Farmers’ Choice
Evaluating an approach to agricultural technology adoption in Tanzania

Edited by
Helene Bie Lilleør and Ulrik Lund-Sørensen

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8.5 The benefits of being in a group 97
8.6 The role of the RIPAT groups in the village 98
8.7 Conclusion 100

9. Local adoption of social and agricultural technologies 103
   Quentin Gausset
9.1 Introduction 104
9.2 Adoption as an indicator of the success of RIPAT 1 104
9.3 The adoption of perennial crops (bananas and trees) 105
9.4 The adoption of conservation agriculture and annual crops 107
9.5 The adoption of farmer groups and savings groups 108
9.6 Conclusion 110

10. Social constraints on the adoption of improved banana varieties in Arumeru District 113
   Quentin Gausset and Anna Folke Larsen
10.1 Introduction 114
10.2 Methodology and population 114
10.3 The adoption of banana cultivation 115
10.4 Water 116
10.5 Labour and household types 117
10.6 Wealth and hunger 118
10.7 Education 121
10.8 Gender 122
10.9 Conclusion 122

11. RIPAT, RECODA and government institutions 125
   Charles Aben, Deborah Duveskog and Esbern Friis-Hansen
11.1 Introduction 126
11.2 The RECODA Academy 126
11.3 Influencing local government and its agricultural policies 129
11.4 Conclusion 131

12. Summary and concluding remarks 133
   Helene Bie Lilleør and Ulrik Lund-Sørensen

Annex 1: Profiles of RIPAT projects 141
   Catherine W. Maguzu and Dominick Ringo

Annex 2: Banana cultivation in the RIPAT projects 143
   Dominick Ringo and Jens M. Vesterager

Annex 3: Acronyms, abbreviations and glossary 145

Index 151
Figures, tables, boxes and photo credits

Figures
1.1 Timeline of RIPAT interventions and data collection 4
5.1a Adoption of crops among RIPAT 1 and comparison households 53
5.1b Adoption of crops among RIPAT 3 and comparison households 53
5.2a Adoption of livestock among RIPAT 1 and comparison households 54
5.2b Adoption of livestock among RIPAT 3 and comparison households 54
5.3 Impact of RIPAT 1 on food security 57
5.4 Impact of RIPAT 1 on poverty indicators 59
8.1 Reasons for dropping out of RIPAT 1 and RIPAT 3 96
10.1 Access to irrigation for banana cultivation 117
10.2 Number of banana stools per farm among adopting households 118
10.3 Wealth and food security among households adopting banana cultivation 119
10.4 Poverty, food security, education, and time of adoption among non-RIPAT households 120
10.5 Average education levels in the household 121

Tables
2.1 Key characteristics of RIPAT projects 1–4 18
3.1 Number of households and villages interviewed 27
5.1 Characteristics of households and villages in the two districts 52
6.1 Source of group land in RIPAT projects 72
10.1 Number of RIPAT and non-RIPAT households interviewed 114
10.2 Proportion of RIPAT and non-RIPAT households adopting banana cultivation 115
11.1 RECODA Academy courses, 2008–2011 128

Boxes
2.1 The group field – rented plot or land provided by the community? 14
2.2 The elements in the basket of technology options 15
4.1 The importance of livestock 39
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.2 Development in Tanzania</td>
<td>40</td>
</tr>
<tr>
<td>5.1 Measuring food access: the Household Hunger Scale</td>
<td>49</td>
</tr>
<tr>
<td>5.2 The Progress out of Poverty Index</td>
<td>50</td>
</tr>
<tr>
<td>5.3 The Difference-in-Differences method as applied in the impact study</td>
<td>56</td>
</tr>
<tr>
<td>6.1 Experiences of RIPAT group members with three key agricultural</td>
<td>67</td>
</tr>
<tr>
<td>technologies in the basket of options</td>
<td></td>
</tr>
<tr>
<td>7.1 A female farmer: case study 1</td>
<td>81</td>
</tr>
<tr>
<td>7.2 Examples of women’s use of savings groups</td>
<td>84</td>
</tr>
<tr>
<td>7.3 A female farmer: case study 2</td>
<td>87</td>
</tr>
<tr>
<td>8.1 The importance of the RECODA consultants</td>
<td>95</td>
</tr>
<tr>
<td>8.2 Charles Kaaya: making bananas a profession</td>
<td>98</td>
</tr>
<tr>
<td>8.3 The Ushirikiano group</td>
<td>99</td>
</tr>
<tr>
<td>10.1 Securing water for banana cultivation – Dominick</td>
<td>116</td>
</tr>
<tr>
<td>10.2 Securing water for banana cultivation – Elias</td>
<td>116</td>
</tr>
<tr>
<td>10.3 Return on investment, RIPAT farmer – Japhet</td>
<td>118</td>
</tr>
<tr>
<td>10.4 Return on investment, non-RIPAT member – Rosaline</td>
<td>119</td>
</tr>
<tr>
<td>10.5 Women and agricultural decisions – Martha</td>
<td>122</td>
</tr>
<tr>
<td>10.6 Women and agricultural decisions – Elizabeth</td>
<td>122</td>
</tr>
<tr>
<td>11.1 The Agricultural Sector Development Programme</td>
<td>130</td>
</tr>
</tbody>
</table>

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Preface

In recent years the Rockwool Foundation has increasingly supported social entrepreneurs in developing effective practical interventions with the aim of making a positive and sustainable impact on poverty, food security, and social capacity building in the targeted communities. Rockwool Initiatives for Poverty Alleviation in Tanzania (RIPAT), the intervention under scrutiny in this book, was one of the first practical interventions to receive financial and developmental support from the Foundation. The aim of RIPAT is to improve the livelihoods of small-scale farmers by ‘closing the technology gap’. This is achieved by training farmer groups in a set of relevant and efficient agricultural technologies and ensuring that each individual farmer has a genuine choice as to which of these technologies to adopt and to what extent, according to his or her needs and resources.

The story of RIPAT began with the Danish non-governmental organization PULS (Projekt Ulandshjælp til Selvhjælp). PULS was of the opinion that development assistance in Tanzania was often granted in a rather non-participatory manner, and that this reduced the chances of such assistance succeeding. In 2003 the Chair of PULS, Elly Vesterager, consulted Research, Community and Organizational Development Associates (RECODA) on how PULS could help poor communities to emerge from poverty in a sustainable way through the provision of ‘help to self-help’. This led to the first pilot project in 2003, which was sponsored by PULS and which targeted three villages in Arumeru District. In 2005 Tom Kähler, Chairman of the Rockwool Foundation, visited two of these three villages, and on the basis of this visit the Rockwool Foundation Board decided to sponsor a similar agricultural project covering eight villages in the eastern lowlands of the Mount Meru area. This was to be a partnership project involving RECODA, PULS and the Foundation. The first project was launched in 2006 under the name of RIPAT. In 2009 and 2010, additional RIPAT projects – RIPAT 2, 3, and 4 – were started. On the basis of these projects, an implementation manual is available for download from www.rockwoolfonden.dk.

In 2010, the Rockwool Foundation approached its Research Unit with a request to evaluate the RIPAT interventions. The Research Unit was grateful for this opportunity and appreciated the understanding that it could set about tackling the evaluation in the same way as it would any other research question. After determining that there was a need for both a rigorous quantitative impact evaluation and qualitative analyses of the actual implementation of the scheme and of the adoption and diffusion mechanisms in the local communities, the Research Unit established partnership arrangements with various external researchers, thus ensuring that the evaluation would be full and independent. In carrying out the evaluation, the Rockwool Foundation Research Unit has, as always, maintained complete scientific independence in its relationship with the Rockwool Foundation.
The RIPAT intervention and the evaluation design are described in Part I of this book, while the key results of the evaluation analyses are presented in Part II. The findings are based on a series of independent analyses conducted by the various teams of researchers involved in the evaluation study. It is our hope that readers will find the book enlightening and useful, both in its description of the combination of the various evaluation methodologies chosen to reveal what RIPAT did and did not bring about, and in the reports of the actual findings showing how an intervention such as RIPAT seems able to succeed in closing the technology gap among the targeted small-scale farmers in Tanzania.

We wish to thank RECODA for its support in giving practical assistance to the researchers during their fieldwork. Special thanks go to Dominick Ringo, Executive Director at RECODA, and Catherine W. Maguzu, Programme Director at RECODA, both for assisting the study teams and for their contributions to the description of the RIPAT project implementation.

We also want to extend our gratitude to the anonymous referee for their valuable comments, Tim Caudery, who has been a great support in copy-editing the text, and to research assistants Cathrine Søgaard Hansen and Maria Fibæk for their invaluable assistance during data collection and data cleaning.

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Copenhagen, November 2012
Map of the RIPAT project areas

Africa, showing Tanzania
CHAPTER 1

Introduction

Helene Bie Lilleør and Ulrik Lund-Sørensen,
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The World Development Report (2008) estimates that 75 per cent of the world’s poor live in rural areas in developing countries. This accounts for an estimated 880 million rural people in the developing world who live on less than US$1 a day (WDR 2008: 1). The majority of the rural poor living in Sub-Saharan Africa depend on subsistence farming with limited access to water, land to cultivate, financial services, and technology inputs to optimize agricultural production. In addition, with growing populations, most developing countries are faced with an increasing demand for food. The agricultural sector thus continues to be of great importance both for providing food security and for rural economic development.

Nevertheless, both the proportion and the total amount of funds allocated to agriculture in official development assistance declined dramatically for two decades from the mid-1980s (OECD, 2010). Although the reasons for this decline were many, an important one was increased ‘agro-scepticism’ among donors, which was a clear consequence of failed agricultural development interventions. The failures were, however, primarily due to poor understanding of agrarian dynamics and a tendency for donors to seek ‘one size fits all’ extension approaches (WDR 2008: 41–2). This decline has only recently come to a halt as the major international organizations, with the World Bank and the OECD member countries as the front runners, have started to review their agricultural development policies and increase their agricultural development budgets (OECD, 2012). One consequence of this has been a renewed interest in different agricultural extension approaches.

In this book, a number of authors analyse and evaluate an agricultural extension approach totechnology adoption among small-scale farmers. This approach is called RIPAT (Rockwool Initiatives for Poverty Alleviation in Tanzania), and deliberately takes as its starting point the fact that one size does not fit all. Between 2006 and 2012, RIPAT has been implemented among approximately 2,000 small-scale farmers in four districts of northern Tanzania in a series of four pilot projects. RIPAT can be seen as a pragmatic mix of traditional extension approaches and more recent participatory extension approaches. It introduces a ‘basket of technology options’ to farmer groups, leaving each individual farmer with a genuine possibility of choice as to which technologies to adopt and to what extent, depending on his or her needs and resources.

Two dominant approaches to agricultural extension

Agricultural extension has long been seen as key to enhancing agricultural development by improving the delivery of information, inputs (e.g. fertilizer and seeds), and new technologies to farmers. However, the effectiveness, impact, and sustainability of two dominant approaches to agricultural extension services – the ‘Training and Visit’ concept primarily promoted by the World Bank in the 1970s and 1980s, and the ‘Farmer Field Schools’ approach primarily promoted by the UN’s Food and Agriculture Organization (FAO) in the 1990s – have been widely debated.

The Training and Visit approach was developed to tackle some of the inefficiencies present at the time in traditional public extension services. It relied on a 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. Unfortunately, the approach lacked financial and institutional sustainability, and, as the funding from the World Bank ceased and the results in terms of a sustained increase in food production and higher incomes
among the rural poor were not obtained, the system was gradually dismantled (Anderson and Feder, 2007; Gautam, 2000).

In a response to the top-down approach to knowledge transfer in both traditional public service extension models and the Training and Visit approach, Farmer Field Schools were developed as a bottom-up or participatory approach to extension, bringing applied research methodologies into the field for farmers to develop their own knowledge and analytical skills. The field is seen as the ‘school without walls’ in which farmers are assisted by an external, technically competent facilitator in conducting their own assessments, diagnosing the problems they face in improving their agricultural production, and coming up with and testing their own solutions (Davis et al., 2012). The approach represented a clear shift from pure information delivery towards participatory, experiential, and reflective learning, with a strong focus on developing problem-solving capacity among farmers and building on adult learning theory. The Farmer Field School concept was originally developed by the FAO to promote integrated pest management among Indonesian rice farmers in the late 1980s, but since then has spread to many countries and over the years has been so widely adopted and locally adapted that there is no longer a unique model for either its technical content or the educational form (Van den Berg and Jiggins, 2007). Nonetheless, its ability to ensure sustained technology adoption, diffusion to non-participants, and increased productivity is still subject to an ongoing debate about appropriate evaluation methodologies and choice of outcome measures (see, for example, Feder et al., 2004; Braun et al., 2006).

**RIPAT – a modified Farmer Field School approach**

RIPAT can be seen as a modified Farmer Field School approach with strong elements of experiential learning, where the technically competent facilitator not only facilitates learning as in other Farmer Field Schools, but also provides traditional top-down dissemination of knowledge and training in improved technologies to small-scale farmers, similar to the techniques used in traditional extension services and in the Training and Visit programme (i.e. the training is carried out in groups and contains both lectures and practical experimentation on a common group field).

One main focus of the RIPAT approach is to close the ‘technology gap’, the gap that exists between the agricultural production achieved with currently used technologies among the targeted farmers and the production that could be achieved by the same farmers if they had access to existing improved technologies and farming techniques. The gap is caused both by lack of knowledge about agricultural technologies and training in their use, and by lack of access to equipment and agricultural inputs for implementing these better technologies.

The aim of RIPAT is first of all to bridge this gap by providing an opportunity set – the ‘basket of technology options’ – and making sure that the basket includes the most relevant and efficient technologies. Secondly, it also aims at providing an organizational management structure that supports the best use of this opportunity set. All participating farmers are exposed to the full opportunity set of technology options through the farmer groups. It is then the individual farmer’s choice which of these technologies to adopt in his or her own agricultural production and to what extent.

RIPAT draws on the Farmer Field School set-up in that it organizes farmers into groups, and through these groups knowledge is both acquired and disseminated by conducting
joint group experiments on a common group field. RIPAT uses the bottom-up experiential and reflective approach to learning and practical demonstration of farming techniques, as well as a more top-down approach to technology transfer through training in a pre-determined but locally adaptable basket of technology options. By equipping each farmer with the necessary information, knowledge, and practical hands-on experience in the use of the different technologies, each farmer is given the means to improve agricultural production according to his or her own needs, preferences, and resources.

To date (2012), there has been a series of four RIPAT interventions in northern Tanzania (see Figure 1.1), each one targeting approximately 500 farmers through groups of 30–35 farmers, typically with two groups per village. It should be noted that this evaluation comes at an early stage of the RIPAT intervention. Only the first of the four RIPAT projects had been completed at the time of data collection for this evaluation. The book therefore focuses primarily on the description and evaluation of RIPAT 1, but also draws on experiences and data from subsequent RIPAT projects.

**Evaluating RIPAT**

When faced with the task of evaluating an approach such as RIPAT to technology adoption among small-scale farmers, there are several questions that spring to mind. Were the project activities relevant for the target group? Were the activities implemented as planned? Were the agricultural technologies adopted? If so, by whom? Why? How? What impact did this adoption have on the participating farmers? Has there been diffusion into the communities, and to what extent? In trying to discover the answers to these questions, we formulated three separate evaluation studies, each one emphasising different aspects in an overall assessment of the RIPAT intervention. These were: 1) the impact study, which is a rigorous quantitative estimation of the impact of the completed RIPAT 1 project on its two main development objectives: food security and poverty alleviation of the participating households; 2) the implementation study, which assesses how the implementation process has led to the impacts found; 3) the context and adoption study, which analyses who has adopted the introduced agricultural and social technologies, and why. As no baseline data were collected prior to the project’s implementation, the three studies also serve a dual role of checking each other’s findings.
Three different evaluation teams were chosen to undertake these analyses; their members are also the authors of chapters in this book. A team of economists designed and conducted a large-scale household survey in January 2011 (see Figure 1.1) and carried out the subsequent data analysis for the impact study. A team of experts in East African agricultural development and Farmer Field Schools from the Danish Institute for International Studies and the FAO undertook the implementation study. Finally, a team of anthropologists with extensive research experience in the rural areas of Kenya and Tanzania were responsible for the context and adoption study, analysing context and local mechanisms of adoption in the RIPAT 1 villages. The qualitative data collection for these studies was undertaken during May–July 2011.

In brief, the achievements of RIPAT stand out when compared with the dominant extension approaches; the first RIPAT implementation has – five years after it started – resulted in considerable levels of sustained adoption of most of the technologies introduced. In addition, there are clear indications of considerable diffusion, and thus adoption by non-participating farmers, of the most popular technologies into the local communities. Furthermore, it was found that the participating farmers have experienced significant positive impacts on their food security, although no impact on the risk of being poor has been found. There are indications that these achievements are linked to two key features: the genuine choice of adoption given to each individual farmer by presenting them with a relevant and efficient opportunity set of technology options; and the organizational management structure comprising joint learning in groups, a pragmatic combination of traditional and participatory extension approaches, and a strong focus on integrating local needs, resources, and conditions of small-scale farmers into the intervention design.

Outline of the book

During the analyses and discussions of findings among the three teams of evaluators, it soon became clear that interesting synergies could emerge from joint work. Consequently, although the three teams have remained responsible for each of their study areas, there are also chapters in this book that are the result of joint efforts where we have sought to let the qualitative and quantitative data speak to each other, as it were.

In Part I, the implementers of RIPAT and the evaluation design are presented. To set the scene, the designers and implementers of the RIPAT intervention were asked to describe what they see as the core elements of the project and what a typical RIPAT project contains. Chapter 2 provides some insights into the motivation behind the RIPAT project design. In Chapter 3, the two main coordinators of the evaluation studies present key features of the quantitative and qualitative approaches and the data collection tools utilized in the three studies.

Part II of the book contains the various evaluation studies. An intervention such as RIPAT is never implemented in isolation. It is developed in and modified by a political, historical, and cultural context, which must be kept in mind when the project is evaluated. The regional history and the main paradigms in development policy are therefore analysed in relation to RIPAT 1 in Chapter 4 in order to give the reader a sense of what characterizes RIPAT in a development context, and what motivates and typifies the small-scale lower middle-class subsistence farmers targeted by the RIPAT project.

Chapter 5 describes the quantitative assessments of the degree of adoption of different technologies from the basket of options among participating households in two of the
Farmers’ Choice

four RIPAT projects. In addition, the resulting impacts on farmers’ food security and risk of poverty are estimated and analysed.

Chapter 6 contains the evaluation of the project implementation process, analysing such aspects as the relevance, effectiveness, efficiency, and sustainability of the RIPAT approach, and how it differs from the classic Farmer Field School set-up.

In Chapter 7, the focus is shifted away from the intervention itself and onto the targeted households. Just as it is important to understand the context of the society within which RIPAT was implemented, it is also important to understand the gender dynamics within the targeted households; husbands and wives have different responsibilities regarding rights over, and claims to crops, land, and livestock. Since RIPAT introduces new crops and technologies, it can shift or challenge the existing balance of power within a household, and this may influence the adoption process.

Then, in Chapter 8, the focus moves to the RIPAT farmer groups, their members, their characteristics, and the role they have come to play in local communities.

In Chapter 9, the adoption of the specific agricultural and social technologies promoted through the RIPAT intervention is analysed at all levels; that is, both the long-term adoption by the participating farmers and the adoption by or diffusion to non-participating farmers in the targeted villages.

In Chapter 10, the adoption of the most popular technology from the basket of options (the improved banana varieties) is carefully described and analysed in order to understand what have been the main drivers behind its diffusion to non-participating farmers.

In Chapter 11, the focus is broadened once again; RIPAT is analysed in its institutional context, and its institutional sustainability is discussed.

Finally, in Chapter 12, we provide a summary of the analyses and main findings of each chapter. We draw five overall conclusions identified by one or more of the three evaluation studies undertaken for the book.

References

CHAPTER 2
Presentation of RIPAT: core components and project implementation

Catherine W. Maguzu, RECODA, Dominick Ringo, RECODA, and Jens M. Vesterager, Rockwool Foundation
In this chapter, the developers of the RIPAT intervention describe its main characteristics. Through a participatory extension approach, they have sought to develop a sustainable, low-cost solution to the challenges faced by small-scale farmers. The chapter explains how RIPAT transfers a basket of agricultural technology options, including various crops and livestock, to farmer groups. All technology options are implemented in the groups to allow for joint, experiential, participatory learning. Each individual farmer subsequently chooses which options to adopt on his or her own farm. The project relies on close collaboration with village leaders and local government authorities to ensure not only immediate and sustainable adoption of the intervention among the RIPAT farmer groups, but also subsequent adoption by non-RIPAT farmers in the local communities.

2.1 Introduction

RIPAT is an economic development intervention that aims to close the agricultural technology gap as a means of improving livelihoods and self-support among impoverished small-scale farmers in Tanzania. Current crop and livestock productivity in Africa is far below the maximum level obtainable. However, bridging the ‘technology gap’ and thereby improving agricultural practices is not a simple process. In Africa, soil, climate, and socio-economic conditions can vary enormously over just short distances. Consequently, the most suitable farming methods and technologies vary from village to village, and ‘one size fits all’ recommendations have often failed to benefit farmers in the past.

In Tanzania and many other developing countries, new agricultural technologies and methods have traditionally been promoted to rural farmers using a top-down agricultural extension system such as the Training and Visit (T&V) extension system. This was originally conceived as a service to ‘extend’ research-based knowledge and technology to the rural sector to improve the lives of farmers. The T&V system was promoted by the World Bank for more than two decades in over 50 developing countries, and it dominated agricultural extension in Africa in the 1980s and 1990s, but it largely failed to achieve the hoped-for results in most of the continent (Anderson et al., 2006; Gautam, 2000). Today it is recognized that much of the knowledge that farmers need, and also the best practices for an area, must be developed locally, with close cooperation between farmers and technical experts (Braun et al., 2006). The Farmer Field School (FFS) approach, a modified version of which is used in the RIPAT projects, is a participatory extension approach developed to respond to farmers’ needs and demands, and it represents a shift towards participatory and group-based approaches (Gallagher, 2003; Braun and Duveskog, 2008).

The RIPAT intervention was intended to find sustainable, low-cost solutions to the challenges faced by small-scale farmers by providing proper tools, techniques, and information in a participatory ‘help to self-help’ approach. RIPAT is implemented by the Tanzanian non-governmental organization Research, Community and Organizational Development Associates (see Chapter 6, section 6.4 for details about RECODA). As a result of years of work within agricultural research and consultancy, and using lessons learned in a pilot project leading to the initial formulation of RIPAT, RECODA had accumulated valuable expertise on appropriate agricultural technologies for use by rural farmers in the targeted areas of northern Tanzania. Cultivation of improved banana varieties, conservation agriculture techniques and crop/livestock integration were identified by RECODA as particularly promising technologies for dissemination. In formulating the
first RIPAT project, RECODA was also aware of the importance of a set-up that ensured local ownership and relevance, believing that lasting and sustainable change only comes about if the participants take full responsibility for their own development.

This chapter describes the RIPAT concept as it currently exists, and explains the objectives of the project interventions. This is followed by a brief outline of the core components of the RIPAT intervention. The chapter then describes the settings of the four RIPAT projects conducted to date, and lists some of the refinements made in the project approach in the light of experience from RIPAT 1, implemented during 2006–09 (for detailed information about RIPAT, see Rockwool and RECODA’s RIPAT manual).

2.2 The RIPAT concept

RIPAT attempts to promote self-confidence and to create a vision of, and a belief in, a better future – a ‘yes we can’ spirit – among participating individuals and communities. This is a crucial element in the RIPAT approach, based on a belief that helping individual farmers and communities to help themselves – ‘help to self-help’ – can achieve far more in the long term than the distribution of material aid. The free services and handouts that often feature in development aid projects can provide only a short-term stop-gap, while at the same time such aid can create a sense of donor dependency and an acceptance of the idea that poverty can only be alleviated through outside help. Consequently, RIPAT has focused not on providing solutions to immediate needs, but rather on facilitating an understanding of how long-term solutions to the problems of poverty and hunger can be arrived at through farmers’ own efforts and the use of locally available resources.

A typical RIPAT project targets 8–10 villages. Two groups are established in each village, each group comprising 30–35 farmers. Through the RIPAT project, farmers are offered a range of improved farming methods and technologies – a ‘basket of technology options’. These are explained and demonstrated on a participatory basis at the group field, which is used as a training and demonstration plot, and on individual farmers’ fields. Farmers evaluate the ideas and decide for themselves which technologies and methods they want to implement on their own farms. The groups meet weekly, and the progress made with the project crops or livestock is followed and discussed throughout the project period. With guidance from a RECODA facilitator, the farmers learn about and try out the new ideas, and fine-tune the methods to suit local conditions. The aim is that the project concept and technologies should spread from farmer to farmer in the targeted villages, and also to other villages through the government agricultural extension system and trained ‘super-farmers’ – people who have been members of RIPAT groups themselves and who have subsequently received additional training.

The RIPAT approach uses the following three key elements:

1. Creation of a vision of a better future through careful sensitization of communities to the potential for change and mobilization of farmers to take charge of their own development.
2. Establishment of farmer groups with good leadership to enable the transfer of appropriate agricultural technologies through participatory demonstrations using experimental and reflective learning techniques.
3. Close collaboration with local government authorities, village leaders, and government agricultural extension officers to ensure the continuation of the project and its further spread to the wider community.
The overall goal of RIPAT is to contribute to the development of socially and economically sustainable livelihoods among poor rural communities. For the farm families who participate directly in a RIPAT project, the objective is to improve their small-scale farming systems and hence to increase food security in the household and alleviate poverty. This objective should ideally be achieved during the three-year intervention period, but continued diffusion of best practices from farmer to farmer is required after the end of the project for larger communities to be reached.

**Combining top-down and bottom-up extension approaches**

One of the main characteristics of the RIPAT concept is the combination of top-down and bottom-up agricultural extension approaches. Top-down approaches to agricultural extension mainly focus on technology transfer and training of farmers by experts. This was the basis of the classic T&V approach mentioned in the introduction. The bottom-up approach, with a core focus on facilitating the active involvement of farmers through participatory and experiential learning and problem-solving techniques, is exemplified by the FFS approach.

*The top-down approach*

The classic method used for agricultural extension, such as the T&V approach, is primarily based centrally. Basically, it consists of vertical, one-way communication for transferring information to farmers. The flow of information is:

- Researchers develop the ‘right’ technology, then
  - Extension agents transfer the message to
    - Preselected master farmers, who adopt the ideas, and then
    - The wider community copies them.

The main role of the extension agents in the T&V model is to teach and train master farmers. It is assumed that these master farmers will adopt the blanket recommendations and extension messages, and that other farmers in the communities will copy these farming practices from the master farmers. The impact of the T&V approach in Africa has been disappointing (Anderson et al., 2006; Gautam, 2000), especially in low-potential, highly diverse areas inhabited by resource-poor farmers. The T&V approach has been found to work best in high-potential areas dominated by a few key crops for which uniform recommendations can be developed.

*The bottom-up approach*

There is no exact definition of an FFS methodology, but, in contrast to the T&V approach, all FFS approaches apply a bottom-up method. The FFS approach evolved in response to the inadequacy of the T&V approach and has spread to many countries across Africa. It is a group-based participatory method of learning and of technology development and dissemination, and is founded on adult learning principles. In contrast to the T&V demonstration plots, which are managed by the extension staff, the FFS site is managed directly by the group of farmers themselves, guided by an external facilitator. FFS groups conduct their own experiments, diagnose problems, and come up with solutions. The
facilitator is often an extension worker who has been trained in the FFS approach. However, ‘farmer’ facilitators, who have often been members of FFS groups themselves, may also guide the groups. In general there is no lecturing involved. The farmers make all the decisions, but on the basis of information and guidance from the facilitator. Many of the technologies transmitted via the FFS come from the members themselves sharing information and developing new, locally appropriate solutions to local problems by building on their learning. There are a number of publications describing the FFS approach in detail, including Gallagher et al., 2006, and Okoth et al., 2010.

The RIPAT approach – a combination
The fundamentals of the FFS concept are applied in the RIPAT project, albeit in a modified form. The RIPAT approach combines top-down and bottom-up models. The following are some of the key differences between the RIPAT approach and the more standard FFS approaches.

First, in RIPAT, the subject of learning is largely predefined and is not decided exclusively by the individual groups. The starting point for each of the 16 groups (eight villages) in a RIPAT project is the basket of options, i.e. the improved technologies available to the groups. This basket of options is designed during a participatory rural appraisals process and is based on the combined input from farmers (bottom up) and technical experts (top down).

Second, RIPAT includes teaching. The basket of options mostly comprises new technologies that are unknown to the farmers. In order to help the farmers fully understand the concepts and underlying principles, a combination is used of teaching (top down) and hands-on practical and adult reflective learning. This process is designed to ensure that the new technologies are modified using local knowledge and are adapted to local conditions (bottom up). The RIPAT facilitator guides the farmers in the demonstrations and trials, but the farmers do the practical work themselves. Thus, in RIPAT, the facilitator takes a more active role in the technology transfer than in the FFS approach.

Third, the RIPAT projects run over three or four seasons or cycles, and are thus considerably longer than a typical FFS project. Because of the relatively large scale of the package in the basket of options, covering several different technologies, one season or cycle is not sufficient to ensure that farmers gain adequate capacity to master the various technologies.

2.3 Core components of RIPAT
Initialization
It is crucial to have a broad understanding of the livelihood situation in the targeted communities prior to initiating a RIPAT project. The problems of poverty and food insecurity faced by communities, as well as the causes and effects of those problems, must be analysed in collaboration with the farmers before appropriate solutions can be suggested. Since RIPAT focuses on agriculture, it is vital to have a thorough understanding of current farming practices and of the local soil, water, and climate conditions in order to identify an appropriate basket of technology options that can improve the food security situation and alleviate poverty among the members of the target group. During the project planning process, RECODA conducts participatory rural appraisals
by visiting villages and holding focus group discussions with farmers and interviewing village leaders, agricultural extension officers, and other key informants. On the basis of the information gathered through this process, a suitable basket of options – technologies and practices appropriate for the village and that have the potential to improve local agriculture – is identified. Before any activities are commenced, the project concept is presented to the relevant government authorities and to the communities through a sensitization and mobilization process.

**Sensitization and mobilization of communities**

The first step in this process is to establish positive cooperation with the relevant government institutions, making sure that they are fully informed and that the project has their blessing. Active support by the relevant government officials at regional, district, and ward levels is important for ensuring that the project is well received by community leaders and village residents and that help is provided by the authorities to spread ideas beyond the original groups. The government authorities help by recommending which villages in the area should be targeted by a project on food security and poverty reduction. Once the government authorities have given the green light, all the residents in the targeted community are called by the village leaders to participate in a village meeting. At that meeting, the poverty and food security situation in the village is further analysed in a participatory way. This is followed by a discussion of how the RIPAT project could help to rectify the situation through the participants’ own efforts, despite the past failures of other projects. Believing in a better future is a prerequisite for getting development rolling; it is necessary that farmers can visualize a successful outcome. The project elements and activities are clearly explained, including the new farming technologies in the basket of options that the project plans to demonstrate, and the roles and responsibilities of the various stakeholders are clarified. Once everything is clear, the selection of participants and their division into groups is organized by the village leaders using these guidelines:

- Participation must be voluntary, and participants must be committed to the project.
- Participants should not be rich in terms of the wealth ranking of the village.
- Participants must be engaged in farming and have 1–5 acres of their own farmland available for putting the new methods into effect.
- Participants must be willing and able to share the new ideas with others, and to learn from others. This means that participants should be of good standing in the community.
- There should be equal numbers of men and women in the groups, or more women than men.
- Only one person per household, who must be over 18 years of age, may participate.
- Group members must come from the village administrative area, and ideally should know one another in advance.

It is crucial that this group formation process is led by the village leaders, in order to ensure local ownership of the project. Once the groups have been established, the RECODA facilitator meets them on a regular basis (weekly in the beginning, later fortnightly, and then as necessary). Before the agricultural activities begin, the group
is taught about group dynamics, cohesion, and democracy. Two of the first tasks of
the group are to choose a chairperson, secretary, and treasurer, and to write a group
constitution and a set of rules. The constitution and rules are open to amendments and
additions throughout the project through normal democratic processes. Items covered
by the constitution should include management of the group account, membership,
and the roles and responsibilities of officials and members. Each group rents a plot for
demonstration purposes and the practical training, signing a leasing contract with the
landowner for a period of at least five years. When all the formalities have been addressed,
the actual training on the basket of options begins.

Establishing group fields

The group field for demonstrating and testing the new and improved technologies in the
basket of options is a central element in the RIPAT project approach. Group fields in the
targeted villages are rented for a period of at least five years (for details about the plot
renting component, see Box 2.1). One use made of the rented group field is the creation
of demonstration plots for comparisons between different cultivation methods. For
example, various conservation agriculture techniques for maize cultivation (e.g. different
tillage methods, various cover crops, intercropping, and manure application) are system-
atically compared in trials, using a traditional cultivation method as a benchmark.

The advantages of trying out new crops and technologies on a group field rather than
on fields owned by farmers in the group are numerous. They include the following:

• **Working together:** Participants all get hands-on experience by working together
  on the establishment of the group field. In learning and trying out something
  new, it is often useful to work together with other people who are in the same
  situation. This generates a feeling of group strength and of courage, and it is
  possible to divide up the work amongst the group members.

• **Persuasive demonstration:** If farmers see a benefit, they will adopt the method,
  and others will follow suit. Any new technology should therefore be presented
  and demonstrated with care, and this may be more easily done on the group field
  rather than on individual group members’ fields; if poor implementation of a new
  method results in failure, the message conveyed will be that the method is of no
  use, even if it would have been successful if implemented correctly. However, it
  should not be assumed that ‘one size fits all’ and that a technology that works in
  one place will work everywhere. Hence, the methods and technologies demon-
  strated should allow farmers to discover, reflect upon, and adjust the methods
  according to local conditions to minimize the risk of failure. Visits to individual
  group members’ fields are also part of the training.

• **Multiplication of planting materials:** Both the up-scaling of production and
  the spreading of new crops to group members and others in the community are
  made easier by producing input materials on the group field. Lack of availability
  of planting materials for improved crop varieties often creates a bottleneck for the
  spread of new crops and technologies.

• **Group income:** Originally the RIPAT groups were not established with the
  intention of creating long-term organizations. However, it transpired in practice
  that the majority of the groups found advantages in continuing their existence
  and activities after the end of the project. Apart from the strength gained through
Box 2.1 The group field – rented plot or land provided by the community?

