



Rural Initiatives for Participatory Agricultural Transformation (RIPAT) and Rural Development



Edited by Justin Kalisti Urassa, Amon Zacharia Mattee,
Emmanuel Timothy Malisa, Dominick Elimringi Ringo
and Josephine N. Ng'ang'a.

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This book is dedicated to the memory of
Professor Amon Z. Mattee
who passed away on 25/1/2022

List of Abbreviations

ADP	Area Development Program
ADRA	Adventist Development and Relief Agency
AESs	Agricultural Extension Services
AEZ	Agro-ecological Zones
AIDS	Acquired Immune Deficiency Syndrome
AIS	Agricultural Innovation System
ARI	Agricultural Research Institute
ASA	Agricultural Seed Agency
ASC	Action for Social Change
ASDP	Agricultural Sector Development Programme
ASLMs	Agricultural Sector Lead Ministries
BMS	Blue Marsh Society
BO	Basket of Option
BRAC	Building Resources Across Communities
BSc	Bachelor of Science
BTO	Basket of Technology Options
CA	Conservation Agriculture
CBBE	Customer Based Brand Equity
CBE	Commodity-Based Extension
CBO	Community-Based Organisation
CCI	Community Capacity Indicators
CD	Community Development

CGVs	Care Group Volunteers
CO	Community Organizer
COVID	Corona Virus Disease
CRM	Customer Relationship Management
CSDP	Cotton Sector Development Programmes
CSSH	College of Social Sciences and Humanities
CTDP	Cotton and Textile Development Programme
DAECD	Department of Agricultural Extension and Community Development
DAICO	District Agricultural, Irrigation and Cooperative Officer
DDSS	Department of Development and Strategic Studies
DEC	Dietary Energy Consumed
DED	District Executive Director
DLFO	District Livestock and Fisheries Officer
DMCDD	Danish Mission Council Development Department
DPC	District Project Coordinator
DSA	Development Studies Association
EO	Extension Officer
ESRF	Economic and Social Research Foundation
F2FE	Farmer to Farmer Extension
FAO	Food and Agriculture Organization
FBO	Faith-Based Organisation
FFS	Farmer Field School
FMS	Farmer Market School
FNS	Food and Nutrition Security
FRN	Farmer Research Network
FVR	Farmer Voice Radio
GAP	Good Agricultural Practice
GDP	Gross Domestic Product
GF	Group Facilitator
HFIAS	Household Food Insecurity Access Scale
HH	Household

HIV	Human Immuno-deficiency Virus
HSH	Help to Self Help
ICE	Institute of Continuing Education
IFAD	International Fund for Agricultural Development
IFSNAS	Integrated Food Security and Nutrition Assessment System
IGA	Income Generating Activities
IJA	Institute of Judicial Administration
IMF	International Monetary Fund
IO	Implementing Organisation
IP	Innovation Platform
IRD	Integrated Development Approach
KI	Key Informant
KII	Key Informant Interview
KIWAKKUKI	<i>Kikundi cha Wanawake Kilimanjaro Kupambana na UKIMWI</i> (Women Group Fighting Against AIDS in Kilimanjaro)
LFs	Lead Farmers
LGA	Local Government Authority
LIG	Local Interest Group
LITA	Livestock Training Agency
LITI	Livestock Training Institute
MATC	Meru Agro-Tours and Consultants Co. Ltd
MATI	Ministry of Agriculture Training Institute
MLDF	Ministry of Livestock Development and Fisheries
MLF	Ministry of Livestock and Fisheries
MnM	<i>Mboga na Matunda</i> (Vegetables and Fruits)
MoA	Ministry of Agriculture
MoHSW	Ministry of Health and Social Welfare
MoU	Memorandum of Understanding
MUCHALI	<i>Mfumo wa Uchambuzi wa Uhakika wa Chakula na Lishe</i> (Tanzania Food and Nutrition Security Analysis System)

