potato. For instance, and Dithane, which is used in the management of early and late blight in potatoes is not subsidized-there is need to be included in subsidy.
- Connectivity or network loss while using smart Nkunganire system is still unsolved and there is not an alternative to this issue

- Plot registration number UPI can't be used 3 times a year while we have 3 seasons a year, the farmers claimed not to be able to register in Nkunganire system for inputs during the season C period
- Delay in the opening of SNS has been identified as a major challenge for farmers whose season starts early (the season that start July and August miss inputs), this leads them to miss the use of improved inputs in the subsidy scheme-the case of Musanze, Nyabihu, Gakenke and Burera
- Poor quality and non-uniformity of seed supplied especially for wheat have been a frequent issue.

Agro-dealer:

- The quantity for fertilizers packages doesn't meet the standards (e.g.: A package of 50 kg weight in many cases these weigh about (48Kg).
- The transport fee provided by IPTC for agro-dealers is still low (eg: Kigali: For now, they provide 21frw/kg, the wish is 25frw/kg, for Musanze: They provide 12frw/kg, the wish is 15frw/Kg).
- The distribution of agro-dealers in different places is a challenge, there are cases where agro-dealers are squeezed in one place and compete for clients.
- Poor internet connection especially at the time of farmer registration pushes the agro-dealers to register farmers in their books which is a serious cause of delays in the delivery process

District and sector agronomists:

- There is a very low budget allocated for the Nkunganire scheme by the government. There are always government debts (around 1bn, eg: Musanze had 1bn 200M last year) to importers.
- Contract management: Contract for importers is signed by RAB and while districts pay them, it is suggested that better for the districts be part of the signatories. The contracts also have certain terms and conditions that are difficult for the districts to implement, and this has led to several audit queries. It was suggested that the contract between importers and government should be managed by the government signatory (RAB).
- Given the commitments by farmers to use more inputs, fertilizers that are not available on the market except for the subsidy scheme channel. It was suggested that both modes (agro-dealers under scheme and others on 100%) be allowed and facilitated to get those fertilizers.

Seed multiplier potato:

- With the effort to avail local seeds, there is no subsidy for basic seeds and pre-basic seed from RAB. Under this situation, seed multipliers fall unto loss and be demotivated to continue multiplication of seeds since many farmers do not consider buying these seed from multipliers-more advocacy to include basic seeds in the subsidy scheme is needed. This is the same case for Irish potato.

- Manure fertilizers are not included in the scheme and yet they are crucial inputs in multiplication of seeds, this is because some places need high manure due to the nature of the soil. In the effort to strengthen this local production, organic manure usage should be promoted through the extension services.

3.3 Farmers' readiness and self-reliance

The research sought to establish the opinion of respondents regarding farmers' readiness and whether the subsidy program has played its intended role of making farmers self-reliant for them to ensure the continuation of using inputs without the subsidy.

The respondents believed that the subsidy program has partially achieved its intended role since few farmers have built the capacity for self-reliance. The majority of the farmers wish that the subsidy program continues, however, given the understanding level of using inputs, the respondents note that some categories of farmers are ready to continue using unsubsidized inputs though, they might be strained with affordability and use lower quantity which they can afford. The farmers affirmed that they have already started developing a culture of saving money after harvest to purchase inputs easily. Alike, some farmers embarked on an initiative such as "Mfasha gutangira nanjye nkomeze" in form of informal tontines, which is based on the principle that farmers help each other in the community group to get the basic capacity to afford the cost of inputs and then sustain themselves over time and be able to afford the needed inputs. These are initiatives that can be strengthened by the government to support farmers in case of gradual reduction of inputs subsidies. To further confirm the readiness and self-reliance, farmers revealed that the subsidy program made them exploit many fields that were left uncultivated and they are not ready to leave those fields as they found them productive.

During the group discussion, districts and sector agronomists clearly stated that the subsidy has not yet fully reached its intended objectives of making farmers self-reliant because many small-scale farmers are yet not able to acquire inputs without subsidy, especially those classified into wealth quintile categories 1 & 2. However, given the level of mind shift, progressive graduation is possible on the condition that the government establishes a stable balance between the cost of production and output of farmers, in other words, if the market and prices are stabilized. The other stakeholders through Kils corroborated that there is a possibility that farmers can keep using inputs, they believe that Irish potatoes, rice farmers have achieved a certain level of capacity to procure inputs without subsidy support. Agro-dealers stated that fertilizer use has become a culture in agriculture production at the extent farmers cannot do without. Given that reality, they think that farmers could do their best to get them without Nkunganire with some controlled conditions such as market and price stability.

[...] *"Transitioning from old farming to modern farming increased our productivity, therefore, we cannot practice farming without improved inputs since our goal is to maintain and increase our productivity."* [...] (Quoting a farmer from Nyanza)

Nkunganire on seeds is still not well embraced by the farmers as much as that of inorganic fertilizers, as such farmers are not ready to continue without the program, they can go back to traditional seeds. For Seed Multipliers, the investment for seeds is high may be for reductions on fertilizers are possible.

[...] *“The subsidy scheme has been used for some inputs, mainly fertilizers. Seeds were left out for several crops and this has been a challenge for us to build our capacity. Basic seeds are expensive, and they are not covered by the subsidy scheme. Thus, farmers are not buying seeds from us, they get seeds at their own, forcing many multipliers leaving the business” [...] (a seed multiplier, Huye).*

Farmers have increased productivity of all crops that in Nkunganire and have acquired necessary knowledge to use good inputs, however they are not happy of the market and price of their produce that do not allow them to get means to afford seeds due to low financial capacity. *The production has increased, and the experience is good.* Thus, the willingness is certain, what is only needed is to address the challenges related to market and price as well as the post-harvest management. Example: While a kilogramme of maize seeds ranges from Rwf2,281 to Rwf2,461, a farmer pays between Rwf453 and Rwf544 a kilogramme depending on the variety. This is because the government pays a large part of the maize seed cost. However, the farmers still feel that 450Fr is still high despite the higher government contributions. The respondents categorized farmers in three categories based on how capable they are to be self-reliant. Generally, the respondents observed that if the program stops at a given time, farmers can keep on using inputs, but at different levels, based on their respective capacities as categorized below:

- a. Large scale farmers-(with more than 10 ha of land. (Abari ku ruhembe rw’ umuheto), this category might have sufficient capacity and they can continue to use inputs without support.
- b. Middle farmers-with more than 0.5ha (abari hagati) this category doesn’t have enough capacity and they might continue using inputs but with a reduced amount compared to what they have been using. Thus, they might need support for some time, next 3 years
- c. Smallholder farmers-(with less than 0.5 ha) this category might not continue to use inputs as they don’t have the capacity to afford inputs’ cost. This category needs to be supported for long time, next 5 years

The farmers noted that, with the support of the input subsidy program, they realized that even unproductive farms can be productive. For instance, a maize, farmer testified that the program stimulated them to use some of the abandoned land and now produces 90-100kg/1 acre. This shows capability building in terms of understanding and increased motivation, as reliance is not about money, rather a combination of set of capacity and capability (in terms of financial, behaviors, mind-set, among other things).

The key informants’ views on the readiness of farmers to continue procuring inputs from the local businesses were in line with those of the farmers. According to the key informants, many small-scale farmers are not yet ready, if we talk of the government stepping down from subsidies. According to them, this is a sensitive shift that needs more preparation and assessment since the changes are envisioned to occur within a sector where many citizens derive their living. However, this readiness can be said to professional farmers who do farming as a business and probably to farmers who grow Irish potatoes in the volcanic region. Their observations regarding small scale farmers are that if proper strategies are not put in place, there are possibilities of pulling back the progress made in agriculture and all the achievements reached so far.

This is because farmers may opt to use little fertilizers, use their own seeds and go back to the traditional farming practices which in turn will lead to low productivity.

During the discussions with vice mayors, they stated that those farmers are not fully ready to embrace the reductions on subsidies contributions. However, they acknowledged that time will come for farmers to take over the responsibilities to pay for agro-inputs on their own, as stated “it is obvious that the subsidy program will not be there forever, farmers need to be prepared to cover their expenses for inputs.” Participants think that the reduction should be done gradually not radically. Moreover, they emphasized that the farmers' capacity issues need to be explored in a comprehensive manner, not from only the financial perspective. Many of the participants believe that farmers' mindset about the ownership of the cost of the inputs is an issue. Most of the farmers believe that it is the government's responsibility. They also think that before the reduction of the government contribution some questions need to be addressed: What was the target? Have we achieved it? If No, why? If yes, what is the way forward? They also think that the targets should go beyond the number of inputs distributed, rather the increase of production, value of produces on the market and sustainable production mechanisms.