Finding suitable land for group activities is a crucial element of a RIPAT project. The group fields in the RIPAT projects have been rented for at least a five-year contract period – usually from one of the group members, but sometimes from the community where possible and appropriate. When selecting land for group activities in the villages, the following factors are considered:

- **Accessibility:** The site should be located in a central place, allowing both good access for the group members and good visibility for the project. The community members are invited to visit the group field and see project progress once a year on farmers’ field days.

- **Environment:** The site should have suitable soil, water, and climate conditions for the intended crops and technologies. Ideally, all crops should be cultivated (with tests, demonstrations, and seed production) by the group on one group field, but in practice this is often not possible. Crops have specific soil and water requirements and it is important to ensure an adequate match between crop type and land. Groups typically establish banana at a site that has access to irrigation or harvesting of run-off water and with low wind conditions, whereas conservation agriculture is often demonstrated on another suitable plot somewhere else in the village.

- **Security:** The group field(s) must be safe from roaming animals (livestock) and thieves in order to avoid damage to or destruction of the group farm. It is best if the plot is located near a group member’s home.

- **Plot size:** The plot should be at least 1 acre to ensure that the group has enough land for studying various technologies and for seed multiplication. A large plot can also allow for expanding the group activities and can help the group earn income from selling produce from the field.

The groups are asked to look for suitable sites in the village, with the assistance of the village government. RECODA double-checks the appropriateness of their choice and ensures that an acceptable contract is signed by the group leaders and the landowner. The contract is also co-signed by the village authorities and by RECODA, and a copy is kept at the village government office. The main reasons for not always using community land for group activities in RIPAT is: 1) the village government often does not have suitable land that it can provide, and 2) the groups may prefer to rent from one of the group members rather than from the village government, as village government bureaucracy can be an obstacle.

Working together, income from the group field turned out to be much appreciated; it has allowed the groups to raise funds and become self-financing in their activities, for example in starting additional income-generating activities, investing in buying land for new group fields, and starting savings and loan services.

The cultivation of improved varieties of banana using new techniques is perhaps the single most successful crop technology promoted by and adopted through the RIPAT projects. As banana is a perennial crop, its cultivation has tended to create a kind of ‘perennial glue’ which keeps the group members together. Annual crops do not have this advantage. However, for groups located in areas with inadequate conditions for banana cultivation, e.g. in low rainfall areas, the group field and business can instead focus on other, more suitable crop types, such as lablab, cassava, or vegetables, or on livestock and poultry.

**The basket of agricultural technology options**

The basket of agricultural technology options offered to the group and to individual farmers should suit the local conditions of soil, water, and climate. The overall list of technologies available has gradually been developed over the course of the RIPAT projects into those given in Box 2.2. For each target area, RECODA makes a list of appropriate
Box 2.2 The elements in the basket of technology options offered to groups and to individual farmers

1. Cultivation of improved varieties of banana, with new cultivation techniques (see Annex 2).
2. Conservation agriculture, i.e. promoting the three basic principles:
   (a) minimum soil disturbance by replacing the traditional plough with a ripper or special hand hoes (chaka hoes);
   (b) keeping the soil covered by mulching and by planting a cover crop such as lablab or mucuna;
   (c) mixing and rotating crops, e.g. intercropping or rotating maize with pigeon pea, soya or cowpea.
   Crop diversification and cropping stability are further promoted by introducing improved varieties of cassava, sweet potatoes, and vegetables, using supplementary irrigation where possible and appropriate.
3. Post-harvesting technologies, i.e. food storage, processing, utilization, and marketing.
4. Improved animal husbandry (cattle, goats, sheep, pigs, poultry) in terms of breeds kept, housing and feeding, and veterinary treatment.
5. Multipurpose trees for fodder, shade, windbreaks, timber, firewood, soil fertility, erosion control, and food (fruit trees – avocado, citrus, and mango).
6. Soil and water conservation, including contour farming and rainwater-harvesting techniques.
7. Microfinance training, primarily focused on using the village savings and loan (VSL)1 model.

The technologies adopted by a group are adapted to suit local conditions such as soil, water, and climate.

1 A Village Savings and Loan Association (VSLA) is a self-selected group of approximately 15–25 people who pool their surplus money in a fund from which members can borrow. No external capital is involved. See www.vsla.net/.

technologies on the basis of information gathered during the project planning process and at the village sensitization meeting. However, groups are free to say no to any technology they do not want to have demonstrated. During the training process, a simple value-chain analysis for each commodity (be it a crop or livestock) is considered in terms of three factors: logistics and the agro-inputs required; production; and post-harvesting techniques – storage, processing, marketing, and utilization.

Receiving and passing on inputs

During the course of the RIPAT project series, a set-up has been developed where the use of handouts and free gifts is kept to a minimum, in order to avoid the development of a donor dependency syndrome. Most of the inputs are provided to groups and to individual members on the understanding that they have to pay for the inputs, either in cash or in kind, although payments are sometimes not required up-front but only after results have been obtained. Payments are generally made either to the group, or in the form of the distribution of inputs outside the group, rather than to RECODA. For example, farmers who adopt the improved banana technology are expected to give three times the number of banana suckers received through the project to other interested farmers. In the case of goats, sheep, and pigs, members pass on female offspring to others in the group according to a predefined solidarity chain worked out by the group at the outset. The community in general is also allowed to use the male animals of any improved breed provided to the group for cross-breeding with their local stock, thus promoting further spread and wider impact. To avoid group members falling into debt if they experience total crop failure, for instance due to drought, the requirement that farmers should pay for their seeds is waived in such an event. Farmers who fail to establish banana plants due to drought or inadequate biophysical conditions are also excused from redistributing suckers.
Building group capacity

To facilitate the build-up of capital, payments for inputs are made into the group account. For example, if a farmer decides to engage in keeping the improved breed of poultry and buys a cockerel from the project using his or her own money, the cash is paid into the shared group account. The group’s capital is thus increased, and with it the group’s capacity to initiate various enterprise activities. The money earned on sales of crops from the group field is also paid into the group account. Groups usually also agree that members should pay a small weekly membership fee, and that members who do not turn up for group activities for an unacceptable reason must pay a fine. This money is also put into the group account. It is therefore essential that the group leaders are trained in the management of the group’s savings, and that the groups have constitutions that include good provisions regarding how to share group profits, as well as rules concerning members joining and leaving.

The RIPAT groups are trained in how to advocate for their rights and interests in a local context. Groups tend to have a more dominant say than individuals in a village. For example, some RIPAT groups have successfully called for the enforcement of village by-laws against the uncontrolled grazing of animals, which can be a problem for farmers who want to move away from maize cultivation to perennial crops such as banana, or to long-duration cassava, pigeon peas, etc. Groups can also be in a better position to exploit economies of scale; they can sell together as a group and negotiate higher prices, or buy agro-inputs in bulk at lower prices. However, although this aspect of marketing has been presented to RIPAT groups, it is not yet being exploited fully.

The RIPAT learning process includes group-to-group learning exchange. The three leaders from each group, plus two leaders from each of the targeted villages in a RIPAT project and the government extension officers in the project area, all meet with RECODA’s designated project manager on a quarterly basis. The purpose of the quarterly meeting is:

- to share experiences and lessons learned, and to inform each other about project progress, achievements, and challenges faced;
- to ensure good contact with and continued support and understanding for the project among village leaders and government institutions;
- to coordinate activities with the government extension officers, who sometimes make follow-up visits to the RIPAT groups.

At these meetings, important general messages for all the groups are conveyed, and any concerns are voiced, for example about violations of village by-laws. General leadership training and capacity-building activities are also carried out at these quarterly meetings. The meetings are an arena where group leaders can learn from each other and share their experiences of dealing with problems.

Continuation and spread

The RIPAT interventions are operated in close collaboration with local government authorities, village leaders, and government extension officers, with the aim that the groups can continue to operate on a self-sustaining basis if they so wish after the conclusion of the project, and that the farming technologies introduced should spread to the wider community.
The spread of the improved methods from project participants to their peers in the villages largely relies on spontaneous farmer-to-farmer communication. If it works, it spreads! In addition, farmers’ field days are arranged once a year in each village to mark successes and demonstrate what has been learned, and to allow the entire community to see the progress in the group fields and on the land of individual farmers. RIPAT participants are proclaimed by the village government to be village ‘development ambassadors’, and they are required by the village government and RECODA to teach three fellow villagers what they have learned in the RIPAT project in order to promote the spread of knowledge and technologies.

The ‘training of trainers’ method is an integral part of the RIPAT approach. In RIPAT, the trained trainers are called ‘super-farmers’ (or ‘lead farmers’). They are selected by the groups themselves from among the best farmers to teach others the new methods. Each group has super-farmers in various disciplines, according to the basket of options adopted by the group – for example, one person becomes a super-farmer in banana cultivation, another in goat or sheep husbandry, another in conservation agriculture. The super-farmers receive special training at the RECODA Academy (see Chapter 11 for further information), and they are expected to serve both their own groups and the wider community as paraprofessional consultants. In addition, the RIPAT approach includes close coordination and cooperation with local extension officers, who participate in the weekly or fortnightly group training sessions as much as possible. The local extension officers receive further training by RECODA on how to start up new groups in other villages in collaboration with the super-farmers. This training has largely been co-funded by the districts involved.

2.4 RIPAT implementation to date

To date, RIPAT has been implemented through four projects. These have involved the establishment of 68 groups in 34 villages in Arumeru, Karatu, and Korogwe districts. The four RIPAT projects have targeted different farming systems and agro-ecological zones in northern Tanzania, and have covered communities that have a range of cultural, social, and economic characteristics (see Table 2.1). These variations, combined with the basic trial-and-error implementation approach, have required adaptations to be made – but the core elements and the strategy have remained the same. The main features of the implementation process for each of the projects are described and discussed below.

RIPAT 1

May 2006–December 2009 (three-and-a-half years). Located in Arumeru District, Arusha Region, on the windward side of Mount Meru, in the border area between the middle zone and the lowlands.

It was largely through this project that the RIPAT concept was developed. Several agricultural technologies and improved methods were tried out in the RIPAT 1 project, but some were then abandoned. For example, the use of artificial insemination for introducing an improved breed of cattle was included only in the RIPAT 1 project; although this technique offers great potential, and despite some encouraging results, it was found to be too expensive and complicated, and the provision of semen at the appropriate time was found to present too great a logistical challenge in the rural areas.
<table>
<thead>
<tr>
<th>Table 2.1 Key characteristics of RIPAT projects 1–4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RIPAT 1</strong>&lt;br&gt;Arumeru District, Arusha region</td>
</tr>
<tr>
<td>Project duration</td>
</tr>
<tr>
<td>No. of villages/groups</td>
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<tr>
<td><strong>Site description</strong></td>
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<tr>
<td>No. of villages having relatively good rainfall / dry climate</td>
</tr>
<tr>
<td>Villages’ access to irrigation channels</td>
</tr>
<tr>
<td>Religion</td>
</tr>
<tr>
<td>Presence of other NGOs</td>
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<tr>
<td><strong>Agro-technologies introduced</strong></td>
</tr>
<tr>
<td>Improved banana: individual and group levels</td>
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<tr>
<td>Multipurpose trees, fruit trees, fodder crops</td>
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<tr>
<td>Improved cassava, sweet potato</td>
</tr>
<tr>
<td>Crop diversification and improved maize/pulses</td>
</tr>
<tr>
<td>Production of vegetables</td>
</tr>
<tr>
<td>Conservation agriculture: ripper/chaka hoes provided</td>
</tr>
<tr>
<td><strong>Livestock introduced</strong></td>
</tr>
<tr>
<td>Artificial insemination cattle</td>
</tr>
<tr>
<td>Improved goats for breeding – solidarity chains</td>
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<tr>
<td>Improved sheep for breeding – solidarity chains</td>
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<td>Improved pigs for breeding – solidarity chains</td>
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<td>Improved poultry for breeding</td>
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<tr>
<td>Marketing and value chain</td>
</tr>
<tr>
<td><strong>Other issues</strong></td>
</tr>
<tr>
<td>Group constitutions</td>
</tr>
<tr>
<td>Microfinance promoted</td>
</tr>
<tr>
<td>Year for introducing farm record keeping</td>
</tr>
<tr>
<td>Year for training of extension officers (EOs) and super-farmers through RECODA Academy</td>
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1 RIPAT 1 is the main focus of evaluation in this book.
2 including post-harvest technology, storage, processing and utilization
3 including breeding, fodder, veterinarian training and husbandry

The RIPAT 1 area enjoys relatively good rainfall in normal years, and most villages have access to water through irrigation channels for at least part of the year, although this is not available to all farmers in the villages. Most farmers are agro-pastoralists, and the good availability of farmyard manure and water creates an environment conducive to the successful cultivation of the improved varieties of banana promoted by RIPAT.

One advantage of being the first project was that the start of the subsequent RIPAT projects created a demand for the improved planting materials, e.g. banana suckers, which were purchased from the RIPAT 1 farmers for distribution among new groups in the RIPAT 2, RIPAT 3, and RIPAT 4 projects. The disadvantage of being the first RIPAT project was that some problems were not identified until the end of the project. For instance, in introducing an improved breed of milking goat, just one male goat was provided for each group for cross-breeding with the local goats. However, for farmers to enjoy the real benefit of pure-breed milking goats, a larger number of both male and female animals of the improved breed were needed if the new breed was to reach everyone in the group. Unfortunately, this was only realized towards the end of the project, when there was no time available for corrective action. In the subsequent projects, two male and five female goats were provided to each group. Similarly, the need was discovered for group constitutions that included rules for sharing the profit accumulated in the groups during the project period (see Chapter 8) and that took into account the interests of both the farmers who wanted to continue and the farmers who wanted to leave the group at the end of the period; again, this was realized at too late a stage for the situation to be rectified in RIPAT 1, but was remedied in later projects.

In the RIPAT 1 project, microfinance was introduced during the last year of the project to the villages using the government-promoted Savings and Credit Cooperatives (SACCOs)\textsuperscript{2} concept. In the subsequent RIPAT projects, the Village Savings and Loan (VSL)
Farmers’ Choice microfinance model was included in the basket of options offered to the groups; this has turned out to be very popular among the group members.

RIPAT 2

*September 2008–July 2012 (four years). Located in Arumeru District, Arusha Region, on the leeward side of Mount Meru.*

The context for RIPAT 2 proved to be much more challenging than that for RIPAT 1. Many of the members of the RIPAT 2 groups are semi-nomadic people from the WaArusha and WaMaasai tribes. Their farming system is in a state of transition. Illiteracy levels are very high, and strong cultural traditions made it difficult to sensitize communities to the advantages of new ideas and agricultural technologies. These factors inhibited the rapid adoption of the technologies promoted through the project. A further problem was that RIPAT 2 (like RIPAT 1) was affected by the existence of a donor dependency syndrome in the targeted areas, created over the years by the activities of other NGOs. The climate in the RIPAT 2 area is drier than that in the RIPAT 1 area, and there are no possibilities for supplementary irrigation. The soil is subject to erosion and is depleted of nutrients. The rainy season is short, and during the long dry season there is limited moisture and a lot of wind, conditions that are particularly unsuitable for banana cultivation. However, the RIPAT 2 area is endowed with valleys that channel a lot of run-off water during the rainy seasons, and this water can be harvested. Although not all groups were able to tap this potential, some groups and farmers learned to master the technique and succeeded in establishing good banana plantations. Because the very serious 2009 drought resulted in the death of up to half the cattle in villages in the area, the project moved away from the use of ox-drawn tilling implements for conservation agriculture (rippers) and replaced them with the Zambian hand hoes (chaka hoes) for land preparation. Farmers who could not cultivate banana frequently opted for husbandry of the improved breeds of milking goat, sheep, and poultry, and for conservation agriculture using Zambian chaka hoes. The project period was extended by one year as a result of the drought.

RIPAT 3

*September 2008–July 2012 (four years). Located in Karatu District, Arusha Region.*

The RIPAT 3 implementation period in the mountainous and incised valleys of Karatu was also extended to four years, because of widespread drought in two of the implementation years. In normal years around half of the targeted villages (those at the higher altitudes) receive relatively good rainfall that allows for the cultivation of a variety of crops, including the improved banana varieties introduced through the project. The lack of access to irrigation in the RIPAT 3 area required that the project concentrated largely on water conservation methods and the cultivation of a range of drought-resistant crops. In the drier areas, banana can be cultivated only in selected locations that are sheltered from the wind and where the harvesting of run-off rainwater is possible. In addition to improved poultry and milking goats, pigs were included in the RIPAT 3 basket of options at the request of the participants. The pig component turned out to be very much appreciated among the groups – particularly because the large number of piglets in a litter reduced the time for completing the group solidarity chain.
RIPAT 4

January 2010–December 2012 (three years). Located in Korogwe District, Tanga Region. Low-altitude coastal climate conditions.

As a result of learning from the previous projects, the RIPAT 4 implementation is perhaps the most developed of the RIPAT series. The RIPAT 4 area has relatively good rainfall and great potential for agricultural development. Only a few villages have irrigation channels, but the high water table in many villages offers opportunities for supplementary irrigation in the banana and vegetable fields using treadle pumps – a technology included in the basket of options in the RIPAT 4 project. These advantageous conditions have led to the rapid adoption of the RIPAT options.

2.5 Conclusion

RIPAT has been implemented in a series of four projects in a variety of socio-economic, farming, and biophysical environments, with the overall aim of alleviating poverty and increasing food security among rural farming families. Over time, many lessons have been learned and concepts fine-tuned relating to how innovations can be adapted and spread to bring about the desired impact. The following are the main points that are considered the key distinguishing features of RIPAT:

- full and real ownership of the project by the participants and community leaders;
- assistance provided on the basis of ‘help to self-help’, so that donor dependency is eliminated and the improvements created in the project are diffused and become self-sustaining;
- provision of a basket of options so that farmers decide what is most appropriate for them and adjust the technologies to local conditions;
- good collaboration and coordination with government authorities at all levels;
- effective, in-built mechanisms for ensuring that technologies introduced to the target groups spread to the wider community;
- work in groups – not only for cost-effective training but to promote a sense of togetherness and cooperation that will help to sustain the work of the project; and
- effective training in group organization and leadership.

Julius Nyerere, the first president of Tanzania, said: ‘People cannot be developed – they can only develop themselves.’ This view has formed the basic working premise for the RIPAT project – the belief that lasting and sustainable change only comes if the participants take full responsibility for their own development.

Notes

1. The technology gap is the gap between the farm production that is achieved with the agricultural technologies currently being used by farmers and the production that could be achieved by the same farmers if they had access to better but currently unavailable technologies and had the capacity to adjust them to local conditions. The gap is caused both by lack of awareness of the techniques and training in their use and by lack of access to equipment and agricultural inputs for implementing better technologies.
2. Savings and Credit Cooperatives (SACCOs) are member-owned microfinance institutions. Most SACCOs are rural-based and have fewer than 1,000 members, but some can be huge institutions with several branches.

References


CHAPTER 3
Evaluation methods

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The analysis and evaluation of the RIPAT intervention consists of three separate studies: one determining the impact of the project intervention; one evaluating the implementation process and institutional sustainability; and one analysing the context and the adoption of project approaches and technologies in the local community. The aim of each study determined its evaluation methodology, and each methodology is described in this chapter. They range from highly structured quantitative analyses to explorative ethnographic qualitative approaches. The aim is for this combination of evaluation approaches to serve to verify each study’s findings and bring additional insights to the separate analyses.

3.1 Introduction

The investigation of the RIPAT intervention is made up of three separate studies: 1) a study that determines the impact of the project intervention – the impact study; 2) a study that evaluates the implementation process and points to lessons learned – the implementation study; and 3) a study that looks at the context and adoption of project approaches and technologies in the local community – the context and adoption study.

The following research questions were investigated by the three studies:

- The impact study investigated such questions as the adoption rate of RIPAT technologies and to what extent the RIPAT intervention has affected the level of food security and poverty among the participating households.
- The implementation study focused on questions relating to the relevance of the intervention for the target group; sustainability of the technology and institutional outcomes; and the effectiveness and efficiency of the RIPAT concept for reducing rural poverty.
- The context and adoption study was guided by questions such as: to what extent have the promoted social and agricultural technologies been adopted by participating and non-participating farmers? What characterizes the farmers who adopt the RIPAT technologies? What characterizes the RIPAT farmers who have been most effective in spreading the new technologies? What role have the farmer groups played in the adoption of the social and agricultural technologies? And what has been the impact of RIPAT on household dynamics and gender politics?

The deliberate choice to undertake a broad evaluation of the RIPAT intervention has required the use of a number of methodological approaches. The evaluation has involved a large-scale survey to determine the impact of the project activities, a conventional evaluation study to assess the implementation process, and an observational study to investigate the context and the extent to which the project technologies have been adopted in the local communities. This chapter explains how the impact study made use of quantitative methods to measure the scale and extent of the impact of RIPAT, whereas both the implementation and context and adoption studies made use of qualitative methods to assess changes in agricultural practices among the target group and in their communities.
3.2 The combination of methodological approaches

In social science research there is an ongoing debate about the pros and cons of various methodological approaches for assessing the results and value of social interventions. Rather than adopting a single methodological approach, this study has analysed the diversity and complexity of the RIPAT intervention using both quantitative and qualitative methods.

Quantitative and qualitative methodologies imply different understandings of what it is important to know, as well as how it may be known. The combined efforts of quantitative and qualitative researchers can provide a more complete picture than would be obtained by any single methodological approach alone – similarly, the results from a range of methods may inspire new analytical questions across the different approaches. The production of this book is an illustration of this, in that all the chapters have been subjected to several rounds of critique by all the researchers involved, each one commenting on the others’ preliminary interpretations and conclusions in the light of their own insights. The aim has been to reach an agreement on the presentation of results without settling for bland compromises or reducing the strength of each method.

In a quantitative study there is strict separation of the phases of the process: preparation (including the specification of hypotheses), data collection, and analysis. Once the research questions and survey questionnaires have been defined through careful consideration of the kinds of data needed, the collection of that data proceeds in a rigorous manner, so that the data are homogeneous throughout the process. Analysis of the data is a separate phase, in which different research questions are tested against the data in order to identify correlations and causal relationships. Some results may be anticipated, but others may be entirely unexpected.

A characteristic of qualitative methods, particularly those used in the anthropological, explorative tradition, is the integrated process of data collection and analysis. Critical discussions of how to interpret data begin even before data collection itself, and continue throughout the study process, as they help to shape the form and type of data generated. The character of the data themselves therefore changes and expands in the course of the project. Thus, there is no strict separation of data generation and analysis, as these are dependent upon each other. Analytical perspectives and conclusions based on empirical material gradually grow out of this process, as an increasingly accurate and detailed account of the observations made and insights obtained.

The RIPAT study uses a mixture of methods in order to validate the findings by means of a methodological triangulation – that is, assessing a point from two or more perspectives in order to permit a comparison of the results, and therefore to ensure that those results are accurate (Denzin, 2006). In addition to applying different methods, the evaluation study has also used another type of triangulation in order to enhance its analysis and understanding of the complex set of factors and dynamics in play in the RIPAT project context, namely that of involving a number of different evaluators. These evaluators have had different entry points to the study process and have come to it with different research profiles, in terms of both the nature of their knowledge of the subject and their expertise in applying specific approaches. In general terms, the quantitative approach was used to measure the scale and extent of the impact of RIPAT; the qualitative approach was used to assess the meaning and character of this impact from the farmers’ point of view, as well as to document and assess the way in which the project that brought about this impact was implemented.
3.3 Data collection tools

A number of tools were used to gather both quantitative and qualitative data for the evaluation study.

The quantitative data were based on surveys using structured questionnaires. In this type of research, trained interviewers ensure that each question is answered in quantitative terms or with a response from a predefined range of options. The respondents in the RIPAT evaluation were asked questions about themselves (age, gender, education, occupation, marital status, number of children), about their household (members, accommodation, ownership of assets, past crises such as illnesses or harvest failures), and about their agricultural practices (which crops are grown, their yields, types of technologies used, ownership of livestock). Respondents living in RIPAT villages were also asked a range of RIPAT-related questions.

For such a highly structured questionnaire to work well, intensive piloting of all questions is necessary to ensure that an exhaustive list of possible responses is prepared prior to the actual data collection. The aim is that all respondents should be asked exactly the same questions in the same way, and that their answers are selected from exactly the same list of options, thereby enabling consistent analysis of the responses.

The qualitative data were collected through various types of interviews (some with a limited set of questions, others of a more in-depth and open-ended nature); direct observations (using narrative descriptions); participant observations; analysis of written project documents; and focus group discussions. The anthropological researchers involved in evaluating the project emphasized the use of traditional ethnographic fieldwork methods, including participant observations of the daily lives of farming households, in order to gain a basic understanding of the living conditions, opinions, and priorities of local families. This participant observation approach was supplemented by informal and formal interviews and conversations. The ethnographic perspective enabled researchers to place RIPAT within the context of people’s lives, rather than treating people as ‘recipients’ of RIPAT. An important aspect of the explorative approach is that it not only gives answers to predefined questions and subjects of interest, but, more importantly, it also inspires the researchers to develop and ask new questions during the data collection process; this occurred during the data collection for this study.

In addition to open-ended interviews and direct observations, focus groups were used in the qualitative studies to a considerable extent, particularly by the researchers from the Danish Institute for International Studies (DIIS). In this qualitative evaluation method, small groups of people are brought together to discuss specific topics under the guidance of a moderator. The evaluators lead the focus group discussions and take the initiative in probing and asking additional questions as warranted by the situation. The group process tends to elicit more information than individual interviews, because people express different views and engage in dialogue with one another. The moderator may facilitate the dialogue and explore the members’ motivations and feelings, allowing participants to bring up information or different opinions at any time.

3.4 The impact study

The main aim of the quantitative impact assessment of RIPAT was to estimate the extent to which the RIPAT intervention has affected the level of food security and poverty
among the participating households. However, since it cannot be known what would have happened to these households had they not participated in RIPAT, it was necessary to establish a credible comparison group in which food security and poverty levels could be measured. Quantitative assessments of this kind require a sufficiently large amount of data to ensure that it is possible to detect any statistically significant effect of the intervention that actually exists.

Working together with a Tanzanian survey company (Economic Development Initiative or EDI), RECODA, a team of local interviewers, and economics graduate students from the University of Copenhagen, in January 2011 the Rockwool Foundation Research Unit undertook a large-scale survey in which households, village governments, and RIPAT groups were interviewed in order to assess poverty and food security among small-scale farmers in Arumeru and Karatu districts. The data are called the ‘EDI-RF Assessment of Poverty and Food Security’ or the ‘EDI-RF’ data set.

Data collection

Interviews were conducted with approximately 90 per cent of the households that had participated in the RIPAT 1 or the RIPAT 3 projects at some point; a total of 1,058 RIPAT households were interviewed. Furthermore, interviews were carried out with 577 households in RIPAT 1 villages that did not participate in the RIPAT groups (in order to analyse diffusion and adoption), and with a large number of households from comparison villages in the districts of Arumeru and Karatu, the locations of RIPAT 1 and RIPAT 3 respectively (see Table 3.1 for details). The household survey therefore involved interviewing a total of 2,484 households in 36 villages, of which eight were RIPAT 1 villages, eight were RIPAT 3 villages, and 20 were comparison villages from Arumeru and Karatu districts.

Although RIPAT 2 and RIPAT 3 were implemented simultaneously, a pilot study in the RIPAT 2 area – populated mainly by the WaMaasai people – revealed a low degree of willingness to participate in the questionnaire survey. This stance was respected, and RIPAT 2 was excluded from the survey.

<table>
<thead>
<tr>
<th>District</th>
<th>Villages</th>
<th>RIPAT households</th>
<th>Non-RIPAT households</th>
<th>Households in total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arumeru</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RIPAT 1 villages</td>
<td>8</td>
<td>500</td>
<td>577</td>
<td>1,077</td>
</tr>
<tr>
<td>Comparison villages</td>
<td>8</td>
<td>–</td>
<td>383</td>
<td>383</td>
</tr>
<tr>
<td>Karatu</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RIPAT 3 villages</td>
<td>8</td>
<td>558</td>
<td>–</td>
<td>558</td>
</tr>
<tr>
<td>Comparison villages</td>
<td>12</td>
<td>–</td>
<td>466</td>
<td>466</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
<td>1,058</td>
<td>1,426</td>
<td>2,484</td>
</tr>
</tbody>
</table>

Source: EDI-RF APFS data, 2011
An interview was conducted in each household with the person responsible for most agricultural decisions, typically the head of the household. However, in RIPAT households, the person interviewed was always the RIPAT group member, irrespective of whether or not this person was the head of the household. Since households with female heads are overrepresented among RIPAT farmers, the same kind of overrepresentation among the comparison households was sought. In addition to the heads of households, representatives of all local village governments and representatives from all RIPAT 1 and RIPAT 3 farmers’ groups were also interviewed.

The problem of non-random selection

The ideal methodology for assessing the impact of an intervention such as RIPAT would be to design the intervention from the outset as a randomized controlled trial, i.e. to imitate the randomized treatment models used in medical science when, for instance, the effect of a new drug is tested. This overcomes the problem of the ‘missing counterfactual’: what would have been the situation for the participating farmers had they not participated in the RIPAT project? Obviously, we will never know the answer to this. The challenge is therefore to find a good approximation for the missing counterfactual. A randomized controlled trial does this by collecting data both prior to and after project implementation from both treatment and control groups. The members of these two groups are randomly selected at the outset, which makes the groups directly comparable. Tracking the control group households over time then becomes the best approximation for the missing counterfactual for the treatment group. Using this methodology of comparing matched groups, the trial will be able to detect any impact of the intervention.

When the RIPAT 1 project originally started in 2006, it was thought of as a pilot project, where the implementation strategy was to be continuously adapted to local circumstances and demands from the participating farmers. There are no baseline data in existence from before the project activities started, and the project implementation was not randomized.

This is problematic from an impact assessment viewpoint, because the careful process of selection of project participants in terms of both villages and households explicitly breached the principle of randomization. The ‘skewed’ selection process (in evaluation terms) could in and of itself bias assessment results dramatically, if it were not taken into consideration when comparisons are made. As explained in Chapter 2, Section 2.3, the selection of participants in the RIPAT projects involved matching them against a long list of criteria. Thus RIPAT farmers are not a random sample of farmers from a given village, but rather a group of farmers with certain characteristics, ranging from the size of their farms to their willingness to learn and engage in new activities. Comparing RIPAT farmers with a random sample of farmers from non-RIPAT villages would therefore be problematic, because it is impossible to determine whether these comparison farmers would have been RIPAT farmers if they had had the option. Likewise, RIPAT villages themselves were not chosen at random, but on the basis of their degree of poverty, suitability in terms of agricultural production, and the village government’s willingness to cooperate with RECODA. Even though Larsen and Lilleør made an attempt to select similar villages as comparison villages, they are not certain that this attempt was successful.
Addressing the problem of non-random selection

Unless fully controlled and randomized, this problem of ‘skewed’ selection for the purpose of comparison is often a serious difficulty in any impact assessment. However, luckily it is possible to imitate to some extent a randomized controlled trial in the impact assessment of RIPAT 1. Working on the assumption that the selection of both villages and households was carried out in roughly the same way and with the same results in Arumeru and Karatu districts, Larsen and Lilleør can use the time lag between the start of RIPAT 1 and the start of RIPAT 3 to estimate the impact of RIPAT on outcome variables.

The assumption that the selection procedures were the same in the implementation of both RIPAT 1 and RIPAT 3 implies that households participating in the two projects differed from their respective sets of comparison households to the same degree at the outset. Because the two projects were implemented two years apart, it is possible to measure an impact on, for example, food security from the two-year lead that RIPAT 1 households have over RIPAT 3 households. This method was used to obtain the results presented in Chapter 5 by measuring the differences between RIPAT 1 households and RIPAT 3 households, using the differences between their comparison households to take any district-level variations into account, and thus effectively cancelling out both the village-level and the household-level selection bias mentioned above in the results. Box 5.3 in Chapter 5 presents the estimation method in more detail.

As Larsen and Lilleør note, the only major flaw in this method is that the evaluation results will be underestimated to the extent that any effect of RIPAT on the outcome variables had already taken place in RIPAT 3 by January 2011, two-and-a-half years after the project start. This will have been the case for more immediate outcomes that would have had time to appear within this two-and-a-half-year time span.

3.5 The implementation study

The core aim of the implementation study was an analysis of the relevance, effectiveness, efficiency, and sustainability of the RIPAT intervention, focusing specifically on RIPAT 1 but also drawing on lessons learned and improvements implemented in RIPAT 2, 3 and 4. The study team also looked at the institutional sustainability of the RIPAT intervention, assessing how successful RECODA has been in transferring the RIPAT concept to local government institutions, and at the prospects for a further strengthening of the institutional component of the RIPAT intervention. The study team was composed of researchers from the DIIS and the Food and Agriculture Organization of the United Nations (FAO). Team members had in-depth knowledge of smallholder agricultural development processes in East Africa, with particular expertise in the Farmer Field School (FFS) approach.

Methodology and data analysis

Data collection for the qualitative evaluation of the RIPAT concept and approach involved individual and group interviews, observations of RIPAT in action at several different locations where the four RIPAT projects were in operation, and observations of individual stakeholders. The DIIS/FAO team employed a mix of qualitative methods, according to the different types of data being collected. There were a total of 49 qualitative interviews, which can be divided into four types:
3.6 The context and adoption study

The purpose of the context and adoption study was to understand to what extent and via what mechanisms practices introduced through RIPAT are adopted and spread. Farmers participating in RIPAT groups have the option of adopting practices introduced through the project on their own farms; not all practices are adopted by all farmers. One aim of RIPAT is to encourage the spread of RIPAT practices beyond the original participants, particularly through farmer-to-farmer contacts in different forms – within and between villages, and through neighbours, kinship ties, trade contacts, etc. The adoption study investigated the extent to which this spread took place, and therefore the adoption of RIPAT practices by non-RIPAT farmers. The study team explored diffusion mechanisms, and focused particularly on the context and conditions of adoption from the farming families’ point of view. What are the social, economic, organizational, practical, and other realities of daily life that have encouraged farmers to adopt (or discouraged them from adopting) the options offered by the RIPAT project?
In order to explore and analyse the nature and extent of the adoption of elements in the RIPAT projects, a qualitative study based on ethnographic methods was carried out by a group of researchers from the Department of Anthropology at the University of Copenhagen. Four of these researchers had extensive fieldwork and other research experience relating to a range of African countries, including Tanzania, and to a range of issues, including agricultural development. The research process was managed by the department’s consultancy unit, Anthropological Analysis.