MVIWATA	<i>Mtandao wa Vikundi vya Wakulima Tanzania</i> (Network of Farmers' Groups in Tanzania)
NARI	National Research Institute
NBS	National Bureau of Standards
NGO	Non-Governmental Organisation
NLF	Non-Lead Farmer
NMBU	<i>Norges Miljø- og Biovitenskapelige Universitet</i> (Norwegian University of Life Sciences)
NPM	New Public Management
NTPSI	Northern Tanzania Potato Systems Improvement
OECD	Organisation for Economic Co-operation and Development
OFSP	Orange-fleshed sweet potatoes
OSU	Ohio State University
OVCs	Orphans and Vulnerable Children
PA	Producer Association
PEA	Participatory Extension Approach
PG	Producer Group
PLHA	People Living with HIV and AIDS
PO-RALG	President's Office - Regional Administration and Local Government Authorities
PPP	Public Private Partnership
PRA	Participatory Rural Appraisal
PRP	Public Relation and Publicity
PULS	<i>Prosjekt Ulandshjælp til Selvhjælp</i>
PVS	Participatory Variety Selection
QDS	Quality Declared Seeds
R&D	Research and Development
RAs	Regional Agricultural Advisors
RAS	Regional Administrative Secretary
RBD	Rural Business Development
RECODA	Research, Community and Organizational Development Associates
REPOA	Research on Poverty Alleviation

RF	Rockwool Foundation
RIPAT	Rural Initiatives for Participatory Agricultural Transformation
RUDECT	Rural Development and Environmental Conservation Trust
SACCOS	Savings and Credit Cooperative Societies
SAT	Sustainable Agriculture Tanzania
SaWaFo	Safe Water for Food
SBCC	Social and Behaviour Change Communication
SCSRD	SUA Centre for Sustainable Rural Development
SDGs	Sustainable Development Goals
SHERFS	Southern Highlands Extension and Rural Financial Services Project
SHT	Southern Highlands of Tanzania
SLA	Sustainable Livelihoods Approach
SNAL	Sokoine National Agricultural Library
SMS	Subject Matter Specialists
SPSS	Statistical Package for Social Sciences
SSA	Sub-saharan Africa
SUA	Sokoine University of Agriculture
SUASA	Sokoine University Academic Staff Association
SUGECO	Sokoine University Graduate Entrepreneurs Cooperative
T&V	Training and Visits
TABIO	Tanzania Alliance for Biodiversity
TAFRI	Tanzania Farmer Radio Initiative
TAHA	Tanzania Horticulture Association
TAP	Tropical Agriculture Platform
TARI	Tanzania Agricultural Research Institute
TCRA	Tanzania Communications Regulatory Authority
TEAM	Tanzania Empowerment ADP Model
TEEAL	The Essential Electronic Agricultural Library
TFCCG	Tanzania Forest Conservation Group

THRIVE	Transforming Household Resilience in Vulnerable Environment
TOAM	Tanzania Organic Agriculture Movement
TOSCI	Tanzania Official Seed Certification Institute
ToT	Training of Trainers
TPC	Tanganyika Planting Company
TPRI	Tanzania Pesticide Research Institute
TSAAE	Tanzania Society of Agricultural Education and Extension
UMADEP	Uluguru Mountains Agricultural Development Project
UNDP	United Nations Development Programme
URT	United Republic of Tanzania
USAID	United States Agency for International Development
UVIKIO	<i>Umoja wa Vikundi vya Kilimo Old Moshi</i> (Old Moshi Agricultural Groups Association)
VAEO	Village Extension Officer
VEO	Village Executive Officer
VLEO	Village Livestock Extension Officer
VSLA	Village Savings and Loan Association
WAEO	Ward Agricultural Extension Officer
WDC	Ward Development Committee
WFP	World Food Programme
WLEO	Ward Livestock Extension Officer
WOM	Word of Mouth
WRC	Ward Resource Centre
WUR	Wageningen University and Research Centre
WVT	World Vision Tanzania

Preface

Rural development has traditionally centred on the exploitation of land-intensive natural resources such as agriculture and forestry, whereas agricultural development mainly aims at increasing agricultural products such as crops, livestock, fish, etc. Human beings, land and capital are simply regarded as production goods and means. Rural development mainly targets people and institutions.

Many approaches have been used in the attempt to bring about rural development before and after countries in Africa and in other parts of the world got their independence. Some of the popular ones in Tanzania include: Transformation Approach (1960s) – a child of green revolution (1940–1960), the Community Development (CD) approach (1950s–1960s), the Integrated Rural Development Approach (IRD) (1970s) and the Sustainable Livelihoods Approach (SLA) (late 1990s to-date). There are two dominant approaches in the agricultural extension services—the Training and Visit (T&V) approach primarily promoted by the World Bank in the 1970s and 1980s, and the Farmer Field School (FFS) approach primarily promoted by the UN's Food and Agriculture Organization (FAO) in the 1990s. The T&V approach relied on top-down extension of knowledge and technical information, with specialists and field staff transferring knowledge to “contact farmers” in villages, who in turn were responsible for diffusing the knowledge into the local community. The FFS approach was developed as a bottom-up or participatory approach to extension, bringing applied research methods into the field for farmers to develop their own knowledge and analytical skills. Furthermore, it is worth noting that the approaches continue to exist in some form and are being employed to-date; the approaches at