3.4 Farmer's willingness, ability and capacity to purchase inputs

There is no doubt with respect to farmers' willingness to purchase inputs on their own, farmers state that currently, every farmer knows the advantages of using fertilizer and improved seeds in agricultural development. This finding was supported by Key informants indicating that farmers know very well the difference between their productivity before and after using improved inputs and the overall economic importance brought by the use of inputs in improving their agriculture sector. This fact is strongly backed by the history of inputs cost change over time where farmers did not stop using the inputs despite the price rise, and the example is the recently rise of fertilizer price in 2021 season B following COVID effect.

[...] “When the NPK price increased from 603 Rwf to 713 Rwf farmers used the same quantity (we sold the same quantity as previous, therefore in our opinion, many farmers will use inputs even if they are not subsidized” [...] (Quote from agro-dealers Gatsibo)

With respect to ability, the respondents confirmed that some farmers can continue using inputs while others may strain to be able to continue the use of inputs in case the government withdraws the subsidy contributions. However, some prerequisites need to be met to achieve the farmers' ability to continue using inputs in case the government steps down. It is important to mention that ensuring the stability of market and price is imperative for farmers to afford unsubsidized inputs, most of the stakeholders stated that their ability is dependent on the market available for their farm produce as well as the market prices that allow them to make profits. Besides, the price setting in maize and rice value chains needs to be revised, price establishment needs to consider the production costs and should include negotiations with all actors along the value, mainly producers and marketers. The government should work to lessen the burden of the middlemen/brokers in the chain, which is sought to add more effects on the price imposed to farmers. The price is crucial since if the farmers are to be self-reliant, their sole source to procure these inputs is the income generated through sales of their produce, and savings. The respondents also emphasized that their ability can be enhanced if they are given time to prepare themselves.

[...] *“The use of inputs has really contributed to the improvement of the productivity with time. We are already working in cooperatives which improve our ability to get inputs easier and we intend to work with the cooperatives to help the farmers to have savings from sale of their produce so as to continue using inputs after the subsidy program end”* [...] (Quote from a farmer, Gicumbi).

The same view was corroborated by key informants, through the KIs who indicated that generally, farmers have the willingness to cope with reduced subsidies, but these are constrained by the unstable market environment, which does not compensate/meets the costs of production incurred by farmers. For instance, the district officials reveal that the knowledge and abilities to afford inputs depend on farmers’ categories, and their understanding is so far good to allow them to be prepared for any reform if well executed considering the involvement of all stakeholders in the respective value chains.

The research also sought the farmers’ views on how to improve the affordability of agricultural inputs for smallholder farmers. Consulted stakeholders suggested initiatives to improve the affordability of agriculture inputs such as enhancing working with banks for loans acquisition through availing special agriculture credits with interest rates calculated by seasons; market and price protection to valorize the production and enhance the financial capacity of farmers, and strengthen the post-harvest management. Farmers mentioned that at the harvesting time, prices are low (e.g: Maize is sold at 180frw per kilogram at harvesting and at 300-400frw later in the season). There is a need for facilitating farmers for post-harvest handling activities, mainly storage so that they can increase their bargaining power.

3.5 Strategies to continual inputs usage after reforms

The research examined the strategies which the farmers view as important in supporting them for continued usage of inputs in the scenario where subsidies are reduced or withdrawn.

3.5.1 Strategies to acquire unsubsidized inputs

The respondents proposed strategies, which will enable farmers to independently fully fund the purchases of the inputs they require and make efficient use of them in case the subsidies are reduced or withdrawn, as outlined below;

Improved market for farmers produces

- The government should guarantee the market stability to avoid failure amongst small scale farmers
- Revise the price regulations for the harvest so that farmers can sustain the financial capacity to afford inputs. The government institution like MINAGRI, RAB, NAEB, MINICOM should fully involve farmers and other actors to regulate market prices to avoid underpricing of crops that require a lot of production costs.

Improved access to credits /loans for purchase of inputs

- Policy should be put in place to assist farmers access bank loans with low interest rates to improve their ability for purchase of inputs without subsidy. The government should mobilize banks to provide agriculture loans.
- The banks and SACCOs should consider the farmers' produce as collateral such that the farmers can access loans and credits at the onset of the season and then pay later on marketing the harvest.

During the key informant interviews, financial institutions stated that agriculture has high risk since it is based climate patterns. However, they believe that the government can help in establishing financial guarantees between FIs and farmers by engaging more partners in such agreements to ensure risk sharing between partners and avail more products tailored to agriculture. For instance, Zamuka Muhinzi is one product developed by Kenya Commercial Bank specifically small holder farmers in partnership with the World Food Program (WFP) and input dealers. The KCB provide money to inputs dealers to ensure farmers acquire needed inputs, the WFP guarantees farmers about market and ensures the monitoring farming activities along the value chain by providing agronomists to ensure the outputs are assured. Another example is the Access to finance that give cash as guarantee to KCB as guarantee for farmers, thus rendering loans practicability more feasible.

Purchase of inputs through groups and cooperatives

- Forming small groups of farmers to facilitate them get specialized inputs on credit as a group (group guarantee)
- Financial institutions should avail financial services to farmer groups and cooperatives at low interest rate to help farmers to get access to loans.

In line with other stakeholders, the key informants stated that there are several models in the country that have been proved to be successful which they think can be also applied in agriculture. For instance, the key informants proposed designing a loans and credit facility tailored to agriculture such that farmers would be supported to obtain inputs on loans and pay in installments based on seasonality. Additionally, this can be supplemented by strengthening the informal farmer groups at the community level (*ibimina*) where they keep on saving little money to invest in buying inputs.

Moreover, linking farmers to buyers and stabilizing prices is a viable solution to improve the affordability of agricultural inputs for smallholder farmers since they can get money to save for inputs.

3.5.2 Strategies to build up resilience

Participants proposed the following strategies to build up resilience and accumulate enough resources to sustainably produce without the subsidy program:

Farmers to practice farming as a Business

- Some farmers have started saving for their own development but the re-investment in their farming activities is not a priority. Thus, capacity building in agri-business is a key initiative to promote farming as a business approach among the farmers. This will

improve the farmers capacity in making savings and reinvesting them into the farming activities, especially procurement of inputs.

- Professional farmers think that the only stable market and good prices can help them to be resilient. If this can be arranged, farmers can benefit from their production and be able to afford the cost for their needs for inputs without the subsidy program. This call for practicing agriculture as a business and being prepared to embrace the market dynamics for the agriculture production.

Encourage farmers' savings from sale of the respective seasons' production

- Mobilize farmers and inculcate the saving culture among farmers. So far, savings is a problem for many farmers.
- Complementarity and collaboration, the government has to facilitate to establish trust between financial institutions and farmers to ensure agriculture is considered among tradable products. These arrangements can be exploited from negotiated rates, establishment of agricultural collateral through crops and livestock insurance.
- Sustaining "Twigire muhinzi" and strengthening farmers cooperatives. Eg: Rice cooperatives are strong, if this can be applied to other crops, it might help. Under "Twigire muhinzi", there are groups, where farmers can help each other. There is weekly contribution that might be used to purchase inputs when the season starts. Farmers decide together on what they will do (eg: buying potato seeds), then make a saving plan together so that they can have the means to buy the needed amount of inputs (e.g, potato seeds). However, these are the types of farmers' groups need to be supported by the government since community saving schemes/groups (lbimina) can be a strategy to build financial capacity with a mutual support among farmers.

Farmers empowerment through groups/cooperatives

- Farmers should continue to group themselves in farmers' cooperative for all crops as there is a good example among the rice farmers. Farmers stated that cell agronomists have to play their roles properly at the grassroots levels through organizing farmers in groups where they would be mobilized to save small amounts of money which can be collected and be used to buy fertilizers if the subsidy reduces or withdrawn.
- Farmer groups should be encouraged to approach financial services whether formal or informal (lbimina) to ask for small loans.

Use of Integrated soil fertility management (ISFM)

- Increasing the use compost and organic manure to reduce the use mineral fertilizers. This will lead to healthier production but also reduce the cost of mineral fertilizers, as their quantity will reduce.
- There should be research on the quantities of organic fertilizer that can be used with inorganic fertilizer for specific crops.

Contract production with seed companies, where by farmers are provided with inputs on credit, which is deducted from the sales of the produce. (Access of inputs through companies as out-growers)

3.5.3 Summary of the strategies to sustain the gains from the subsidy program

Previous sections of this study indicate that the introduction of input subsidies to priority crops has led to various gains in the production of these crops, thus improving food security and poverty reduction. The study thus sought to establish from the respondents, the strategies, which they proposed to ensure these gains continue to grow after the subsidy program is reformed. Participants suggested the following strategies to ensure the sustainability of gains:

- Proper planning of seasons and review of cost of production and undertaking market research to establish the best price of the farmers produce so as to ensure “Kutotsa *imyaka*” meaning selling produce at relatively good price
- The relevant government ministries should work closely with banks and microfinance institutions to ensure farmers access to loans and credit, for use in procurement of inputs and embracing of weather index crop insurance
- Improve post-harvest storage facilities and other postharvest management strategies for priority crops like cereals (wheat, maize, and rice) and pulses (beans) such that they can be sold when the market price is favorable
- Transformation and processing of agriculture production in order to add value on the produce would be the way also to keep gains from Nkunganire because it would still encourage farmers to continue producing as they will get more income. The subsidies could be waived on the price of the produce to sustain the farmers’ gains
- The quality of inputs should be certain and good since it assures sufficient and adequate productivity even though they would not be subsidized.