Methodology and data analysis

In preparing for the fieldwork, literature on ethnic, agricultural, and historical characteristics of the region was collected and studied, and a range of possible understandings of and scenarios for diffusion were discussed. In order to obtain information about the experiences and viewpoints of farmers who had participated in the RIPAT projects, it was decided that ethnographic fieldwork should be carried out in one or two of the villages associated with RIPAT 1. This was to be supplemented with information obtained from a range of other sources, including visits to other villages and interviews with various local officials and researchers. Contact with a local independent and experienced research assistant, Jehova Roy Kayaa, was established, in order to obtain relevant local information. The staff of RECODA were consulted extensively, and the local interpreters used by the research team in their work also proved to be a useful source of information.

Members of the Anthropological Analysis team carried out a total of 20 weeks of ethnographic fieldwork during the period of May to July 2011. Half of this fieldwork was carried out by researchers based in the two RIPAT 1 villages, where local households made living space available for them, allowing the researchers to have close daily contact with farmers in the area. Several visits were made to other villages as well, and a total of 20 villages were visited in the RIPAT 1, 2 and 4 areas. Fieldwork involved participant observation – i.e. experiencing continuous interaction with local people and observing local life through participation in daily activities, engaging in informal conversations, and making visits to homes. Researchers also found it useful to do village and field walks, and crop and field visits, in order to encounter local farmers and converse with them both about their agricultural practices and produce, and about other issues of interest. The research team further participated in market mapping and observations, particularly with respect to banana crops. They also took part in group and project meetings and attended Farmers’ Day (a local agricultural show).

In addition to the individual interviews detailed later, nine group interviews were conducted. Further input was provided by five women who kept diaries of their daily activities and thoughts for two weeks; these diaries were later used as inspiration for interviews and discussions. Four ‘participatory rural appraisal’ group sessions, each with four to eight female farmers, were conducted; these focused on the participants’ experiences with different crops (existence, availability, quality, preference, priority, etc.). All of these activities were recorded in written field notes, and, as far as possible, observations and findings were continuously discussed among the researchers – this opportunity for discussion being one of the major advantages of undertaking fieldwork as a group. The explorative and flexible nature of ethnographic research was very clearly evident in this study process.
In total, more than 70 farmers were interviewed, slightly more of them women than men; this number included both RIPAT and non-RIPAT farmers. A range of other relevant informants was also interviewed, including seven employees of local government and four extension officers or experts. Ten people involved in the market – either wholesale or retail sellers of bananas – were interviewed in connection with market visits. Several field trips were made with RECODA staff, including visits to RIPAT and non-RIPAT farmers in the RIPAT 2 area, in order to compare conditions and progress in the different areas. Other visits were made with RECODA consultants to the RIPAT 4 area to observe the practical training of and meetings with local RIPAT group farmers and local extension officers.

By its very nature, the ethnographic research process allows the inclusion of a virtually indefinite range of issues. This is particularly so in the first phases of fieldwork, when foci have not yet been established and the crucial questions have not been finally settled, as the researcher attempts to keep an open mind regarding the facts relating to the situation. In the RIPAT study, a range of issues was covered as the research progressed, in an attempt to understand the conditions for RECODA’s work as well as the many factors upon which RIPAT might have made an impact – and therefore upon the potential and actual adoption of RIPAT elements. These issues included questions regarding the ecological and economic difficulties facing the area as a whole (such as drought and problems with water access), overall prices of food, land issues (tenure, rents, and rights), the farming and development history of the area (including prior projects), and farmers’ relationships to local extension officers. General issues of village life were also covered, including the organization and practices of village government, and cooperation and conflicts in the community. Local farming conditions and methods – in terms of soil, water, labour, tools and techniques, planning, economy, etc. – were central concerns. Former, current, and new crops were discussed, including good and bad experiences, problems, and expectations, as well as questions of subsistence versus cash cropping, and rights and obligations in relation to different crops and farm animals (cattle, goats and chickens). Marketing strategies and experiences – in the villages, at town markets, and with traders – were covered too. Household life – livelihood strategies, family and gender relations, work, economy, and relationships and obligations within and outside the household – proved to be of crucial importance for understanding the impact of RIPAT. Finally, of course, the experience of group work was of relevance – not only group work in connection with RIPAT, but also in savings groups, cooperatives, and in other projects, including issues of membership, group dynamics, organization, finances, training, and cooperation.

As is evident from the chapters that illustrate the results of the analyses of the qualitative data concerning the adoption and spread of RIPAT practices (chapters 4, 7, 8, 9 and 10), the issues mentioned above have been incorporated into the discussion of RIPAT in various ways and to various extents. In qualitative ethnographic research processes, analysis begins with the fieldwork preparation and data collection stages, and is a continuous process through all stages of the project, culminating with the writing of presentations. Discussions with peers and co-workers form an integral part of the analysis process, and, in an important sense, the final text is the analysis, not just a presentation of it.
3.7 Conclusion

In this chapter, we have given accounts of the various approaches to evaluation adopted, and the various methodological and analytical choices made as a consequence of the different foci and types of questions implied by these approaches. In particular, we have outlined how qualitative and quantitative methodologies have shed light on the processes and results of the RIPAT projects in a number of ways.

Practical interventions that aim to influence people to adopt new knowledge and change practices are likely to operate in a local context that is both dynamic and complex. Such ‘social change’ projects call for a flexible and pragmatic approach to project implementation as well as to evaluation, and the RIPAT intervention is characterized by having an implementation process in which activities have changed and been refined over time based on a trial-and-error approach.

The evaluation of the RIPAT intervention was designed to analyse this complex and diverse project implementation by dividing the study into different research questions and by making use of different methodological approaches to collect and analyse the information. This was done by having three separate evaluation studies, each one conducted by a group of researchers with expertise on the subject matter and the research methods used in the study. Apart from making use of both quantitative and qualitative approaches to analyse experiences and determine outcomes and impacts in the separate studies, there has also been a fruitful methodological crossover in terms of using quantitative and qualitative data to inform the analysis and broaden the understanding of the findings presented in chapters 7, 8, 9 and 10. The combination of evaluation methods that address results – ‘what came out of it?’ – with methods that address process – ‘how and why did it happen?’ – gives depth and perspective to both sets of evaluation issues, and has made it possible to extend discussions and conclusions further than would have been possible in a single-approach evaluation model. In addition, it has been a goal of this book not simply to let each methodology speak for its own results, as it were, but to challenge and explore insights across disciplinary approaches. We leave it to the reader to judge whether the book has succeeded in this endeavour.

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CHAPTER 4

The context for RIPAT: taking regional history and development policy into account in the interpretation of project processes and success

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In this chapter, the local historical, demographic, and political contexts of RIPAT 1 are described. It is stressed that there is an ever-present need for farmers to be responsive and adaptive to the changing political and climatic conditions that they face. The role of crops and livestock in the long history of exchange between ethnic groups is described. The authors find that the integration of different approaches to agricultural development, the provision and careful composition of the basket of options based on local context, and the ability to adapt to and engage with local conditions and realities, leaving the farmer with a genuine element of choice, have all been instrumental in the achievements of RIPAT.

4.1 Introduction

The context and adoption study (see Chapter 3, Section 3.6) in the RIPAT 1 area began in the summer of 2011. In the course of our fieldwork we both saw and heard about the genuine accomplishments of the RIPAT 1 intervention. Interpreting this success correctly is crucial, not least because the RIPAT intervention is supposed to serve as a model for support to rural communities that can be applied elsewhere in Tanzania and in the broader region of Sub-Saharan Africa. Clearly, RIPAT 1 cannot become the sole template for future work in other regions. Nevertheless, there are important lessons to be learned from the first RIPAT project, as its success seems to be tied to both an efficient project implementation design and an ability to engage with local realities and variations. In this chapter, therefore, we attempt to understand these two particular circumstances.

After a brief introduction to the RIPAT 1 project area, i.e. northern Tanzania in the vicinity of Mount Meru, we consider its changing demographic, political, agricultural, and economic features, with the specific intention of reminding ourselves that RIPAT plays into ongoing and complex social changes rather than marking any simple and radical shift from one static situation ‘before’ to another one ‘after’ the project. The point is that any given RIPAT project will always be influenced by the specific historical, economic, and demographic situation of the area in question. Consequently, the main lessons to be drawn from RIPAT 1 are not about the particular crops and techniques, but rather about adaptation to local conditions.

In the second part of this chapter we outline an interpretation of RIPAT in terms of the changing discourses and practices of development policy, both generally and in the specific Tanzanian context. Overall, we make a distinction between a top-down approach that focuses on the implementation of a set of centrally predefined best practices imposed from outside, and a bottom-up approach that favours flexible adaptation to local conditions and preferences. These two approaches are involved in all levels of policy, from general development and national policies right down to – as in the case of RIPAT – the introduction of certain recommended agricultural products and procedures. We suggest that one of the secrets of RIPAT’s success may lie in a pragmatic handling and flexible integration of the two approaches. New technologies and new crops and animals were presented to farmers as part of the RIPAT packages, but there were also elements of choice and opportunities for farmers to satisfy their own self-interest.
4.2 The study area in brief

The eight villages involved in RIPAT 1 are all situated to the east of the city of Arusha, in what was then called the Arusha District on the southern plains of Mount Meru.

There are three major climatic zones in the district: the upland, midland, and lowland zones. The villages involved in RIPAT 1 are all situated on the border between the middle and lower belts. The area where the RIPAT 1 villages are situated can generally be described as a semi-arid region with irregular rainfall, and as consisting of bush and open grasslands; however, farming conditions vary immensely from village to village and even from farm to farm because of differences in soil structure, access to water, and annual rainfall. Agriculture is the main economic activity in the villages, with maize, beans, vegetables, pigeon peas, and sugar cane as the main crops. The majority of farmers are subsistence farmers with an average of 2 acres of farming land for cultivation per household. None of the villages have electricity installed, and only a few villages have access to piped water. Water for the cultivation of crops is mainly obtained from rainfall or by means of irrigation systems, with water being taken from rivers and canals coming from the upland area. However, because of the erratic rainfall, irrigation water is not available throughout the year, and access to water is thus a constant struggle. All the villages in RIPAT 1 are situated south of the main tarred road between Arusha and Moshi, but access to the villages themselves is by dirt roads that are maintained only to a certain extent. For several decades now the area has seen substantial population growth. The annual growth rate in Arumeru District during the last 50 years is estimated to have been around 3 per cent. It is estimated to have had a population of 460,000 in 2000, with an average population density of 159 people per square kilometre, making it one of the most densely populated areas in Tanzania (Arusha Regional Commissioner's Office, 2000). The population density varies, however, from that of the closely populated fertile highlands on the slopes of Mount Meru to that of the lowlands, which still have only a scattered population.

4.3 History: people, power, and produce in the RIPAT 1 area

Whereas the Mount Meru midland and lowland zones are semi-arid, the Mount Meru upland, with its rich soil and plentiful rainfall, is one of the most fertile areas in Tanzania. Due to its fertility, the area has a long history of migration flows and competition for its attractive but limited land. The people around Mount Meru have therefore been part of wider systems of exchange for centuries, and they have been selecting crops and developing technologies for just as long. It was into this historical setting that the first RIPAT project was introduced in 2006. In order to understand the current social context as well as the scope and variety of RIPAT 1’s successes, it is useful to take a look back at the history of the region, since past experiences always tend to influence current options and choices.

History of agricultural exchange

In the latter half of the 19th century, the area which was to become Arumeru District was inhabited by long-established highland farmers, the WaMeru, as well as by pastoral WaMaasai and a mobile group of farmer-pastoralists, the Arush WaMaasai. The RIPAT 1 area
is still primarily inhabited by the three ethnic groups – WaMeru, WaArusha, and WaMaasai – but, in contrast to the situation today, the groups used to live within fairly separate social spheres in distinct agricultural zones. On the lower plains, pastoral activities dominated. On the upper plains, the WaArusha specialized in irrigating their crops, and provided the pastoral WaMaasai with key resources in times of drought or disease. Higher up still, on the well-watered and fertile slopes of Mount Meru, the WaMeru carried out intensive cultivation of bananas and grain (Spear, 1997: 21–31 and 35–8). In the 19th century, European demands for ivory and sugar brought the people of both Mount Meru and the plains into far closer interaction with the wider world. As the trade in ivory and sugar developed, the WaArusha supplied the trading caravans that travelled up from the coast. A wide range of products were noted by travellers in the region: maize, cassava, sorghum, beans, sugarcane, sweet potatoes, bananas, millet, tobacco, and yams, all generally cultivated in irrigated plots. This list of produce (Spear and Nurse, 1992) deserves our attention. Over half of the crops (maize, cassava, sweet potatoes, beans, and tobacco) came originally from the Americas, and were thus relatively recent arrivals in East Africa. Sugarcane and bananas point to older connections with South Asia, while millet, sorghum, and yams are part of well-established African crop mixes. This variety of crops is significant, marking the existence of a dynamic exchange economy and indicating willingness to experiment with new crops and their associated agricultural technologies. So, in the context of history, the current basket of options of crops and strategies in the RIPAT projects, as well as people’s willingness to take up a range of the options available, should be seen as a continuation of a long agricultural development process involving experimentation and adoption of new crops and technologies that can be traced back for centuries.

History of social interaction

The WaArusha evidently did well from their 19th-century niche. They expanded both down into the plains and up onto the mountain, and soon came into direct conflict with the WaMeru population. Over the next few decades, isolated raids turned into an invasion of sorts. Soon both the WaArusha and WaMeru were living side by side on the slopes of Mount Meru, where both groups further developed intensive agriculture. However, despite the increased interaction between the two ethnic groups, they remained culturally distinct. As Spear notes (1997: 57): ‘Arusha and Meru thus continued to pursue similar [agricultural] objectives in fundamentally different ways as each continued to order its own world according to its own cultural values and perceptions.’

There are two major points to observe from this. First, we should note that development and change in the Arumeru District has been a continuous process of exchange and adoption, not only of crops, goods, and livestock, but also of people and traditions. This is also evident in the RIPAT villages today, where WaArusha, WaMeru, and WaMaasai live side by side, with no clear-cut distinction between the ethnic categories in terms of livelihood and social relations. However – and this is the second point – despite their long history of interacting and adapting to changes, ethnic identity remains important, and there are noticeable differences in orientation and preferences in terms of livelihood strategies and traditions which still make ethnic variation one of the keys to understanding some of the complexity of the society of the area (see Box 4.1 and Chapter 7).
Livestock production is one of the major agricultural activities in Tanzania. In the RIPAT 1 area, as in most of Tanzania, livestock plays a major role. Most households live as agro-pastoralists, which means that they combine crop cultivation with animal husbandry, keeping cattle, goats, sheep, and chickens on their farms — although the amount of livestock kept varies, depending on spells of drought and outbreaks of disease. The ownership of farm animals is of great importance for several reasons. First, livestock is an important source of market products such as meat, skins, milk, and eggs. Second, farm animals are an economic asset in terms of providing households with draught power for transport and cultivation, and with valuable manure that improves agricultural production; cow manure can also be used as a building material and as fuel for cooking. Third, owning livestock is regarded as an alternative method of saving, with reasonable protection from inflation. As capital, livestock are also seen as a means of insurance against natural hazards and other economic hardships. These factors are important for the successful introduction of improved breeds of chickens and goats from the range of options provided by the RIPAT project (see Chapter 2). Whereas the introduction of a new or improved crop entails a certain risk of harvest failure, the receipt of a goat or chicken is a direct and immediate financial gain.

In addition to these economic factors, livestock has a much wider social and cultural significance. This is the case for both the WaMeru and WaArusha populations, but most especially for the WaMaasai, for whom cattle and the pastoralist way of life are of significant practical and symbolic value. The ownership of livestock is a symbol of wealth and a source of pride, and for pastoral WaMaasai, cattle still define their systems of social hierarchy and prestige. Livestock also hold great importance in rituals and ceremonies. Cattle are exchanged between a groom and his bride’s family, and can also be used as payment for fines. Advice to farmers to cut down on the number of goats of traditional strains that they own and instead keep a smaller number of animals of superior breeds indoors (as recommended in RIPAT) might seem a rational option from an agricultural and market-oriented perspective; for the WaMaasai, however, this option might not be appealing, as the size of the herd plays just as important a role as the quality of the animals.

4.4 Adapting to change

In 1885 Tanganyika was declared a German protectorate, and things changed. Perhaps the most far-reaching action of the new German administration as far as this area was concerned was the decision to make available a large area on the lower mountain slopes for settlers and commercial farming. At the same time, an upper boundary for settlement on the mountain was laid down, effectively locking both the WaArusha and the WaMeru into an enclosed zone on the mountain (Larsson, 2001: 32). This ‘iron ring’ policy was taken over by the British, the colonial power after the First World War. The inability to expand their territory forced both the WaMeru and the WaArusha on the mountain to intensify and restrict their cultivation beyond anything they had attempted before. Pastures traditionally used for grazing were turned into fields for annual crops – first in rotation with pasture, and later for permanent cultivation. The territorial boundary blocked access to the lower slopes and plains in many places, which limited the possibility of owning cattle, since the pastures had become inaccessible (Larsson, 2001: 169; Spear, 1997: 135–9). Only a small number of cattle were kept up on the mountain, where they were kept indoors and hand-fed on banana leaves and grass – incidentally, exactly the kind of goat husbandry recommended by RIPAT today. As the population continued to grow, annual crops such as beans and maize were replaced with perennial crops, mainly coffee and bananas, giving the area the name ‘the coffee-banana-belt’. Bananas had always been important on the mountain, both as a socially significant crop used in
ceremonies and for gift-giving and as a staple food. An inhabitant of one of the RIPAT villages referred to bananas as ‘the mouth-opener’ for the WaMeru people, as it was the first kind of solid food that they tasted as babies. With the need for more intensive land cultivation, bananas became the main staple food for the farmers, and they were grown on every spare piece of land that could be found.

During the 1930s and later, members of the younger generations who could not find sufficient farmland anywhere near their home communities moved into towns or were forced down to the semi-arid plains, where they settled and started to cultivate land (Spear, 1997: 146). Many of our informants in the eight RIPAT 1 villages told stories of how they themselves or their parents had moved down from the mountain to settle, and everyone still had families and home villages on Mount Meru. Many of the farmers who migrated tried to grow bananas around their new homes on the plains, but because of infertile land, the lack of water, or both, very few succeeded. Having the possibility of growing bananas again is therefore very much appreciated and has undoubtedly contributed to local people’s readiness to adopt an improved method of growing bananas as introduced by RIPAT.

4.5 RIPAT in a development context

Looking back at the historical context of the farmers targeted in RIPAT 1 helps us to understand some of the challenges faced as well as the successes achieved by RIPAT.

Agriculture has always been a national priority for poverty alleviation in Tanzania. With 74 per cent of its population involved in agriculture (UNDP, 2010), agricultural development in Tanzania continues to be a central concern for both the Tanzanian government and the donor community. The main question to be addressed has been how best to help farmers to curb poverty. Since Tanzania’s independence in 1961, several strategies have been employed to tackle this issue, with a variety of approaches and

Box 4.2 Development in Tanzania

As in most other developing countries from the 1960s to the mid-1980s, there was an emphasis in Tanzania on imposing development from the top downwards through ready-prepared solutions for the farmers to implement. The most well-known example of such an approach in Tanzania was perhaps the ujamaa nationwide village reorganization policy, based on ideas of African socialism. In the early 1960s, President Julius Nyerere adopted a strategy of resettling otherwise scattered farmers in new collectivized villages, where the people were supposed to practise collective farming. The intention was to improve the farming system by bringing together the rural population in these villages where social services, extension services, and farm implements could easily be provided (Assmo, 1999: 66–7). Approximately 5 million people were relocated overall. Social services were improved with the development of these centralized villages, but food production did not keep up with population growth and, instead of economic development, Tanzania was faced with additional debt and greater poverty (Larsson, 2001: 33–4). As in other countries where centralized development policies were followed, this crisis eventually led to the adoption of an agricultural liberalization policy in the late 1980s, with the aim of reducing state involvement in favour of market orientation and private sector development (Cooksey, 2003: 70; Larsson, 2001: 34; Ellis and Biggs, 2001: 438–9). With liberalization also came a stronger focus on – or at least a stronger rhetoric concerning – giving people a say in the development decisions that might affect them, and ensuring that development interventions were appropriate to the needs and preferences of the population that they were intended to benefit (Ellis and Biggs, 2001: 443). In this sense, liberalization became rhetorically tied to a bottom-up approach that argued for the participation and empowerment of local people in the determination of their own lives.
policies replacing and overlapping each other over time. In line with international
trends in development policy, one may speak in broad terms of a general shift from a
top-down policy approach – i.e. centrally defined and usually large-scale programmes
that are implemented across whole nations – towards a bottom-up approach that (it is
claimed) favours local participation and involvement in the design and implementation
of development projects (see Box 4.2).

In its pure form, the top-down approach advocates the replacement of the existing
agricultural, social, and cultural organization by another model. Accordingly, local partic-
ipation is regarded as the participation of local people in an externally designed project,
and imperfect adoption of the project elements is understood as a sign of imperfect local
participation in an otherwise perfect project. This approach takes as its point of departure
the assumption that local practices are problematic or deficient and that change must be
transferred in a top-down manner from scientists and developers who know what is best
for local farmers (Ellis and Biggs, 2001: 440). What is advocated is a shift in local agricul-
tural practices and, by implication, also in mindsets, culture, and social organization.

Ideally, the elements introduced should be adopted evenly, at the same pace,
everywhere – as if everybody had the same problems and were in need of the same
solutions to escape from poverty. An incomplete adoption of the package would be seen
as a semi-failure; one could try to understand why people resisted or failed to do as they
were told or taught, and then try to identify obstacles to change (in people’s mindsets,
tradition, culture, poverty, ignorance, and so on) in order to overcome those obstacles.
An example of this approach is the national government extension system in Tanzania,
which is based on trained extension officers and specialists visiting preselected contact
farmers. It is expected that the contact farmers will take on the recommendations from
the extension officers, and then spread the messages to other farmers in the communities.

The bottom-up approach, by contrast, views farmers as knowledgeable and able to
decide on their own best future course of action. It takes as a point of departure the fact
that farmers must have very good reasons to do what they do, however ‘imperfect’ or
‘irrational’ this might seem to an outside observer unfamiliar with the local context.
Local participation is thus taken as the participation of project staff in local lives, working
with people to find solutions to their problems, and adoption is then a measure of how
well the project or staff have understood the local problems and how appropriate their
proposed solutions have been in the local context. The approach assumes that what
farmers do is right for them given the local constraints, but also that what they do may
in many cases still be changed and improved, and that farmers are interested in doing
this if it is to their advantage. Change may come from the outside, but must build upon
local knowledge, needs, and constraints in a bottom-up manner, and in a strong collabo-
ration between local farmers and scientists or developers (Chambers, 1983; Ellis and
Biggs, 2001: 443). It recognizes that farmers are individually different and have different
needs: some engage only in agriculture, others also in marketing or business; they adopt
different agricultural strategies, and they change their strategies over time; and so on.
This approach builds on what people already do, and then tries to widen the range
of options available to them as well as to help them overcome local constraints. It is
therefore accepted that things cannot be adopted evenly, and even a partial adoption of
the products from a basket of options will be seen as a success, and taken as a sign that
the developers have introduced some of the right products or techniques, given the local
context, and have done more good than harm.
It is worth noting, however, that the bottom-up approach is in itself a policy defined from the top down, in that it specifies the role and contribution of local participants within projects and programmes, and individual projects continue to be required to adhere to general political priorities and targets. Therefore, the continuing challenge for social and economic development initiatives is to answer the question of how to combine the intentions and resources of donor and development agencies with local interests, preferences, and conditions as they are seen from the participant/recipient point of view. As we shall see, this aspect of the difference of approach is particularly pertinent in the discussion of the role of RIPAT within the villages and groups involved in the project.

4.6 The RIPAT answer to the challenge

In the light of our account in Section 4.3 of the historical development of the area, with its emphasis on constant changes to the local agriculture and economy, the bottom-up approach to agricultural development appears more realistic and practical. Actual changes have always occurred on the basis of farmers’ assessments of the choices available and of the practicality and the advantages and disadvantages of these choices. That is certainly not the same as saying, however, that farmers have always been able to overcome all problems and limitations, and that there is no need for external input into farmers’ practices, or no need for the general improvement of structural conditions (such as access to markets, land, and training) – and some of these problems can be addressed only by centrally implemented, political actions. As we see it, RECODA’s work is an expression of this understanding.

In fact, we have detected elements of both the top-down and the bottom-up approaches in the RIPAT project. The farmers were not involved in defining their main problems or the solutions to their problems prior to the project implementation, as a fully participatory extension approach would imply. There was therefore very little local participation in the process of project design in RIPAT 1, as it was RECODA and the Rockwool Foundation that decided to focus on agriculture in general and on the specific farming techniques selected. In this respect it can be argued that RIPAT was a top-down approach. However, the RECODA staff introduced a range of crops and technologies to the farmers based on thorough knowledge of farming, local conditions, and marketing opportunities, and they gave the farmers the option to choose what suited their individual needs best. RECODA and the Rockwool Foundation established the framework for the development approach, but within that framework they allowed the farmers themselves to define their own best ways forward, thereby recognizing that farmers are different from one another in many respects and have different needs.

On the one hand, the project has a top-down approach with the aim of ‘bridging the technology gap’ (which is the slogan of RECODA), changing the mindset of farmers (shifting from subsistence to commercial farming, maximizing productivity and income), and introducing packages of good practices (such as conservation agriculture or zero grazing). These elements of RIPAT were determined at the organizational level, and it was expected that they would be implemented to some degree by the farmers. From such a top-down point of view alone, however, RIPAT does not seem to have had a very significant effect. Even though farmers were eager to learn and the top-down teaching and transfer of knowledge were greatly appreciated, few of the old ways of practising
farming have been eliminated, and there has not been a radical change of ‘mindset’ from subsistence agriculture to cash cropping. First, the traditional strategies already integrated a good deal of cash cropping and marketing. Second, subsistence agriculture remains important, as risking too much on cash crops is a difficult and insecure strategy.

On the other hand, however, the project also has a bottom-up approach that provides baskets of options trialled on demonstration plots, lets farmers select what is best for them (regardless of what the agency would prefer to see them do), and works very closely with farmers through farmer groups to overcome the constraints on their endeavours (see Chapter 2). In this way, by emphasizing choice and flexibility, RIPAT manages to create the conditions for a variety of farmer innovations. The success observed therefore reflects a continuous process of adjusting what the project has to offer in order to come closer to what the targeted farmers need and want. This process of choice and flexibility is not only a matter of having the right project design. It also requires a constant attention to farmers’ shifting predicaments and situations which can be achieved only through close, hands-on work with the farmers – something of which RECODA is very well aware.

Another important factor in this regard is the close collaboration between RECODA as the implementing institution and the Rockwool Foundation as the project donor. Both RECODA and the Rockwool Foundation are, in top-down/bottom-up rhetorical terms, the power holders in the project, although their roles are different. These different roles could potentially be a source of conflict and misunderstanding, because of different and possibly competing interests. However, through constant communication and consultation from the start of the first RIPAT project, the two parties have achieved a mutual respect and understanding which has allowed flexibility and change according to farmers’ needs. This has enabled the project to strike a balance between participatory and directive approaches, and still satisfy the requirements of the donor. New technology (which may not actually be so very new to the farmers) and new crops and animals were presented to farmers as part of the RIPAT packages, but there was always an element of choice. Local farmers received a range of possibilities and, working in groups, explored those possibilities to find those that fitted best with their own immediate assessment of needs and markets.

In the RIPAT project, the top-down approach to agricultural development has been transformed into a process that is very open. There are many options for farmers to choose from, and most of these options are improved variants of known practices, crops, and livestock. Furthermore, RECODA’s implementation has more often than not managed to maintain a dialogue with farmers and to continuously incorporate the experiences of RIPAT farmers into the project design. There has been a real, and often successful, attempt to give farmers not just new ‘things’, but also new choices.

RECODA has worked with farmers on an equal footing, considering them as experts, and has invested time and resources in working with them in their fields. RECODA originally promoted a particular vision of modern farming and modern life, summed up in a picture of the ideal family home, a modern building surrounded by a goat shed, a poultry house, well-organized home fields, and outfields with crops in marshalled lines (see image, ‘The model super-household’). But the reality was different. Farmers chose in terms of what they could manage with available labour and land, and also in terms of their perceptions of their own best interests. Some of the RIPAT technologies found a niche, but had different impacts on different farmers.
The model 'super-household'
The provision of a carefully composed basket of options was therefore the development strategy that proved most helpful, as it acknowledged that the local farmers were active agents who would select what fitted best with their perceived needs and local constraints. New knowledge and experience were acquired, even if the entire package was not adopted, and other projects will be able to build on this in the future.

Notes

1. When RIPAT began in 2006, the area in which it was implemented was called Arumeru District. Arumeru District has subsequently been divided into Meru District and Arusha District. Some of the RIPAT 1 villages are located in Arusha District and some are in Meru District.

2. According to the impact study, 82 per cent of the heads of households in Marurani (one of the RIPAT 1 villages) refer to themselves as WaArusha, 8 per cent WaMaasai and only 3 per cent WaMeru. The village of Kwa Uguru is primarily WaMeru, with 81 per cent of the heads of household WaMeru, 13 per cent WaArusha and less than 1 per cent WaMaasai.

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CHAPTER 5
The impact of RIPAT on food security and poverty

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The main findings of the impact study, which built on the highly structured large-scale quantitative household data, are described in this chapter. There are three main findings. First, there has been a high degree of adoption of various technologies from the basket of options among the individual participating farmers. Second, there are large, positive, and sustainable impacts from RIPAT on different measures of food security, including a reduction of hunger during the lean season, and an increase in the consumption of animal proteins. Third, there are no measurable effects on poverty, but rather an indication of a shift in the sources and use of farm income among the RIPAT households towards savings or agricultural investments.

5.1 Introduction

In evaluating interventions, the first question that springs to mind tends to relate to the size of the impact: to what extent did this intervention influence the lives of the participants in the areas that it was designed to improve? As we see from many of the other chapters in this book, a whole range of outcomes may be brought about by an intervention, but in this chapter we focus on the two main areas that the RIPAT projects were designed to improve, namely food security and the poverty situation among the participating households. We use data from a large-scale household and village survey specifically designed to determine the quantitative impact of RIPAT on food security and poverty alleviation among its participating households: the EDI-RF data. These data and the associated survey methodology are described in more detail in Chapter 3, Section 3.4.

A prerequisite for discovering the impact of a project on its development objectives is, first, that it has been adopted by the target group, in this case the participating RIPAT farmers. We found that there has indeed been a high degree of take-up of project activities among the participating RIPAT farmers, and that, although improved banana cultivation has been in particularly great demand, many of the different options in the RIPAT basket have had good adoption rates, indicating that the project appeals to a wide range of different farmers with different demands and needs. (Box 2.2 in Chapter 2 gives details of the contents of the basket of options.)

In our assessment of the impact of RIPAT on the levels of food security and poverty among the participating farmers, we took advantage of the time lag between RIPAT 1 and RIPAT 3, which allowed us to compare the two groups of households involved, provided that we took the district-level differences into account. We found that there have been substantial effects on food security; on average RIPAT 1 households are now 25 percentage points less likely to experience hunger in the lean periods of the year, and have significantly improved the nutritional quality of their diets. For some households this improvement in food security seems to have translated into a considerable reduction in malnutrition among children under five years old.

Despite this positive impact of RIPAT on food security, we did not find any significant impact on the prevalence of poverty as measured by a number of different poverty indicators relating to households’ expenditure levels. There is a variety of possible reasons for this finding. Food security in the lean period of the year will increase if households find it easier to smooth their food consumption over the year, even if their total food consumption levels remain unchanged. Furthermore, all households have limited resources which they have to allocate between different types of expenditure (food and
non-food), savings, and investments. There are some indications in the data that RIPAT households have shifted their main sources of income away from cash income from casual labour, and their uses of income have moved towards savings and agricultural investments by increasingly hiring labour.

5.2 The RIPAT objectives and how we measure outcomes

In our selection of outcome variables, we have been guided by the stated main objectives of the RIPAT projects. The original project documentation stated that the 'main development objective' of the RIPAT 1 project was 'to improve small-scale farming systems to attain food security and poverty alleviation through combined efforts in land management and upgrading agricultural production'. Similar project goals were stated, although rephrased to some extent, in subsequent RIPAT projects. Food security and poverty alleviation have remained the overall development objectives, and they were therefore also selected as our main outcome measures. That is, we analysed whether RIPAT 1 has had an impact on food security and poverty among households that have participated in RIPAT 1 groups. In doing so, we used the following definitions of food security and poverty.

**Food security** occurs when 'all people at all times have physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life' (Deitchler et al., 2011: 2). This means that there has to be adequate food available and adequate access to food for all household members to meet their nutritional requirements.

We therefore measured food security in three different ways. First, to capture adequate **access to food**, we used a standardized measure developed to capture hunger called the 'Household Hunger Scale', developed by USAID (Deitchler et al., 2010). The Household Hunger Scale is an index measuring the degree of household hunger and thus access to food. We used the index to define whether households suffered from hunger in what they defined as the worst month of the year in terms of food security, i.e. the typical lean or 'hungry' season (see Box 5.1 for details).

Second, to capture the **nutritional quality of the diet**, we analysed the intake of animal proteins by looking at whether a household had meat, fish, or eggs to eat during the week prior to the interview.

And third, in an attempt to capture more long-term improvements in both food security and nutritional intake, we examined whether the **prevalence of stunting among children under five years of age** had been reduced sufficiently to make a positive impact on the height-for-age measurements of such children. Malnutrition in early childhood or

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**Box 5.1 Measuring food access: the Household Hunger Scale**

The Household Hunger Scale is based on three questions on whether anyone in the household, due to lack of resources:

1. went to sleep at night hungry;
2. had no food to eat of any kind in the household;
3. went a whole day and night without eating.

We defined 'no hunger' as cases where the household answered 'no' to all three questions. As the period of reference, we used the worst month in terms of food security within the past year, as defined by each individual household.
of the pregnant mother leads to stunted growth, i.e. children having severely reduced height-for-age measurements.

Poverty is a more complex outcome to measure. Poverty is itself a relative concept, and depends on local circumstances. There is an ongoing scientific and political discussion on how to define poverty and which standards determine poverty threshold levels in different countries. Tanzania operates with a national poverty line of 492 Tanzanian shillings (TZS) per adult equivalent per day, representing the local monetary cost of fulfilling basic needs. This is very much in line with the typical international poverty threshold for developing countries of US$1.25 per day, after correcting for purchasing power differences. With this definition we would classify any household with expenditure levels below TZS 492 per adult equivalent per day as being poor, since their expenditure would not be enough to fulfil the basic needs for food and shelter.