times tended to co-exist and overlap. However, all the above approaches have their pros and cons with some being too much oriented to the top-down approach or too much dependent on donors/development partners while others require highly skilled personnel to effectively implement them. Hence, the need for simpler approaches such as the Rural Initiatives for Participatory Agricultural Transformation (RIPAT) approach, which puts lead farmers at the forefront. The approach is worth emulating as it promotes a basket of technology options that farmers can easily adopt and manage by themselves.

The book presents empirical evidence and testimonies of the success of the RIPAT approach in facilitating the transformation of smallholder farmers' livelihoods leading to food security and reducing rural poverty. In addition, it presents some challenges facing the RIPAT approach and what needs to be done to make it better. Therefore, the book provides some new insights into how to approach rural development particularly in developing countries such as Tanzania to students, instructors and other stakeholders of rural and community development actors in general. Moreover, the book offers some opportunity for others to come up with new ideas or ways by which the RIPAT approach can be improved in future to accommodate technological changes and take on board other useful innovations for enhanced rural development with communities in control of their own destiny.



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There are many other people who contributed to the development of this book, but we cannot mention them individually; however, their contribution is highly valued and appreciated. It is our hope that this book will be beneficial to rural development actors especially those dealing with provision of extension services.

SUA and RECODA

CHAPTER 10

RIPAT Approach and Gendered Technology Dissemination: Insights from Small-Scale Farmers' Groups in Tanzania

Tumaini Allan and Fatihiya Ally Massawe

Abstract

The efforts to improve agriculture sector performance in Tanzania have not been very successful. The poor performance of the sector is attributed to among other factors, the ungendered process of agricultural technology development and dissemination. This review chapter contributes to the ongoing debate about gender responsiveness of agricultural technology dissemination approaches. While 40% of the agricultural Labour force in sub-Saharan Africa comes from women, it is unfortunate that most agricultural technologies and practices are masculine coupled with gender insensitive dissemination approaches. Therefore, improving agriculture sector productivity through technology adoption calls for the development of a gendered approach to technology dissemination. RIPAT is a participatory extension approach that aims to close the agricultural technology gap as a means of improving livelihoods and self-support among rural small-scale farmers. While empirical evidence demonstrates the approach to be successful in addressing among others

the gap in agricultural technologies adoption by smallholder farmers it is not well documented on the extent to which the approach integrates the gender aspect in its dissemination of technologies and practices. The chapter is based on desk review where various gender studies were reviewed to establish gender sensitivity of the agricultural technology's dissemination approaches. The RIPAT handbook manual was used as a guiding document for assessment. Results show basket of options through RIPAT approach has created fairness on access to inputs though options are gender influenced. Farmers adopting agricultural technologies have 17% probability to be food secure throughout the year and able to save and loan in their farming groups. However, across countries, the difference between men and women in productivity rates range between 4 – 25% due to multiple socio-economic factors. Active participation of female farmers in farmer groups may encourage disseminating gender responsive technologies. The RIPAT approach considers the household as a single unit where both members participate equally in decision-making while there are a lot of dynamics in the household decision making process. A gender-responsive approach suggests that equal benefit in agriculture starts from the design and application of technologies so that equity in access to resources and efficiency in productivity of both men and women can be recognized and addressed.

Keywords: Gender responsiveness, Technology, Agriculture, RIPAT, Tanzania.

Introduction

Given the growing global population, it is obvious that the demand for food will continue to increase. Currently, the requirement for cereal food crops alone has increased by about 100 million tons (Mkonda, 2017). The estimated population of 2 billion people by 2050 implies more demand for food to feed the growing population. Thus, the agricultural sector will continue to be the main vehicle for ensuring food security and enhancing rural economic development. Therefore, any effort to enhance productivity in this sector will contribute to the socio-economic development of the agriculture dependent economies. In Tanzania, agriculture sector is the main source of economic livelihood for 66.3% of the population (Kinyondo & Magashi, 2017). The sector contributes about 28% of the GDP, provides 95% of the food, and employs over 75% of the national labor forces (BOT, 2020; Mkonda

& He, 2018). Despite the notable contribution of the sector in the country's socio-economic development, the sector is facing the problem of low productivity. For example, though the country has 44 million hectares of arable land, they are underutilized due to low investment in the agricultural sector in terms of finance and technology (Mkonda and He, 2018). Therefore, increasing and sustaining the agriculture sector's contributions to countries' economies will depend on the extent of sector transformations by adopting and scaling up improved and eco-friendly technologies (HLPE, 2016).