3.6 Targeting to implement subsidy reforms

3.6.1 Targeting farmers

During the consultations at district level, the study examined the core characteristics of farmers to retain in the subsidy scheme, the participants suggested the following characteristics and criteria for farmers to be among the top priorities:

- Ubudehe categorization especially categories 1 & 2 sought to accommodate financial vulnerable households, mainly these households practice farming on small land for home consumption. It is revealed that these farmers (e.g, people in ubudehe 1) sometimes get inputs from RAB, LODA and other stakeholders (e.g., Rwanda fertilizer company) due to low financial capacity. For instance, in the previous seasons, RAB provided fertilizers for this category of farmers but is done *on ad-hoc*, this can constitute the base to identify them.

With respect to better ways to identify and proper monitoring of farmers, the respondents stated that targeting aiming at identifying vulnerable households should start with an objective assessment at the community level, to screen all characteristics of those households with facts. For this, there is a need to support smallholder farmers to work together in groups to strengthen their voices for articulating their needs and taking advantage of economies of scale. The practical way to identify these households would be:

- Identify them in the general assembly of farmers at the village level in presence of researchers, taking into consideration how they are organized and recognized by grassroots level administratively. Here, local leaders (through *imiryangoremezo*), at the grassroots level should support identification of those who need the subsidy
- There should be a special committee of “village wise people” in identification and follow up on farmers provided with subsidies, more so to ensure they do not sell or misuse the inputs

3.6.2 Targeting crops

The research sought to establish among subsidized crops, which crops can be sustained that generated more income for farmers that can be self-financed in long run. Crops like potato, maize, beans, wheat, and rice were mentioned as crucial crops in terms of household food security. In addition, these crops have high productivity and the potentials to be self-financing if much effort is invested. The participants suggested that farmers should be united in groups (not necessarily intended to produce for market) as it is one way of supporting many people at once. However, crops selection should consider the regions’ specific since they do not have same importance, for instance, maize and potato are key crops in Northern province, while in other places like eastern maize, beans are important, wheat in some other places, and rice in some parts of the South, West, and Eastern provinces.

3.6.3 Targeting type of fertilizers

The targeting has considered the NPK, DAP, and UREA to be retained as they are important inputs in crop growth in Rwanda. These suggestions are based on fertilizer's potentials, suitability, and incomparable roles with the main crops grown in the country, for instance, NPK is good for Irish potatoes, while DAP and UREA are good for cereals. If the aforementioned fertilizers are not fully retained, the participants suggest that there is possibility for UREA to be revised for potato farmers who observed that they can afford it at 100% given their current level of self-reliance. However, regarding seeds, participants call to retain the three subsidized crops.

3.7 Envisioned gradual reduction of input-specific subsidies

3.7.1 Farmers’ contribution levels in the envisioned subsidy reductions

The research explored the respondents’ views on how much did they think the government can reduce on every subsidy cost for taking into consideration individual crops. This was in line with key message stating the gradual reduction of input-specific subsidies over time, where the proposal was to consider modest annual reductions of 5-10 percentage point, for a period of ten years, while carefully monitoring profitability of specific inputs at market price as the guiding principle.

The study further examined the predicted impacts of the envisioned reductions/withdraw on the side of business actors. The participants mentioned that reducing inputs subsidies will affect agro-dealers business differently and the consequences will be depending on the location, the crops, and how farmers are self-reliant. On one hand, agro-dealers think that their business might be affected positively by increasing the income and profit because the selling price will

be increased. In other words, if the subsidy is withdrawn the suppliers of inputs will acquire full autonomy and the fertilizer business will be purely be a business. However, when considering both sides (business actors & farmers) the business might negatively be affected in long term due to:

- Many agro-dealers may invest in this business and cause saturation while the market size remains the same, this is can lead to considerable loss of clients due to farmer's capacity to acquire unsubsidized inputs and hence low profit
- Loss of uniformity in price regulation since without the subsidy agro-dealers may violate the price

[...] *"The mission of the government is to ensure the country is food secure, and if the subsidy is reduced yet we don't have many investors in inputs production and distribution, then, food security will be much affected. Our geo-set up has to be put under consideration when it comes to Rwanda being self-reliant for food security. If the subsidy is reduced, we may ask ourselves: Are we able to feed our people? What if the situation goes wrong? What are the strategies in plan? The reduction of subsidies should be thought of twice as it will have a negative impact. If it is to happen, let it be gradually to avoid the negative impact ahead"* [...] (Quote form Key informant).

3.7.2. Appropriate measures to bridge the input subsidy gap

3.7.2.1 Complementary public investments

During the consultations, the stakeholders were questioned about potential options to channel investments should the Government consider to reduce the costs incurred on subsidy costs, this was pursued to bridge the gap that may be inflated by the gradual input subsidy reductions. The subsidies are so important for optimum yield in Rwanda, however, since then, farmers do not get a fair price for their crops and this is denoted as a big issue that needs to be addressed. Thus, consulted stakeholders suggest that more investments should be channeled to stabilize prices for farmers' produce that compensate the cost of production. Besides, the government should inject money to establish a specialized agriculture bank and create an enabling environment to ensure a guarantee for the financial institutions to trust farmers.

Moreover, investment should also be channeled towards strengthening compost making by farmers countrywide, this is one way to improve soil condition and claim for less inorganic fertilizers in the future. Specifically, for drought-prone regions, the government should strengthen investments in irrigation programs, increase agro-processing and postharvest facilities which would be key enablers of the market price stabilization.

Other efforts should include:

- Establishment of buffer stocks system which buys and stocks at times of good harvests to prevent price falling below a target range (the minimum price set to compensate incurred cost of production)
- Prior to any step toward subsidy reform, the government should put effort into research on soil nutrient deficiency and soil mapping to determine the fertilizer application levels based on location specificities and to optimize the utility margin for every crop to be subsidized (eg for now the nitrogen need in NKP for maize in Musanze are the same in Nyagatare), there is need for updated research on the standard dosage of inputs based on specific crop and region.

- Enhance investment to build the capacity for local seed multipliers, especially subsidize the pre-basic seeds, these local seeds production will respond to local conditions and meet the farmers financial capacity.
- Government should invest in infrastructure like roads to facilitate transport, as well as access to storage facilities to avoid post-harvest losses. Alike, promote agro-processing and value addition in collaboration with the private sector, and subsidy should be channeled into the price of produce.
- The Government should channel the investment in establishing a specialized fertilizer making plant in Rwanda, which according to farmers would reduce the high costs of imported inputs and make them affordable to farmers.
- Increase storage facilities especially for Irish potatoes such that farmers can conserve the produce and sell when the prices are favorable

Besides, during the consultations the vice mayors highlighted some areas where investments can be channeled based on levels in value chains as follows:

- At the production stage, it was suggested to focus on: irrigation (hillside and marshland) infrastructure, erosion control (terraces-radical and progressive) and marshland preparation to prepare for harsh climate conditions.
- For transport, it was suggested to increase roads for transporting the harvest. Feeder roads need to be considered instead of cheap seal roads that are expensive and can't reach many places.
- For post-harvest, it was suggested to increase post-harvest infrastructures for storage and value addition. The following were emphasized: storage facilities such as metal silos for cereals, cooling facilities for vegetables and fruits, agro-processing industries for different crops like potato in the North.

3.7.2.2 Appropriate policy measures needed

During the consultations, we examined the suitable policy measures to put in place while the subsidy budget is being reduced over time. The stakeholders' highlighted the following ones:

- Participants suggested that reinforcing policy measures should focus on issues of price stabilization and regulation, market availability and access to finance as well as strengthening agriculture insurance.
- Develop a clear market expansion by removing unnecessary actors in the market chain and promote open commercialization of inputs for easy access.
- More research on modern inputs (seeds and fertilizers) that increase productivity and suit specific soil types and regions is recommendable. Strengthen research programs on soil analysis and classification for appropriate use of fertilizers.
- Build agricultural value chain sustainability to ensure that gains are not lost along the chain and ensure market through strengthening contract farming strategies
- Pragmatically, the government should facilitate more private investors to invest in fertilizer-making factories. This would reduce the transportation charges hence reducing the prices of fertilizers at the market and making them affordable to farmers.