However, expenditure levels, or income levels for that matter, are notoriously difficult and time-consuming to capture accurately. Most rural households in developing countries rely on home production for food consumption, and estimating the purchase value of such home-produced consumption is often problematic. Income among small-scale farmers is typically highly irregular, and often represents a return on an earlier agricultural investment. We have therefore used two different approaches for analysing whether the RIPAT project has had any major impact on poverty levels. The first is to assess whether it has had any impact on the probability that a household falls below the national poverty line of TZS 492 per day. To this end, we use the ‘Progress out of Poverty Index’ (PPI) (Schreiner, 2011), which estimates the risk of being poor on the basis of 10 simple questions. These questions all correlate highly with having an expenditure level below the national poverty line (see Box 5.2 for details). We have taken the PPI as our key poverty indicator because it is the most widely used measure for estimating poverty levels. However, it is a composite and somewhat static measure, meaning that it is less likely to capture temporary fluctuations in poverty and therefore less appropriate for identifying short-term changes in poverty levels. We should therefore expect to find a

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**Box 5.2 The Progress out of Poverty Index**

The PPI measures the risk of being poor on the basis of the following 10 questions:

1. How many household members are 17 years old or younger?
2. Do all children ages 6 to 17 attend school?
3. Can the female head/spouse read and write?
4. What is the main building material of the floor of the main dwelling?
5. What is the main building material of the roof of the main dwelling?
6. How many bicycles, mopeds, motorcycles, tractors, or motor vehicles does your household own?
7. Does your household own any radios or radio cassettes?
8. Does your household own any lanterns?
9. Does your household own any irons (charcoal or electric)?
10. How many tables does your household own?

*Source: Schreiner, 2011*

The responses are given different weights. The overall score obtained is between 0 and 100, where higher scores correspond to a lower risk of being poor. The PPI scale is constructed using data from Tanzanian households on income and expenditure and predicts poverty with reasonable certainty. More than half of the households in Tanzania with a PPI score below 30 also fall below the national poverty line. We therefore categorize households with a PPI score lower than 30 as ‘high poverty risk’ households and the remainder as ‘low poverty risk’ households.
change in the PPI only if the household has experienced a substantial improvement in their level of wealth.

Our second approach is therefore to assess whether some partial poverty indicators have changed, i.e. whether housing standards have improved, the ownership of luxury items has increased, or the proportion of children in the household enrolled in school has risen. Although such poverty indicators are only indirect expressions of the level of poverty within a household and therefore cruder than direct income measures, they can still provide useful information about the overall impact on socio-economic well-being among participating RIPAT households. Because they are simpler, we expect these measures to be of a more dynamic nature than the composite PPI.

5.3 RIPAT households and comparison households

To analyse the impact of RIPAT 1 on food security and poverty among participating households, we collected data using the large-scale quantitative household survey described in Chapter 3. The survey covered roughly 90 per cent of all RIPAT 1 and RIPAT 3 households, as well as comparison households from 20 selected comparison villages in the two districts of implementation, Arumeru and Karatu (see Table 3.1 in Chapter 3). For the impact assessment in this chapter we used a total of 1,718 interviewed households, of whom 424 had participated in RIPAT 1 groups and 491 had participated in RIPAT 3 groups. There were 361 households from comparison villages near the RIPAT 1 area in Arumeru and 442 households from comparison villages near the RIPAT 3 area in Karatu. We explain in Section 5.5 why we also need information on RIPAT 3 households for the impact assessment of RIPAT 1.

In Table 5.1, we list some of the main characteristics of all the households and villages (both RIPAT households and villages and their comparison households and villages) included in the impact analysis. The first column in the table lists the overall averages for all the households and villages included. In the subsequent columns, this average is broken down by the four types of household and village that form the basis of our impact analysis, namely RIPAT 1 households and villages (R1) and their local comparison households and villages (C1) in Arumeru District, and RIPAT 3 households and villages (R3) and their local comparison households and villages (C3) in Karatu District.

The majority of households in the sample have male heads. The average age of heads of households is 47 years and they have on average 5.5 years of schooling. There are three children living in the average household, which owns roughly 3 acres of land. The most important food crop for households in the sample is maize, and the most important cash crops are beans in Arumeru and pigeon peas in Karatu District. The majority of the houses have access to well or piped water for drinking, but a substantially larger proportion of the households in Karatu have very poor housing standards in terms of floor, walls, and roofs than is the case in Arumeru. All the villages have primary schools, and many villages also have a secondary school. Many villages have an agricultural extension officer associated with the village. On average, the villages are 10 km from the nearest market where farmers can sell their crops. The majority of villages in Karatu have no irrigation channels, whereas the opposite is the case for villages in Arumeru District.

Although there are several similarities between the two districts, there are also important differences. Karatu is a somewhat poorer and more remote district than Arumeru, with 44 per cent of the population in Karatu having a high risk of being poor...
Table 5.1 Characteristics of interviewed households and villages in Arumeru and Karatu districts

<table>
<thead>
<tr>
<th></th>
<th>All households</th>
<th>Arumeru District</th>
<th>Karatu District</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>All</td>
<td>R1</td>
</tr>
<tr>
<td>No. of households interviewed</td>
<td>1,718</td>
<td>785</td>
<td>424</td>
</tr>
<tr>
<td><strong>Household level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head of household is female (%)</td>
<td>15</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>Average age of head of household (years)</td>
<td>47.2</td>
<td>47.5</td>
<td>48.3</td>
</tr>
<tr>
<td>Average years of schooling of household head</td>
<td>5.5</td>
<td>5.7</td>
<td>5.8</td>
</tr>
<tr>
<td>Average no. children (0–16 years) in household</td>
<td>3.0</td>
<td>2.5</td>
<td>2.6</td>
</tr>
<tr>
<td>House is of a poor standard (%)</td>
<td>26</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Land area owned by household (acres)</td>
<td>3.2</td>
<td>3.4</td>
<td>3.5</td>
</tr>
<tr>
<td>Most important food crop is maize (%)</td>
<td>97</td>
<td>94</td>
<td>92</td>
</tr>
<tr>
<td>Most important cash crop is pigeon peas (%)</td>
<td>44</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>Most important cash crop is beans (%)</td>
<td>13</td>
<td>24</td>
<td>25</td>
</tr>
<tr>
<td>Drinking water from pipe or well (%)</td>
<td>64</td>
<td>58</td>
<td>55</td>
</tr>
<tr>
<td>Ethnic group of household is WaMeru (%)</td>
<td>19</td>
<td>41</td>
<td>35</td>
</tr>
<tr>
<td>Ethnic group of household is WaArusha (%)</td>
<td>14</td>
<td>31</td>
<td>36</td>
</tr>
<tr>
<td>Ethnic group of household is Iraqw (%)</td>
<td>53</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>High risk of poverty (based on PPI score) (%)</td>
<td>30</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>Housing standard: metal sheet roof (%)</td>
<td>72</td>
<td>91</td>
<td>88</td>
</tr>
<tr>
<td>Own a mobile phone (%)</td>
<td>63</td>
<td>67</td>
<td>68</td>
</tr>
<tr>
<td>School-aged children attending primary school (%)</td>
<td>87</td>
<td>91</td>
<td>90</td>
</tr>
<tr>
<td>Household experiences no hunger (%)</td>
<td>37</td>
<td>35</td>
<td>40</td>
</tr>
<tr>
<td>Household ate meat in past week (%)</td>
<td>54</td>
<td>72</td>
<td>75</td>
</tr>
<tr>
<td>Household ate fish in past week (%)</td>
<td>58</td>
<td>68</td>
<td>64</td>
</tr>
<tr>
<td>Household ate egg in past week (%)</td>
<td>44</td>
<td>47</td>
<td>56</td>
</tr>
<tr>
<td>Household includes at least 1 stunted child &lt; 5 years old (%)</td>
<td>43</td>
<td>30</td>
<td>26</td>
</tr>
<tr>
<td><strong>Village level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of villages</td>
<td>36</td>
<td>20</td>
<td>8</td>
</tr>
<tr>
<td>Irrigation channel in village (%)</td>
<td>74</td>
<td>69</td>
<td>74</td>
</tr>
<tr>
<td>Secondary school in village</td>
<td>68</td>
<td>72</td>
<td>60</td>
</tr>
<tr>
<td>Average distance to nearest market (km)</td>
<td>10.2</td>
<td>9.1</td>
<td>10.4</td>
</tr>
<tr>
<td>Village agricultural extension officer in village (%)</td>
<td>65</td>
<td>73</td>
<td>90</td>
</tr>
</tbody>
</table>

1 These are all outcome measures

Note: R1 = RIPAT households in Arumeru District; C1 = comparison households in Arumeru District; R3 = RIPAT households in Karatu District; C3 = comparison households in Karatu District

Source: EDI-RF APFS data, 2011
as opposed to 16 per cent in Arumeru, according to our PPI (see Box 5.2). Furthermore, housing quality is worse and there is almost one child more per household in Karatu than in Arumeru, and the children in Karatu are less likely to attend primary school, more likely to be stunted, and they come from households with a less varied diet in terms of their consumption of meat or fish.

Ethnically, most of the population in Arumeru are either WaArusha or WaMeru, whereas most households in Karatu belong to the Iraqw people.

Any significant difference between districts and between RIPAT and comparison households is taken into account in the following impact analysis. The main conclusion that can be drawn from the data in Table 5.1 is that the two RIPAT projects studied have been implemented in areas that are dominated by subsistence farming, but where household and village characteristics suggest that, although these areas are poor, they are not among the poorest or most deprived areas of Tanzania or East Africa. There is a certain base upon which the RIPAT intervention can build.

5.4 How was the RIPAT basket of options received?

For any intervention to have an impact, participants must adopt the project activities. RIPAT is a somewhat complex intervention, because it entails many different elements in its basket of options. Consequently, before analysing whether RIPAT has had any impact on the food security or poverty of the participating households, it is useful to look at the extent to which RIPAT farmers actually adopted on their own farms the various project elements contained in the basket of options offered to them. Table 2.1 in Chapter 2 provides a useful overview of the main components of the four RIPAT projects.

In the survey for the impact study, farmers were asked about their adoption of a number of the elements from the basket of options offered to them. Figures 5.1a and 5.1b show that RECODA was successful in getting the participating RIPAT farmers to plant a variety of the crops introduced through the projects, both in RIPAT 1 and in RIPAT 3. Although improved bananas have come to play a dominant role in the RIPAT projects, with roughly 60 per cent of all RIPAT 1 and 3 farmers adopting this crop on their own farms, other crops have also proved successful. RIPAT 1 farmers are significantly more

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**Figure 5.1a** Adoption of crops among RIPAT 1 and comparison households

**Figure 5.1b** Adoption of crops among RIPAT 3 and comparison households

Note: R1 = RIPAT households in Arumeru District; C1 = comparison households in Arumeru District; R3 = RIPAT households in Karatu District; C3 = comparison households in Karatu District

Source: EDI-RF APFS data, 2011
likely to have adopted soya beans than their comparison farmers (C1), and RIPAT 3 farmers are significantly more likely to have adopted cassava, lablab, pigeon peas (which were already widespread in Karatu), and soya beans than their comparison farmers (C3).

Turning to the introduction of improved animal breeds, we see a similar picture in Figures 5.2a and 5.2b, with a substantially higher prevalence of improved strains of goats, chickens, and pigs among RIPAT 3 households than among their comparison households. Improved pig breeds were not part of the basket of options in RIPAT 1, but have caught on in RIPAT 3 to the same extent as improved goat breeds. Although RIPAT 1 farmers were found to be significantly more likely to own a goat of an improved breed, only 10 per cent of them reported that the breed was introduced to them by RECODA or RIPAT. RECODA has noted that the adoption of improved goat breeds was not optimally designed in RIPAT 1, and it is something it changed in subsequent projects; see Section 2.4 in Chapter 2.

In both Figure 5.1 and Figure 5.2, we have shown in dark green the proportion of farmers where we know for certain that the crop or the improved animal breed was introduced to them by RECODA or a RIPAT farmer. Bars in light green indicate farmers who reported having adopted the technology, but did not explicitly state that it was introduced to them by RECODA or a RIPAT farmer.

Overall, these figures show that each RIPAT farmer adopted different components from those available in the basket. None of the options covered in the survey were adopted by all the RIPAT farmers to whom they were offered, but virtually all the options analysed above were adopted by some of them. The element of choice built into the basket of options was thus used by the farmers to pick and choose according to their specific needs and resources. At the time of the survey, all the RIPAT farmers interviewed were growing or keeping at least one of the promoted crops or animal breeds; among these farmers, almost 80 per cent stated explicitly that the crop or animal was introduced to them by RECODA or by a RIPAT farmer.

Finally, when we turned to other types of technologies promoted through the basket of options, such as zero-grazing livestock husbandry or participation in savings groups, we
also found clear indications of high adoption rates among RIPAT farmers compared with their comparison farmers in comparison villages. Both RIPAT 1 and RIPAT 3 farmers are significantly more likely to employ zero-grazing husbandry for some of their livestock, and are up to 20 percentage points more likely to be members of a savings and loan group than their comparison farmers in comparison villages. The consequences of this for the impact analysis are discussed in Section 5.5.

5.5 The impact of RIPAT on food security and poverty

Having established that RIPAT farmers did in fact adopt components of the basket of options to a greater or lesser extent, the next question is whether this adoption led to the expected impact on food security and poverty as stated in the development goals of the project. That is, do we see an increase in food security and a reduction in poverty among RIPAT 1 participants due to the RIPAT 1 intervention? In order to identify such an impact, we used a statistical method called ‘Difference-in-Differences’, which establishes the difference in impact between RIPAT 1 and RIPAT 3 households, subtracting the difference between their comparison households to take into account regional variations stemming from the fact that the two projects were implemented in two different districts.

Using this method, we exploited the fact that there is a two-year time lag between RIPAT 1 implementation (which started in 2006) and RIPAT 3 implementation (which started in 2008). This allowed us to account for two important and unobserved selection processes, namely that: 1) RIPAT villages were not chosen at random from among all the villages in the two districts, but rather they were selected due to their specific characteristics; and 2) similarly, RIPAT households were not chosen at random but rather volunteered to join the project, and hence might have been more motivated to improve their livelihoods than the average comparison households in the comparison villages. Therefore, we made use of the fact that RIPAT 1 and RIPAT 3 households are likely to be more directly comparable with each other in certain respects than are RIPAT households with randomly chosen comparison households in comparison villages. However, there will be other respects in which the RIPAT 1 households and RIPAT 3 households differ, because they reflect variations in the districts where they live, for example agro-ecological and socio-economic differences. The comparison households allowed us to control for these regional differences in the impact analysis, as explained in Box 5.3.

Impact on food security

When should we expect to see an impact on food security from RIPAT? We cannot expect any impact before the household has adopted the new agricultural technologies and the crops have had time to mature and ripen, which would take 9–15 months in the case of bananas, depending on the local climate. By then it should be possible to detect small impacts on food security if the implementation and production of the new crops have gone according to plan. Unfortunately, many of the RIPAT 3 villages were badly hit by drought in the first year after project commencement. We therefore expect only a very limited impact on food security in RIPAT 3 by January 2011, and not nearly the same impact as in RIPAT 1 (see Box 5.3 for details).

We find a statistically significant positive impact of RIPAT on access to food, measured using the Household Hunger Scale. Using the Difference-in-Differences method, RIPAT 1
Box 5.3 The Difference-in-Differences method as applied in the impact study

Did RIPAT have an impact on food security or poverty among the participating households?

**The problem:** We need to know what the counterfactual situation would have been, i.e. what level of food security or poverty we would have found among the participating RIPAT households had they not participated in the RIPAT project. But we cannot simply compare RIPAT households with randomly selected non-RIPAT comparison households in the same district, because RIPAT households were not selected at random.

**The solution:** We can compare RIPAT 1 households (in Arumeru District) after four-and-a-half years of project implementation with RIPAT 3 households (in Karatu District) after two-and-a-half years of project implementation. The impact of RIPAT – if it exists – should be much greater after four-and-a-half years than after two-and-a-half years.

RIPAT 1 and RIPAT 3 villages and households are likely to be comparable because they were selected for project participation by the same method and according to the same criteria. RIPAT 1 and RIPAT 3 villages and households are likely to differ because they are in different districts and thus geographical areas. Karatu is poorer than Arumeru, so a direct comparison between them will not give accurate results.

**How can a meaningful comparison be made between RIPAT 1 and RIPAT 3 households?**

First, we average the outcome measures that we wish to compare for RIPAT 1 households and for RIPAT 3 households, and calculate the difference between the two averages. In the averaging process here and below, we control for various characteristics of households and villages in the sample. The difference between the averages gives us a measure of the raw difference between RIPAT 1 and RIPAT 3 households.

Next, we average the outcome measures for the randomly selected comparison households for RIPAT 1 (in Arumeru District) and for RIPAT 3 (in Karatu District), and calculate the difference between the two averages. This difference between the outcome measure averages for the comparison households gives us a measure of the difference between the two districts.

Now we deduct the difference calculated between the two districts from the difference found between RIPAT 1 and RIPAT 3 households – the Difference-in-Differences. This calculation removes any systematic difference between the districts from the difference between RIPAT 1 and RIPAT 3 households. It is reasonable to assume that any remaining difference between RIPAT 1 and RIPAT 3 households is attributable to the impact of RIPAT.

There are two sources of potential bias in this estimated impact, and these pull in opposite directions. Within the first year of RIPAT 3 implementation, Karatu District was hit by a severe drought. If this drought hit the RIPAT farmers relatively harder than their comparison farmers (because the new technologies depended more on having an adequate water supply), then we are likely to overestimate the impact of RIPAT when applying the Difference-in-Differences method. On the other hand, because we assume that RIPAT 3 had no impact after two-and-a-half years, whereas in reality there might already have been some impact, we are likely to underestimate the impact of RIPAT. Thus, it is possible that the effect is either slightly overestimated or slightly underestimated overall, or even that the two potential sources of error cancel each other out.

Finally, it should be noted that for outcomes where the impact after two-and-a-half years of implementation in RIPAT 3 was likely to have reached the same level as that after four-and-a-half years in RIPAT 1, we cannot use the Difference-in-Differences method and thus cannot take the unobserved selection processes at village and household level into account. In the rest of the chapter, we indicate the instances where we believe this to be the case.
households are estimated to be 25 percentage points more likely to experience 'no hunger' in the worst period of the year than they would be otherwise. This result is shown in Figure 5.3 by the black line in the centre of the first bar, representing 'no hunger'.

A brief note on how to interpret the findings in Figures 5.3 and 5.4 is required here. The graduated shading on the bars displays the level of statistical uncertainty for the results. It is possible to state with 95 per cent certainty that the true impact measure lies somewhere within the shaded area, called the 'confidence interval'. Since the shaded bar for 'no hunger' does not cross the zero line, we can be reasonably certain that there has been an impact on our hunger measure. We can in fact say with 95 per cent certainty that RIPAT 1 decreased the prevalence of hunger by 10–40 percentage points, our best estimate being a reduction in the prevalence of hunger of 25 percentage points among RIPAT 1 farmers compared with RIPAT 3 farmers, after controlling for specific household and village characteristics as well as regional differences.

In addition to improving access to food and thus reducing the prevalence of hunger, RIPAT 1 has also had a positive impact on the nutritional quality of the diet. It can be seen from Figure 5.3 that, at the time of the survey, RIPAT 1 households had become almost 20 percentage points more likely to have eaten meat in the previous week. It seems that RIPAT 1 households are also slightly more likely to consume fish, but since

Figure 5.3 Impact of RIPAT 1 on food security

Note: The black lines represent the estimated effects. The graduated bars represent the 95 per cent confidence intervals around this effect. As long as the lower ends of the graduated bars are above the zero impact line, there is at least 95 per cent probability of a positive impact from RIPAT. The vertical axis shows the percentage difference between responses from RIPAT 1 farmers and those from RIPAT 3 farmers, after controlling for household, village and regional characteristics.

Source: EDI-RF APFS data, 2011
the graduated bars cross the zero impact line, we cannot statistically distinguish the estimated impact on fish consumption from zero. RIPAT 1 households have, however, also become more likely to eat eggs. This is less surprising, since improved chicken breeds were part of the basket of options in the RIPAT project, as mentioned in Section 5.4. Similarly, the implementation study also reported improved nutritional quality of the daily diet as exemplified by the quote from a female farmer from Marurani village (see Section 6.3, Chapter 6).

The last food security outcome we examined was the degree of malnutrition among children under five years old. We found that some children in a few villages are considerably less likely to be stunted. This results in an overall average of young children being 27 percentage points less likely to be stunted.³ It suggests that for these children the improved food security, in terms of both better access to food and better nutrition, has been sufficiently persistent to have generated a lasting impact on their lives. RECODA has – with its focus on bananas and chickens, and hence on the production of eggs – hit on one of the best and most cost-effective nutritional combinations that one could obtain. In a study from the Philippines (Banerjee and Duflo, 2011: 26), eating eggs and bananas has been found to be the cheapest way to obtain sufficient calories, and to provide the right proportion of calories from fat and from protein; this might also apply to rural Tanzania.

Impact on poverty

Despite the fact that we found clear indications of a strong positive impact from RIPAT on food security outcomes, we did not find any statistically significant impact on the risk of being poor as indicated by the PPI measure, as can be seen from the first bar in Figure 5.4. Although the impact of RIPAT on the risk of poverty appears to be positive (at slightly below 10 percentage points), the shaded bar crosses the zero line, indicating that we cannot distinguish the impact from a zero effect with any reasonable degree of statistical certainty.

There are a number of possible reasons why the study did not reveal an impact on poverty in RIPAT households.

First, it is possible that RIPAT did make an impact on poverty, but that this impact was not captured by the measure of poverty used, the PPI. The PPI measures poverty indirectly, by measuring spending, rather than directly, by measuring income. It does this through 10 simple questions on items owned in a household, the condition of the house, literacy of the spouse, and children’s education. To achieve a change in the overall PPI value would require additional spending on household items, housing quality, or children’s schooling. This suggests that the PPI value for a household tends to change only over a long period or with a substantial change in the level of prosperity. However, from the PPI data documentation it is possible to extract a list of consumption indicators that are highly correlated with having expenditure levels below the national poverty line. We also examined the results for these separate items of consumption. The average values for one item may change more quickly than the full index, and thus an examination of individual items is more likely to reveal short-term changes. Again, we found no impact from RIPAT 1 on any of the individual indicators, be it housing quality measures, ownership of ‘luxury’ items such as mobile phone, sofas, stoves, lanterns, or watches. Some examples are shown in Figure 5.4. Although the estimated impacts are
generally positive, they are not statistically significant. The findings are similar when we consider the schooling of children measured in terms of the proportion of children aged 7 to 14 years enrolled in school.

Obviously, it is possible for a household to have experienced an increase in available resources without increasing spending on the items listed above or in the PPI. For example, a household may produce and consume more, and better, food – food that has a monetary value, and thus represents income. Such an effect could well have been an outcome of RIPAT, and would have had an impact on both food security and poverty without necessarily having any great impact on the PPI or the other poverty indicators examined. Similarly, additional income might have been spent on agricultural investments, or saved in the savings and loans schemes that were a feature of RIPAT, rather than spent on the items covered by the PPI.

This takes us to the second possible reason why there was no impact on the PPI; the sources of income and uses of income may have changed as a result of RIPAT without necessarily having affected the overall income level. The data show that both RIPAT 1 and RIPAT 3 households are less likely to supply casual labour than their comparison households as one of their most important sources of income. They are also more likely to hire labourers to work for them. Finally, they have increasingly joined savings groups,
as they have been encouraged to do by RECODA since 2009; RIPAT participants are 20 percentage points more likely to be members of savings groups than their comparison households. These factors suggest that not only have the households opted to reduce their cash income by reducing their supply of casual labour, they have also increasingly opted to use whatever cash income they have on agricultural investments (through hiring labour) or on savings (through their savings groups), rather than on improving their housing quality or purchasing luxury items. Because all these three changes are already evident among households in RIPAT 3, we cannot employ the Difference-in-Differences method to control for the unobserved selection processes of households and villages in RIPAT 1, but instead have to compare RIPAT households and their comparison households in the same district.

The findings regarding the use of labour within the household are shown in the last two bars in Figure 5.4; these depict the situation for RIPAT 3 households only. Here we see that RIPAT 3 households rely 10 percentage points less on supplying casual labour as one of the most important income sources in the household than their comparison households do. In rural Tanzania, supplying casual labour is strongly stigmatized, and many farmers cut back on this as soon as they can afford to do so, despite it being a rather remunerative source of income. We should therefore expect the reduction in casual labour to be a result of a household being able to do without that income source, although the net effect may be a reduction in overall income level. RIPAT 3 farmers have not only cut back on their supply of casual labour, they are also 10 percentage points more likely than their comparison households to hire labour from outside to work for them, and RIPAT 1 households are 30 percentage points more likely to do so (not shown in Figure 5.4). This impact is pronounced only among the RIPAT households that grow bananas; this is not surprising, since banana cultivation is very labour intensive in the early stages.

A third possible reason is that RIPAT may have made consumption smoothing easier by spreading the yields of agricultural production, and thus income, more evenly over the year, and by introducing the availability of loans and savings through the savings and loans associations. Improved consumption smoothing could account for improved food security even if incomes had not increased overall. Our food security measure is a measure of whether or not the household has experienced hunger in what is defined as the worst month of the year in this respect. That is to say, our ‘no hunger’ measure can also be seen as a measure of whether RIPAT households have been successful in securing enough food for the ‘hungry’ period – i.e. whether they have increased their ability to smooth food consumption over the year. In terms of agriculture, RIPAT promotes the cultivation of banana, a perennial crop that, once fully established, produces food at a more constant rate throughout the year than annual crops. Improved breeds of livestock also largely provide a yield throughout the year with relatively little seasonal variation. Thus, irrespective of whether RIPAT has changed income or poverty levels among the participating households, the shift towards less seasonal agricultural technologies has lessened the need for the smoothing of food consumption. This could be sufficient to generate a positive impact on food security in the lean season. This effect on food security may have been strengthened by the increased membership of savings and loans associations towards the end of the RIPAT 1 project period. Such membership increases the ability to smooth consumption by providing both the means for more secure cash savings for lean periods and the possibility of borrowing during those periods.
A note should be included here on what the impact evaluation captures. The fact that training in the establishment of savings groups became an integral part of the RIPAT projects only in 2009, i.e. in the last year of the RIPAT 1 project period and in the early phase of the RIPAT 3 project period, makes it impossible to separate the shorter-term effect of savings group participation from the longer-term effect of agricultural technology transfers. Although we are not able to detect any statistically significant difference in the probability of RIPAT 1 and RIPAT 3 farmers reporting membership of a savings group, it is possible that the levels of the savings made by members of the two groups were different at the time of the survey. We therefore cannot identify whether the impacts found on the various food security outcome measures among RIPAT 1 farmers are attributable to improved agricultural production, to a more intensive use of savings groups by RIPAT 1 farmers than RIPAT 3 farmers, or to a mixture of the two.

5.6 Conclusion

Although RIPAT is known locally by many as ‘the banana project’ (see Chapter 7), the considerable variation between households in which technologies they adopt suggests that the choice built into the basket of options has indeed been used by the individual farmers to select technologies according to their needs and resources.

We have found that RIPAT has had substantial impacts on the food security of farmers participating in RIPAT 1. We have found positive impacts on access to food and on the nutritional quality of the diet, which also seems to have caused a considerable reduction in the degree of stunting among some children under five years old. Stunting is typically caused by malnutrition at an early age.

Despite these positive impacts on our food security measures, we found no impact on any of our poverty indicators, be they the composite PPI or the partial indicators focusing on specific improvements in housing standards, schooling, or ownership of ‘luxury’ goods. There may be several reasons for this. It should be kept in mind that RIPAT targets households in an area where three households in five experienced hunger in the past year, and where two in five households with children have at least one stunted child. In an area where food insecurity is so widespread, it seems plausible that this is the first thing households will attempt to address.

Furthermore, the RIPAT project has provided the means to address the seasonal variation in the household’s agricultural production, and thus their food production. By adopting perennial crops and improved livestock breeds, the participating households have almost automatically achieved better food consumption smoothing over the year. This may have been strengthened further through the increased membership of savings and loans associations.

In addition, there are indications that RIPAT households have changed their use of labour; they are more likely to invest in their own farm activities rather than supplying casual labour to others, despite this being a rather remunerative source of income. This suggests that any additional resources that RIPAT may have generated have primarily been used by the participating households to improve their food security and to invest in their farms.

Finally, it should be mentioned that, although at present we cannot detect any impact of RIPAT on poverty, we cannot rule out the possibility that over a longer timeframe RIPAT may have positive impacts on poverty levels among the households that have
participated. Thanks to the impacts on food security, we would expect that, solely as a consequence of improved nutrition among children and adults, there should be an impact on poverty in the longer term. This is, however, pure speculation, and only time will tell whether it is the case.

Notes
1. This poverty line is calculated by defining a food poverty line at TZS 359 per adult equivalent per day, equivalent to the cost of 2,200 calories using food items consumed among the poorer half of the population. The national poverty line of TZS 492 per adult equivalent per day is based on the food poverty line, which is then adjusted for the fact that households also have necessary expenditures on non-food items. For more information see Schreiner et al. (2011).
2. Households where information was missing, households owning more than 8 acres or less than 1 acre of land in 2006, and new residents in the village have all been disregarded from the impact analysis. Results are robust to their inclusion.
3. The height-for-age (stunting) index provides an indicator of linear growth retardation and cumulative growth deficits in children. Children whose height-for-age Z-score is below minus two standard deviations (–2 SD) from the median of the World Health Organization (WHO) reference population are considered short for their age (stunted), or chronically malnourished. Children who are below minus three standard deviations (–3 SD) are considered severely stunted. Stunting reflects a failure to receive adequate nutrition over a long period of time and is affected by recurrent and chronic illness. The height-for-age measure, therefore, represents the long-term effects of malnutrition in a population and is not sensitive to recent, short-term changes in dietary intake.

References
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CHAPTER 6

Evaluation of the RIPAT concept

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In this chapter, the actual implementation of the RIPAT interventions is assessed, following the OECD’s Development Assistance Committee (DAC) principles. The authors conclude that RIPAT has been a relevant project in terms of both the technologies offered and the way in which they were offered, through the use of a basket of options as a pragmatic mix of different extension approaches. There are indications that RIPAT has succeeded in closing the technology gap experienced by small-scale farmers, as the risk of agricultural failure during drought has been reduced. The writers draw special attention to the use of built-in spreading mechanisms and of biologically based inputs (which can be produced locally) as effective and efficient ways of ensuring sustainability and further diffusion of the technologies introduced. However, a potential weakness of RIPAT may be a lower level of sustainability in the farmer groups compared with the classic Farmer Field School (FFS) set-up.

6.1 Introduction

In this chapter, we provide an overall analysis and evaluation of the RIPAT concept, its implementation strategy, and its organizational structure. Specifically, our evaluation examines the relevance, effectiveness, efficiency, and sustainability of the RIPAT project design. The evaluation described here was carried out by a team of researchers from the DIIS and the FAO. Our analysis and evaluation are based on a thorough reading of all the documents related to the project, and on observations and interviews carried out in Tanzania in June 2011 for the implementation study (see Chapter 3, Section 3.5).

As outlined in Chapter 2, the stated overall objective of RIPAT 1 was to reduce poverty and increase household food security by introducing new technologies and practices to poor farmers – i.e. by closing the agricultural technology gap. However, we note that the objectives of the RIPAT projects have evolved over time. RIPAT 1 focused on improving agriculture for the individual farmers, and forming groups was simply a means of reaching farmers in an efficient way. In the process of implementing RIPAT 1, RECODA and the Rockwool Foundation realized that groups were very important in themselves for spreading the various elements of the project and for project continuation, and also that groups could be a vehicle for development in general. Therefore, when the objectives for RIPAT 2, 3 and 4 were formulated, support for groups was included in the objectives.

Activities in the RIPAT projects fall into two categories: those aimed at supporting food security and agricultural business opportunities for the targeted groups of farmers; and those aimed at building up the organizational capacity of farmer groups. Support is provided to groups of farmers; they are offered a combination of advice and training in agricultural techniques and the tangible inputs associated with the basket of technology options. Technologies spread from members of RIPAT groups to the wider community. RIPAT participants are proclaimed by the village government to be village ‘development ambassadors’ and they are required by the village government and RECODA to teach fellow villagers what they have learned in the RIPAT project in order to promote the spread of knowledge and technologies. Technologies also spread through the sale of inputs on a market basis. The overall finding of our evaluation is that RECODA’s ‘help to self-help’ support for RIPAT groups has been highly successful in bridging the technology gap, and relatively successful in terms of capacity development of the groups. Members of the RIPAT groups have acquired relevant agricultural knowledge and have also gained
in individual and collective empowerment, enabling them to improve their well-being and livelihoods through increased household agricultural production.

The chapter is organized as follows. First, the key components and implementation strategy of RIPAT are presented in Section 6.2. This is followed by four sections examining the relevance, effectiveness, efficiency, and sustainability of the RIPAT intervention. Finally, conclusions and recommendations are discussed in Section 6.7.

6.2 Key components and implementation strategies

In our assessment of the four RIPAT projects begun to date, we have identified three components that we believe characterize the intervention:

- support for smallholders in developing their agricultural techniques through the offer of a basket of agricultural technology options;
- capacity development for groups of farmers;
- provision of a mechanism for spreading agricultural technologies within the groups and to the wider community.

As shown in Table 2.1 in Chapter 2, RIPAT has been implemented in the form of projects planned for three years. RIPAT 2 and 3 were extended by one year because of drought. Implementation of each successive project is guided by the lessons learned from the previous one. In general, what has characterized the intervention is the adoption of a development approach that is flexible and open to continuous adjustments during project implementation, i.e. action and reflection (see Figure 1.1 in Chapter 1 for a timeline for the RIPAT projects).