Despite the technical and financial challenges affecting agriculture sector performance, the gender gap in access to agricultural production resources and productivity is identified as one of the limiting factors for the sector's growth (Huyer, 2016). For example, while women account for 60-80% of the labour force in the agriculture sector in developing countries including Tanzania (Palacios-Lopez *et al.*, 2017), women's access to productive agricultural resources is limited. Wekesah *et al.* (2019) argued that gender inequality is revealed in access and control in various key resources and inputs for agriculture production like land, labor, credits, information, extension services, and technology. Therefore, closing the gender gaps in the sector will contribute significantly to agricultural sector productivity World Bank (2014) and ultimately reduction in poverty, hunger and promoting economic growth.

For more than forty years, the top-down agricultural extension approaches have relied on imposing centrally based technology solutions with limited consideration of the diverse needs of farmers in the ground. The top-down approach puts poor rural farmers at a disadvantageous position in accessing appropriate knowledge and technologies services that suit their environment. To close the technology gap, the Rural Initiatives for Participatory Agricultural Transformation (RIPAT) approach has been implemented around Northern and Central Tanzania. The approach bridges the technology gap by promoting the adoption of new technologies that are likely to improve food security and reduce poverty. Sunny *et al.* (2018) noted that the adoption of new technologies and technological packages have positive impacts on the environment, agricultural productivity, cost, and income in the developing world. For example, for very poor households, agricultural development not only serves as a defense against hunger but also can raise incomes nearly four times more effectively than growth in any other sector (World Bank, 2006).

Given the limitations associated with Top-down agricultural extension approaches, RIPAT approach seeks to combine the best elements from both bottom-up and top-down extension approaches. The design of combining the best elements in the basket of technology options allows farmers to choose what fits best in their context depending on the resources and needs. The experience from previous extension approaches confirms that choices of technology were made through trial and error in its application hence the speed and extent of adoption varied considerably among farmers (OECD, 2011). This can be justified by poor access to extension services which is only able to reach 10% of the farmers (Urassa *et al.*, 2020). Moreover, lack of information about productivity improvement has often constrained women's adoption of improved technologies and agricultural practices, and there is a strong case for improving the gender responsiveness of agricultural extension systems (IFPRI, 2014).

This chapter contributes to the knowledge on gender sensitivity of the RIPAT approach in disseminating agricultural technologies. The chapter is guided by two specific questions i), Does the objective of the approach achieve equity or efficiency? and (ii) How is the proposed RIPAT approach gender sensitive?

Selection of a representative to the RIPAT project

Household is the lowest level at which most decisions around resource allocation for farming are made. It involves a bargaining process among the household members. The unitary household decision-making model forms the foundation for the agricultural household model of this chapter. The model assumption is that the decision-making within the household is done through a single household head (Becker, 1991). Thus, at times, the model is regarded as a common preferences model. It is regarded as a standard framework where household behavior assumes the existence of a household welfare function that aggregates the preferences of all members (Chiappori *et al.*, 1993). Members are maximizing this function due to budget constraint and sometimes yield demand functions for goods. As it was noted by Abdullah *et al.* (2019) food insecurity typically operates at the level of the household, and is influenced by other household factors, such as family structure and social support. The fact that the RIPAT approach uses one representative from the household; hence confirms the bargaining process among household members, where men and women are assumed to have common preferences. Among the practical components of RIPAT

approach is the selection of participants to form groups where one member is selected from each household, who must be over 18 years of age. The graduated participants after training are expected to influence changes at the household level via establishing their farms and later at the community level.

In this case, the success of the RIPAT approach rests on the quality of household representatives. The representatives from the household participating in RIPAT projects groups are expected to play the role of change agent by transferring knowledge, skills and technologies learned from the group to the household. While the RIPAT approach trusts the representation of the single member from the household to influence change, this leads to an empirical question that to what extent does the representative if not the head of the household influence household decision-making? Whereas the household head has overall control over decisions, it raises the issue of power imbalance within the household (Donni & Ponthieux, 2011). The RIPAT approach considers the household as a single unit where both members participate equally in decision-making while there are a lot of dynamics in the household decision making process.