3.8 Timing of subsidy Reforms

The research explored farmers' opinions on making the input subsidies time-bound such that the program will be implemented only for a further period of time and afterward be reformed. Participants had difference in their views on further time for the program implementation before it is reformed. However, generally they suggest a period is [3-5] years for the program reform, but proceeded by strong mobilization and trials. According to them, since we don't have reserves especially for food security commodities which mostly serve large communities (schools, military, police, prisons) like maize and beans, then the government should start with few commodities as a pilot study/testing. The government should not reduce the subsidy abruptly, instead it should reduce the subsidy slowly such that farmers should be used to changes. This slow reduction of inputs subsidy would avoid the shock that might be exacerbated by quick reduction, and hence drastically reduce agriculture productivity.

Additionally, participants suggested that the time might also be different depending on the type (rate) of government's contribution to different inputs. Below are their opinions on the issue:

- There are differences in subsidized crops, maybe the phasing out of the subsidy program should consider each crop included in the program. Participants classified crops into 2 main categories (crops produced at low cost and crops produced at high cost) and suggest the timing based on the proposed categories. They suggested 3 years for crops with low cost of production: Beans, soya, maize, and 5 years for crops with high cost of production such as wheat and potatoes. Moreover, a 20% yearly reduction was suggested for each category of crops.
- Participants also suggested that different dynamics should be considered: eg: The capacities for seed multipliers that are not yet sufficient. The government has subsidized only 3 types of seeds, whereas, for fertilizers, 9 types are under the scheme. The government contribution should be reduced on fertilizers applied for specific crops like Irish potatoes and increased on seeds. They highlighted crops that are less costly to produce like beans and soybean which can take like 3 years by reducing 20% each year, other crops that are more costly to produce like potatoes can take like 5 years by reducing 10% each year.

The key informants 'deliberation on this matter is that reforming subsidies will not affect farmers if they are prepared and effectively communicated about change before the reform. The subsidy program would continue up to 5 years while farmers are accompanied by preparations, thereafter the subsidy can gradually start reducing. During this preparatory phase, there is a need of conducting a study to assess deeply the farmers who have reached a level of resilience, those who are still at a low level (in terms of financial capacity) would be retained in subsidy. Based on their experience, they suggest that better if the subsidy is reduced on fertilizers but subsidized in value-added of their harvest on the market price. Practically, the mobilization and awareness on envisioned reforms can start from season 2023 A, while initiating the reductions should be done in phases.

CHAPTER FOUR: DISCUSSION AND DATA ANALYSIS

4.1. The noticed changes induced by the input subsidy program

Based on the study findings, farmers have indeed noticed many changes, which have occurred since the commencement of the subsidy program. Of most importance is that the agriculture productivity has improved proportionally with the improvement of the use of agriculture inputs for crops covered under the subsidy program. The study participants acknowledged that the program has been a learning platform that stimulated a lot of changes including the mindset shift and acquisition of new knowledge among farmers across the country. The following are the key main changes highlighted:

Farmers' knowledge and mindset change

The study reveals that farmers have acquired knowledge in GAP through learning exchange and research activities. Specific practices acquired by the farmers include the proper planning of the agriculture season, where farmers are now able to plan for the agriculture seasons with timely acquisition and estimation of inputs for the whole season. The program has enabled farmers to recognize the fertilizer and seeds application rates as well the right time for inputs application. In addition, the post-harvest and handling skills have enabled farmers to considerably reduce the losses previously recorded. The subsidy program is based on the integrated soil fertility approach that promotes the broader integrated sustainable use of inputs, which aims at raising productivity in a sustainable way, using good agricultural practices to trigger agronomic efficiency of fertilizer and recapitalize or maintain soil fertility.

Moreover, in terms of financial literacy, farmers instigated a saving culture and are now able to calculate the price-based inputs and other investments made in the production process. Furthermore, through the subsidy program farmers have gained skills in agriculture research as well as extension services and serve as extension/advisory agents to convince hesitant neighbor farmers to join the subsidy program.

With respect to attitude change, the implementation of the subsidy scheme has greatly contributed to understanding the benefit of fertilizers and improved seeds. Through the subsidy program, the farmers overcome a persistent doubt that synthetic fertilizers deteriorate the soil, thus creating resistance against the adoption. This mindset shift was mostly motivated by the tangible crop production outcomes among users and non-users. Consequently, there is a frequent increased interest and commitment in the use of inputs amongst farmers.

Improved availability and accessibility of farm inputs

In line with proper management of inputs within the subsidy program, many inputs suppliers were trained across the country, and are available within the farmers' vicinity, hence improved input accessibility as well as availability of good quality agri-inputs. Miklyaev et.al, 2020 specified that although, to date, Rwanda is overall a low user of inorganic fertilizers, an integral part of input subsidy program has been to increase the availability of fertilizers and improved seeds to the farmers. The agro dealer shops are stocked with the agro inputs following farmers requirements as recorded in the SNS.

However, it was shown that farmers do not get alternative markets to purchase inputs outside the subsidy market platform once they operate in complementary farms (rented land). This is considered as a hindrance to access the inputs alongside other constraints. Many agro-dealers are spread across the country and the Nkunganire contributions by the government have enabled farmers to fairly afford these inputs than it was the case previously. As a result of setting mineral fertilizer-use targets in the district IMIHIGO with the subsidies that come along with it, there has been an increase in the use of chemicals in farming practices in Rwanda (Ansoms, et.al, 2018)

Improved production of crops under the subsidy program

The research observed that there a considerable distinction in productivity in the actual situation before adoption of agri-inputs. Under the scheme, farmers have greatly increased the production of crops especially potato, maize, beans, wheat and rice which allow them to get surplus for the market. Examples provided in potatoes, whereby the use of fertilizers lead to increased production from as low as 2 tonnes/ha to 20-25 tonnes/ha in the districts of Rubavu, Musanze and Nyabihu. Analysis by Druhle and Barriero-Hurle (2012) confirms that through raising fertilizer use, subsidies have boosted average yields and agricultural production in developing countries. MINAGRI (2011) reported that as a result of inputs use under the Crop Intensification Program, the crop productivity has increased whereby production of maize and wheat has increased by 6-fold, and that of Irish potato and cassava has tripled. The production of rice and beans has increased by 30% in the period of 4 years and these outputs have pushed Rwanda to the verge of becoming a food secure country. According to the word bank (2019), there is significant increase in crop yields input subsidies as a result of input subsidies as successive PSTAs have reported. As the fertiliser application rate in CIP areas increased from a 1998-2005 national average of 4.2 kg/ha/year to 29 kg/ha/year in 2011-2012, crop yields also increased; for maize from 0.65 MT/ha in 2000 to 2.5 MT/ha in 2010, for wheat by 2.5 times during the same period. Consequently, according to PSTA4, "Total production quantity for CIP priority crops grew by more than 150 % between 2007 and 2013 in CIP supported plots, and yields of all the targeted commodities improved.

Improvements in food security and Livelihoods

The food security is achieved when people have ability to produce enough food for consumption and having physical and financial access to food. The research observed that the implementation of the subsidy program has improved the local crop production and enhanced the availability of diversified commodities for family diets; this has led to change in diet composition and behavior amongst households. Fertilizer subsidies have been proved to increase productivity in Sub-Saharan Africa and thus help solve the food availability dimension of food security. For instance, some respondents mentioned the diversified use of maize products in all the meals including flour, porridge for breakfast and animal feed. Besides, this rise in production has allowed farmers to enter the market and earn money for buying other necessities.

Increased investment in agriculture by farmers

The study revealed that in Rwanda, investing in agriculture is on two sides; first, through the adequate adoption of modern inputs and successful implementation of the subsidy program, farmers have identified farming as a probable business to improve their livelihoods, and thus, they consider investing in agri-inputs with a certainty of positive outcomes. Secondly, with increased usage of inorganic fertilizers and improved seeds, the suppliers of the inputs are assured of customers (farmers), hence are confident to invest more in the agro-inputs business. According to Adimassu et al (2016) and Okello et al (2018), economic benefits, such as higher yields and income, can affect farmers' investment in seed selection. Farmers' investment adjustment behavior is affected by factors such as households' resource endowments, knowledge, and experience of farming, access to information, social capital, and availability of family labor.