- RIPAT 1 started in 2006 and was extended by six months to provide additional support for group leadership, management of group accounts, and post-harvesting and marketing, etc. (including processing and drying of bananas).
- RIPAT 2 has been the most challenging, as the area where it is being implemented was hit by spells of drought in 2009 and 2010; consequently, RIPAT 2 has been extended to last for four years. Although some RIPAT 2 groups have managed to cultivate bananas, the majority of farmers in RIPAT 2 rejected improved banana cultivation, which was the main technology option in RIPAT 1, and have instead opted for improved breeds of sheep, goats, and poultry, as well as for conservation agriculture. These technologies are better suited to the extremely dry conditions, and are also more culturally acceptable to the members of the RIPAT 2 groups. The RIPAT 2 farmers are pastoralists; their farming system is under considerable pressure and in a state of transition.
- The technological innovation in RIPAT 3 was to add an improved breed of pig to the basket of options; this project also started in 2008, but in the mountainous Karatu District. RIPAT 3 was extended to last four years because of the 2009 drought.
- RIPAT 4 started in January 2010 in the lowland part of Korogwe District and is expected to finish as planned in December 2012. Groups in RIPAT 4 seem to have adopted a greater variety of the elements from the basket of options than did the other groups.
6.3 Relevance

This section discusses the extent to which the activities and outcomes of RIPAT are, in our view, consistent with the overall project aims of achieving household food security and reducing rural poverty. Our overall finding is that the objectives of RIPAT are highly relevant for and consistent with the needs of poor farmers in northern Tanzania. A farmer from the Elakonoto RIPAT group in Marurani village (RIPAT 1) said: ‘Members used to be viewed by others as average poor farmers. Now they are viewed by the community as resource persons, in terms of both knowledge and material resources. Many come to them for advice and even for loans.’

Basket of agricultural technology options

RIPAT offers farmers a basket of agricultural technology options designed to bridge the agricultural technology gaps identified during initial needs assessments and problem analysis, and thus to help the farmers use existing techniques more effectively (see Box 2.2 in Chapter 2 for details about the content of the basket of options). The technology gap can be understood as the difference between the farm production that is achieved with the agricultural technologies currently being used by farmers and the production that could be achieved by the same farmers if they had access to better technologies and had the capacity to adjust them to local conditions. The gap is caused both by lack of knowledge of techniques and training in their use and by lack of access to equipment and agricultural inputs for implementing better technologies.

The closing of the technology gap aims to achieve two effects:

• a reduction in the risk of agricultural production failure during drought; and
• an increase in productivity during seasons with adequate rainfall.

Several techniques have been promoted to secure a reduction in the risk of production failure as a result of drought. Cultivation of improved varieties of bananas, planted in large holes filled with a mixture of cow manure and topsoil, generally ensures much better water infiltration and retention than the crop cultivation it replaces (e.g. cultivation of maize). This significantly reduces the effect of drought spells, especially when it is combined with other elements from the basket of options, e.g. intercropping with improved varieties of cover crops (particularly lablab), which reduces evaporation, and construction of tied ridges in combination with water harvesting, which reduces loss of rainwater. Other technologies in the basket that reduce the risk of poor harvests in drought conditions include conservation agriculture for maize and improved varieties of cassava and sweet potatoes (the full list of technologies is provided in Box 2.2 in Chapter 2). The negative consequences of drought can also be reduced by shifting from crop cultivation to small livestock husbandry, with the adoption of improved breeds of poultry, sheep, goats, and pigs.

A farmer from the Garmi RIPAT group in RIPAT 3 stated: ‘Short-season maize combined with conservation agriculture has increased the period during which the maize can survive without adequate rainfall. I can see that my neighbours’ [traditionally planted] maize fields are much more affected by drought.’

With regard to increasing productivity, the combination of improved husbandry techniques and access to improved varieties of crops and small livestock seemed to be effective. A subsistence farmer who may often be faced with food deficit would consider a successful technology to be one that produces an acceptable yield in the worst year
rather than one that produces a bumper yield in the best. In a semi-arid environment where rainfall fluctuates considerably from year to year, the issue of production stability is particularly important. We therefore consider these technology options to be highly relevant for RIPAT’s food security and poverty alleviation aims.

A woman from the Elakonoto RIPAT 1 group in Marurani village said: ‘The quality of feeding has changed for all group members. We used to eat a monotonous meal consisting of maize ugali [maize flour mixed with water and cooked to a porridge or dough-like consistency] with occasional beans and relish. Today we eat diverse meals consisting of chicken, eggs, milk, banana, maize ugali, a range of vegetables, pigeon pea, cowpea, soya bean, and occasionally goat meat or beef.’

Members of RIPAT groups are free to choose which elements of the basket of options to adopt on their private farms. The impact analysis described in Chapter 5 shows that all members of RIPAT groups adopted at least one item from the basket available, and virtually all the elements offered were adopted to a greater or lesser extent. The qualitative interviews we conducted for the implementation study (see Chapter 3, Section 3.5) indicated that RIPAT farmers typically adopted the main technology element in the basket, e.g. an improved banana variety in RIPAT 1, while there were differences among group members with regard to the adoption of the other elements in the basket. One combination of technologies cannot be said to be better than another. The combination that is best for one farmer may not be the one that is best for another farmer. We therefore consider the RIPAT practice of allowing group members to freely choose which elements of the basket of technology options are best suited to them to be highly relevant and appropriate.

The technology options promoted by RIPAT are all founded on biological inputs that can subsequently be produced by farmers themselves. This contrasts with crops that require regular and costly externally provided inputs, e.g. hybrid maize seed, fertilizers, and pesticides.

**Box 6.1 Experiences of RIPAT group members with three key agricultural technologies in the basket of options**

Farmers explained that local banana is low-yielding. The plants are tall and prone to lodging (the collapse of top-heavy plants), and they take a long time to mature. Improved varieties have a significantly higher yield potential. The plants are shorter, and the fruit mature more quickly, are sweeter, and are of good quality for cooking. The sale price of a banana bunch can vary from TZS 3,000 to TZS 12,000, depending on the size, location, and time of year.

With regard to poultry, cockerels of the improved breed produce hybrid offspring when mated with local chickens. Farmers appreciated the fact that the hybrid offspring grow faster than the local poultry, and weigh more. The poultry husbandry system used is simple and cheap; farmers use local materials to construct poultry units. In RIPAT 1, the poultry programme faced some problems related to management and disease control, but these issues were resolved in subsequent RIPAT programmes. Overall, the poultry technology has proved to offer good business opportunities with a ready market for the produce, and has involved limited requirements for both labour input and land.

In Karatu District, the introduction of an improved breed of pig has been highly successful. Both male and female pigs of improved strains were supplied to the groups for breeding. In addition, the new male pigs are crossed with local female pigs. Offspring receive supplementary feeding and veterinary treatment, unlike the free-ranging local pigs. There are differences in size – the improved breed of pig producing considerably more meat than the local breeds. Moreover, the quantity of piglets is greater for the improved strains (litters of 8–10 piglets twice a year, compared with 4–8 piglets once or twice yearly for the local types). After adopting the improved pig breed, each farmer is required to give five of the female offspring to other group members on the list according to the solidarity chain.
The options that have been offered in the different RIPAT projects have varied in number and in the combinations available, with each new project learning lessons from the previous one. The intention has been to vary the mix in the basket of options so that it is as relevant as possible to the recipient group, taking into account both previous experience and the needs of farmers in different environments and cultures.

**Organization into groups**

RIPAT projects organize farmers into groups, and RECODA uses these groups as the units for providing support. The groups are encouraged to play an active role in choosing which of the technology options they are interested in, thus empowering them from the outset. Learning in RIPAT groups follows a season/cycle-based process, similar to the classic FFS method, where a given technique is followed through all its stages. This ensures that the timing of learning is appropriate. The system emphasizes the principles of ‘learning by doing’ and using the field as the primary learning environment. Project participants meet in the field and have hands-on involvement in every step of the process of establishing demonstration plots for the implementation of the technologies. However, unlike the FFS approach, which emphasizes broad understanding of the ecosystem and basic scientific concepts, RIPAT focuses on an understanding of specific, predetermined technologies. RIPAT therefore applies a mixture of a traditional extension approach and an FFS approach. In RIPAT, the introduction of a basket of options of unfamiliar technologies has required the combined use of a demonstration approach (top down) and experimentation, reflection, and analysis, as applied in the classic FFS approach (bottom up). For example, the new banana varieties and cultivation methods were unknown in most of the RIPAT 1–4 villages – and therefore the role of the RECODA staff member sometimes became more that of a teacher rather than a facilitator. Nevertheless, experimentation was a crucial and integral part of the technology transfer. Groups experimented with and evaluated the four or five varieties tested in each group, different manure application rates, and so on.

Perhaps because of the emphasis on demonstrating the basket of options, the evaluation team’s visits to the RIPAT group fields left them with an impression of demonstration plots and production sites, rather than experimental plots of the type used by FFS. However, interaction with RECODA staff revealed that, while the technology options are established for demonstration purposes, they are also tested and compared with traditional methods, and the outcomes are evaluated by the RIPAT group members themselves. This evaluation process involves RIPAT farmers in defining the experiments, in reflecting critically on the results, and in reaching consensus after group discussions. There are instances where this process has resulted in innovations and adjustments to elements in the basket of options.

One example provided by RECODA staff concerned farmers in Majimoto village. They designed an experiment where they applied 10 20-litre containers of manure to each banana hole instead of the demonstrated seven containers. The experiment showed that 10 tins of manure gave remarkably better yields. The farmer group and RECODA staff discussed the results critically and agreed to modify the recommendation for banana cultivation in the village, and RECODA has changed its recommendations for other areas with similar growing conditions.
The advantage of FFS over the RIPAT learning approach is that farmers learn in FFS to analyse their own situation in a very systematic way and to understand the underlying scientific principles of the chosen technology options, while RIPAT group members’ experimentation is less systematic, leading the groups sometimes to simply replicate what they have been taught.

The advantage of the RIPAT learning approach is that it is a much faster way of spreading proven techniques. The combination of a relevant basket of technology options and a modified FFS approach seems highly relevant for the rapid agricultural improvement needed during the relatively short RIPAT projects.

In RIPAT, the intensive instruction and assistance by RECODA staff ends after the initial 18 months, and learning sessions become less frequent over the following 18 months. Continued teaching is gradually taken over by one or more farmers within the group. These ‘super-farmers’ receive supplementary training from RECODA staff, or are offered the opportunity to attend training elsewhere through the RECODA Academy (see Chapter 11). One of the tasks of the super-farmers is to provide their groups with expertise relevant to the techniques that they have chosen to implement, and to organize group activities relating to the projects. The super-farmers also contribute to the spread of RIPAT technologies to the wider community (see chapters 9, 10 and 11).

6.4 Effectiveness

Our analysis of RIPAT’s effectiveness focuses on RIPAT 1, but also draws on the implementation processes of subsequent RIPAT projects and on an assessment of RECODA as the implementing organization. The overall assessment produced by our analysis is that, to a large extent, RIPAT has achieved its objectives. The high level of effectiveness has been achieved through both the relevance and efficiency of the project and, perhaps most importantly, through the absence of any major design failings or implementation failures.

Assessment of RECODA

RECODA is a Tanzanian non-governmental organization. It was established in 2000 with the aim of bridging the technology gap among small-scale farmers through research, consultancy, capacity-building, and facilitation of community-based projects. During its first five years it had no major source of income and employed only a few staff, who attracted assignments based on their individual professional credentials. Its core staff members had previously been employed as agricultural researchers at government research stations. From 2006 onwards, RECODA has been closely linked with the Rockwool Foundation. RECODA has grown to its current size of 15 permanent employees through its implementation of RIPAT projects, and it has received flexible and responsive support from the Rockwool Foundation in this work. This has given RECODA the breathing space needed to concentrate on its work and spend less time chasing funding or worrying about how to pay the bills.

At the time the RIPAT project began, RECODA had already carried out development and consultancy work in the districts that were targeted in the RIPAT projects. RECODA therefore had comprehensive practical and background knowledge from the outset about the local settings, including the potential for and restrictions on agricultural
development. RECODA also had practical experience of spreading new, useful knowledge and technologies to farmers and of how to optimize technology adoption.

In the opinion of the evaluation team, RECODA stands out among the numerous Tanzanian NGOs. RECODA staff are well known and respected among local government politicians and technical staff in the districts where RIPAT is implemented; they are widely viewed as being serious in their work and as acting in a spirit of partnership with local government staff. This high regard is due not only to the high degree of technical competence of their agricultural support, but also to how they work as an organization.

RECODA has a highly qualified team of staff, including a charismatic executive director and an extremely competent programme director, committed project managers for each of the ongoing RIPAT 2, 3, and 4 projects who are assisted by a number of well-informed and active field staff, and a small administrative department. The DIIS evaluation team interacted with most of the RECODA staff, who all came across as being very dedicated and well qualified for their jobs. The educational profile of the staff is biased towards technical agriculture, with limited formal social sciences background.

Senior staff seemed genuinely interested in learning through critically examining the experience gained from RIPAT project implementation, with a view to understanding how they could improve their efficiency as an organization. RECODA also seems concerned with cost effectiveness: for example, the organization has rented a rural house in Korogwe District that both provides accommodation and serves as an office during the staff’s frequent visits to farmers in the RIPAT 4 project. While many Tanzanian NGOs seek to maximize personal benefits for staff, RECODA as an organization seems to act to minimize the use of funds for unnecessary hotel expenses.

**Basket of agricultural technology options**

The most obvious factor contributing to the effectiveness of RIPAT is that the technologies offered generate the outcomes demanded by farmers. We found many indications that farmers’ adoption of technologies from the basket of options has improved the resilience of farming to drought in the project villages. An appropriate combination of improved crop cultivation for banana, conservation agriculture, water harvesting, and the introduction of genetically improved varieties of poultry and goats have all contributed to decreasing farmers’ dependency on rainfall. While there is a clear relationship between access to water and yields, RIPAT group members all seem to be able to harvest at least something during drought years, while most other farmers in their communities experience crop or livestock failure. While agricultural production over the past three seasons has been generally depressed by drought, the farmers interviewed all agreed that the RIPAT technology options will be able to increase productivity significantly if there is adequate rainfall. As one farmer from the Upendo RIPAT group under RIPAT 4 put it: ‘Give us one good rainfall season and we will stop working as casual labourers for other farmers and become household food secure.’

Efforts by RECODA to make the technologies easily accessible to poor farmers also contribute to RIPAT’s effectiveness. Poor farmers lack the money to access the external technology inputs needed to improve agricultural productivity and increase income. Many technologies available in the shops, such as hybrid maize, fertilizers and pesticides, have high input costs and low farm-gate prices for the produce. RECODA has solved this constraint by eliminating or lowering input costs. The RIPAT projects supply biological
inputs to RIPAT groups, and in return the benefiting farmers are asked to help others in the community to gain the same capacity, in particular by passing on inputs that they produce themselves. In addition, RIPAT group members learn to produce the inputs needed for all the technologies in the basket of options (seed, manure, and improved strains of small livestock), thereby reducing their dependency on expensive and sometimes difficult-to-obtain external farm inputs. From being one of the major constraints to successful farming, inputs have become an asset for RIPAT group members, as the sale of inputs has come to contribute an increasing proportion of farm income.

**Group organization and support**

However, offering relevant technology is not sufficient on its own. RECODA’s efforts to organize farmers into groups to enhance their social, organizational, and technological skills and capacity also contribute to RIPAT’s effectiveness. It is important that support for building organizational skills in the groups is provided in advance of each group’s introduction to the basket of technology options. By combining support for social empowerment and access to relevant technologies, RIPAT enables farmers to play an active role in their own development. This dual approach has been shown to be successful elsewhere in East Africa (Friis-Hansen and Duveskog, 2011).

The quality of the support provided by the implementing agency is another crucial component influencing effectiveness. All the people interviewed for the evaluation, whether farmers, village leaders, or local government staff, recognized that ‘RECODA is different from other NGOs’ in that RECODA keeps its promises and its engagement in the community is a long-term commitment. RECODA implements activities in close liaison with district and village government politicians and technical staff, thus ensuring strong feelings of ownership of the project among public officers as well as among group members and the wider community. RECODA’s support to farmer groups through RIPAT differs from that of other NGO projects and the government’s Agricultural Sector Development Programme (ASDP); frequent follow-up visits are made during the first 18 months, during which time any unsolved problems or unexpected obstacles are dealt with. RECODA has also been efficient in synchronizing the delivery of advisory services with the provision of adequate volumes of appropriate and high-quality biological inputs. Our visits to the four RIPAT projects demonstrated to us that the local RECODA personnel were very knowledgeable and highly qualified for their jobs, and were well known to and respected by farmers and village officials.

However, in one specific aspect – the group field – RECODA is facing a serious threat to the long-term sustainability of those RIPAT groups that decide to continue their existence after the conclusion of the RECODA project. By choosing to rent land for the RIPAT groups from private farmers on five-year contracts, RECODA is copying the normal practice among farmers who need additional land for cultivation (see Box 2.1 in Chapter 2). Land is commonly rented among private farmers for one or two seasons for cultivation of annual crops such as maize or for traditional banana. However, there is a major difference between cultivating annual crops and the establishment of improved banana varieties using good crop husbandry (as taught in the RIPAT groups), which represents a considerable investment of labour. RIPAT groups are returning fields to their owners that are much more productive than when they first rented them, without getting any compensation for their accumulated efforts.
Table 6.1 Source of group land in RIPAT projects

<table>
<thead>
<tr>
<th></th>
<th>Community land (%)</th>
<th>Privately rented land (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RIPAT 1</td>
<td>Conservation agriculture</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Banana</td>
<td>31</td>
</tr>
<tr>
<td>RIPAT 2</td>
<td>Conservation agriculture</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Banana</td>
<td>25</td>
</tr>
<tr>
<td>RIPAT 3</td>
<td>Conservation agriculture</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Banana</td>
<td>0</td>
</tr>
<tr>
<td>RIPAT 4</td>
<td>Conservation agriculture</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Banana</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: RECODA

Based on interviews with 22 RIPAT farmer groups, the evaluation team got a clear impression that having to start again and establish a new group field after the five-year rental period is over is a major setback for the development and sustainability of the group. The groups are reacting differently to the situation, depending on their strength and the opportunities available to them. The opportunities to acquire land suitable for the cultivation of banana are also more difficult to find than for other land. In some villages, the village government does not have any land suitable for cultivating banana; in other villages, such land is already in use.

Table 6.1 shows that, although most group plots continue to be rented from private farmers, some farmer groups have (with the help of RECODA) managed to acquire community land. In some of these cases, land has been allocated to a RIPAT group as long as they make good use of it and the village benefits; in three cases a RIPAT group has rented school land on a five-year contract. In the case of privately rented land, some groups have renegotiated the terms and period of rent, typically paying 50 per cent of the production in rent, while other groups have opted for renting another privately owned field for another five-year term.

In a possible future RIPAT project, RECODA should be even more innovative and put more effort into exploring alternatives to renting private land for farmer groups. Two options are used successfully by other projects in East Africa. The first option is that the project asks the village government to allocate land to the group within the village as a precondition for support. This option is used by the FAO in some of its support for FFS groups in East Africa. The second option is to request that one of the group members allocates land for the group for a fixed period, e.g. five years, and to facilitate a memorandum of understanding between the group and the owner of the field concerning the terms. This option is widely used by NAADS in Uganda. Typically, the owner of the field has to compensate the group for their permanent investments by providing the group with inputs, such as banana suckers.
Mechanism for spreading technologies

The ‘solidarity chain’ mechanism for the spread of new animal breeds within the groups is a very important component of the projects, and seems to work well. The chains are designed to ensure that all members of the group obtain access to costly improved breeds of small farm animals. One example is the solidarity chain for the improved breed of goat. Each RIPAT group adopting this technology (except in RIPAT 1) received between five and seven female and two male pure-bred goats. The female goats were given to individual group members, who then each passed on two female offspring to other RIPAT group members, after which the original goat they had received became their property. The two male goats were used to breed with the new female goats as well as with goats of the local breed, owned both within the group and in the wider community.

The banana solidarity chain mechanism is intended to promote the flow of banana suckers from RIPAT group members to other people in their communities. RIPAT 1 farmers received 20 suckers from the project, and were supposed to pass on three times this number to other members of the community. Data from the household survey (EDI-RF APFS data, 2011) show that group members in RIPAT 1 on average have passed on 50 banana suckers to others in the community as agreed. The solidarity chain can therefore be viewed as successful. However, although the agreement made by RIPAT group members with RECODA to pass on technology inputs to other farmers in the community has generally been upheld, its impact has been limited. The spread of banana suckers from group members to the community on a commercial basis has become much more important.

This commercial trade involves more than just the banana suckers; it includes all types of improved biological inputs provided by the RIPAT project to farmers, including cassava and sweet potato cuttings, improved onion seed, improved pigeon pea seed, open-pollinated maize seed, and piglets of improved breed (RIPAT 3), as well as the mating of cockerels of improved breed with local chickens for a fee and the mating of male goats of improved breed with local female goats for a fee. Elephant grass and other fodder crops are inputs that have very high multiplication factors and do not require a lot of labour for their establishment compared with bananas and other crops; therefore they are often simply given to other farmers free of charge.

Other characteristics of project implementation affecting effectiveness

Since the RIPAT project was developed on a trial-and-error basis through close cooperation between RECODA and the Rockwool Foundation, it required a relationship between the two parties built more on trust than on elaborate plans and written agreements, and this has enabled the RIPAT project to be implemented on a highly flexible and responsive basis.

This high level of flexibility was observed in the implementation of all four RIPAT projects. One example is RIPAT 1, where monitoring revealed problems for the solidarity chains within the groups that had adopted the improved breed of goat. The pace of diffusion was too slow, and not all the group members had had the use of a male goat for breeding by the time of project closure. This was adjusted in subsequent RIPAT projects, where more male and female goats of the improved breed were provided by RECODA to enhance the multiplication rate and allow all group members to receive a pair of goats of the improved variety within a reasonable timeframe. Another example is when RECODA
discovered that the drought in 2009 had resulted in up to half of all cattle dying in villages in the RIPAT 2 area. The project quickly shifted away from ox-drawn Magoye rippers, and replaced them with Zambian hoes (which perform a similar function using human labour).

6.5 Efficiency

This section discusses the assessed cost and development outcomes of RIPAT with those achieved by Agricultural Sector Development Programmes (ASDPs) and in best-practice Farmer Field Schools run by agricultural Extension Officers. All three schemes operate with groups of approximately the same size, namely 30–35 farmers, and have comparable aims. We cannot compare cost and benefit of the three programmes directly because we do not have data for the programmes in comparable stages.

Our assessment shows that the cost of ASDP groups is relatively high: about US$140 per farmer per year over a period of three-and-a-half years. The best-practice FFS runs at lower cost. This reflects both the lower level of technology input support and a concerted effort over a number of years to reduce costs.

The four RIPAT programmes can be seen as developing a prototype, and a significant part of the RECODA activities associated with them have been invested in trying out different approaches in collaborating with farmers, interacting with other stakeholders, and engaging in systematic data collection. Nevertheless, RIPAT has run at a lower average cost than ASDP during this development phase, at about 85 per cent of that level, but still not at the same low cost level as the best-practice FFS. The level of overhead is likely to be significantly reduced in any future best-practice RIPAT or RIPAT-like projects.

Our assessments of development outcomes are based on the qualitative fieldwork undertaken by the DIIS team and on an impact study among Farmer Field Schools in East Africa (Friis-Hansen and Duveskog, 2011). Household food security outcomes are assessed to be high for both RIPAT and Farmer Field Schools. The food security outcome of ASDP is assessed to be low to medium, because the ASDP farmers are generally better off initially (they can afford 50 per cent co-funding) and thus mostly already food secure before receiving support.

We assess the technology development outcome to be highest for RIPAT. This is due to the high-quality ‘basket of technology options’ approach and the good synchronization between access to inputs and access to learning. The pace of technology development in FFS is slower, reflecting the greater emphasis on an in-depth understanding of scientific causes and effects, and a lower degree of emphasis on rapid adoption. Technology development in ASDP is assessed to be slow because of poor timing and coordination between advisory services and access to inputs, and because of the individualized technology input procurement system, which fails to ensure quality.

We judge that both RIPAT and FFS result in increased productivity, producing positive outcomes in the long term. The long-term effects of ASDP are assessed to be low and/or uncertain, because of the unsustainable nature of the support for group formation. FFS comes out as a slow but cheap road to poverty reduction. RIPAT produces results faster but might be more expensive in the short run. An accurate comparison of the two programmes’ virtues in the long run would require further studies at a time by which the younger RIPAT approach is in a more comparable state of development compared to the older best-practice FFS approach considered here.
The cost of RIPAT groups could without doubt be reduced considerably if paraprofessionals were employed to a greater extent (see chapters 2 and 11 regarding the RECODA Academy training programme for such paraprofessionals) and if the technology inputs were acquired from established RIPAT groups rather than externally.

Our observations during our field visit suggest that the efficiency of project implementation has increased in RIPAT 4, which shows a high degree of learning from the previous projects.

6.6 Sustainability

RIPAT has been successful in closing the technology gap by introducing new agricultural technologies. The use of these technologies seems likely to continue and expand, in particular among those farmers who have remained members of RIPAT groups. Most of these farmers are likely to continue their development in terms of agricultural practices and thus become more food secure than the rest of the community during years affected by drought, and able to accumulate resources during years with good rainfall. Farmers in the wider community are likely to continue to adopt RIPAT technologies by accessing biological inputs from RIPAT farmers on a commercial basis.

Technology development is likely to have a positive effect on community resources. There has been a notable increase in the use of farmyard manure for banana growing; indeed, this has happened to such an extent that manure has now become a commercial resource in many of the RIPAT localities. The use of the ripper for conservation agriculture has not only reduced the labour required for maize cultivation but has also conserved the land by reducing the soil erosion that usually results from water run-off. The study team observed the positive effects of introducing better agronomic practices in connection with the intercropping of pigeon peas and maize. Although intercropping with maize and pigeon peas had been practised widely in the past, RIPAT introduced improved practices that included the growing of improved varieties and optimum plant spacing, thereby increasing yields and the efficiency of land use. Achieving high yields of bananas is closely linked to irrigation. In Kikwe village (RIPAT 1), the use of water for the irrigation of RIPAT group members’ banana crops was assessed by the evaluation team to be three times more efficient than using the same water to irrigate maize, as is done by most non-members of RIPAT.

Some of the outcomes achieved by the RIPAT intervention are likely to continue longer than others after the withdrawal of project support from RECODA and the Rockwool Foundation. The RIPAT project supports both the empowerment of farmer groups and agricultural technology development. Although the emphasis is on the latter, the fact that 13 out of 16 RIPAT groups were still fully operational 18 months after all support for the RIPAT 1 project was terminated is an indicator of sustainable organizational outcomes.

Many of the socially empowering elements of the best-practice FFS are not included in the support for RIPAT groups. This is understandable, given the emphasis on technology development and the short period of intensive input of RIPAT (18 months). However, this has consequences for the sustainability of the development outcomes. While some of the groups seem to be well established, many remain relatively weak. Some of these weaker groups have been negatively affected by losing their joint group fields (and their
accumulated resources) when the lease expired, thereby interrupting the momentum they had achieved and setting back development.

One major source of difficulty is that the RIPAT groups are not linked to each other in networks or as part of marketing cooperatives. Another problem is that, although the RIPAT scheme is well known to local government officials, there seems to be little contact between the RIPAT groups and local government technical departments, including the ASDP. The Rockwool Foundation and RECODA were well aware of these shortcomings, but decided to use the available finances to expand activities to RIPAT 2, 3, and 4, instead of continuing support to farmer groups under the RIPAT 1 project. To mitigate the situation, the Rockwool Foundation sponsored a marketing workshop for all stakeholders in the hope that the participants would identify and take ownership of new activities. Judging from the workshop report, the stakeholder meeting generated a good understanding of the marketing situation; however, progress towards action has been slow.

6.7 Conclusion

We assess RIPAT's design and implementation to be consistent with the requirements and needs of the intended beneficiaries. The dual approach of supporting capacity development of farmer groups and offering these farmers a basket of technology options is highly relevant for supporting rapid local agricultural technology development. The RIPAT approach of supporting two groups per village, together with agreements with group members that they will engage in solidarity chains that will spread technologies to other farmers in the community, is relevant, but its impact on the wider community is limited as yet.

A modified FFS approach combined with the provision of access to a basket of relevant technologies has proved to be effective in increasing agricultural productivity and improving RIPAT farmers' livelihoods. The comprehensive, high-quality support from RECODA has contributed positively to achieving a high degree of effectiveness. The combination of the Rockwool Foundation as donor and RECODA as implementing agency has ensured a high level of flexibility during the development and implementation of RIPAT and has allowed lessons learned from ongoing monitoring to be used immediately to improve the concept.

It is not possible to arrive at a clear-cut conclusion regarding the cost-effectiveness of RIPAT compared with the Tanzanian government's ASDP or FFS. Overall, the conclusion of our evaluation is that technology development is more rapid in RIPAT groups than in best-practice FFS groups, and RIPAT produces results faster but might be more expensive in the short run.

Sustainability of agricultural development is assessed to be high for the individual members of RIPAT groups, while the institutional and organizational sustainability is more uncertain (see Chapter 11 for a further discussion). Some groups are likely to continue their activities after project support has ended, while others are likely to stop their activities. The capacity of RIPAT groups to organize marketing networks or to engage with local government remains relatively weak.

The current RIPAT concept seems highly relevant, and appears to be an effective and cost-effective approach to supporting smallholder agricultural development. However,
serious concerns remain over the institutional sustainability of development outcomes after project support has ended. The main deficiency of the scheme noted by the evaluation group is the low level of emphasis placed on institutional development. Future RIPAT support for institutional development could draw on experience from FFS in Kenya and the government of Uganda’s NAADS programme. These projects use group members (‘super-farmers’) in an effective and cost-effective way to support institutional development, both in facilitating the organization of new groups and in linking existing groups in local networks. This point is discussed further in Chapter 11.

The renting of group plots from private farmers for RIPAT projects may have a negative influence on the sustainability of the groups. Again, the approaches used by FFS and NAADS provide a contrast. FFS frequently request the village administration to provide land for the FFS groups as a precondition for starting development activities in the village. Technology development sites in NAADS are located on a group member’s field, and that group member signs a memorandum of understanding with the group agreeing on the services he or she must provide in return for the resources invested by the group on the field.

Note

1. In RIPAT, two types of solidarity chains were applied: 1) animal (goats, sheep, pigs): each group is supplied with pure-bred female and male animals as initial improved breeding stock. Members pass on female offspring to others in the group according to a list worked out by the group. Only after having distributed two female offspring to the next person on the list will the group member be able to claim ownership of the female animal received; 2) banana: each farmer who adopts the improved banana technology is expected to give three times the number of banana suckers received through the project to other interested farmers in the community and to train them in improved cultivation techniques.

References

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CHAPTER 7

Household dynamics and gender politics: female farmers in RIPAT 1

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This chapter provides a contextual analysis focusing on intra-household dynamics and the everyday lives of women in two selected RIPAT 1 villages. With the introduction of new crops through RIPAT and new social relationships through the RIPAT groups, traditional gender roles and rights over crops and other resources are challenged, and new negotiations take place within homes. There are examples of RIPAT women having become more empowered because they now have the ‘backing of the project’ in their new productive activities, but also of women’s traditional authority in the area of banana cultivation being challenged, because the improved banana variety is becoming a valuable crop that can provide both food and cash all year round.

7.1 Introduction

In this chapter we will discuss the everyday lives of women in a sample of RIPAT 1 villages in order to illustrate the complexity of household dynamics and gender politics, and to show how new influences – e.g. new knowledge, crops, and technologies, such as those introduced by RIPAT 1 – interact with a complex society in which people have different views, behaviours, and roles and pursue diverse goals. A household is never a homogeneous unit that makes all decisions as one. The various household members have different priorities, and many conflicts of interest exist when negotiating what to grow, what to eat, what to sell, and how to spend money. The spread of new ideas therefore takes place in unexpected and often unpredictable ways, and in order to understand what is going on, it may be useful to talk not about how certain things spread, but rather about how people select from the range of new opportunities presented to them. In relation to this, the social complexity is also closely linked to the wide ecological diversity that can be found within short distances.

We begin by describing the everyday lives of women in the area, and the way in which farming and small-scale trade are closely integrated activities for most women. Next, we describe the negotiations that take place between men and women over labour, income, rights, and responsibilities. Finally, we discuss the impact of a project such as RIPAT 1 on household dynamics and gender politics, both for those who were themselves members of RIPAT groups and for other women who may have adopted one or more of the ideas introduced by RIPAT.

7.2 The study site

Our discussion is based on our ethnographic fieldwork in two RIPAT 1 villages, Marurani and Kwa Uguru, which lie to the south-east of the town of Arusha. Our primary methods were participant observation and qualitative interviews (see Chapter 3, Section 3.6). We stayed with a local family, participating in the everyday life of the family and making numerous informal visits to various homes, in addition to conducting open and semi-structured interviews and using participatory rural appraisal methods such as agricultural calendars and different types of ranking (Mikkelsen, 1995). In this chapter, we draw upon both our own research and the results of the impact survey carried out in all the RIPAT 1 villages (see Chapter 5).

As discussed in Chapter 4, the ethnic complexity of the area is closely linked to ecological variation, and the place where people have settled is of great importance for their identity. The people of the region have a long history of interaction between ethnic
Box 7.1 A female farmer: case study 1

Zefania used to be a member of a RIPAT group, but the group disbanded. She has about 10 banana plants behind her house and a cow of an improved breed. Last year she grew stuka maize and the new kind of soya beans introduced by RIPAT. She has seven children; the youngest is 12 years old. Her husband came back to the household last year after having been away for seven years. He said he had been working as a watchman in Moshi and he had photographs from there to prove it. However, they never heard from him while he was away, and Zefania managed the home and raised the children by herself during those years. While her husband was gone she became a member of a RIPAT group and of savings groups; she undertook a lot of small-scale business and was managing well. She once borrowed TZS 100,000 from her savings group and used the money to send her daughter to school. She kept some of the money for investment in her vegetable business and she sold some of her chickens. She managed to return the money to the group after three months.

When her husband suddenly came back last year, he refused to let her go to the market, accusing her of going there to meet men. He has also taken back authority over his land and insists that they should grow only the old kind of maize, not the new crops that Zefania had tried over the previous couple of years. This year (2011), the maize has completely failed due to lack of rain. Zefania thinks she can feed the family for only one or perhaps two months with what she has: there has been no harvest and no business. Her husband takes the cattle out to graze, sleeps, and eats, and does nothing else. He does not even consider getting up in the morning to help her water the bananas. ‘But women do their best to deal with men,’ she said, and explained that sometimes when her husband goes out she will run out to buy tomatoes and ask somebody, for example her sister-in-law, to sell them for her at the market. Also, she negotiates with her neighbour for permission to plant the new kind of soya beans in her maize field, offering to weed the whole field for both of them; or, if the neighbour prefers, they can help each other to weed and share the harvest. Then at least she will have something to sell for school fees for her children. But will her husband allow her to keep that money? ‘Yes, when something has passed through a project, like a new kind of bean, then the man does not have authority over it. Also, he was not even around when I planted the bananas. I was the one who received them, I am the one who does the work, so there is no way he can say they belong to him.’

groups and of adaptation to changes, with the result that ethnic identities are by no means clear-cut. However, ethnicity is still one of the key factors in understanding some of the complexity of the society. Marurani is primarily inhabited by the WaArusha, and Kwa Uguru by the WaMeru. The villages are both situated on an area of the Maasai plain that was settled in the 1950s and 1960s by WaArusha and WaMeru farmers who had migrated from the densely populated slopes of the mountain.