Is the RIPAT approach achieving equity or efficiency

RIPAT is a participatory extension approach that aims to close the agricultural technology gap as a means of improving livelihoods and self-support among rural small-scale farmers (Lilleør & Sørensen, 2013; Vesterager *et al.*, 2013b; Larsen & Lilleør, 2017). It transfers a 'basket' of agricultural technology options, including new banana cultivation techniques and improved varieties, crop diversification, conservation agriculture techniques, post-harvesting technologies, improved animal husbandry, multipurpose trees, soil, and water conservation and saving groups. These technologies are disseminated jointly where a group of farmers learn through experiments (in group demonstration plots) in a participatory way. As reported by UNDP (2012), technological efficiency is achieved when production takes place at the lowest possible cost per unit. The RIPAT approach has a mainstream efficiency aspect through a solidarity chain in two folds. First, once a farmer receives an improved banana technology free of charge for, she/he is expected to give three times to the interested farmers and future spreading groups. Furthermore, farmers pay for their animals by passing on the first two or five female offsprings for dairy goats and pigs, respectively, to others

in the group. This solidarity chain mechanism ensures the availability of inputs and technologies to farmers at a lower cost.

There is evidence that the adoption of technology has a positive impact on food security because it has created fairness in access to inputs among less poor and poor farmers (Blein *et al.*, 2013; Larsen & Lilleør, 2014; Asfaw *et al.*, 2015; Lilleør & Sørensen, 2013). The basket of options is practically devising equity by ensuring different farmers receive technologies of their need and priority. Similarly, a gender-responsive economic and social policy considers and addresses the different situations, roles, needs, and interests of women and men to achieve either their efficiency or equity objectives (UNDP, 2012). The bottom line is the trade-off between equity and efficiency when evaluating disseminated agricultural technologies. As expected, RIPAT projects in Karatu and Arumeru Districts show that 30-40% of participating households sustained positive effects on food security for more than one year after the end of the project (Larsen & Lilleør, 2014; Vesterager *et al.*, 2013). The sustained results were in terms of access to food, food consumption, and quality of diet. Therefore, stimulating the adoption of technology via group demonstration plots increases farmer to farmer learning including vulnerable groups like women and thus increases equity.

Gender is a socially constructed attribute in terms of roles and responsibilities of both men and women (March *et al.*, 1999). Inheritance of resources such as land for agricultural activities is based on gender (Mark & Winniefridah, 2010). Furthermore, crops are gendered to an extent that women seem to cultivate crops for household consumption while men focus on annual crops mainly those which attract quick income. This implies that the selection of technologies from the basket of options is not gender neutral. Given the diverse crop interest among men and women farmers and limited resource endowment to smallholder farmers raises the main concern on whether a household representative to the group will be able to balance between his/her choices with that of his/her household members.

According to Khushbu *et al.* (2020) and Huyer (2016), the technology adoption rate of the female farmers was lower compared to male counterparts. The reasons for the gender gap in technological adoption are attributed to farm size, asset ownership, social capital, access to labour, training, and extension services, therefore, to be able to achieve equity and efficiency and at the same time closing the gender and technological gap respectively; dissemination of technologies through

training should be participatory. Experience shows that men are more likely to join production-oriented groups like farm cooperatives, whereas women are more involved in civic or religious groups (IFPRI, 2014). This experience implies that it may be better to work with existing social groups in which women are already members.

Most agricultural technologies are masculine hence limiting women's adoption of the same. Technologies that are disseminated to farmers tend to be oriented towards men's physique or activities and will often be too heavy or culturally inappropriate for women (Carr & Hartl, 2010). The RIPAT approach address this challenge through various ways i) Mobilizing farmers to work in groups offer an opportunity to distribute roles among men and women hence each group will work on the manageable task, ii) Basket of options offer freedom to women and men to choose the technology that fits their needs, iii) Training in savings and loans using the VSLA model empowers farmers to have access to credit/ loans that can support farm activities like hiring labor for labour intensive activities. For example, women farmers may hire labour for establishing banana plantations, especially digging holes.

Nevertheless, Doss (2013) argued that the measure of productivity between men and women is narrow and missing out on processes and preparations conducted during farming activities. Thus, a concern for further research has been directed to joint farm management systems where husbands, wives, and other family members all contribute to the production and their contributions cannot be measured separately (Kristjanson *et al.*, 2017). Moreover, the gap in agricultural productivity between plots managed by men and women varies across countries and crops, but ranges from 4% to 25% when measured as the value of agricultural production per hectare across Sub-Saharan Africa (Aqilar *et al.*, 2015).