4.2 Farmers' readiness and self-reliance

The study assessed the level of readiness amongst farmers to pursue with the subsidy reforms, both consulted stakeholders believed that the subsidy program has partially achieved its intended role of making farmers self-reliant since few farmers have built the capacity for self-reliance. According to the World Bank (2014), with the yield ambitions that drove launch of input subsidies in the first place not yet achieved, there continue to be calls for continuation and even expansion of the input's subsidy programme. In the first place, despite production increases staple food production remains below consumption and is being complemented by imports. However, the research noted that the understanding level of using inputs amongst farmers has improved considerably and affirm that some farmers are ready to continue using unsubsidized inputs. Three clear categories of farmers were identified, in reference to their readiness and self-reliance of continued unsubsidized inputs use. The respondents suggested that wise leaders from the community would be engaged to categorize the farmers in the following categories.

a) Category of small farmers with a small land, though with limited resources, they could potentially benefit from using modern inputs to increase production. However, in the scenario of using unsubsidized inputs, these farmers are not self-reliant and can even quit farming. This implies that the government should consider retaining these resource-poor farmers in the subsidy at 100 percent. The World bank (2019) show that these farmers can still be offered inputs with social protection as major objective and alongside programmes such as VUP and by offering options for off-farm jobs or other interventions of off-job creation. By now persistent calls for subsidies also undoubtedly come from near-certainty that many of those farmers who are currently subsidized (especially the many very small and poorest ones) would not continue using modern inputs if subsidies are removed (ibid).

b) Category of middle farmers/ Medium size farmers who are able to continue farming with the little they can have, some can afford inputs without subsidy one season another season they cannot, without Nkunganire this category will always be in struggle. This means that the subsidy scheme should consider supporting these farmers on revised rates according to farmers' profiles. The world bank (2019) suggest that these farmers should be supported by input subsidies with other complementary measures such as post-harvest handling and marketing facilities.

c) Category of farmers who are business-oriented get more income from their produce and have achieved a reasonable level to be labelled as 'self-reliant'. They are ready to ensure continuity in using improved seeds and fertilizers even when Nkunganire is stepped down since they have built financial capacity. The government could channel the support not in subsidy rather through the market expansion and other facilities. The findings by the World bank (2019) found that farmers under this category constitute the core segment of farmers currently contributing significantly to the current status of agriculture in terms of surpluses for national food security and industrial use as well as for national poverty reduction. Their input use will be a combination of purchase at subsidised and full-price rates. The subsidised-input support can be accompanied by other enabling incentives such as access agricultural insurance and credit to finance selected and strategic investment.

The reforms should base on the farmers' readiness and level of self-reliance, if proper strategies are not put in place, the possibility of pulling back the progress made in agriculture is higher. This is because farmers may opt to use less fertilizers than required, use their own seeds and go back to the traditional farming practices which in turn will lead to low productivity.

4.3 Farmer's willingness, ability and capacity to purchase inputs

During the district consultations, all the stakeholders exhibit that the farmers' willingness to continue purchasing unsubsidized inputs is beyond doubt since currently they recognize the advantages of using fertilizer and improved seeds in their farming. The research established that although farmers may have the willingness, their ability and capacity to procure inputs are dependent to other factors such availability of inputs market outside the subsidy channel, and especially the affordability by small holder farmers.

4.4 Positive and negative facts in the implementation of the subsidy program

The study exhibits a lot of improvements made during in the management and implementation of the subsidy program. Amongst portrayed strengths in the management/implementation of the subsidy program:

The subsidy program established the proficient agro-dealership which improved the accessibility of quality and standard inputs, and ensured harmonized inputs prices across the country. Consequently, improvements in inputs delivery service and overall avoidance of fraudulent actions in fertilizer and seed business. Additionally, leveraging on technology, the program considerably improved inputs delivery service through digital solutions like "Smart Nkunganire System", which is used during farmers' registration and record keeping. This platform has improved the capacity of farmers and other actors to embrace the use of ICT-based applications and establishes the confidence to use other digital platforms in the future. According to USAID/Trocaire, 2019 SNS has significantly increased efficiency, productivity and transparency by bridging communication gaps within the agri-input subsidy program. It has improved financial inclusion and increased cashless transactions in the agriculture sector in Rwanda.

Moreover, establishment of demo plots by roadside has served as an instrument to witness the crop production change between plots with/without inputs. Furthermore, these demonstrations helped farmers to understand the advantage of using inputs in increasing agriculture productivity as well as removing the existing bias. Demo plots are a common feature of agriculture extension interventions. According to World Vision, 2017, demos are also common with other practitioners because they provide a platform to introduce new ideas and allow farmers to experience innovative practices first hand. Demos are an important tool for enabling farmers to learn first-hand about improved agricultural production practices.

By contrast, the consulted stakeholders disclosed some weaknesses in the implementation of the subsidy program, they are different based on divergent categories of actors in the subsidy program:

Farmers: The low inputs use rate observed is associated with the low purchasing power of farmers, unavailability of unsubsidized inputs (due to closed inputs market). The Farmers who wish to get more fertilizers than what is required in the SNS do not have alternative market. In addition, the farmers pinpoint the underpricing of their products at the market, the claim that market price is low and this constitutes the major hindrance to reach profit targets. The study further observed that there is no soil testing in the cultivated land to identify the type of fertilizer required. As such, the subsidy program provides the same types of fertilizers to different lands/different types of soils. Furthermore, there are poor storage facilities which undermine negotiation capacity of farmers to get good prices where farmers are compelled to sell their produce immediately after the harvesting period since they cannot manage to store and wait for increased market prices.

Agro-dealer: With the respect to challenges highlighted by agro-dealers, the study points out the issue of internet connection for SNS which push agro-dealers to manually register farmers in their books and slow the registration and delivery. Alike, the quantity for fertilizers packages paid do not meet the standard weight, a case 50 kg weight sacks, which in most cases weigh (48Kg). Another important challenge mentioned by the agrodealers, is the transport fee provided by IPTC for agro-dealers which is still low (there is need to revise fees).

Seed multipliers: The consultations established that basic and pre-basic seed from RAB for multiplication are not subsidized and their prices are high, under this situation many farmers do not afford them, and hence seed multipliers fall unto loss and be demotivated to continue multiplication of seeds (thus more advocacy is needed to include basic seeds in the subsidy scheme). The inclusion of manure fertilizers in the scheme is to be examined since they are crucial inputs in seed multiplication, especially in the regions that need high manure due to the nature of the soil.

District (implementors): At district level, there is a very low budget allocated for the Nkunganire scheme by the government. This is reflected by the recurrent government debts. District agronomists exhibit that there is a lack of district consultation by RAB in input budgeting. Besides, the contract management was identified as an area of improvement, they suggest that since the contract is established between RAB and importers, likewise the payments should be initiated

by RAB, alternatively, if no change to the existing procedures, the districts should be part of the contract signatories to avoid recurrent audit queries.

4.5 Strategies to implement subsidy reforms and ensure procuring the unsubsidized inputs

The consulted stakeholders identified strategies, which will enable farmers to independently fully fund the purchases of the inputs they require and make efficient use of them in case the subsidies are reduced or withdrawn. At farmers' own, it is difficult to draw maneuvers that can ensure the continual procurement of unsubsidized inputs, the study exhibit that these strategies are dependent on other stakeholders in the subsidies.

Improved market for farmers' produce: Guaranteed market availability and improve prices of the harvest are essentials for farmers to build financial capacity and ensure affordability of inputs. These are the key requirements that keep farmers motivated and avoid disappointment. With high supply after harvest, farmers receive low prices for their produce. Similarly, during lean periods, prices are high due to slow adjustment on the supply side. As a result, the agri-food system, especially in sub-Saharan Africa, is characterized by significant seasonal price variations: low prices during glut and harvest period and high price during lean (Gilbert et al., 2017). At the same time, smallholder farmers are often under pressure to sell their produce right after harvest due to household demand for cash to meet short term needs and the lack of storage facilities (Saini and Gulati, 2015). Therefore the need to improve post-harvest and storage facilities, so as to enable farmers store their produce and market it once the prices are higher.

Improved access to credits /loans for purchase of inputs: The access to finances is proved to be the booster of production once acquire. However, it is one of the major constraints existing among primary producers since the financial Institutions do not perceive agriculture as a viable business following its natural risks. According to SPARK,2020, In Rwanda, lack of data on farmers operations, agricultural insurance and collateral, are the key problems. The challenges also include insufficient confidence or competence by lending institutions in the agricultural sector to assess and manage risks, and the inadequate infrastructure of rural bank branches. Therefore, government should mobilize banks to provide agriculture loans by establishing the trust and agriculture-tailored collaterals, as well as set policies favorable to farmers to acquire credits with low interest rates to improve their ability for purchase of inputs without subsidy, including providing low-rate, affordable loans for small farmers through microfinance institutions and community cooperatives.

Farmers to practice farming as a Business: Farmers has to capitalize their farming and lift it at another level since they it is a potential business, parallel, capacity building in agri-business is a key initiative to promote farming as a business approach among the farmers. This is a step to foster and mobilize farmers to instruct the saving culture among themselves, since it is shown that saving is a problem for many farmers. In addition, the farmers groups have been proved to be inputs acquisition channels to reach more farmers easily. The farmer groups can be used to approach financial institutions whether formal or informal (Ibimina). Moreover, the consulted stakeholders are willing to engage in contract farming, establishment of agreements between producers and buyers to ensure the certainty in their farming.