7.3 Social organization

All of the three ethnic groups in the RIPAT 1 area, like most of the ethnic groups in Tanzania, are patrilineal, i.e. descent is traced through the man, and patrilocal, i.e. a man ideally settles with his wife on his father’s land. The age-set system is another important element in social organization. Younger and older men are clearly differentiated, and men of the same age set are united by a series of common rights and responsibilities (Haram, 1999; Talle, 1988). There has been a dramatic drop in the incidence of polygamy over the past few decades. However, this has been replaced by a considerable amount of ‘informal polygamy’. Extramarital relationships are downplayed and not given formal standing, but most men are involved with more than one woman; the same thing occurs the other way round. Young men may try to keep their wives to themselves during the first years of their marriage, and young women may have ideals about a monogamous household and
shared finances, but they usually end up being disappointed and going their own ways in terms of both providing for the family and finding lovers for themselves (Haram, 1999). Because our focus was on farming, we interviewed only the inhabitants of the villages, i.e. women living on their husbands’ land, who were usually the formal wives. Thus we did not witness ‘informal polygamy’ to any great extent, although we heard about women whose husbands were absent for long periods, officially due to work in town, as in the case of Zefania described in Box 7.1.

Women in Marurani voiced many complaints to us about men. When discussing their husbands and men in general they said things such as: ‘Many men just drink and sleep and have no plans’; ‘Men go out with cattle in the morning and drink in the afternoon, or they ask the women to take out the cattle and drink all day’; and ‘The night hides things that maybe you have not yet noticed. Do you ever see men walking on the road like women? Doing this. Doing that. No, they are in the drinking places while women are busy planning for their lives.’ RECODA is hoping to target younger men with RIPAT and to show them that it is possible to plan for a future in farming. Indeed, those marrying now and having children are said by women in Marurani to be working harder for their families than their fathers did.

Age sets are divided into three classes: uninitiated, initiated, and elders. The initiated are the ones who are establishing themselves: marrying, building a house, having children. These younger and recently initiated age sets are always more active than the other age sets. Once a man’s age set passes into the category of ‘elders’ (which may happen while he is still in his thirties), he is expected to have already established himself, he can no longer have children, and he is said to ‘go to sleep’, spending his time discussing politics and drinking beer – which is what many men do literally. There is therefore a large difference between the contributions of men of different ages to the household.

A woman’s position within a household is thus dependent on where she and her household are in this life course at a certain point in time. There are large differences between being a young unmarried daughter with no access to land; being a newly wed woman with no children and working her mother-in-law’s land before getting her own fields; being a woman of child-bearing age with small children and the responsibility both to cultivate her husband’s land and to take care of her ageing mother-in-law, but with a husband who may be still actively contributing to the farm; and being a woman with a husband who has ‘gone to sleep’ and with children in their teens or older who may assist in the field but who also need school fees – or who are perhaps starting to marry and bringing daughters-in-law into the family (and hence assistance to the woman). The working conditions, the relationship with the husband (and perhaps with lovers), the freedom to move around, the negotiations between man and woman, and the opportunities to participate in RIPAT groups and activities, and make use of new knowledge and technologies vary considerably depending on where a woman – and thus the household – is in this life course. Therefore, not only do we find ethnic variations in the roles, responsibilities, and opportunities of women, but these also change over time during the course of a woman’s life.

All in all, we see that a household is never a homogeneous unit making decisions as one. Among all of the ethnic groups in the region, men and women operate in separate economic spheres, and at any point in time a household will encompass a range of diverse interests and conflicts (see Haram, 1999, for a detailed ethnographic study in this geographical location on the issue of separate economic spheres).
7.4 Women as farmers and women doing business: ‘following the water’

It is morning in Marurani village, and we are trying to find women to interview. We enter a homestead. A woman arrives with a bundle of firewood on her head, sweating, and at first she does not notice our arrival. She greets us but quickly apologizes for not having time to talk to us this morning. She is on her way out again to find grass to cut for the cattle. We move on, but most of the homesteads we visit next are empty, with the exception of small children and sometimes young men, who appear to be doing nothing. Women are busy from early morning to late afternoon, and finding them at home, with the time to be interviewed, turns out to be a challenge – but a challenge that provides a significant piece of information about their lives and their livelihood strategies.

Beans were being harvested during the weeks we were there (the month of July). Grass for the cattle has to be cut every day of the year. Firewood has to be found several times a week all year round. In the afternoons it turned out to be as difficult to find women as it was in the mornings. They were at the market, selling vegetables or looking for vegetables to sell, out cutting grass again, or in a savings group meeting. Men take the animals out to graze, and do heavy tasks such as ploughing with oxen and digging the ‘RIPAT holes’ for bananas, but women do practically all the rest of the work in both the home and the fields; this pattern is found in many other places in Tanzania (Swantz, 1985).

Vegetables (Chinese cabbage, tomatoes, cucumbers, and onions) are an important source of cash for women in Marurani. They have authority over vegetables, as opposed to most other crops, meaning that they can decide to grow, consume, or sell the vegetables and use the money themselves. Some have plots with enough water for vegetables to be grown. Others cannot grow vegetables at all due to lack of water. But everybody can do business with vegetables all year. ‘We move with the water,’ they say. Due to the great variation in the local ecosystems and in access to rain and/or irrigation channels within a manageable distance, it seems to be possible throughout the year for women to find a place where vegetables are grown and another where there are none at that time of the year and where vegetables can thus be sold. Access to water is desirable, but it is not expected to result in major differences in income. Those who do not have water are more involved in trading – and often they can earn even more by being the second link in the marketing chain rather than by being the first one.

In Kwa Uguru the women did not mention vegetables as a main source of income. We instead noticed many small shops where sugar, small bags of salt, soda, beer, kerosene, and other everyday necessities were sold. Women explained that this was a common way for them to make extra money, since the bigger shops were far away and people had no means of transportation. Thus, women usually supplement their income from agriculture with some kind of commercial business in order to be able to pay for everyday items, clothes, utensils, and school fees, but the villages differed in terms of the predominant type of business carried out by the women.

In Marurani all the 23 women interviewed were members of a savings group – with the exception of one, who had had to withdraw her money a couple of years previously. Many used the savings group simply as a savings scheme, and placed their money there with the sole purpose of getting interest at the end of the year (see Box 7.2). Others borrowed money for their vegetable businesses; or rather, like Zefania in the case study in Box 7.1, they seemed mostly to borrow money in order to pay school fees or hospital bills, but managed to repay it thanks to their vegetable businesses. The fact that they all, no matter what their age, had managed to save up at least some money every week shows
Box 7.2 Examples of women’s use of savings groups

- One woman, a former RIPAT group member, had been in a savings group for seven years, but she had never borrowed money. She just used the group for saving money. At the end of the first year she made TZS 54,000 in profit. After the second year she got TZS 124,000. The year before we interviewed her she had received TZS 300,000. (Some in her group had got TZS 800,000, since they had bought more group shares than she had.) She usually used the profit for school fees, and she bought furniture for the house once. She is the only one in the family contributing to school fees for the children.

- One woman was no longer a member of a savings group. She used to be, but there was a serious drought in 2008, and so in 2009 she had nothing to plant on her field for the following year. She therefore took her group shares; she had saved TZS 70,000 and she took it out to buy seeds. Now she can only enter the group again if she puts in a large amount of money so that she will be at the same level as the others again.

- One woman had been a member of a savings group for almost two years. She once borrowed TZS 100,000 to send her daughter to school. In her group they have to pay back TZS 10,000 after one month, TZS 10,000 again the second month, and then TZS 110,000 in the third month as full repayment of a loan of TZS 100,000. She kept some of the money to trade in vegetables, and then she also sold some of her chickens; she was therefore able to return the TZS 110,000 in the third month. She was in a RIPAT group and had bananas, but the bananas had ripened very late that year due to the drought, so she could not sell them in time to pay her daughter’s school fees.

that there was surplus production in the village even during a time of drought. People were concerned about the drought but not to the extent that one might have expected, perhaps because they knew that ‘we can follow the water’, and also that, thanks to the savings groups, they were able to keep cash in the village.

Women in Kwa Uguru reported a different experience. When it came to selling agricultural products, Kwa Uguru had been ‘overrun’ by the neighbouring village. About 10 years previously the two villages had agreed to establish a sales cooperative together whereby farmers from the two villages would cooperate in transporting their produce to Arusha and thus avoid having to sell crops at the farm gate. However, people from the other village had much less water than Kwa Uguru and were therefore much more dependent on finding alternative means of generating income than the farmers there, who had a fairly good annual production of crops and did not depend as much on other income activities. This meant that the villagers in the neighbouring village were much more experienced in business activities, and they had basically taken over the cooperative. So now Kwa Uguru grows the produce, while people from the neighbouring village collect it and sell it wholesale. This also means that the current drought is very serious for the farmers in Kwa Uguru, because they are so dependent on their own outputs. Kwa Uguru villagers earn much less from cash crop activities than their neighbours, even though they produce much more. Interestingly, bananas seem to be excluded from the cooperative activities. Villagers in Kwa Uguru were attempting to set up their own banana cooperative in order to carry out marketing on a larger scale. According to the EDI-RF APPS data from the impact survey (see Chapter 3, Section 3.4), bananas had partly replaced vegetables as a cash crop in Kwa Uguru. Of non-RIPAT farmers in Kwa Uguru, 20 per cent mentioned vegetables as their most important cash crop, and nobody mentioned bananas. Among RIPAT farmers, only 10 per cent mentioned vegetables, while 16 per cent mentioned improved bananas. Does this mean that bananas are taking over the role of vegetables as a cash crop among RIPAT farmers in Kwa Uguru? Are women farmers replacing vegetable business with bananas? Who owns
the bananas, the vegetables, and all the other agricultural outputs? Or, more generally, what are the gender politics in relation to cultivation and the marketing of crops? Some of these questions will be discussed in the next section.

What we learn from women's everyday lives is that small-scale trading is part and parcel of being a female farmer, but it takes very different forms in different villages, and some forms of commerce may be better than others for keeping the cash flow within the village.

7.5 Gender politics: ‘who owns the bananas?’

Some agricultural products are the preserve of the man. Other products are under the woman’s control. But again, there is local variation and continuous negotiation over these matters. In Marurani, women have full authority over vegetables and chickens. These are for the women to sell, and they can spend the money as they wish. Usually, money from vegetables and chickens is used for utensils for the house, clothes for the children, and cooking oil, for example. Increasingly, women say, they also have to find school fees themselves, although this used to be the responsibility of men. Women have no authority over livestock – but they have authority over the milk from a milk cow. They have no authority over beans or maize; less so over beans than maize. If the man wants to sell maize, the woman can stop him if she thinks there is not enough to feed the family until the next harvest. As a woman in her thirties said: ‘Sometimes they have to make a compromise, but yes, the woman has something to say over the maize because it is the food of the family.’ There is general agreement that a man has the right to sell beans and keep the money for buying cattle, corrugated iron sheets, or other larger and more durable items, or for paying school fees.

One of the most time-consuming and strenuous tasks for women is cutting grass for indoor animals (i.e. milk cows and goats). Usually men take the Maasai cattle out to graze, but goats and cows for milking have to be kept indoors. According to the plans for RIPAT, the improved breeds of goats and cows were supposed to reduce the workload of a domestic unit. But in reality the opposite is the case from the women’s perspective. The thinking in the RIPAT model was that, since these animals produce much more milk than traditional cattle, it is possible to manage with fewer animals and yet have a higher income. Elephant grass was also introduced in RIPAT 1 and subsequent RIPAT projects; this can be grown near the house, grows fast and abundantly (when rains are adequate), and should make the job of cutting grass for the animals much easier. Elephant grass is indeed spreading in Marurani, but women claim they cannot grow enough to feed the indoor animals on it exclusively. Even more importantly, no man voluntarily reduces the number of animals he owns. His status as a man is closely associated with the number of animals he has, and he will always keep the traditional ones even when he gets new animals of improved breeds. Thus, women gain milk from improved animal breeds, but they also acquire an extra workload in an already busy day.

It is unclear – or rather, it is negotiable – who has the rights over bananas in Marurani. There seems to be an agreement that men have any rights related to the improved varieties of banana – the type that can bring the most money when sold. One woman said: ‘It is like a cow. It is too expensive. It belongs to the man.’ But otherwise ‘it depends on the family’. There is a difference, though, between bananas and the other crops. One woman explained: ‘It is very difficult for him to refuse a child school fees, or refuse to help a child who is sick, as long as the bananas are out there in his garden. When a
man sells his beans once a year then he has to keep that money in order to buy those permanent things for the home. But sometimes he ends up spending it instead. Or he can say that he has spent it and that he has nothing for the woman when she needs it. But the banana is there in the garden until it is sold and you cannot refuse to help when it is just there.’

Traditionally, bananas have always belonged to women all over northern Tanzania. Women would grow them, decide to cook or sell them, take them to the market, and decide how to spend the money from the sale of bananas. Bananas also play an important role in rituals and as symbols of female fertility and reproduction (Weiss, 1996). In Kwa Uguru, we did indeed note that bananas were under the authority of women. Observations from Tengeru market (the biggest market for bananas near Arusha) also showed that women were in charge of selling bananas. Many people still consider bananas to be the woman’s crop – but it is also clear that men are challenging this in the light of increased opportunities for marketing and income generation from bananas.

As the above discussion shows, there are continuous negotiations over rights and responsibilities. It is possible to identify certain trends in who has authority over which crops, but these change over time and may differ from one village to another. The negotiations taking place over the right to bananas are an example of how the introduction of new technologies may have unexpected consequences, and it is not clear what will happen in the years to come. Will new and improved bananas give women new opportunities and power? Or will the men manage to take over the banana crop?

7.6 Negotiating roles and rights: ‘when the project is behind it’

Participation in a project (such as RIPAT) is one of many factors – albeit an important one – influencing negotiations over rights and responsibilities. There are two main reasons for this. First, groups provide a good network for women who do not already have one in the village where they marry. The women also all agreed that it gave them a certain authority to be a member of a project such as RIPAT: ‘Men don’t like to see that women have more money than they do themselves, but they respect the project.’ Women also appreciate that the groups are mixed, ‘so that men hear the advice of the project, or at least hear that they should leave the women to do the work’.

Second, new crops are good for women, not only for the reasons that RIPAT suggests, but also because new crops do not fall into the traditional categories of female and male authority. The person who receives them and introduces them has authority over them, as illustrated by the case of Zefania. Or rather, a new crop gives women an extra card to play in their negotiations with others. In Zefania’s case, the fact that the project was behind her helped her keep authority over the new things that she introduced in the home, even though her husband’s return meant the loss of her authority over the crops they had always grown together. When a new crop becomes a major source of income – and is therefore no longer so new – the man may challenge the woman’s authority over it, as we can see happening with certain banana varieties. Still, the introduction of new crops demonstrates that it is possible to provide women with new opportunities and to think of ways to support them in their efforts. While the adoption among non-RIPAT farmers of RIPAT crops and technologies may not have the backing of the ‘authority of the project’, as was the case for the RIPAT farmers, a new crop is still an extra asset in women’s ongoing negotiations with their husbands.
In conclusion, even if women (or men) drop out of RIPAT groups, their RIPAT membership may have had a notable impact on their lives just by changing a few of their routine behaviours (e.g. through the planting of elephant grass), providing more options for obtaining cash (e.g. bananas, or soya beans grown in a neighbour's maize field), or strengthening the positions from which they negotiate rights and responsibilities. RIPAT has given many women – group members as well as non-members – a few more options, in terms of more manoeuvrability in their daily lives and in their relationships with their husbands.

7.7 Women's freedom of action: constraints and opportunities

We now move on to a more general discussion of the ways in which a project such as RIPAT also has an impact on the lives of women who have not necessarily been members of RIPAT groups. It can be difficult to discern whether a change in agricultural practices or a new crop in a household is an example of adoption of RIPAT technologies and crops, or stems from another project, or is the result of the spontaneous spread of ideas. RIPAT is known for its bananas, whereas milk goats and milk cows are promoted by various projects. Some improved crop strains (e.g. maize of an improved variety) were introduced previously by the government, but with little impact. However, we were told by previous RIPAT members we interviewed that some women living in the driest parts of the village had adopted the stuka maize variety as a result of its promotion by RIPAT. Other crops that were adopted at first by RIPAT farmers and a few other people have already been abandoned, due to the drought of recent years, during which many crops failed. Women interviewed who had a crop or practised a technology known by the researchers to have been introduced by RIPAT rarely referred to RIPAT as the source of inspiration – except when it came to bananas. What is clear, however, is that RIPAT, with its basket of options, has added value to women's attempts to draw on the various options available to them, to combine farming and business, and to continuously adapt to new situations through mobility and networking.

Due to the patrilocal system, i.e. a couple settles on the land of the husband's father, men usually live near their relatives, and often they have never farmed in any other
place. Women, in contrast, are far more mobile in terms of agricultural experience. In every village there are women who originate from many different clans and villages. Due to the large variation in ecosystems and thus in crops and agricultural practices within short distances (the mountain, the slopes, the plain), women may have experience with other crops and agricultural practices that they can use in the locations where they marry – and a new crop introduced into that area may not be new at all to the woman. In addition, after marrying, women continue to visit relatives in their home village and elsewhere (e.g. sisters married in other villages). Therefore they often come into contact with other agricultural practices and crops. During these visits, gifts are exchanged, and usually people try to find something to give that they know the recipient does not have, e.g. a crop grown in their area that is not grown in the visitor's village. This is another means by which knowledge of new products is spread.

Women often have little or no network in the area where they marry. Throughout their adult lives, they work both on keeping alive their networks in the village where they were born and on building up new networks where they marry. WaMeru women in particular continue to invest heavily in their parents' homes even after marrying. If women get access to livestock, they will never leave the animals in their husband’s home when they are away but will make an agreement with other relatives, e.g. a sister and her husband, for them to care for the animals. The situation where a wife is caring for a ‘borrowed’ animal is different from that when a man cares for his own wife’s cow (which he would consider to be his). In the former case, the woman does not have disposal rights (one never does when caring for someone else's animals); the animal is not hers, and if her husband took and sold an animal that was in his wife’s care, it would leave the man open to accusations of theft, and even a police case. In contrast, police and local leaders would be reluctant to hear a theft case brought by a wife against her own husband.

Another example of women’s attempts to keep alive networks in the village where they were born is that mothers try to influence the choice of marriage partners of their sons, so that the mothers can draw women away from their own homes to their present home villages. Women are also more eager to join project groups, church groups, or groups of any kind, and RECODA knows from experience that when a RIPAT group is disintegrating it is the women who struggle to keep it together. Women’s involvement in business is important not only for economic but also for social reasons. Moving around, buying vegetables, selling tea or rope, and going to the market are ways of keeping in touch with other women and of building networks – and possibly sometimes of seeing lovers (as Zefania’s husband feared). The restrictions he placed on her movements not only had economic consequences for Zefania and the family but also had social consequences.

Both women and men are involved in economic activities that their spouses are not aware of, and invest both in and outside their common home. It therefore may be difficult to say what impact RIPAT has had on households as a unit. But the RIPAT basket of options has provided both those who have been in the groups and those who have not with additional tools for ‘doing their own thing’.

7.8 Conclusion

When trying to trace the impact of a project such as RIPAT, we are looking not at the ripples from a stone thrown into calm water, but at the many ripples from many stones
thrown into a turbulent ocean. The many new ‘stones’ in the RIPAT basket of options therefore affect household and gender dynamics in unexpected ways that can both weaken and strengthen women and their abilities to act and to care for the family. In this chapter we have attempted to describe the troubled water of women’s social lives and to give examples of how items in the basket of options may be selected by women and become tools in their attempts to navigate through these waters. When we look at what people actually do in their everyday lives, rather than at what they fail to do, we observe them to be creative social agents, and see evidence of social synergies that RECODA and the designers of the RIPAT projects had not anticipated.

The main points of the chapter are, firstly, that households are not homogeneous units and there are many – often conflicting – interests at stake within them. They are composed of people of different ages growing up and growing older, moving in and moving out. The RIPAT experience shows that it is important to involve both men and women, but not necessarily the household as a unit, and consideration should also be given to whether households are the most appropriate unit when it comes to measuring the impact of an intervention. Secondly, farming and small-scale trade are both closely integrated into women’s lives. Some villages have more success than others in keeping cash flows within the village. Thirdly, negotiations over men’s and women’s rights and responsibilities are always in a state of flux, and at present men are trying to take over the banana, which was traditionally a woman’s crop but which is now turning into an important cash crop. It is not yet clear what the outcome will be of these negotiations over the rights to the banana crop, but it should be considered whether it is possible – and desirable – to try to support women in acquiring and keeping control over banana cultivation (and possibly also over other crops).

References


CHAPTER 8

The RIPAT groups

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This chapter takes a brief look at the role and characteristics of the RIPAT farmer groups, as they constitute a crucial component of the intervention. The targeting of the ‘lower middle-class farmer’ seems to have been a good choice, as wealthier farmers are more likely to leave the farmer groups prior to project completion. However, farmers who are the sole adults in their household are also more likely to drop out. This accords with the fact that the majority of group dropouts report having left the RIPAT groups because they found the group work too demanding. Even so, the majority of the original RIPAT 1 participants declare themselves still to be group members, and 13 out of the original 16 RIPAT 1 groups are still active in the sense that they continue to make joint agricultural investments.

8.1 Introduction

The establishment and use of farmer groups as an entry point for technology transfer through participatory learning methods are crucial components of the RIPAT project design. The groups and the common group fields are intended to function as valuable and cost-effective demonstration sites for the implementation of new agricultural technologies. In the RIPAT concept, groups are viewed as providing suitable mechanisms for spreading agricultural technologies to the rest of the community, as the group field serves as a persuasive example of good agricultural practice that can inspire other villagers.

The use of farmer groups was largely driven by a pragmatic approach to achieving the objective of ‘closing the technology gap’ rather than by an adherence to existing participatory extension approaches such as the classic Farmer Field School (FFS) methodology. That said, the RIPAT groups developed into farmer groups with many similarities to those of FFS groups. For instance, RECODA also used the RIPAT groups to focus on factors such as the mobilization and empowerment of group members to enhance both their individual and their collective power within their communities. Chapter 7 thus argues that the support of the groups gives female group members more power to act freely in their everyday lives, and Chapter 9 stresses the supportive function of the groups in terms of strengthening RIPAT farmers’ negotiating power with village authorities. Furthermore, as the RIPAT projects have progressed, some RIPAT groups have taken on an additional function as savings groups. These increase the degree of financial freedom among the individual members, as described in Chapter 9.

The farmer groups are therefore not only a useful tool in the work of introducing, adapting, and spreading the new agricultural technologies and components of the RIPAT basket of options in the targeted villages; they have also come to play a role in the everyday lives of their members and their communities. In this chapter we consider in more detail how the groups were formed, and by whom. We analyse what characterizes those original RIPAT 1 farmers who have decided to leave the group. We look at the benefits of being in a group and at the role of the groups in village communities. Finally, we discuss which group characteristics seem to be of importance for their long-term sustainability by comparing active with inactive groups. In doing this, we draw on the findings from the qualitative context and adoption study, and we revisit the quantitative impact survey data, which is based on interviews with both households and RIPAT group representatives (see Chapter 3, Section 3.4).
8.2 The main selection criteria in the formation of the groups

RIPAT group members were selected on the basis of age, gender, land ownership, physical ability, and social status. As described in Chapter 2, Section 2.3, RECODA facilitated group formation through village governments, in order to help in establishing local ownership. The village governments were therefore asked to form groups (two in each village) consisting of farmers who complied with a list of criteria. Participants were to be voluntary and committed to the project; they should have a reasonable amount of land to cultivate themselves (at least 1 acre), though not too much land (for later projects a 5-acre maximum was applied), as the target group was lower middle-class, small-scale farmers; they should not be rich in terms of their wealth ranking in the village; they should be willing and able to share the new ideas with others and to learn from others, which meant that they had to be integrated members of the community. Furthermore, the village governments were asked to create the groups in such a way that there was an equal number of men and women in each group, or more women than men. Only one person per household could participate in the group. Although not explicitly stated in the criteria, RECODA staff have mentioned in interviews with the researchers that it was expected that group members should not hold leading positions in the village; in reality, the wealth ranking was probably the objective criterion that avoided this from happening.

The aim of these selection criteria was to create groups consisting of lower middle-class, small-scale farmers, who nevertheless had access to some land that they could use for agriculture and who were in good enough physical shape to enable them to take an active part in the group work, whatever their age. This meant that the most deprived members of the local community, such as landless or sick people, were deliberately excluded from the target group because they would lack the resources necessary to learn, adopt, and spread the new technologies.

Another aim of the criteria was to create the best chance for the successful spread of technologies, because RECODA relied on the participating farmers to disseminate their new knowledge to their fellow villagers. To this end, it was a requirement that the group members should be well respected in their village societies. As a RECODA staff member explained: ‘We need socially acceptable people; someone who wants to make a step in their life and somebody who is ready and willing to share, to train and teach others. So “socially acceptable” means someone who works well with others in the village and whom the other villagers respect and are willing to learn from.’ Last but not least, the selection criteria had the aim of helping to balance power in the community and improving the position of women in society, by making sure that none of the group members were among the wealthiest in the community, and that at least 50 per cent of the group members were women.

In general, it seems that RECODA was largely successful in guiding the village governments in the group formation process. However, visits to and interviews with RIPAT 1 groups revealed some variation in group composition from village to village, indicating that the various village governments may have interpreted and prioritized RECODA’s selection criteria differently in organizing the groups. The quantitative impact survey data suggest that among RIPAT 1 groups there was a reasonable gender balance (45 per cent women), and also that there was a reasonable distribution of group membership across age groups. It appears that the lower middle class of small-scale farmers was largely captured as intended. However, not all households complied with
the ‘not more than 5 acres of land’ criterion. There are a few instances of farmers with less than 1 acre of land in RIPAT groups, but almost 21 per cent of the RIPAT 1 group members owned more than 5 acres in 2006. This proportion was reduced to 14 per cent in the case of RIPAT 3 group members, where the land criterion was made more specific.

In addition, one should keep in mind that the selection criteria were to some extent contradictory. On one hand, having more than 5 acres of land goes against RECODA’s land ownership criteria. On the other hand, including the better-off farmers might be seen as an effort on the part of the village government to include respected villagers in the group, thus enhancing the potential for spreading technologies and perceptions among fellow villagers. As such, the inconsistency observed becomes a matter of interpretation and adaptation to the needs and interests of the village government. Different village governments have different interests in the project and might interpret the targeting criteria differently. It is not possible to envisage whether a more strict compliance with the target criteria would have made the project more or less successful, and any attempt to do so would be mere speculation. However, letting the respective village governments choose the group members was not just a matter of practicality; it was also a matter of leaving the targeted villages in charge of their own development. As a member of the RECODA staff explained: ‘We don’t choose – the village government does that, because the groups are taken care of by the village government. It is their mandate to make sure that the groups continue and survive, not ours. Our responsibility is to “bridge the technology gap”, but we need to work hand in hand with the local government and let them be part of their own progress.’ From visits to the villages, it is clear that some village leaders have taken this concept of village ownership of the RIPAT project seriously and, as we shall see, the sense of local village ownership has played an important role in the support given to groups and thus the long-term sustainability of those groups.

8.3 Who leaves the groups and why?

When the RIPAT 1 groups were set up in 2006, a total of 16 groups were constituted in the eight target villages. These groups had an average of 33 members each. Of the 16 original groups, 15 were still active after the first year; 14 groups completed the planned three-year RIPAT programme in January 2010; and in January 2011, 13 of these groups were still active, in the sense that they had sold crops harvested from their group fields in the previous 12 months and/or they reported having plans for making joint additional agricultural investments in the coming year, either by planting more bananas or by purchasing more land. This willingness to invest collectively shown by the large majority of the original 16 groups indicates that gains continue to be made from joint group activities, and this seems promising for the longer-term sustainability of the groups.

Such gains do not come without an effort, however. Group members are required to attend meetings and to work the common plot, and by 2011, one year after project completion, 25–35 per cent of the original RIPAT 1 farmers had left their groups.\footnote{According to the quantitative household survey, dropout rates peaked when RECODA’s involvement ended in 2009, at which point almost two-thirds of all exits from the project took place. It is worth mentioning that the RIPAT 1 project was advertised as a three-year project and there was a graduation ceremony in January 2010 after the project’s completion. Farmers were not obliged to participate in group activities after that,}
Box 8.1 The importance of the RECODA consultants

As part of the ethnographic research for the context and adoption study, a group of five RECODA consultants were joined by one researcher for a round of visits to village groups in the RIPAT 4 area. Every week for a year the consultants took the 300-kilometre journey east from the RECODA office in Arusha to the RIPAT 4 groups in the district around Mombo for a four-day visit. At the visits, each group gathered to work the group field and to learn from the theoretical and practical instruction of the consultants, who joined the groups in the field and explained the details of the farming methods or principles in question. Every week a new theme was presented, and the previous week’s theme revised. On the occasion of the researcher’s visit, at the end of June 2011, the transplantation of onion seedlings from nurseries to prepared beds in the fields was the focus of the instruction, and the main points of the previous week’s theme of how to handle various problems related to drought were reiterated. Consultants also made general visits to individual farms in the villages to check on the status of project animals and on other issues.

Reactions from, and in-situ interviews with, farmer participants in the groups gave the clear impression that the visits of the RECODA consultants were highly appreciated as a core element in the RIPAT project. Farmers valued not only the expertise of the consultants and the guidance they gave, but also the interest that they showed in the progress of the project and the success of the farmers – evident not least from the frequency of their visits. The teaching of the RECODA staff was listened to with attention and respect, even when farmers were reprimanded for not keeping to the time schedule or when cultivation advice was interwoven with general inspirational talk about mutual support and keeping up faith in the project and in their hard work. For some group members, the opportunity to learn from skilled agricultural consultants was their main reason for joining the project. For instance, a young farmer in one of the RIPAT 4 villages explained that he had the good fortune to own 3 acres of land, but lacked the skills to develop it into a good source of income. He said that when he heard about the coming RIPAT project, he was immediately sure that this would be his opportunity to become a successful farmer in the future. He strived to attend whenever the RECODA consultants came to the village.

In the second and third years of the project, visits from the consultants are gradually reduced in frequency. Group members know about this from the beginning, but many still regretted this, although RECODA maintains contact with the RIPAT groups for at least three years. ‘It is like a father leaving a child without care!’ one farmer said – clearly signalling the attachment that the group had formed to the caring consultant. There seems little doubt that the active participation and interest of the RECODA staff is a crucial element in maintaining the continued participation of the groups in the project. Although, as noted earlier, many groups did continue. Only around 11 per cent of the original RIPAT 1 group members decided to drop out early, i.e. before 2009. This suggests that RECODA’s presence and active involvement with the groups were important factors for group members’ continued participation (see Box 8.1).

The impact survey data show that the majority of those leaving the RIPAT 1 groups stated that they did so for one of two main reasons: one was ‘poor leadership in group’, and the other was that the attendance and group work requirements were too onerous to be compatible with the everyday life of the farmer. Common explanations for leaving the group were that the member was ‘busy with other things’, that ‘group work was too hard/tough’, ‘rules were too rigid’, or that there was ‘illness/death in the household’, a factor that would also divert attention away from work in the RIPAT group. As can be seen from Figure 8.1, the vast majority of the 121 RIPAT 1 dropout farmers interviewed (including those who left after project completion) gave poor group leadership or group work being too demanding as the main reasons for dropping out. Among the 105 RIPAT 3 farmers who had dropped out prior to project completion, over 85 per cent stated that the reason for leaving was that the group work requirements were too demanding.
Therefore there is little doubt that the strong emphasis on having to work with the group and comply with the attendance rules is the major reason for farmers leaving the group, and thus the RIPAT project.

However, it does seem that RECODA has become more successful in building up good organizational skills, and that this has had an effect in RIPAT 3. According to RECODA, the staff did indeed put extra emphasis on the importance of good group leadership, both towards the end in RIPAT 1 and from the beginning in RIPAT 3. They put more effort into stressing the importance of developing a good group constitution and of democratically electing a group leader, who then has to run the group according to the constitution, running the risk of not being re-elected if he or she fails to do so. The impact survey data show that the number of people who left the groups due to poor group leadership in RIPAT 3 has been reduced; fewer than 5 per cent of the early RIPAT 3 dropouts stated that they left due to poor leadership in the groups, as opposed to more than 25 per cent of the early (and also the late) RIPAT 1 dropouts (see Figure 8.1).

To understand what characterizes the farmers who choose to leave the groups, we have turned to the impact survey data to investigate possible explanations for people dropping out.

First, when we compare all the 121 RIPAT 1 dropouts interviewed with those who were still group members in 2011, the most striking thing we see is that farmers who come from households where they are the sole adult are considerably more likely to have left the RIPAT group. This is not surprising, given the group work requirement explanation given above. Age and gender do not seem to influence the likelihood of leaving the group, but poverty ranking does. We find that farmers from households with a lower probability of being poor measured in terms of the Progress out of Poverty Index (PPI, see Box 5.2 in Chapter 5) are significantly more likely to have left the RIPAT group. On the other hand, those farmers who have adopted the improved banana technology introduced through the RIPAT groups are significantly less likely to have left the RIPAT group.

Second, when we look at what characterizes the early RIPAT 1 dropouts, that is those who dropped out prior to project completion, we find that they tend to be older, have

Figure 8.1 Reasons for dropping out of RIPAT 1 and RIPAT 3

![Graph showing reasons for dropping out of RIPAT 1 and RIPAT 3](image)

Source: EDI-RF APFS data, 2011
some years of schooling, and are more likely to be women. Again, adoption of the improved banana technology lowers the probability of having left the group prior to project completion considerably.

That the wealthier farmers leave the groups need not be of serious concern, since the RIPAT project targets the lower middle class of small-scale farmers. However, there is some qualitative evidence that women who are heads of households, have absent husbands, or have many children to take care of may find the group work requirements too burdensome. One example is the woman described in Box 7.3 in Chapter 7. She had four adult children of her own and the responsibility of raising six of her sister’s children, aged between 1 and 15. RIPAT was an attractive project for her, both for social and technology transfer reasons, but the group work requirements were too much on top of her existing workload. She therefore decided to leave the group.