Gender sensitivity of the RIPAT methods

Demystifying dominant linear technology transfer model

The setup of the RIPAT approach is centred on its flexibility to put farmers at the centre of their development. This demystifies the dominant linear agricultural technology transfer model of the research-extension-farmer linkages that have been criticized for losing its utility in understanding the sources of farmers' problems and their appropriate solutions (Koutsouris, 2018). The application of the linear model registered long-term complaints that farmers are conservative and not ready to adopt new technologies. Fujisaka (1994) argued that among

other factors that make limited adoption of agricultural technologies are that farmers do not face the problem targeted by the innovations, or sometimes farmer practice is equal to or better than the innovation. Therefore, giving farmers a space in the RIPAT approach model, raises their voices and hence, makes the approach inclusive and hence gender sensitive. The approach blends the Top-down and Bottom-Up approach that creates a room of experts (researchers and extension officers) and farmers inputs to inform the type of technologies to be introduced in the respective agricultural settings. The approach demystifies the long-term myth that favours experts' opinions over farmers on choices of solutions that solve farmers' problems. The approach removes barriers and farmer dependency syndrome to donors and outside communities in solving their problems. The great strength of the RIPAT approach is laid on establishing groups that facilitate self-help philosophy where solidarity chains and paybacks systems of inputs are spread and sustained by farmers themselves. For example, the average cost per household is USD 30, and this expenditure led to an overall outcome of a 17% increase in the probability of households being free from hunger in RIPAT I villages (Lilleør & Sorensen, 2013). These cost benefit analyses in development programmes may encourage the spreading of such programmes.

Furthermore, the RIPAT approach builds farmers' capacity by making communities and individuals get out of poverty, food insecurity, and any challenges that they face through their efforts. For example, one of the RIPAT intervention in Kilimanjaro to People Living with HIV (PLHAs) (2014-2017) shows that 93% of the participants were able to meet their daily needs for 12 months and 89% were able to consume three or more meals per day though before the project they were less resilience to food security and income (Vesterager *et al.*, 2013, Larsen & Lilleør, 2017). This was also justified by the fact that 93% were members of saving and loans groups. The RIPAT approach encourages farmers' sensitization and mobilization before introducing various technologies. For example, the farmer's mobilization and sensitization promote the acceptance of the RIPAT aspect of the solidarity chain where the obligation to spread technologies is placed to farmers themselves. This practice increases the sense of ownership, promotes help to self-help and reduction of project cost.

The technologies will only be introduced after farmers decide on what they want and register their willingness to do so. This feature makes RIPAT align well with a new extension approach whereby extension

workers take an independent systemic role in process facilitation (innovation facilitators/ brokers) than production or dissemination of innovation (Koutsouris, 2018; Klerkx *et al.*, 2012). Extension workers serve well as co-learning facilitators. The innovation system approach among other characteristics is flexible and recognizes the importance of both technology producers and users and acknowledges that their roles are both context-specific and dynamic (Agwu *et al.*, 2008).

Expanding farmers option through a basket of options

The RIPAT approach relies on farmers' capacity to change their own lives through setting a development goal and using locally available resources. The basket of options emanating from the situation analysis is built up by farmers themselves by listing and evaluating the existing potentials and opportunities (technologies) before getting knowledge about new interventions. The approach is termed by Vesterager *et al.* (2013) as the pragmatic and flexible extension approach that gives farmers genuine possibility of choices of technologies to adopt, time, and extent of adoption depending on their needs and choices. This allows for flexibility for male and female farmers to adjust their choices based on each farmer's socioeconomic and environmental context. This refutes the long-term and dominant practices in the agricultural extension approach thinking of one size fits all. The flexibility of the RIPAT approach in letting male and female farmers design the basket of the option of technology and choose the technologies to implement through the same allows the diverse gender interest in technologies to be included in the basket of options. For example, given women's gender roles in household food security, the preference for women will be on crops and livestock breeds that will offer maximum benefits for household food and nutrition security (Vesterager *et al.*, 2013). On the other hand, men will prefer technologies that have a high market value (Hart & Aliber, 2010). So, combining various technologies in the basket of options expanded choices for various gender groups. Programmes that do not consider gendered responsibilities, resources, and constraints, have very limited chances to succeed in increasing productivity or benefitting men and women smallholder farmers (Doss, 2018). An empirical study conducted by Lilleør and Sørensen (2013) in one of the RIPAT projects in Marerani revealed that, while women have full authority over vegetables and chickens including spending cash derived from these crops, they have no authority over livestock but have authority over milk from the dairy cow. This kind of

dynamics is a very important input to the designing of the options of technologies to be included in the basket of options. So, the provision by RIPAT approach for a basket of options and equal presentation of farmers in the selection of appropriate technologies allows for the needs and contextual circumstances of both male and female farmers to be included in technology development and dissemination process.