However, there is no regulation/policy to support contract farming in Rwanda, and AgriProFocus and partners have embarked on a process with the aim to stimulate the development of a legal framework to enable/support contract farming in Rwanda (AgriProFocus,2016) The study therefore identifies the need for the government to develop standard operating procedures (SoP) for contract farming, followed by public awareness on how to apply the procedures effectively.

Use of Integrated soil fertility management (ISFM): Smallholder farms in Rwanda are characterized by soil fertility depletion due to continuous cultivation without nutrient replacement, leading to poor crop productivity. Fertilizer application is therefore a prerequisite to improve productivity in these soils as advocated for under the subsidy program. However, Soil fertility management through incorporation of both inorganic and organic fertilizers has a significant influence on the productivity on most food crops. Enhancing agricultural productivity through Integrated Soil Fertility Management (ISFM) approach is one Rwanda's strategies for soil management through the proper use of fertilizers, improved seeds and scaling up agro forestry and composting (MINAGRI,2018).The study therefore urges the government to capitalize the composting amongst famers to acquire organic manure to complement the mineral fertilizers as a means to improve the soil structure and a solution to reduce costs incurred on inorganic fertilizers.

4.6 Targeting

The study concluded that to ensure the efficient use of input subsidies and in the midst of imperative reforms, the subsidies should be targeted and viewed into two distinct lenses given their nature. First, the subsidies should be understood as a social protection element to, second, it should be visualized as an investment to boost the agricultural productivity. IFPRI (2021) emphasizes that input subsidies need to be targeted rather than being distributed through a common subsidy system since targeting can avoid that, big farmers benefit from subsidies when they may not need such support. However, the World Bank-commissioned public expenditure review (2019) argues that input subsidy programs should be seen as an investment in the productive capacity of agriculture and not much as a mechanism for social protection. Other literatures suggest that interactions between agriculture and social protection are important since social protection influences agricultural production while agricultural interventions reduce household risks and vulnerability (Tirivayi et al. 2016), thus retaining the most vulnerable farmers in the subsidy is a worthwhile option.

So far, the wealth quintile categorization is considered as a basic characteristic to identify these farmers, especially categories 1 & 2 sought to accommodate financial vulnerable households mainly farming on small land for home consumption. Having potential land is also thought to be a good characteristic since the subsidies are to be used with those who can acquire parcels to grow crops. This finding is in line with 2AGSolutions (2020) who proposed targeting criteria including Ubudehe category, land type, cropping system, cooperative membership, or combinations of these features that effectively map to the attributes of these farmers.

The study further considered a better strategy for identification and monitoring the procurement of inputs to selected farmers. The respondents stated that targeting that aim at identifying vulnerable households should start with an objective assessment at the community level, to screen all characteristics of those households with facts. Identify them in the general assembly of farmers at the village level in presence of local leaders, researchers, alongside with a special committee of “village wise people” in identification and follow up on farmers provided with subsidies, more so to ensure they do not sell or misuse the inputs. It is revealed that in the previous seasons, RAB, LODA and other stakeholders provided fertilizers for this category of farmers nonetheless is it done *on ad-hoc*, this can also constitute a base to identify them. This finding is corroborated by 2AGSolutions (2020) who suggest LODA’s social profiling as a tool to establish a farmer’s eligibility as mechanisms to address targeting errors and changes in a farmer’s circumstances over time.

In regard to targeting crops and potato, maize, beans, and cassava were suggested as the crops to be sustained following their importance in ensuring household food security. In addition, they can potentially generate more income for farmers and be self-financed in long run. These findings are in line with the integrated cost–benefit analysis by Miklyaev et.al, 2020, which shows that the cultivation of beans, cassava, and potato to be financially, economically, and fiscally sustainable, but rice, wheat, and soybean cultivation to be financially unsustainable without continued subsidization.

The consulted stakeholders proposed NPK, DAP, and UREA to be retained as they are crucial inputs in crop growth in Rwanda. Their suggestions are based on fertilizer's potentials, suitability, and incomparable roles with the main crops grown in the country. However, in the extreme cases, the UREA has been revealed as an input with room to be unsubsidized for potato farmers whose current level of self-reliance is considered good. These findings are in line with those by IFPRI (2019), which highlighted the possibility to slowly reduce the low subsidy rate on NPK as it is largely used in Irish potato cultivation and potato is financially, economically, and fiscally sustainable.

There is a special emphasis on seeds during the consultations whereby participants claim for more inclusion of crops rather than reductions on few crops under the scheme as it may be for fertilizers. This is in line with the findings of Spielman and Kennedy (2016) who established that, while considering seed and fertilizer subsidies reforms the approach should not be the same given substantial differences in how seed is produced and disseminated, how farmers respond to changes in seed prices, and how outcomes from a seed input subsidy program are measured.

4.7 Farmers' contribution levels in the envisioned reductions of subsidy cost

The study concludes that farmers are ready to continue taking part in the subsidy costs and they have backed the gradual reduction of input-specific subsidies over time. In regard to the farmers' contribution levels, the study established that, the annual reductions in cost per kg, should be between 11 percent and 20 percent on both fertilizers and seeds. The proposed annual reduction should be applied while careful monitoring profitability of specific inputs at market price as the guiding principle. For instance, IFPRI Rwanda working paper shows that, subsidy rate has room for reductions nonetheless profitability, production, and price effects vary significantly by crop. The same source argues that these reductions can greatly affect the profitability and production of maize than rice and Irish potato.

4.8 Appropriate measures to bridge the gap triggered by input subsidy reductions

The consultations highlighted the complementary public investments as potential options to increase effort by the government to bridge the gap that may result from gradual input subsidy reductions.

It is worth to mention that investments should be channeled to stabilize prices for farmers' produce to balance the cost of production with the return. Several financial models proved to be successful in Rwanda can serve as good example and be applied in agriculture. The government should inject money to establish a specialized agriculture loan facility to ensure a guarantee for the financial institutions to trust farmers.

This is a great investment that ensures access to credit and financial products tailored to agriculture, thus increased number of inputs users. The 2AGSolutions (2020) report the association between access to a loan from the Rural Investment Facility (RIF) with a 39 percent higher chance of using inorganic fertilizer by famers. In the same line with our findings, IFPRI (2021) suggest to consider public investments intended to extend credit and other financial services to farmers as they are essential to increasing fertilizer use and realizing the goals of PSTA 4.

Since the introduction of the subsidy program, the market and prices are amongst unsolved interrogations as stakeholders denoted as big issues that need to be addressed. Thus, consulted stakeholders suggest that more investments should be channeled to stabilize prices for farmers' produce to compensate the cost of production. The World Bank-commissioned review (2019) found that, there is an alert in reference to price stability in markets and recommend the Government to defend the right of farmers to make a living out of their efforts and investments. Therefore, the government should strengthen investments in irrigation programs for drought-prone regions, increase agro-processing and postharvest facilities which would be key enablers of the market price stabilization. Other investments should be directed in infrastructure like roads storage facilities, agro-processing and value addition. The Government should channel the investment in establishing a specialized fertilizer making plant in Rwanda, which according to farmers would reduce the high costs of imported inputs and make them affordable to farmers.

As revealed by several studies, the increased demand of mineral fertilizers is showing its notch, and the sole continual application compromise the soil quality. Therefore, consulted stakeholders suggest that investment should be directed towards strengthening compost making by farmers countrywide, this is one way to improve soil condition and claim for less inorganic fertilizers in the future. This finding is corroborated by palladium (2020) who stated that Rwandan soils deplete continuously, the use of organic fertilizer reduces over time, and emphasize that RAB in collaboration with districts should promote compost-making to increase green manure at household level.

With respect to policy measures, the consultations have emphasized on the need to open and expand the input market to improve accessibility, according to them, the market is so monopolistic since they derive inputs solely in the subsidy scheme, this limits them form acquiring inputs once they have additional fields not registered in the SNS.

This is in line with the findings by IFPRI (2021) who recommend the government to offer farmers with a possibility to purchase inputs at both subsidized and non-subsidized rates. The study further shows that there is need to support farmers in case of total crop failure. The World Bank commissioned review (2019) mention that insurance is critical in an environment where production depends on nature (rain) and markets are not stabilized through policy. The study established that there is an ongoing agriculture insurance program, which however need to be upscaled across the country.