8.4 What characterizes the inactive groups?

To be able to further strengthen the composition of future groups, it is useful to understand how the three now-inactive groups from RIPAT 1 differ from the 13 groups that were still active at the end of 2011. The groups that we term ‘inactive’ are the groups that, according to our quantitative survey, owned no land, had no plans to plant new banana stools, or did not seem to have had any produce to sell or share in the previous 12 months. These groups are also the ones that RECODA staff recognize as being the least active groups.

It is striking that members of inactive RIPAT groups have a statistically significant lower probability of being poor than members of active groups, again suggesting that the wealthier farmers have relatively less to gain from being in a RIPAT group, and that the group is more likely to be a lower priority for them. In one of the RIPAT 1 villages, for instance, most of the villagers were involved in seed production for several big seed companies. This business was much more lucrative than banana production, and hence buying a plot for banana production made no sense. For these farmers, the RIPAT project had limited relevance and the local group soon dissolved.

Another factor that seems to have had an influence on the successful outcome of a RIPAT group is the age distribution within the group. According to our household survey, more than half of the members of the three inactive groups were over 50 years old in 2011, and only 10 per cent were under the age of 35. In comparison, the active groups have a more even distribution of members across the age range, and a quarter of the members were under the age of 35. This suggests that having a larger proportion of younger and middle-aged people in the group may have a positive influence on the group’s sustainability.

8.5 The benefits of being in a group

Of the 13 groups that were still active at the end of 2011, all had bought or rented new plots for cultivation of bananas, and most had also established savings groups. Some groups remained very active in cultivating their shared group fields, while others were more actively engaged in their savings activities. Thus, the groups had become more than simply effective implementation units for the RIPAT intervention.
The context and adoption study (see Chapter 3, Section 3.6) in the various RIPAT 1 villages revealed that, despite the work requirements, being in a RIPAT group yielded benefits. There is, of course, the advantage of having access to first-hand knowledge of new cultivation technologies and improved crop varieties. But several RIPAT group members also stressed a gain in terms of having a supplementary source of income and food from the shared group field. Moreover, in the groups that had established savings groups, the members had the additional advantage of being able to take out loans. According to the quantitative data, half of the RIPAT 1 groups offer credit to their members if they are in need.

Besides these obvious advantages, being a group member also seemed to involve other unintended but positive side-effects or opportunities. Several RIPAT group members explained that their membership had given them new status in society. The example of Charles Kaaya, described in Box 8.2, shows how the existence of RIPAT groups and the demand for banana cultivation have contributed to a considerable change in the life of a man with an entrepreneurial spirit. Similarly, several farmers told us how other non-RIPAT farmers had come to them for advice and help in agricultural matters, as they were now recognized as a valuable resource in their communities. RIPAT farmers are often approached to give advice on the adoption of the improved banana technology by the more entrepreneurial and educated non-RIPAT farmers, as the findings described in Chapters 9 and 10 show.

8.6 The role of the RIPAT groups in the village

Visits to the targeted RIPAT villages showed that some of the RIPAT groups had come to play a key role in the villages, as they had learned how to advocate for their interests and to demand enforcement of village by-laws, for instance by-laws against uncontrolled grazing of animals. Uncontrolled grazing can be a problem for farmers who want to shift from primarily maize cultivation to long-duration or perennial crops such as banana, long-duration cassava, or pigeon peas. Likewise, groups are now in a better position
The Ushirikiano group in one of the RIPAT 1 villages is one of the most successful groups in RIPAT 1. One-and-a-half years after the project finished, the group was still meeting once a week. The group has bought a shared field of 1 acre where the members grow bananas and the village water committee makes sure that the plot gets enough water for the plants to grow properly. The group has become one of the prime examples of RIPAT’s success, and RECODA has arranged field trips to the village for regional and district authority staff and for government officials. Because of this massive attention, the group is currently saving money to build a small office on their shared plot in order to have proper facilities for welcoming their many visitors.

One evening, as one of the researchers was sitting by the fireplace with her host family, a pickup truck drove past with a loudspeaker on the roof. This happened quite frequently, and was the village government’s way of getting messages to the whole village. On this particular day, the village government had invited all the banana farmers in the village to the next day’s RIPAT meeting in order to discuss the establishment of a village banana cooperative, which was something the several banana farmers in the village had asked for. About 50 farmers – both RIPAT and non-RIPAT – showed up to the meeting, as did a RECODA staff member and the district cooperative officer. The aim of the proposed banana cooperative was for farmers to join forces for crop sales. All the bananas in the village would be collected together, and a rented pickup truck would be used to take the bananas to sell wholesale. Most of the farmers were interested in this opportunity to earn more money. However, several non-RIPAT members had reservations. One farmer was unsure why the meeting was held on the Ushirikiano group’s land and not outside the village office, where village meetings were held normally. Another farmer was concerned that the proposed cooperative was just another of RIPAT’s projects and that he would not gain anything personally from being in it, since he was not a member of the RIPAT group.

The following week the whole village was again invited to the RIPAT group meeting. This time, a delegation from the Farm Concern International organization wanted to present an agricultural project for the village, again concerning the establishment of a farming cooperative for the sale of crops.

to negotiate higher sales prices for their produce, and to bargain for lower prices for agro-inputs as bulk purchases.

In several villages, the inhabitants in general recognized that the RIPAT groups now played an important role in village agricultural matters; in the village of the Ushirikiano group (see Box 8.3), common village meetings concerning agricultural matters were sometimes even held at the group’s field.

Gathering farmers together in groups is a well-known approach in agricultural development projects. Villagers in the RIPAT villages have seen many development groups come and go. According to both farmers and members of various village governments that we spoke to during our ethnographic fieldwork, many development groups have only a short lifespan, because of poor management and insufficient local anchoring. However, as a result of RECODA’s intensive facilitation process, the RIPAT groups have built up a reputation among villagers, government officials, and other development organizations as being stable and well organized. The RIPAT groups have therefore developed into attractive and convenient entry points for other development agencies, as was the case for the Ushirikiano group.

This is an advantage not only for the group members, but also for the village governments and for each village as a whole. Several village officials explained how the RIPAT groups had turned into a valuable asset for the village, as they attracted other development projects and gave the village special attention from important outside agents. During our ethnographic fieldwork we also met many non-RIPAT members who
expressed gratitude for the RIPAT group and the attention it brought to the village; but some also expressed a degree of envy towards the group, finding that it tended to be favoured by the village government, for instance through extra allocation of water for the group field or free allocation of land. In one village, for instance, the RIPAT group had dissolved because they had had to hand back their group field when the lease expired. However, the village government was interested in a continuation of the group because of the attention it brought to the village, so they allocated a new piece of land to the group.

The success of the RIPAT groups and the benefits of being a group member have resulted in an increased interest from non-RIPAT villagers in getting the same opportunities. This has made the issue of entry into and exit from a group pertinent. Since all RIPAT groups have had members who left the group, all groups could potentially incorporate new members. However, many groups have accumulated so many assets in terms of savings and crops that it would be difficult for a new member to pay what was needed to buy an equal share in the assets and enter the group. Similarly, when a group member wants to drop out of the group, he or she faces an equally big loss in terms of both tangible assets and many hours of hard work. This is a problem that hinders flexible entry to and exit from groups; it has only been identified late in the implementation process, and hence it was not taken into account when writing the original group constitutions in RIPAT 1.

In 2011, RECODA drafted new sets of rules which were adopted as amendments to the constitutions of all groups in RIPAT 2, 3, and 4. These rules laid down that, at the end of the project period, the group would take a democratic decision as to whether to continue or to dissolve. If the group dissolved, then the rules stated how the assets of the group were to be shared out between its members. If the group continued, it would still be possible for those who wished to leave to take their share of the assets accumulated by the group over the project period. Similarly, the rules stated how new members could join the group by paying a fair price for a share of the property of the group.

8.7 Conclusion

Although anchoring at village level was taken into consideration by bringing village governments on board from day one, the long-term continuation of the RIPAT 1 groups has been somewhat unexpected. That 13 out of the original 16 RIPAT 1 groups were still active one year after the end of the project is an indicator of the longer-term sustainability of these groups. As will be further discussed in the next chapter (see Section 9.5), the diffusion of farming groups as a social technology to spread farming knowledge has not proved particularly successful, and few groups function in the way that they did when RECODA was involved. However, the groups have proved to be an important institution, offering new possibilities for improved livelihoods to their members. Some groups have introduced savings and credit schemes, some are considering joint marketing initiatives, and many now have the attention of the village government and have become strong groups of farmers with a say in village agricultural matters.
Note

1. The reported dropout rate of the groups varies depending on whether we consult the household survey or the group survey elements of the impact survey (see Chapter 3, Section 3.5). In the household survey, where each individual farmer was interviewed, we find that 25.4 per cent of respondents stated that they had left the group. This figure could, however, be an underestimate if the interviewers were less likely to be able to trace a dropout farmer than a continuing RIPAT farmer. In the group survey, where the group representatives were asked, we find that the groups reported dropout rates of 34 per cent, which is in line with RECODA's own records.

Reference

EDI-RF APFS data (2011) *EDI-RF Assessment of Poverty and Food Security*, Rockwool Foundation Research Unit, Copenhagen.
CHAPTER 9

Local adoption of social and agricultural technologies

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In this chapter, the extent of adoption of the social and agricultural technologies promoted through RIPAT 1 is assessed. The analysis builds on three different levels of adoption: the immediate adoption by participants, adoption on a lasting basis, and adoption of the promoted social and agricultural technologies by non-participants. Overall, it was found that both the social and agricultural technologies introduced through RIPAT have been well adopted by the project participants, and with a high degree of permanence, and that some of the agricultural technologies have also been adopted by non-participants. In particular, the improved varieties of bananas have been a genuine success at all levels of adoption, whereas adoption of the social technology, i.e. forming farmer groups for joint participatory learning, has been successful only among RIPAT farmers. Non-participants have not formed new farmer groups; this contrasts with the situation often found among savings groups.

9.1 Introduction

The adoption of new crops, technologies, or knowledge is often viewed as providing a measure of the success and impact of an agricultural development project (Feder et al., 1985). The instigators of many projects hope that the new products and technologies introduced will also spread by themselves, thereby replicating the success of the project elsewhere. This chapter describes the adoption of different crops and of conservation agriculture through the RIPAT 1 project in Arumeru District in Tanzania. The chapter discusses why banana cultivation has been adopted beyond the circle of RIPAT participants while conservation agriculture has not, and why savings groups have caught on rapidly while farmer groups have not. The analysis focuses on three main explanatory factors. First, new crops and agricultural technologies will be adopted if they are adapted to local needs and constraints, i.e. if they are accessible and compatible with existing practices, and if clear benefits can be obtained. Second, new products and technologies will be adopted if they are flexible, can be tried on different scales, and provide significant benefits at all scales. Third, a specific social technology used to spread new practices (such as the formation of farmer groups) will be adopted if it matches the characteristics of the development or agricultural technology promoted (savings groups will spread, but groups of farmers practising conservation agriculture will not). The methods used to collect the data on which the context and adoption study is based are described in Chapter 3, Section 3.6.

9.2 Adoption as an indicator of the success of RIPAT 1

A common way to investigate the success of a project is to look at how much change has been introduced through it into local farming practices. To start with, one can explore whether farmers adopt new products and technologies as a result of a project. However, farmers will sometimes revert to their old methods after termination of the project, so the permanence of change constitutes a second criterion of success. A third level of success occurs when non-participants start adopting the changes introduced.

All three levels of success are found in the RIPAT 1 project. First, the project introduced a number of changes through teaching new techniques of banana cultivation, conservation agriculture, water harvesting, tree nurseries, poultry keeping, and goat husbandry, and through introducing improved crop and tree varieties. These elements were presented
as a basket of options from which each farmer could choose what best suited his or her needs (see Chapter 2, Box 2.2). Second, some of these changes are evidently here to stay, as they make a difference to farmers’ production, food security, or labour management. Third, some of these changes – most notably banana cultivation and improved maize, pigeon peas, or lablab crops – have spread and been adopted by farmers who did not participate in the original project.

This chapter focuses on three aspects of the RIPAT project:

- the adoption of perennial crops such as bananas and fruit trees;
- the adoption of conservation agriculture and annual crops such as maize or pigeon peas;
- the adoption of farmer groups as a social technology intended to introduce and spread new agricultural knowledge.

I discuss each of these three areas in turn, with special focus on the third level of success (further spreading), and I analyse why some products and technologies have been more successful than others.

9.3 The adoption of perennial crops (bananas and trees)

The most successful crop introduced by the RIPAT project is, without any doubt, banana. There was almost no banana cultivation in the targeted RIPAT 1 villages prior to project implementation. The introduction of banana cultivation has been so successful that many villagers refer to RIPAT 1 as ‘the banana project’. Today, in the villages involved in RIPAT 1, one finds bananas wherever there is enough water to grow them (see Chapter 10). New farmers continue to adopt bananas, and those who have already adopted them are expanding their plantations.

The immense success of banana can be explained by a number of factors. First, bananas and plantains are much appreciated as a staple of the daily diet in Tanzania and are highly valued for both cooking and brewing. Moreover, the banana is a crop of high social and cultural significance for the WaMeru and WaArusha people, who regard bananas as an obligatory component of dowry payments. In areas where bananas are not cultivated they must be purchased at a fairly high price, due to transportation costs. As discussed in Chapter 4, Section 4.4, the WaMeru and WaArusha people now living in the study area had been forced to leave Mount Meru due to a lack of sufficient land there over a period from the 1930s onwards. When they settled on the Maasai plain, they tried to cultivate bananas, but were largely unsuccessful due to the drier conditions and lower fertility of the soil; however, they have never entirely given up trying to grow bananas, despite the poor results. When RIPAT introduced a new method of cultivating them, people were therefore extremely happy to be able to grow bananas rather than buying them at a high price at a faraway market.

Furthermore, banana cultivation was also historically the main strategy of the WaArusha and WaMeru people to intensify agricultural productivity in order to keep up with population growth in an area with one of the highest population densities in Africa (Spear, 1997). The transformation of pasture land into fields for maize and bean cultivation and the further transformation of the maize and bean fields into banana plantations on the Maasai plain thus replicate the historical intensification of production that happened previously on Mount Meru over two centuries.
Bananas are also valued because, once established, they do not require as much labour as annual crops, and because they are less vulnerable to drought: although bananas require regular watering for optimal yields, the plants are able to produce some yield even in years with low rainfall, when maize, the main staple crop, may fail. Moreover, they have spread easily because of the simplicity of the new technology. Holes of 90 cm diameter and 90 cm deep are dug with 3 metres between each hole, and these are filled with a mixture of topsoil and animal manure before planting banana suckers. Successful establishment of banana plantations requires either good and regular rainfall conditions or possibilities for irrigation. There is, of course, more to the process of banana cultivation than is described here – disease control, processing, marketing, cover crops, water harvesting, wind shielding, etc. are also important – but the basic principles of the new banana cultivation technique require only locally available resources: manual labour, hand tools, manure, water, and suckers. The new cultivation technique does not take long to learn and is frequently passed from farmer to farmer (this is also the most widely used mechanism for dissemination of banana cultivation techniques in other parts of Tanzania; see Kikulwe et al., 2007: 46).

People in the area have been longing to grow bananas, and now that the RIPAT technology makes it possible, they are eager to adopt banana cultivation if there is enough water to allow the stools to grow. However, the knowledge associated with banana cultivation – the technological expertise taught through the project – is not always adopted along with the bananas. In this geographical area, for example, one can find greater or smaller distances between the holes, more or less manure in each hole, different numbers of banana plants in each hole, greater or less knowledge about disease control, greater or less use of cover crops or trees planted as windbreaks, and varying techniques used to maintain production. The farmers who are adopting banana cultivation are experimenting with new ideas, for better or for worse.

Improved strains of multipurpose trees have also been adopted along with banana cultivation. The RIPAT project trained some farmers in the use of tree nurseries, teaching them how to plant seeds, graft trees, prune them, and so on. Some of the trees introduced were fast-growing species promoted for use as windbreaks around banana plantations, to prevent the collapse of top-heavy plants in strong winds. Improved varieties of fruit trees such as avocado, citrus, and mango have been introduced. As fruit trees also require good water availability during the establishment phase, the RIPAT farmers who try them usually plant a few fruit trees in between the bananas to benefit from the irrigation system used on the banana plantation. So far, this has been done on only a limited scale, but it might be extended in a few years if the current trials satisfy the farmers. Of course, fruit trees were known before the RIPAT project, but RIPAT made a difference by introducing improved and faster-growing trees, and made the planting of fruit trees easier by promoting banana cultivation that called for improved water management practices.

Bananas require good water conditions – either from rainfall or from irrigation. Simple water-harvesting techniques on the ground – digging channels in the rainy season to bring rainwater into plantations – tend to be adopted together with banana cultivation. People in this study were generally well acquainted with irrigation using channels, as this system has been practised on Mount Meru since the 19th century, to the astonishment and admiration of the first European colonizers, and it has subsequently been extended into the Maasai plain. In most of the villages of our study, we found irrigation ditches that run between 5 km and 10 km and are managed by water committees (see...
Although the available water is often not sufficient to cover all irrigation needs, the fact that it is transported over very long distances in traditional channels dug by hand hoes shows that the local population is very experienced in irrigation. While it is relatively easy for people to harvest water in fields in the rainy seasons, it is normally much more difficult and costly to collect water in cement tanks above ground level. However, we met two farmers who had dug low-cost basins (of 10–15 cubic metres) in the ground to harvest rainwater from roofs, which enabled them to water their bananas at the beginning of the dry season. This innovative solution is affordable and relies on simple technology accessible to all. Although this was not taught by RIPAT, it might well end up being adopted by other farmers.

To sum up, the adoption of bananas has both endured among RIPAT group members and spread to non-RIPAT participants; bananas have been a genuine success at all levels. The adoption of trees has been more modest, even though improved tree varieties have also been adopted by some non-RIPAT participants. This limited adoption is partly due to the fact that the trees are still being trialled, and that the trial period for fruit trees is much longer than for bananas; and partly due to the fact that tree grafting is a technology that requires specialized training. Improved tree seedlings can be acquired only from the few RIPAT farmers who have mastered this technology, and this slows the adoption of such cultivation. Finally, banana and tree plantations have triggered the adoption of better water-harvesting practices.

9.4 The adoption of conservation agriculture and annual crops

Conservation agriculture was an important component of the basket of options proposed to RIPAT farmers. Its practice is based on a set of three basic principles: minimize soil disturbance, maximize soil coverage, and use intercropping and crop rotation (Maguzu et al., 2007; Giller et al., 2009). Conservation agriculture is not necessarily an all-or-nothing technique, but can be implemented to varying degrees. The farmers in our study area have practised some elements of conservation agriculture in a traditional form for a long time. For example, they have long used cover crops such as lablab or pigeon peas, and intercropped with maize. But the RIPAT project tried to improve traditional conservation agriculture by introducing rippers and planters as replacements for ploughs, as these disturb the soil less, break hardpans, and promote better water infiltration and better root development of the crops. Farmers were encouraged to grow more cover crops and to adopt new forms of weed management. RIPAT also introduced fast-growing varieties of maize, lablab, and pigeon peas that can succeed with shorter periods of rain or irrigation. The improved lablab and pigeon peas can also be used to target export markets, and can thus fetch a higher price.

Conservation agriculture is geared towards improving soil fertility by improving water retention, increasing the amount of organic matter in the soil, and reducing soil degradation. But such benefits, if they happen at all, come only in the longer term, after several years of implementation (Giller et al., 2009). Converting from traditional agriculture to ideal conservation agriculture may take several years and much effort (for example in controlling weeds during the first years), which is a disincentive for those farmers who tend to prioritize an immediate return on their investment. Conservation agriculture is usually considered as a holistic management package, and the RIPAT project introduced it as a complex set of practices involving the careful balancing of many...
elements – weeds, pests, water, nutrients, time of planting, animal feed, etc. However, farmers face many constraints, and often select specific elements from the package and drop others (Giller et al., 2009). Some farmers revert to traditional agriculture if their field is too small or if they do not have enough cattle (ripping requires a lot of draught power). Farmers also face a problem if the rains are delayed, as fields must then be prepared a second time with conventional methods. Moreover, the planters are so expensive that few farmers are willing to buy one. It is also difficult to hold onto crop residues when cattle graze in fields after harvest.

Farmers did adopt some improved seeds – mainly maize, pigeon peas, and lablab. Farmers are constantly comparing their agricultural results with those of their neighbours. If a new seed proves successful for someone, it is quickly tried by others. Moreover, all the annual crops promoted by RIPAT are well known in the area, and farmers are already familiar with them. To adopt them does not require much effort or any major change in agricultural practices. What is ‘new’ about the newly introduced and improved seed varieties is that they focus on shortening the growing period and on targeting high-value niche markets. However, what a farmer chooses to grow depends on many factors in addition to the speed of growth or the price fetched at market, and many farmers still prefer traditional varieties for one reason or another. For example, the traditional lablab is considered to be more resistant to drought than the improved lablab. Moreover, pigeon pea branches are the most important source of firewood in some villages, and the traditional pigeon peas grow taller and therefore give more firewood for the household. Finally, traditional pigeon peas are easier to sell in local markets because they are consumed locally. Improved maize (e.g. stuka) is more drought-resistant and grows faster, but gives only one cone of maize, while some traditional types of maize can give two. Stuka maize might be preferred by people who cannot irrigate their fields, but those who have irrigation channels are likely to choose another type of maize.

Some aspects of conservation agriculture are practised to some extent by many RIPAT participants, and are continued even after the end of the project. However, the new techniques have not spread to non-participants, mainly due to the complexity and the cost of changing. The introduction of improved seeds has been a success at all three levels (i.e. during and after the project period as well as outside RIPAT participants), but only insofar as the seeds have proved well adapted to a variety of local constraints. The improved varieties have not entirely replaced the traditional ones, but the new types have found a niche and are complementing the old types.

9.5 The adoption of farmer groups and savings groups

RIPAT chose to introduce the new crops and technologies through groups. The use of groups can be advantageous for project implementation for a number of reasons. For project managers, groups are very practical, because it is cheaper and more efficient to teach 30 farmers together and have only one group field than to deal with 30 individual farmers scattered across 30 fields. For farmers, groups and collective group fields are practical because of the possibility of sharing start-up costs and spreading risks, and of realizing economies of scale in marketing or when acquiring inputs.

Groups level out social differences, as even the poorest farmers can try out things that they would not be able to afford alone. Moreover, groups tend to encourage individuals to perform better. The RIPAT groups visited individual farmers on a rotational basis.
Team spirit and peer pressure to work harder and better engender better results than would have been the case if each farmer had been on his or her own. Finally, as described in Chapter 7, Section 7.6, groups also provide support and protection for their members. Female members may feel bolder and stronger when negotiating farming strategies with their husbands, since a husband might think twice before saying no to his wife when his reaction might be met with disapproval from 30 other group members. Group members are generally stronger in defending their agricultural endeavours: if a cow destroys the crops of a group member, the owner of the cow does not face the wrath of just one angry farmer, but of the whole group. Generally speaking, a group has a stronger voice than an individual farmer in influencing local policy-making, enforcing by-laws, negotiating a better price for agricultural inputs or outputs, and solving conflicts.

RIPAT groups have developed group by-laws to ensure that all members contribute equally to collective efforts. For example, members are fined if they do not show up to meetings and are upbraided if they do not work properly. Some participants have had difficulty in living up to such rules and requirements, and about a third of the original RIPAT 1 participants dropped out of their groups before the end of the project (see Chapter 8, Section 8.3).

At the end of the project period, each group in RIPAT 1 had to decide whether it wanted to continue as a group or dissolve, and 13 groups chose to continue. Some groups have rented (or even bought) a new piece of land that they now cultivate together. In addition, many groups have evolved into savings or investment groups (pooling resources and investing them in a banana plantation or transport business).

Savings groups have been introduced or promoted by several different projects in the area, including RIPAT 1, and these groups are now a great success in some villages. Savings groups are based on calculations of interest rates and benefit redistribution that can be complicated for the uneducated farmer, but the system is usually very well organized, with printed savings booklets that can be bought at any stationery shop, sets of fixed constitutions, and ways of calculating interest rates for both savings and loans. The complexity of the groups, as well as the memory of past failures of official savings institutions, might explain why they are still only in their infancy in some villages. In such villages, we found only a small number of savings groups, with cautious members saving on a small scale, as people want to see how well the savings group works without taking too much risk. In other villages, however, people have already tried the system for a few years and have experienced its benefits. In these villages, savings groups are developing very fast, with most farmers being members of a group, or even of several groups.

Savings groups involve enormous amounts of money (by local standards), and the success of the current system derives in good part from the fact that local and national authorities are actively supporting it, and can force defaulting borrowers to sell their assets and repay their debts. Interestingly, people come from the towns to borrow money in the villages, even though this means paying a higher rate of interest, because it is easier to borrow from a savings association than from a bank. This reinforces links between towns and villages, an important effect in itself, although independent from the diffusion aspect.

Savings groups provide good opportunities for businessmen and businesswomen in need of cash, but they are also a good opportunity for farmers who do not have any inclination to go into business and who just want to benefit from the interest on their
savings, since the rate can be as high as 60–70 per cent per year. The RIPAT groups that save money are just a few among the many savings groups in the area. However, RIPAT members, or those who have adopted banana cultivation, might have an advantage over other savers, since bananas give them a relatively secure and predictable source of income. This secure income can help the farmers to plan their savings better: they are required to contribute savings at each meeting of the savings group. A secure income is also important for farmers to meet the repayments of any loans they have taken out.

Farmer groups, seen as a social technology for learning and trying new farming techniques, did not spread spontaneously to other villages to any noticeable degree. Some RIPAT products and technologies were adopted by non-participants, but such adoption was by individual farmers rather than by groups (see also the case study in Box 8.2 of Chapter 8). Therefore, the social technology that relies on farming groups to spread farming knowledge has not transferred to non-participants in the project. The main reason for this is the discrepancy between the collective nature of RIPAT farming groups and the individual or household nature of farming as it is practised on a day-to-day basis. However, whenever the existence of groups is justified because of the collective necessity of a certain activity (such as the case with savings groups), we can expect to see groups that last much longer and the creation of new groups, i.e. success at all three levels. In planning new projects, it is therefore important to think carefully about the match between the social technology the projects utilize and the nature of the activities to be promoted.

9.6 Conclusion

In this chapter, we have shown that the initial adoption, enduring adoption, and further spread of a new product or technology depend on a number of factors.

First, products and technologies of which the benefits are obvious and immediate are more likely to be quickly and widely adopted than those where the benefits are slower to arrive and more long term. The RIPAT project has generally been successful in identifying products and technologies that were desired by and accessible to local farmers. Furthermore, technologies that are simple, cheap, and compatible with existing farming systems spread more easily than those that are complex, expensive, and require a radical change in established agricultural systems. In the Arusha and Meru districts, anybody can adopt banana cultivation or improved seeds, since farmers are familiar with these crops and they do not require any major reorganization of current agriculture or society. But shifting from traditional agriculture to the full package of conservation agriculture is a long process, and one that depends on relatively complex knowledge and on radical changes in both field and livestock management. Products and technologies that are easy and accessible can be expected (if the project is successful) to spread far beyond the original project participants. However, complex and expensive technologies cannot be expected to spread quickly to non-participants; their adoption requires new projects in new locations, with new groups of farmers, new group fields, and new field schools.

Second, products and technologies that are flexible and give benefits when implemented on small as well as large scales are more likely to enjoy wide adoption. One of the great advantages of banana cultivation is that it can be tried out either with a few plants behind the house or in a large plantation. Also, in both cases, the benefits are immediate, substantial, and proportional to the investment. Likewise, participation in
savings groups can range from a minimal amount of saving to a very large sum of money, and, here too, the benefit is immediate, substantial, and proportional. This allows farmers who differ in terms of wealth, gender, education, and access to land or irrigation to adopt the new products and technologies at different speeds, according to their own capacities and constraints (see Chapter 10).

Third, the matching of social technologies to the characteristics of new products or techniques is important. There is a discrepancy between the individual level at which conservation agriculture or banana cultivation is usually practised and the collective level at which it is taught and trialled. It is therefore not realistic to expect that farming groups will spread to neighbouring villages outside a formalized project framework. The situation is very different for savings groups, since in that case there is no discrepancy between the social technology (based on groups) and the characteristics of a savings group that requires, by its very nature, a collective pooling of resources. Projects tend to work with groups in order to use donor money efficiently, but it should be acknowledged that there could be an incongruity between this social technology and the characteristics of certain agricultural technologies. Some things will necessarily be spread through new groups, but others will spread on an individual basis.

Note

1. Three new groups have been created in one village with the help of the local extension officer and of a RIPAT ‘super-farmer’ from a neighbouring village, but the new groups have concentrated on banana cultivation rather than on the introduction of the complete basket of options.

References


CHAPTER 10

Social constraints on the adoption of improved banana varieties in Arumeru District

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This chapter takes a closer look at what characterizes those farmers who adopted the improved banana varieties among RIPAT and non-RIPAT households in RIPAT 1 villages. It was found that approximately one in eight non-RIPAT farmers in RIPAT 1 villages have adopted the improved banana variety; that farmers endowed with natural, financial, and human resources are in a better position to take advantage of the opportunities offered by this new and profitable crop; and that such farmers adopt the improved banana varieties faster and on a larger scale than the poorer and more marginalized farmers who still adopt, but on smaller plots of land and at a slower pace.

10.1 Introduction

Banana is traditionally one of the most important crops in the Arusha region and is highly valued because of its requirement for regular labour without the peaks of work input typical of seasonal crops, its high productivity, and its relatively good production stability in areas where rainfall fluctuates from year to year, among other things. Although bananas in general require good water availability to produce an optimal yield, the stools are able to produce some yield even in years with low rainfall, when maize, the main staple crop, may fail. Until recently, bananas were not widely cultivated in the area, but since new, improved varieties and simple improved techniques for cultivating bananas were introduced by the RIPAT project, the crop has been spreading at an impressive rate within the RIPAT villages. In this chapter, we examine who adopts bananas as a crop. We find that farmers who are wealthier, better educated, freer to make their own decisions, and have better access to water are more likely to grow bananas, and to do so earlier and in larger quantities than others. The farmers who have access to natural and financial resources and have a higher level of education are in a better position to seize the opportunities offered by this new and profitable crop. Poorer and more marginalized households might also end up adopting banana cultivation, but they do so on a smaller scale and at a slower pace. However, they may also benefit indirectly from such projects through being hired as labourers on other people’s fields and plantations.

10.2 Methodology and population

We investigated the adoption of banana through both quantitative and qualitative surveys. From the quantitative impact survey data, described in Chapter 3, Section 3.4, and in Chapter 5, we used information from RIPAT and non-RIPAT households in the eight RIPAT 1 villages. Within each group, we further distinguished between those households that adopted the cultivation of improved bananas and those that did not. Table 10.1 shows the number of households in each category.

<table>
<thead>
<tr>
<th></th>
<th>Adopting</th>
<th>Non-adopting</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>RIPAT 1</td>
<td>348</td>
<td>158</td>
<td>506</td>
</tr>
<tr>
<td>Non-RIPAT</td>
<td>228</td>
<td>369</td>
<td>597</td>
</tr>
</tbody>
</table>

Source: EDI-RF APFS data, 2011
The sample of RIPAT households is based on a registration of all such households, whereas the sample of non-RIPAT households is based on a random sample of households in the village, supplemented by as many additional adopting households as could be identified in the field. This inclusion of additional households was done in order to provide a larger sample of non-RIPAT households that had adopted banana cultivation. The figures in this chapter are calculated in such a way that the oversampling of adopting households does not affect the conclusions. The composition of the RIPAT sample is biased by the criteria used to choose participants. Throughout this chapter, we assess statistical significance at the 5 per cent level – that is to say, a result is said to be significant if there is a 95 per cent probability or higher that it was not arrived at by random chance, but rather it represents a real difference.

The ethnographic qualitative study on adoption was conducted mainly in three villages and consisted of participant observation and semi-structured interviews with more than 70 RIPAT and non-RIPAT households (see Chapter 3, Section 3.6). The case studies are all based on information collected during the context and adoption study, unless other sources are cited.

### 10.3 The adoption of banana cultivation

The farmers who joined a RIPAT group were introduced to banana cultivation on the group fields and were given 20 suckers for planting in their own fields. They were required in return to give 20 suckers free of charge to each of three other villagers when they could collect these from their plants. Today, more than two-thirds of the RIPAT farmers and 13 per cent of non-RIPAT farmers grow the improved banana varieties, as can be seen from Table 10.2 (note that the figures for non-RIPAT households in Table 10.2 refer only to the households in the random sample). The table also shows that the adoption of

<table>
<thead>
<tr>
<th>Village</th>
<th>RIPAT households</th>
<th>Non-RIPAT households</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Adopting banana (%)</td>
<td>Using irrigation (%)</td>
</tr>
<tr>
<td>Karangai</td>
<td>87</td>
<td>100</td>
</tr>
<tr>
<td>Manyata</td>
<td>87</td>
<td>100</td>
</tr>
<tr>
<td>Marurani</td>
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<td>Maweni</td>
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<td>90</td>
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<tr>
<td>Majimoto</td>
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<td>90</td>
</tr>
<tr>
<td>Kikwe</td>
<td>71</td>
<td>88</td>
</tr>
<tr>
<td>Mungushi</td>
<td>18</td>
<td>66</td>
</tr>
<tr>
<td><strong>All villages</strong></td>
<td><strong>69</strong></td>
<td><strong>91</strong></td>
</tr>
</tbody>
</table>

Source: EDI-RF APFS data, 2011
banana cultivation varies greatly between villages, with a particularly low percentage of adopting households in Mungushi village. We will return to this in the next section.

Most of the non-RIPAT farmers who have adopted banana cultivation live in the same villages as the RIPAT farmers, but banana cultivation has also made a breakthrough in some non-RIPAT villages.

10.4 Water

**Box 10.1 Securing water for banana cultivation – Dominick**

Dominick has been designated a RIPAT ‘super-farmer’. He cultivates about 360 banana stools on 1 acre of land next to his house. His land is fertile and needs to be irrigated only once every month; this is sufficient because his land is in a small natural depression and hence the soil moisture conditions are quite good. He owns a total of 4.5 acres of land and intends to plant more bananas there. But he also rents another plot of land on which he has planted 72 banana stools. The land that he is renting has good access to irrigation trenches, which is why he invested in planting bananas on the rented land before he invested on his own land.