RIPAT prioritize understanding of local context through situation analysis from a gender lens

The project implemented through the RIPAT approach offers an opportunity to conduct a situation analysis. Unlike non-RIPAT projects that come with prepackaged solutions, conducting a thorough situation analysis is a prerequisite in an area of RIPAT project implementation. The analysis offers an in-depth understanding of the farming practices, seasons, quality of the soil, climatic conditions especially rainfall patterns, and the availability of water. The understanding of the context under which agriculture intervention takes place is part of the innovation system thinking that one among its assumption is that institutional context rather than technological change drives socio-economic development. The comprehensive situation analysis with farmers serves as an input to the type of technologies to be included in the basket of options (Agwu *et al.*, 2008). This element calls for use of various Participatory Rural Appraisal (PRA) tools. The proposed PRA tools are qualitative and gendered since it allows the analysis to be done by sex and gender categories. The approach opens different perspectives that can facilitate or hinder the implementation of the project. For example, the activity profile tool allows for understanding gender roles within the households and communities, decision-making patterns, opportunities that are very important in deciding together the gender-appropriate interventions and technologies that will not add burden to any gender group.

The group as a platform for capacity building

The formation of the group involves farmers with the same situation and coming from the same village. The design facilitates the building of trust among farmers and easiness in information sharing among members. The group is where the knowledge, technologies, and inputs are channeled through. The groups empower male and female farmers by developing choices and negotiation ability in the community. In RIPAT groups, there should be equal numbers of men and women or more women than men. In addition, only one person from a household

who must be over 18 years of age is allowed to participate. Though the criteria for including more women or an equal number of women intends to increase the number of women who have access to agricultural training, information, and skills, The assumption is that women involved in the group will have the capacity to influence agricultural technology adoption decisions in their household. Likewise providing room for only one person from the household implies the person will be a true representative of the household in terms of choices and interest. Some empirical findings from Ghana revealed that some farmers who attend the demonstrations may not be decision-makers in their homes and may fail to influence decision-making hence delaying the process of transferring the technology to the household level (Azumah *et al.*, 2018). It has been proved empirically in Malawi that, in dual-headed households, joint access to information is a more powerful driver of food security than women's access (Ragasa *et al.*, 2019, Ragasa *et al.*, 2013). This is because in those households, women are frequently allowed to attend training and meetings but have little power to implement lessons (*ibid*). The bargaining power to influence decisions might be undervalued or constrained by limitations on women's access to resources, services, and market opportunities rather than the capacity to influence decision making (Jemimah, 2016). For example, active participation of women encourages choices of technologies that are gender responsive to ensure redistribution of tasks and decision-making within the household. It has been empirically proved by gender research (Larsen & Lilleør, 2014) among women in Northern Tanzania which revealed at times decision making might depend on the type of technology disseminated. The fact that improved milking goat breeds introduced in the RIPAT groups were zero-grazing goats, collecting fodder is a female task. Therefore, female RIPAT farmers were against the choice of keeping the milking goats, as this would increase the burden of collecting fodder. Despite this difference, in some communities, women may enjoy considerable decision-making power over production and input while they are disempowered with respect to asset ownership, control over income, or community leadership (Alkire *et al.*, 2013).

The group field as a platform for learning by doing

Another element of the approach is a group field where all demonstrations for various technologies selected in the respective area are practically done. This includes teaching, training, and dissemination of technologies. The group field allows the group members to gain hands-on training

on specific technology following step by step. Studies have shown that the demonstration method of technologies is the leading method for agriculture technology adoption (Azumah *et al.*, 2020). The group field method promoted by the RIPAT approach led to women empowerment because the manual directs the involvement of an equal number of men and women or more women to be engaged in the group. This criterion is included in the group constitution where it requested every participant whether a woman or a man to be responsible to train three other farmers in the community on what they have learned and adopted. Empowerment of women is not only confirmed by participation in terms of number but what they can do after gaining hands-on training. For example, RIPAT projects in Morogoro are spreading with the recognition of 6 females and 19 males as lead farmers. Chabata and Wolf (2012) sampled 247 lead farmers for assessing their effectiveness lead farmers in agricultural productivity; out of that number, 43% were females and 56% males. This shows the participation of men and women in farmer groups is active and followed. Ringo (2020) noted that lead farmers are agents of change, social entrepreneurs, and successful farmers from their groups. Thus, the lead farmer model of technology dissemination where lead farmers are trained and then pass on the technologies to their peers seems to be adopted by donor organizations to implement agricultural projects (Chabata & Wolf, 2012).