4.9 Timing of subsidy reforms

The study found that the government should not reduce the subsidy abruptly, instead it should reduce the subsidy slowly such that farmers should be used to changes to avoid the shock that might be exacerbated by quick reduction. In Rwandan context, it is earlier to envisage the graduation given that the inputs uptake is still low compared to regional and international levels. There is need to keep the subsidy rate for a at least time for the upcoming 3 years and start gradual reduction considering strong mobilization to communicate changes to farmers, and this calls the government to be more cautious while considering the subsidy reforms. The World Bank commissioned review (2019) believe that the Rwanda's rural people are not yet able to afford inputs high cost which constitute a barrier to more intensive use of inputs. The assessment by 2AGSolutions (2020) revealed a very slow increase of inputs use despite the subsidy program, and recommend the not to consider reduction of the subsidy for seeds and fertilizers provided to small scale farmers because this could lead to a drastic drop of inputs use.

CHAPTER 5. CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

The research concludes that the majority of the farmers countrywide are benefiting from the advantages of using fertilizer and improved seeds in their farming. There is a positive signal that farmers are ready and willing to continue buy unsubsidized inputs in the scenario were of reduced subsidies. The research recognizes that farmers are ready to embrace the subsidy reforms upon satisfying some conditions. We recommend that proper strategies should be put in place to improve their ability and affordability of farm inputs, so as not to retract the benefits brought about by the subsidy program.

5.1.1 The future strategies to enhance farmers procure inputs without input subsidy support

- i. Improved access to financial services by smallholder farmers.

It is clear from the study findings that without access to financial services such as credit and loans, smallholder farmers may not be able to reach their productive potential, due to lack of ability to procure inputs. The study therefore proposes that for farmers to continue using agro inputs after withdrawal of the subsidies, credit should be easily available to farmers and loans should be granted at a low rate of interest for long period of time. To achieve this, the study therefore recommends the following options;

- a) The local commercial banks can develop new models of lending to smallholder farmers to compensate the government's reduced subsidy portion.
- b) Alternatively, the government owned finance institutions, can establish a subsidiary, which can offer financial support to the agriculture sector, more specifically focusing on the smallholder farmer.
- c) The third option in improving financial services to small holder farmers, is for the government to motivate commercial lenders, by creating incentives through policies. The government should mobilize banks to provide agriculture loans, as well as set policies favorable to farmers so as to access bank loans with low interest rates to improve their ability for purchase of inputs without subsidy

- ii. Improve the prices of the farmer produce so that farmers can gain from marketing of the products so as to have their financial capacity to afford inputs.

The study established that the farmers are willing to buy inputs upon withdrawal of the input subsidy, if only their ability and affordability is improved. The farmers suggested that if the marketing price of their produce is improved, then their ability and affordability of agri-inputs would be enhanced. The study therefore recommends the following so as to improve the marketing of the farmers produce;

a. Warehouse Receipt System

The government should develop policies to guide warehouse receipt system in the country and should also sensitize the small holder farmers on the same. Warehouse receipts are a common method to catalyse agricultural lending by collateralizing stored commodities. Additional benefits may include secure places for storage leading to reduced price variations across seasons, and permit farmers to avoid selling immediately at harvest.

b. Contract farming models

The small holder farmers are willing to start procuring inputs without the subsidies, however, the fear that they will not find a good market for their produce is a strong disincentive. Contract farming may be one solution, as it guarantees that farmers will have a market. The government should build farmers capacity in contract farming, by promoting the following models:

- The smallholder farmers are linked to the specific value chains, through the buyers and farmers entering into a forward agreement for agricultural production
 - 'Out-grower' models where by farmers are provided with inputs on credit, which is deducted from the sales of the produce. (Access of inputs through the buyers(companies) as out-growers)
- iii. Financial institutions should avail financial services to farmer groups and cooperatives at low interest rate to help farmers to get access to loans and improve their ability to procure inputs.

The study recommends the following financial models which can be used for farmer groups and cooperatives to access finances to the small holder farmers.

- a) **Group lending:** the standard microfinance model can be used for farming households. Loans can be repaid in weekly or monthly instalments, but the timing of disbursement and repayment may take the growing season into account.
- b) **Crop-specific microfinance with farmer groups.** The financial institutions should develop a crop-specific arrangement for smallholder loans in collaboration with the cooperatives. The lending parameters should be adjusted to meet the credit need for this specific farming activity, like the size of the loan, the timing of disbursement and repayment schedule after harvest.
- c) **Microfinance to individual farmers:** The cooperatives can obtain loans from the financial institutions and thereafter provide loans to individual farmers. Within these cooperatives all members are farmers and, if possible, loans should be tailored to members' needs based on an investigation of these needs.
- d) **Financing by chain actor:** linking MFIs and companies who collaborate in the chain is another financial model through cooperatives. The financial service provider (MFIs) provides input and, if needed, output loans. These loans are secured by a contract between cooperatives and the MFI.

5.1.2 Strategies to build up farmers' resilience to sustainably produce without subsidy support

i. Building of farmers' capacity to practice farming as a Business

A farmer- entrepreneur is someone who produces for the market, however, most of the small holder farmers in Rwanda produce for home consumption, but with the intention of selling surpluses on the market. Therefore, there is need to build their capacity to become farmer-entrepreneurs, so as to see their farms as a business. The farmers need to see their farms as a means of earning profits, which will make them passionate about their farm business and thus willing to take calculated risks to make their farms profitable and their businesses grow, including purchase of agri-inputs without the subsidies. For small-scale farmers to become more 'entrepreneurial' assistance from extension workers and supporting institutions is needed.

ii. Build farmers skills in financial literacy

The government should build financial literacy for a small holder farmer, such that they understand the basic financial principals such as: a. Why it is important to save your money, thus making savings from sale of the respective seasons' production. The farmers should be enlightened that after they harvest and sell their produce, they will receive payment and it is very important to save this money in a safe place. b. How and where to open an account with a financial institution so that they can save their money and c. Keeping proper records of financial transactions so that you can manage your income and expenses wisely; How to access financial assistance in forms of loans so that they can sustain and grow their business.

iii. Farmers empowerment through groups/cooperatives

Farmers that were consulted in this study indicated the importance of organizing smallholder farmers into strong cooperatives, to better link them to markets for their produce. The feeling was that enhanced access to markets would help improve farmer's incomes and eventually help them to graduate out of the subsidy program. Although majority of the farmers are members of the cooperatives, these cooperatives do not support in marketing of their produce. The government should therefore train the cooperatives to be market oriented.

iv. Small holder farmers, either as individuals or as Farmer groups should be encouraged to approach financial services to ask for small loans.

The financial services can be formal (commercial banks, microfinance institutions and SACCOs) or informal (Rotating savings and loans in farmer groups (Ibimina), Village savings and loans associations (VSLA). There is need for assessment and designing of a potential process of graduation of farmers from the subsidies to ensure the exit strategy is not only concerned with termination of the programme but an exit that leave supported beneficiaries able to pursue sustainable independent livelihoods. The study therefore recommends that the government should consider linking farmers to a loans/credit scheme, where eligible farmers are subsidized over a 3 to 5-year period, after which they graduate and become eligible for a separate farm input loan arrangement under an agricultural financial services programme. Such a loan

programme could incorporate a weather-indexed farm income insurance component to further enhance their resilience to shocks.

5.1.3 Strategies to ensure the gains from the subsidy programme continue even after the reforms.

- i. The reforms should start with sensitization of farmers on the reforms.

The government should organize mass information campaigns, for the reforms implementation to be successful. The government should communicate effectively to the citizens the drawbacks of the pre-reform situation and the advantages of pressing ahead with the package of reform measures.

- ii. The government should support regular review of the production cost and undertaking market research to establish an efficient marketing system

An efficient marketing system, shall ensure higher levels of income for the farmers by reducing the number of middlemen or by restricting the commission on marketing services and the malpractices adopted by them in the marketing of farm products. An efficient system will therefore guarantee the farmers better prices for farm products and induces them to invest their surpluses in the purchase of modern inputs so that productivity and production may increase. An improved and efficient system of agricultural marketing will also help in the growth of agro-based industries. An efficient marketing system will also help the farmers in planning their production in accordance with the needs of the market.

- iii. The relevant government ministries should work closely with banks and microfinance institutions to ensure farmers access to loans and credit, for use in procurement of inputs.

Financial institutions interested in serving farmers face myriad risks and challenges associated with agricultural production and lending, including seasonality and the associated irregular cash flows, high transaction costs, and systemic risks, such as floods, droughts, and plant diseases. The government should therefore ensure that banks and microfinance institutions adopt a single, flexible agricultural credit product, and flexible payment terms, matched to agricultural production cycles.

- iv. The government should continue to ensure quality of inputs for continued confidence in inputs use among farmers.

It is clear from the study that high-quality inputs are essential to the continued use of inputs by farmers. The farmers are less likely to continue paying for inputs when the agro-inputs are of poor quality

5.1.4 Policy measures, which the research recommends as the subsidy budget is reduced

The study recommends policy measures, to be put in place as the subsidy budget is reduced. Such policies could be within the broader sphere of agricultural policy (i.e. irrigation and rural

infrastructure, market linkages and development, credit provisioning and insurance, or research and extension services) or outside the ambit of agricultural policy (i.e. cash transfers, infrastructure investments, and other public works).