It is still debatable whether women engaged in group fields and later become lead farmers can influence decision-making at the household level. Bjornlund *et al.* (2019) found out that though jointness in decision making can be complex, experience in farming and time spent in farm activities are among the socio-economic factors influencing decision making within the household. In this case, it is expected that women who are participating in learning and practicing agricultural technologies can influence cooperation in decision-making within the household.

Exclusion of marginalized communities

Analyzing were for whom and when to apply the RIPAT approach to agricultural project intervention the analysis revealed some exclusion criteria embedded in the RIPAT approach. For example, the RIPAT approach is recommended to work best where farmers live relatively close to one another, with relatively good conditions for agriculture and with a settled population. Furthermore, the approach works best with people with land and having a cooperative mind. For example, RIPAT project targeted small- and medium-sized farmers in rural villages with at least one acre and principle no more than five acres of land (Larsen &

Lilleør, 2014). Although the criteria set intends to promote the success rate of the RIPAT project but sets the exclusion for the neediest people. For example, most rural women have limited ownership of land, and where the land is owned by their husbands, women face limited control. Despite this challenge, women have their coping strategy where they rent land for their crop production. Therefore, the criteria of having land might exclude women if project implementers interpret it wrongly. Mudege *et al.* (2017); Mudege *et al.* (2016) argued that the extension officer's selection of project participants is influenced by the intersection between gender norms related to ownership and control of resources. Presented findings on the role of gender norms on access to agricultural extension training revealed that women were excluded from the selection because of the criteria of land ownership ending up having more men for the Orange Fleshed Sweet Potato (OFSP) project (*ibid*). The criteria of looking for an area with good conditions for agriculture exclude people living in areas with marginal land of which the RIPAT approach could suit better in changing the type of agriculture system practices in these areas.

Conclusions and recommendations

The chapter explored RIPAT approach and its gendered technology dissemination among small scale farmer groups in Tanzania. It is concluded that the approach demystifies the agricultural technology transfer which is putting farmers at the centre of their problem and expanding choices of technologies through a basket of options that suit the farmer's context. Hence, the approach encourages equity in the process of designing and access to inputs for both poor and less poor farmers. The results indicated that the RIPAT approach empowers various gender groups to integrate gendered needs and interests in the design of which intervention to be implemented. This is because the approach builds farmers' capacity and confidence through extensive engagement. This implies that agricultural projects which will not consider gender needs and responsibilities between men and women have limited chances to succeed in increasing productivity and equity between the two sides. Graduated farmers from groups, both men and women are expected to be agents of change for transferring knowledge, skills and technologies learned to the household. While active participation, experience in farming, and time spent in farm activities of women in farmer groups encourage decision-making within the household, access to resources such as land, control over income, and market opportunities may

undervalue or constrain on the same. Despite this difference, in some communities, women may enjoy considerable decision-making power over production and input while they are disempowered.

The study also concludes that despite being inclusive, some RIPAT elements create room for excluding some more needy farmers. For example, farmers who live in villages with unfavorable climatic conditions, marginal land, and individual farmers with no land are excluded from the RIPAT project. This exclusion criterion affects the more needy communities and most of them being women who are more affected by household food insecurity.

Given that agricultural technology options and choices are gendered between men and women and that dynamics of resources inequities in agriculture influence gaps in agricultural productivity; any effort to disseminate technologies and reduce the technological gap should be more inclusive of all socio-economic factors and consider the gender-differentiated impact of adoption between men and women. There is a need for the RIPAT approach to be flexible in some cases where both husband and wife might be interested to be group members. There is a need to gather more empirical findings on the influence of household representatives in overall household decision-making concerning agriculture. While improving livelihoods of and self-support among rural small-scale farmers is rooted in improving efficiency in productivity, equity in processes and preparations of farm activities can double the effort.

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