The study recommends the following specific policy measures.

- i. Policy of farmers support in case of crops failure with upscaling of the weather index insurance to cover all farmers in the country
- ii. A policy on establishment of agriculture loans/credit facility to be implemented within the financial institutions which can provide loans/credit to farmers at affordable interest rates.

The above opportunity costs and outcomes under the proposed policy alternatives need to be better understood and quantified, hence further studies/research.

5.1.5 Reasonable time to implement reforms.

The research deduced that the reforms could be well implemented in 3-5 years to come given the need, challenges persistence in the program, and time for mobilizing farmers and build their capacity. The reforms should be undertaken in phases:

- 1st year: Mobilization: This should be well organized involving CSOs which will provide neutral spaces for deep engagement and insure local ownership.
- 2nd -4th year: gradual annual reduction of 30 percent of govt contribution
- 5th year identification and targeting of vulnerable households

The process should include continuous and periodic monitoring and evaluation of changes in terms of mindset and impact evaluation of the review on the production

5.2 RECOMMENDATIONS

5.2.1 Strategies to ensure the gains from the subsidy programme continue even after the reforms.

- **The reforms should start with sensitization of farmers on the reforms:** The government should organize mass information campaigns, for the reforms implementation to be successful.
- **The government should support regular review of the production cost and undertaking market research to establish an efficient marketing system:** An efficient system will therefore guarantee the farmers better prices for farm products and induces them to invest their surpluses in the purchase of modern inputs so that productivity and production may increase
- **The relevant government ministries should work closely with banks and microfinance institutions to ensure farmers access to loans and credit, for use in procurement of inputs.** The government should therefore ensure that banks and microfinance institutions adopt a single, flexible agricultural credit product, and flexible payment terms, matched to agricultural production cycles.
- **The government should continue to ensure quality of inputs for continued confidence in inputs use among farmers.** It is clear from the study that high-quality inputs are essential to the continued use of inputs by farmers. The farmers are less likely to continue paying for inputs when the agro-inputs are of poor quality
- Government should invest in infrastructure like roads to facilitate transport, as well as access to storage facilities to avoid post-harvest losses. Alike, promote agro-processing and value addition in collaboration with the private sector, and subsidy should be channeled into the price of produce.

5.2.2 Potential options to channel investments by the government

- **Establish a guarantee fund for agriculture credits in banks for small scale farmers:** Banks need to have agriculture tailored financing models to help farmers build financial capacity, learning from previous initiative like Umwalimu SACCO for teachers.
- Work to properly **link farmers to markets and stabilize commodity prices** and increase storage places: To harmonize and remove all unnecessary brokers in the value chain
- To capitalize the **composting-making** amongst famers to acquire organic manure to complement the mineral fertilizers as a means to improve the soil structure and a solution to reduce costs incurred on inorganic fertilizers

5.2.3 Suitable policy measures to put in place while the subsidy budget is being reduced over time:

- Develop a clear market expansion by removing unnecessary actors in the market chain and promote open commercialization of inputs for easy access.
- More research on modern inputs (seeds and fertilizers) that increase productivity and suit specific soil types and regions is recommendable. Strengthen research programs on soil analysis and classification for appropriate use of fertilizers.

- Build agricultural value chain sustainability to ensure that gains are not lost along the chain and ensure market through strengthening contract farming strategies
- Pragmatically, the government should facilitate more private investors to invest in fertilizer-making factories. This would reduce the transportation charges hence reducing the prices of fertilizers at the market and making them affordable to farmers.
- Policy of farmers support in case of crops failure with introduction of a weather index insurance that cover all farmers.
- A policy on that foster public and private partnerships to enable financial institutions, provide loans/credit tailored to agriculture at affordable interest rates.

5.2.4 Time for implementation of subsidy reforms.

Based on the status of international market prices for inputs, the government can consider a progressive input subsidy reduction within a period of 3-5 years. However, the reductions may not necessarily be exponential over time, as the hiking of input prices may trigger increase in subsidy to maintain affordability by farmers. International price increases have been observed mainly linked to COVID 19 effects, increases in gas prices and geopolitics. The reforms can be undertaken into 3 phases:

1st year: Mobilization and preparation stage should focus on mobilizing and educating farmers on the importance of keeping using inputs and developing the sense of ownership for inputs' expenses

2nd and 3rd year: reduction of 30 percent followed by analysis on the status and impacts of inputs subsidies on production levels for cautious reforms.

4th year: Targeting of vulnerable households, this is an extend and takeover stage that consists of extending the number of farmers who will cover their expenses or to get a small contribution while others will be fully covering their cost.

The inputs subsidy reforms should be done progressively based on the type of inputs and specific conditions of individual districts/regions. Additionally, an assessment for each district (or agro-ecological zone) might be helpful to decide on how to implement these reforms taking into account specific inputs and peculiarities of each region.

IRDP RESEARCHERS WHO CONTRIBUTED TO THIS ASSIGNMENT

Dr. NDUSHABANDI Ns. Eric, Director IRDP and research team leader

MUTEBUTSI Alexis, senior researcher and coordinator

Lucy Mwangari Mwangi, senior researcher

NTEZIREMBO Victor, Researcher and facilitator

Dr. Yongabo Parfait, lecture at UR, Researcher and facilitator

Dr RUMANZI Saidi, lecture at UR researcher and facilitator

MUVUNYI issa, Researcher and facilitator

MARIZA Yves, Researcher and facilitator

Badege Peter, Researcher and facilitator

NTEZIREMBO Victor, Researcher and facilitator

Gisele Sandrine, Researcher and facilitator

REFERENCES

1. Ansoms, A.; Cioffo, G.; Dawson, N.; Desiere, S.; Huggins, C.; Leegwater, M.; Murison, J.; Bisoka, A.N.; Treidl, J.; Damme, J.V. 2018. The Rwandan agrarian and land sector modernisation: Confronting macro performance with lived experiences on the ground. *Rev. Afr. Political Econ.*
2. Adimassu, Z.; Langan, S.; Johnston, R. 2016 Understanding determinants of farmers' investments in sustainable land management practices in Ethiopia: Review and synthesis. *Environ. Dev. Sustain.*
3. AgriProFocus, 2016.contract farming in Rwanda
4. Druilhe, Z. and Barreiro-Hurlé, J. (2012) Fertilizer Subsidies in Sub-Saharan Africa. ESA Working Paper No. 12-04. FAO, Rome.
5. IFPRI. 2020. COVID-19 Policy Response (CPR) Portal. Available at: <https://www.ifpri.org/project/covid-19-policy-response-cpr-portal>.
6. Miklyayev, M.; Jenkins, G.; Shobowale, D. 2020 Sustainability of Agricultural Crop Policies in Rwanda: An Integrated Cost–Benefit Analysis. *Sustainability* 13, 48. <https://dx.doi.org/10.3390/su13010048> <https://ideas.repec.org/p/qed/dpaper/4566.html>
7. Okello, J.J.; Lagerkvist, C.J.; Kakuhenzire, R.; Parker, M.; Schulte-Geldermann, E. 2018 Combining means-end chain analysis and goal-priming to analyze Tanzanian farmers' motivations to invest in quality seed of new potato varieties.
8. Ricker-Gilbert, J. & Jayne, T. (2017), 'Estimating the enduring effects of fertiliser subsidies on commercial fertiliser demand and maize production: panel data evidence from malawi', *J Ag Econ* 68(1)
9. Saini,S. & Gulati,A. 2015, The National Food Security Act (NFSA) Challenges, Buffer Stocking, and the Way Forward Working Paper (No. 297)Indian Council for Research on International Economic Relations (ICRIER), New Delhi
10. SPARK, November 4, 2020 Lower interest rates and digital loans for Rwandan farmers
11. Spielman,D.J, Ad Kennedy, A. 2016 Towards better metrics and policymaking for seed system development: Insights from Asia's seed industry International Food Policy Research Institute, 2033 K St NW, Washington, DC 20006, USA
12. Tirivayi,N. Knowles,M and Davis,B (2016) The interaction between social protection and agriculture: A review of evidence DOI:10.1016/j.gfs.2016.08.004
13. USAID/Rwanda Quarterly Report ,2019 Narrative Report for Q2 – Year 3, Covering January to March 2019 “Enhancing Participatory Governance and Accountability Project”
14. World Vision, 2017. Improving the Management of Agriculture Demonstration Sites in Food Security Programs A Practitioner’s Guide World Vision U.S.300 I Street NE Washington DC, 20002 USA
15. World Bank Group. 2019. Agricultural subsidies in Rwanda: current status and future directions. Ministry of Agriculture and Animal Resources.