**Box 10.2 Securing water for banana cultivation – Elias**

Elias learned how to grow bananas from Dominick (see Box 10.1). He and his wife have planted 85 banana stools next to their house, and they water them with buckets of water taken from a tap. Elias would like to plant more bananas, but his tap is supplied with water for only two hours per day, and he and his wife cannot water many bananas with this limited amount. He has therefore dug a hole in the ground 4 metres long, 4 metres wide and 2 metres deep. The hole is between his house and his plantation and he is planning to put in a plastic liner and then mud or cement. He will fill this tank with rainwater collected from the roof of his house during the rainy season, and this will allow him to expand his banana plantation.

Bananas require good water availability for optimal yield. Farmers with good access to irrigation and opportunities for rainwater harvesting are therefore more likely to grow bananas than other farmers. As we can see from Boxes 10.1 and 10.2, there are different ways of securing enough water for banana cultivation. Figure 10.1 shows that around 97 per cent of both the RIPAT and non-RIPAT households that have adopted bananas have access to irrigation water, while the proportion of households with irrigation water is considerably smaller among households that have not adopted banana. This suggests that access to irrigation water is an important factor, though by no means the only one, in deciding whether or not to adopt banana cultivation. One explanation for the very low rate of adoption in Mungushi village (see Table 10.2) might well be the limited access to irrigation water there.

Those who cannot irrigate their fields and do not have fields in depressions with good soil moisture conditions have to rely on water from wells, taps, or rainwater tanks for watering any crops they grow. Some people plant a few banana stools behind their houses and water them with the same water that is used for drinking in the household. However, the public supply of drinking water through pipes is limited to a few hours per day, so households dependent on this form of water supply for watering crops are restricted in the quantity of bananas they can cultivate. Nevertheless, households that have access to piped water or their own well water are more likely to grow bananas than
other households; 58 per cent of the adopting households get their drinking water from a pipe or a well, while only 44 per cent of the non-adopting households have access to this kind of drinking water.

Living close to a river is also an advantage for those who want to grow bananas. People usually live close to their fields, and the RIPAT farmers who cultivate bananas live on average only 1 km from a stream or river, compared with 2 km for RIPAT farmers who do not grow bananas (there is no difference for non-RIPAT farmers, however). Living close to a seasonal stream does not necessarily mean that one lives closer to irrigation water; many streams become completely dry a few months after the rainy season, as water is tapped upstream to feed irrigation channels there. However, land that is close to a water course is still likely to receive more water and to retain moisture better, and is therefore more suitable for banana cultivation, than land located further away. Thus, although banana is a relatively drought-resistant crop, good access to water all year round is required to have optimal yields, and those farmers who enjoy such good access to water are more likely to grow bananas than those who do not.

10.5 Labour and household types

Establishing a banana plantation is very hard work, as banana suckers need to be planted in a hole with a diameter of 90 cm and 90 cm deep. Bananas should grow without being subjected to water stress during the first four to six months after planting. In areas with a relatively dry climate, and particularly in years with low rainfall, farmers may have to water the banana crop regularly during the dry season. If the farmer does not have access to irrigation channels, the water needs to be transported in buckets from a tap or a river, which is a very strenuous job, especially if the source of water is far away.

Different types of household face different kinds of labour problems. In young households, parents have to spend time taking care of their small children. More mature
households, where there are teenage children, can usually tap into more labour resources than younger households. Older households, where the children have left home, have a capacity to work that declines as the age of the parents increases. Finally, there are households with a spouse or a generation missing (i.e. households headed by a widow or widower, or households consisting of grandparents and grandchildren). Such households are more handicapped than others with regards to labour. Household structure proves to be important for banana cultivation, as mature households (with a head of household aged 36–50 years) are more likely to grow bananas than younger households, older households or households with a missing spouse or a missing generation. This pattern is statistically significant for both RIPAT and non-RIPAT households. Among the households adopting banana cultivation, the mature households also grow more banana stools, on average, than other types of household, as can be seen in Figure 10.2.

10.6 Wealth and hunger

Box 10.3 Return on investment, RIPAT farmer – Japhet

Japhet explained that before the family joined the RIPAT project, the household had been a discontented one because there had not been enough food to go round. When his wife and children had empty stomachs, trouble and discord were never far away. Japhet enjoys the tranquility that has come to the family with the RIPAT project. Now there is far more food than the family can eat. Japhet is proud to say that he can now afford to pay for schooling for his children. He has put up a henhouse and has established banana fields. With the profits he has made, he has been able to buy a fine new milk cow. Through the RIPAT project, the cow has been inseminated with semen from a bull of a good milk-producing breed. If a female calf is born, Japhet will be able to produce lots of milk in the future.
Rosaline has about 70 banana stools on a piece of land that can be irrigated and that belongs to her own family (not to her husband). She is not a RIPAT member. She hired a RIPAT farmer to plan a layout for banana holes, and another man to dig the holes, mix topsoil with manure, and plant bananas (this man was paid TZS 2,000 per hole), and then she bought 70 banana suckers at TZS 500 each. She thus invested close to TZS 200,000 (about US$125) in planting her bananas, but as she sold her bananas for more than TZS 5,000 per bunch, she quickly recouped her investment.

The cultivation of bananas requires a significant investment in labour when establishing the plantation. If the household cannot provide the necessary labour, casual labour can be hired to dig the large holes required (at about TZS 2,000 per hole – see Box 10.4). The cultivation of banana is best carried out on irrigated land, and this must be rented or purchased if the household does not already own land of this type. Investing in banana cultivation is therefore easier and less risky if the household is wealthier. Figure 10.3 shows that the households that have adopted banana cultivation are on average significantly wealthier and less hungry than those who do not grow bananas; this is true for both RIPAT and non-RIPAT households.

One may ask here whether the relative wealth and food security of the adopting households is a cause or a consequence of banana cultivation. Do the rich cultivate bananas because they have the means to invest in this occupation (as suggested in Box 10.4), or are the banana growers wealthier due to the income generated by banana cultivation? Is it the well-fed families who have the strength to invest in banana cultivation, or are they well-fed because of the bananas that they grow (as exemplified in Box 10.3)?

**Figure 10.3** Wealth and food security among households adopting banana cultivation

![Bar chart showing poverty score and food security (X10) for adopting and non-adopting RIPAT and non-RIPAT households.](image)

Note: For a description of the poverty scoring system (the Progress out of Poverty Index or PPI) and the food security measure, see Chapter 5. Here, the food security scale is multiplied by 10 to enable it to be shown on the same axis as the poverty score.

Source: EDI-RF APFS data, 2011
In this chapter, we cannot draw firm conclusions on such causal relationships, and it is most likely that both factors are in play at the same time. But, to shed a little more light on the relationship between adoption and poverty reduction or food security, it is interesting to compare non-RIPAT households that adopted banana cultivation early (in 2006–08) with those that adopted bananas late (in 2009–10). As Figure 10.4 shows, early-adopting households are wealthier, on average, than households that were late adopters. Late-adopting households are in turn wealthier than non-adopting households, although this difference is not statistically significant. This could be an indication that households become wealthier over the period of time during which they grow bananas. On the other hand, Chapter 5 describes the PPI poverty score as a static measure; therefore, we suggest that the main reason for this pattern is probably that wealthier households adopt earlier. This is also supported by the fact that wealthier households have the means to invest in banana cultivation (and to hire labour, if necessary), and they are also better able to withstand failure and to take more risks. Poorer households are more vulnerable to failure and are therefore more likely to let wealthier households try new practices first, and follow them if they prove to be successful.

Returning to Figure 10.4, we see that early adopters are also more food secure than late adopters, but their levels of food security are not significantly different. However, late adopters are significantly more food secure than non-adopters. Because bananas start producing crops after only nine months, if cultivated correctly, we would expect the impact on food security to be almost immediate and not to increase much with time. This supports the idea that early adopters experience less hunger due to the importance of their bananas as a reliable source of food. This is in line with the results described in Chapter 5 showing that the RIPAT households have become more food secure, but that banana cultivation has not had an impact on the PPI.

**Figure 10.4** Poverty, food security, education, and time of adoption among non-RIPAT households

Note: For a description of the PPI poverty scoring system and the food security measure, see Chapter 5. Here, the food security scale is multiplied by 10 to enable it to be shown on the same axis as the poverty score. A score of 1 for education level indicates education to the current normal levels in Tanzania, i.e. seven years of primary education for adults of 15 and over; the figures shown here (right-hand scale on the vertical axis) are averages for all members of the household.

*Source: EDI-RF APFS data, 2011*
10.7 Education

When new agricultural technologies are introduced it may be easier for better-educated households to apply them because their higher levels of human capital enable them to learn new technologies faster and adapt them to local circumstances at a quicker pace (Rosenzweig, 1995).

Our study shows that banana-adopting households are, on average, better educated than non-adopting households; this is true for both RIPAT and non-RIPAT households, as can be seen in Figure 10.5. For instance, 36.5 per cent of adopting RIPAT households have an average level of education above primary school (more than seven years of schooling), while only 25.9 per cent of non-adopting RIPAT households have the same level of education. Figure 10.4 also indicates that the better-educated households adopt banana cultivation earlier. Moreover, our results show that better-educated households grow significantly more bananas than less-educated households, in both RIPAT and non-RIPAT households.

But better-educated households are also wealthier and more food secure on average, and one might therefore ask whether the correlation between banana cultivation and education stems from the fact that wealthier households are more likely to grow improved bananas. It is interesting to note that RIPAT households are on average significantly better educated than non-RIPAT households, although they are not significantly wealthier or more food secure than non-RIPAT households from the same villages, because the wealthiest households and the largest farms were not selected for participation in the RIPAT projects. This suggests that education affects project participation independently from wealth: RIPAT households seem to be more ‘progressive’ or open to trying new things than non-RIPAT households.
10.8 Gender

Box 10.5 Women and agricultural decisions – Martha

When Martha became a member of a RIPAT group, she was encouraged to grow bananas. But before she could start, she had to ask permission from her husband, who owns the land and has the upper hand in agricultural decision-making. The husband did not believe in bananas and was not happy about the idea, but he let her try because she was part of the RIPAT project and because the project insisted so much on banana cultivation. She planted 30 bananas and did very well. Now her husband has become convinced that bananas can be grown in the area and he gives her better support.

Box 10.6 Women and agricultural decisions – Elizabeth

Elizabeth is a member of a RIPAT group. She owns 2 acres of land and rents 3 acres. She has 200 banana stools and she also grows maize, beans, pigeon peas, cassava, sweet potatoes, soya beans, and elephant grass as fodder for her animals. She bought two dairy cows that give her 10 litres of milk per day (which can be sold for TZS 500), and she also owns 10 non-dairy cows that are kept by her parents. Elizabeth is using her farming income to build an impressive house in brick, with a sheet iron roof. She is a very successful farmer; for that reason, she is visited by most of the donors who arrive to see the region. Elizabeth is also a widow, and is therefore free to make her own decisions without having to ask anyone for permission.

The WaArusha and the WaMeru are patrilineal and patrilocal societies, and land is mainly owned by men. Women marry into their husbands’ families and gain access to land through their husbands. Men have the final say in agricultural decisions, and women therefore have less freedom than men in devising agricultural strategies (see Box 10.5 and Chapter 7). Our data show that men participating in RIPAT are more likely to adopt banana cultivation than women, presumably because women need the approval of their husbands to do so. However, some households are headed by women (they are usually widowed or divorced) and, in such households, women can take agricultural decisions without asking the permission of a man, as can be seen in Box 10.6. There is no significant difference between households with female and male heads in the adoption of banana cultivation. This suggests that gender is a constraint for banana cultivation only within married couples, and that women who can take agricultural decisions on their own (in female-headed households) are as likely to grow bananas as men.

10.9 Conclusion

Our data show that a new and lucrative crop such as banana is not adopted by all farmers, and it is not adopted at the same speed or rate by all those households that do grow it. Those who are best able to take advantage of the opportunities offered by this new crop are those who have better human, social, financial, and natural resources. This does not mean that the poorest, least-educated, and most marginal households do not adopt bananas, but that they do so later and at a slower pace than better-endowed households. This can probably be explained partly in terms of the poorer households lacking the confidence and the resources to adopt the new crop early and rapidly, and partly as a deliberate strategy to minimize risk. Marginal households can postpone the adoption of banana cultivation; they observe the endeavours of the better-endowed households that try the crop first, and then they can imitate them if those households are successful or
avoid repeating the same mistakes in the event of failure. Households that do not adopt banana might nevertheless benefit indirectly from the fact that others do adopt the crop. As discussed in Chapter 5, RIPAT households are less likely than non-RIPAT households to have casual labour as an important income source and more likely to hire labour on their own farms; this creates more income-generating opportunities for the poorer members of the population. Yet, even though the poor might indirectly benefit from banana cultivation, this is likely to be insufficient to bridge the income gap between them and the better-off households.

Note

1. Primary school in Tanzania covers standards 1 to 7, and the normal age of entry to primary school is seven years. We constructed a measure for household average education by grouping household members older than six years into three categories: 0) below average; 1) average; and 2) above average education. Below average education is defined as: below primary standard 7 if the person’s age is between 15 and 60; below the corresponding school year if his or her age is under 15; or below primary standard 4 if his or her age is over 60. Average education is defined as: primary standard 7 if the person’s age is between 15 and 60; the corresponding school year if his or her age is under 15; or primary standard 4 if his or her age is over 60. Above average education is defined as: above primary standard 7 if the person’s age is 60 or below; or above primary standard 4 if his or her age is over 60. Scores for individuals in the household were averaged using equal weights.

References

EDI-RF APFS data (2011) EDI-RF Assessment of Poverty and Food Security, Rockwool Foundation Research Unit, Copenhagen.
CHAPTER 11

RIPAT, RECODA and government institutions

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This chapter assesses the institutional sustainability of RIPAT. It describes how RECODA has taken two main paths towards the promotion of such institutional sustainability. One is the establishment of the RECODA Academy, which strengthens the links with the local governmental agricultural extension system by offering short RIPAT courses to both extension officers and RIPAT ‘super-farmers’, thereby deliberately bringing them together. There are examples of how this has led to productive partnerships that have resulted in joint efforts to start new RIPAT-like farmer groups. The other path is the director’s ongoing advocacy efforts with local government officials at all levels, ensuring that they are aware of and accept activities undertaken in RIPAT projects.

11.1 Introduction

The overall objective of the RIPAT intervention focuses first and foremost on the farming household, and is defined as being to provide ‘increased household food security and income from agricultural sources’ by bridging the technology gap, as explained in Chapter 2. However, as RIPAT has evolved, RECODA has perceived a need for the development of sustainable institutional structures to support the concept. RECODA has therefore sought to build links with government institutions, and to influence local agricultural policy and practices through these links in an effort to also bridge the ‘institutional gap’.

In this chapter, we analyse the extent to which RECODA has succeeded in promoting the institutional sustainability of the RIPAT concept. We find that RECODA has chosen two main paths in order to achieve this aim.

One path has been the establishment of the RECODA Academy, a very structured and successful institution. The main aims of the RECODA Academy are to recruit super-farmers and to equip fresh agricultural graduates, extension officers, and staff from non-governmental organizations (NGOs) involved in community economic development with training in running RIPAT-like projects, i.e. in bridging the technology gap through community mobilization, sensitization, and capacity building by utilizing locally available resources to promote self-reliance in creating food security and reducing poverty. We discuss the characteristics and achievements of the RECODA Academy in Section 11.2.

The other path is a less structured, but equally important, means of communicating information about RIPAT and gradually transferring ownership of the project to local government at all levels. Government personnel at regional, district, ward, and village levels have been involved in the initial design, implementation, and monitoring of the project, and RECODA has focused on collaborating with the agricultural extension services in the targeted areas throughout the duration of the project. In Section 11.3, we describe how RECODA has influenced local agricultural policies and how RIPAT could be a valuable addition to Tanzania’s current Agricultural Sector Development Programme (ASDP).

11.2 The RECODA Academy

One of the main initiatives adopted by RECODA in the attempt to strengthen its links with local government staff and, in particular, with the agricultural extension system has been to set up the RECODA Academy. By engaging in a closer partnership with the
government extension system, RECODA improves its institutional viability as an organization active in promoting agricultural development. At the same time, RECODA also increases the possibility of further spreading the RIPAT concept, since all graduates from the RECODA Academy are instructed in how to form and supervise new groups based on the RIPAT model.

The RECODA Academy evolved as one of the departments in RECODA. It was established because of a strong conviction that other organizations and individuals should have a better understanding of the RIPAT approach to agricultural development. The aim of the academy is to provide for the dissemination of the best, proven, rural economic practices and approaches. The academy is unique in that it offers tailor-made courses to facilitators of rural economic development.

Currently, the RECODA Academy targets two main groups: new graduates from universities and NGO personnel; and agricultural extension officers and super-farmers from RIPAT groups. College and university agricultural students are often required to undertake a stated period of field study as part of their training programmes, and attendance at the RECODA Academy combined with a period of practice with RIPAT provides an excellent opportunity for them to fulfil this requirement. Potentially, the academy could even be extended to cater for the needs of representatives from a wide variety of development organizations and farming communities.

The content of RECODA Academy courses

The slogan of the RECODA Academy is ‘Bridging the technology gap’. The academy has a comprehensive curriculum that is compiled and taught by experienced RECODA staff, with an emphasis on practical fieldwork in rural communities. The curriculum covers topics ranging from drought cycle management to marketing agricultural produce and the value chain.

The academy runs bespoke courses based on community development skills. It aims to spread the use of best practices, and works from case studies taken from the RIPAT projects. Topics and materials depend on the trainees’ needs, with course objectives, expected outcomes, training methods, and course lengths being defined accordingly. At the end of the course, participants should be capable of facilitating rural economic development projects, carrying out consultations, and implementing RIPAT-like development projects that lead to livelihood improvement and poverty alleviation in rural Tanzania.

The curriculum for the RECODA Academy courses covers the following areas:

- introduction and important definitions in rural economic development;
- community mobilization, sensitization, and capacity building;
- bridging the technology gap;
- consultancy and facilitation skills;
- conservation agriculture;
- drought cycle management;
- participatory rural appraisal;
- project cycle management;
- imitating RIPAT approaches;
- entrepreneurship skills, marketing agricultural produce, and value chains;
- farm planning and management by smallholders.
Outcomes of the RECODA Academy courses

The academy has held five courses, attended by university graduates with rural community economic development skills, extension officers, students doing field practice, and super-farmers, as shown in Table 11.1.

When they have passed the RECODA Academy courses, the super-farmers are called ‘paraprofessionals’. It is expected that they will be able to play a crucial role in a future model for the spread of RIPAT groups, and in both new RIPAT projects and local government ASDP activities.

In order to gauge the effects of the RECODA Academy courses on the participants, we interviewed a group of nine agricultural extension officers and two RIPAT 4 super-farmers from Korogwe District who had participated in a course that had finished two months earlier. Both groups of participants expressed great satisfaction with the understanding of RIPAT they had gained and the new skills they had learned relating to organizing and facilitating the operation of farmer groups. Moreover, training agricultural extension officers and super-farmers together seemed to have fostered mutual respect that had led to an improved relationship between the two groups. During the course, the two sets of participants had organized themselves into small groups according to geographical location, each group being made up of around two village agricultural extension officers.

Table 11.1 RECODA Academy courses, 2008–2011

<table>
<thead>
<tr>
<th>Course 1 Arumeru District (R1)</th>
<th>Course 2 Korogwe District (R4)</th>
<th>Course 3 Karatu District (R3)</th>
<th>Course 4</th>
<th>Course 5 Arusha District (R2)</th>
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and two of the super-farmers who were soon to qualify as paraprofessionals. Since the end of the course, these groups had met on a voluntary basis and had already started eight new RIPAT groups and made plans to establish four more. In addition, the original RIPAT groups to which the paraprofessionals belonged had donated planting materials for the new groups.

RECODA realized in August 2011 that, even though these 12 new RIPAT groups did not require much funding, support for them from the village agricultural extension officers and paraprofessionals ran the risk of being discontinued if there were no funds to cover the transportation costs for the advisers and a small payment in appreciation of their efforts. Meanwhile, it became clear that Korogwe District council had not planned for funding under the ASDP budget to support these 12 new RIPAT groups. RECODA visited the groups to encourage them and show appreciation of their work while they were awaiting funds from the government.

A similar model has been set up in Karatu District; 20 agricultural extension officers from the district participated in the RECODA Academy course together with 32 super-farmers from RIPAT 3 in September 2011. The district agricultural officer informed us that there were plans for eight new groups based on the RIPAT concept and organized by the graduates from the course. It was also planned that the eight groups should adapt elements of the RIPAT concept and incorporate these into the current ASDP set-up. The district agricultural officer expected that the operation of each of these eight new groups would be facilitated jointly by one agricultural extension officer and one paraprofessional, working together as a team. The idea was that the agricultural extension officers would provide technical advice and arrange the community mobilization and sensitization procedures while the paraprofessionals would facilitate the organization of the groups and the training and make follow-up visits.

These two examples of how the RECODA Academy courses have been used by the local governments in Korogwe and Karatu are interesting in that, independently from each other, they have arrived at the same model for continued partnership between the newly qualified paraprofessionals and the government extension system. In the case of Korogwe, inspiration for this came from the RECODA Academy participants themselves, while it came from the district agricultural officer in the case of Karatu.

11.3 Influencing local government and its agricultural policies

One of the goals of the RIPAT project is that its model for support to rural communities should serve as a good example that can be applied by local governments and NGOs in Tanzania and in the broader region of Sub-Saharan Africa. The establishment of the RECODA Academy and the outcomes from this represent one very structured approach towards achieving this goal.

Another less structured, but equally important, approach is the advocacy work carried out by the executive director of RECODA. He constantly takes time to nurture RECODA’s relationship with the local government authorities in the four districts where RIPAT operates.

RECODA has increasingly sought to influence the policies adopted by high-level government staff. This is done by keeping policy-makers and technical staff informed about the progress of RIPAT. This advocacy work largely takes the form of explaining the activities of RIPAT in important forums such as district consultative committees, regional
consultative committees, and district council meetings; organizing field visits; and inviting representatives of local government authorities to RIPAT events and meetings.

Interviews with district and regional commissioners in the four districts demonstrated to us that the locally appointed government representatives are well aware of RECODA's activities and are very positive towards the RIPAT projects and approach. These officials perceive RIPAT to be successful, as the projects empower farmers and make them food secure. When asked to specify why RIPAT has been successful, officials tend to refer to the thorough support provided by RECODA's technical staff in the targeted villages. By engaging local government staff at district, ward, and village level, RECODA is therefore slowly making progress in promoting the adoption of the RIPAT concept by local government institutions.

Yet, while support from appointed political officials is important, these officials have no direct influence over the use of the budget associated with the ASDP, which controls the expenditure of funds in the agricultural sector (see Box 11.1). The ASDP budget is controlled by elected district councillors working within comprehensive guidelines from the Ministry of Agriculture in Dar es Salaam. In order to achieve full institutional sustainability for the RIPAT concept, it needs to be adapted for implementation under the auspices of the ASDP.

While both the ASDP and the RIPAT interventions aim at poverty alleviation and food security, the means used to achieve this end differ. For RIPAT, the main objective is to increase household food security and income from agricultural sources through direct farmer support, while the underlying principle of the ASDP is to create a favourable environment for commercial activities and decentralize responsibility for the provision of services. Although the main objectives of the ASDP seem to leave room for, and would probably benefit from, the adoption of interventions such as RIPAT, there are several obstacles to this.

In the views of technical and administrative staff at local government level as they were expressed to us, the biggest hindrance to governmental implementation of projects similar to RIPAT is that the ASDP guidelines prohibit direct implementation of certain

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**Box 11.1 The Agricultural Sector Development Programme**

The Tanzanian ASDP has been formulated through collaboration between a wide range of stakeholders, including the agricultural sector lead ministries and local government authorities, with the aim of creating opportunities to stimulate agricultural growth and rural poverty reduction. The programme comprises two components: the local-level component and the national-level component. Development activities at national level are based on the strategic plans of the ministries, while activities at district level are implemented by local government authorities on the basis of district agricultural development plans, which in turn form part of broader district development plans.

The programme objectives are to:

- enable farmers to have better access to and use of agricultural knowledge, technologies, and market infrastructure, all of which contribute to higher productivity, profitability, and farm incomes;
- promote private investment based on an improved regulatory and policy environment.

The ASDP local-level support component finances three types of intervention:

- investments in community infrastructure and productive assets;
- provision of public or private agricultural services;
- capacity building for farmers, private and public-sector service providers, and local government officials.
elements of the RIPAT interventions; these elements are all RIPAT principles that are not directly transferable from an NGO to the local government system.

First, the ASDP stipulates that a maximum of 20 per cent of programme funds should be used by local governments to implement the programme, leaving (the local government staff argue) too few resources to pay for the agricultural extension officers to make frequent visits to farmer groups, which is one of the central elements in the RIPAT concept. One extension officer told us that she was responsible for 29 groups, but with hardly any funding she had difficulty in paying for her transport, so she visited the groups only very occasionally. When we talked to farmers in the area, it became clear to us that the lack of attention from their local extension officer was perceived as indicating a lack of accountability to them and disinterest on the part of the officer – which created a general feeling of mistrust towards the extension officers.

Second, the ASDP guidelines stipulate support for a single agricultural technology for each group. This stipulation has been made in response to national political pressure to ensure that there are visible results from the projects; promoting a single technology makes it easier to demonstrate take-up. This means that it might not be possible to directly copy the RIPAT principle of providing a basket of options. However, this does seem to be a question of interpretation, as the district agricultural officer in Karatu in fact included support for a full-scale RIPAT basket of technologies for ASDP groups in the 2011–12 budget (although the funding was not made available). However, whether this technology basket will be provided to the ASDP farmers as a basket of options from which they can make a final selection or as a fixed, predetermined package with no choices is yet to be seen at the time of writing.

Third, the ASDP guidelines stipulate that funding for technology inputs should be transferred directly to the ASDP group account, effectively decentralizing the input procurement process and devolving it to group level. A group of agricultural extension officers interviewed in the Karatu local government office expressed frustration over not being able to control the input procurement process. The problem of the ASDP design is that, although it devolves power over procurement to the group level, it does not provide adequate organizational support for the farmer groups to enable them to make effective decisions.

Despite these obstacles, the outcomes in Karatu and Korogwe districts of the training provided by the RECODA Academy indicate that the difficulties can be overcome. Although persuading government agricultural staff to adapt and adopt the RIPAT concept is a complicated and lengthy process, RECODA is slowly beginning to succeed in this.

11.4 Conclusion

Even though the institutional sustainability of the RIPAT concept beyond the formation of RIPAT groups and local village involvement was never an objective per se of the intervention, RECODA has put a great deal of effort into developing sustainable institutional structures for the RIPAT concept. RECODA has sought to build links with government institutions, and through these to influence local agricultural policy. The most tangible results of this work are the RECODA Academy graduates themselves, the partnerships established between the local governmental extension system personnel and the paraprofessionals, and the voluntary work done by these people in establishing
new RIPAT-like groups. None of this could have been achieved without the support of the local district government, which the RECODA executive director has continuously consulted and kept informed of the progress of the RIPAT groups.

It will be interesting to monitor the results from the new groups that have been started as a result of the work of the RECODA Academy. We believe that this model of partnership between local government authorities and paraprofessionals has great potential, both for the spread of the RIPAT components and for the impact of ASDP groups.

Despite the various obstacles to integrating the RIPAT concept and practical intervention with the ASDP initiative, there are opportunities for developing closer links between RIPAT and ASDP in the future. These are best exemplified by the approach of facilitating knowledge transfer and the training of agricultural extension officers through the RECODA Academy. Furthermore, the continuous close dialogue with local government authorities and the sharing of results and best practices from the practical experiences of the RIPAT groups have proved that it is possible to influence local government policies in order to scale up the use of the RIPAT concept in agricultural extension services and to ensure long-term sustainability of the RIPAT intervention.
CHAPTER 12

Summary and concluding remarks

Helene Bie Lilleør and Ulrik Lund-Sørensen, Rockwool Foundation Research Unit
In this book we have provided a comprehensive evaluation of RIPAT, an approach to agricultural extension for improved technology adoption among small-scale farmers in northern Tanzania. We have done so first by having the project developers and implementers explain what characterizes the RIPAT intervention in Part I of the book, and then subsequently in Part II by letting three different teams of evaluators employ their expertise and respective methodological strengths in evaluating and analysing the implementation, impact, context, and adoption of the RIPAT intervention and its different components.

In this chapter we briefly summarize and comment on the main findings in each of the chapters contained in the book, leading to five overall conclusions to be drawn from the evaluation of the RIPAT intervention.

Part I: RIPAT implementation and evaluation design

In Chapter 2, Maguzu, Ringo and Vesterager, representing the designers and implementers of the project, outline the reasons for the development of the RIPAT intervention and describe the main features of the design and implementation of the four RIPAT projects conducted to date, which were intended to close the agricultural technology gap as a means of improving livelihoods and self-support among small-scale farmers. The focus of the project has been on facilitating the availability of a choice of different agricultural technologies by organizing farmers into groups and presenting them with a basket of technology options. The group then implemented all technologies from the basket of options in a joint experiential learning process on the common group field. Each individual farmer chose which technologies to adopt on his or her own farm and to what extent. The objective was to ‘improve their small-scale farming systems and hence to increase food security in the household and alleviate poverty’.

The implementers have been pragmatic in their approach, designing an intervention that is adapted to local contexts. Rather than adhering to a set extension methodology, they sought to combine the traditional view of extension – which can be classified as a top-down methodology focusing on knowledge and technology transfer from experts to farmers through teaching and information dissemination – with the more bottom-up participatory approach to extension used in the Farmer Field School (FFS) methodology, where farmers learn to identify and solve problems together and experiment with new technologies through experiential and reflective learning in the field.

The use of a basket of technology options is a clear example of how Maguzu et al. have sought to combine these two contrasting strands of extension methodologies. Although the composition of the basket of options is modified according to local needs and demands, and each individual farmer makes a choice as to which technologies from the basket of options to adopt on his or her own fields, and to what extent, RECODA maintains a strong influence on the selection, dissemination, and management of the different technologies used by the group. By presenting the farmer groups with a varied set of technologies, ranging from perennial crops through conservation agriculture to improved breeds of livestock, RECODA enables each individual farmer to make an informed choice about what to adopt according to his or her needs and available natural, financial, and human resources.

Maguzu et al. stress that it is not only the basket of options that characterizes RIPAT, but also the conscious effort made to build on local resources, knowledge, and farmers’
own capacity to ‘take charge of their own development’. They point to how this, together with a long list of other activities, is necessary to ensure full local ownership, relevance, sustainability, and further spread of the technologies introduced into the local communities. The list of other activities includes careful sensitization and mobilization of farmers to promote their active participation; bringing local governmental authorities on board from the outset to assist in the implementation process and the group formation; built-in diffusion mechanisms, appointing the more skilled farmers as super-farmers with the responsibility for acting as local resource people in their technology of expertise; and, not least, setting up farmer groups with effective group leadership and clear work requirements using a common group field for the project’s implementation, visibility, and sustainability.

As the brief summary of Chapter 2 shows, the RIPAT intervention is complex and entails many different elements. It was therefore decided that it needed to be analysed and evaluated from different perspectives. As described in Chapter 3, this resulted in three separate studies; an impact study, an implementation study, and a context and adoption study. These studies differ not only in terms of content, but also in terms of their evaluation methodologies. As no baseline data were collected prior to the start of the implementation of RIPAT, making evaluation of its effects more difficult, the various evaluation studies also served to check each other’s findings.

The methodological crossover in the use of both quantitative and qualitative data has proved fruitful in informing the analysis and broadening the understanding and interpretation of the findings, providing insights above and beyond what each of the three evaluation approaches could have generated in isolation. The combination of evaluation methods that address the results – ‘what came out of it?’ – with methods that address the process and the context – ‘how and why did it happen?’ – gave additional depth and perspective to the analyses and helped to shape and highlight the overall conclusions presented at the end of this chapter.

Part II: The evaluation studies

In Chapter 4, Gausset, Jöhncke, Pedersen and Whyte – all anthropologists, and part of the context and adoption study team – point to the importance of knowing the historical, demographic, and political contexts when designing, and therefore also when evaluating and analysing, an intervention such as RIPAT. They describe the local historical development of agriculture and the role of livestock and certain crops, especially banana, and point to the ever-present need for farmers to be responsive and adaptive to the changing political and climatic conditions that they face.

The authors emphasize how the accomplishments of the RIPAT intervention may be a result of the pragmatic handling and flexible integration of the top-down and bottom-up approaches to agricultural extension, together with the provision of a carefully composed basket of technology options, as ‘it acknowledged that the local farmers were active agents who would select what fitted in best with their perceived needs and local constraints’. The provision and composition of the basket of options based on the local historical, demographic, and political contexts introduced flexibility and the ability to adapt to and engage with local conditions and realities, leaving the farmer with a genuine element of choice despite RIPAT deliberately not being a fully participatory extension approach.
In Chapter 5, Larsen and Lilleør analyse the highly structured large-scale quantitative data containing information on virtually all households that were members of either a RIPAT 1 or RIPAT 3 group at any point in time and on a large number of comparison households. They draw three main conclusions.

First, that there has been a high degree of adoption of various technologies among the individual participating farmers, but with considerable variation between households in what they adopted, suggesting that the farmers did indeed use the element of choice built into the basket of options to adopt technologies according to their individual needs and resources.

Second, that there have been positive impacts from RIPAT on different measures of food security among the RIPAT 1 participating households. The authors found that households were 25 percentage points more likely not to have experienced hunger during the ‘lean’ season than their comparison households; that they were almost 20 percentage points more likely to have eaten meat in the week prior to the survey; and that some children under the age of five in certain villages were considerably less likely to be stunted (i.e. to have poor height-for-age measures). Stunted growth is closely related to having experienced malnutrition in early childhood. These are substantial effects on food security in an area where three in five households report having experienced hunger in the past year.

Third, that despite the positive impacts on the food security outcome measures, no statistically significant impact could be found on any of the poverty indicators used in the study. Different possible explanations are advanced for this apparently contradictory result. The RIPAT project has provided the means to address the seasonal variation in the household’s agricultural production, and thus their food production. By adopting perennial crops and improved livestock breeds, the participating households have almost automatically achieved better food consumption smoothing over the year. This may have been strengthened further by the increased membership of savings and loan associations. In addition, there are indications that RIPAT households have changed their use of labour towards investing in their own farm activities rather than supplying casual labour to others, despite this being a rather remunerative source of income. This suggests that any additional resources that may have resulted from RIPAT have primarily been used to improve the food security and farm investments of the participating households. Importantly, this was the result of the individual farmer’s decisions, indicating that low food security was considered by far the most severe problem.

In Chapter 6, as part of the implementation study, the findings on the remaining OECD DAC principles (relevance, effectiveness, efficiency, and sustainability of an intervention) for development evaluations are described. Aben, Duveskog, and Friis-Hansen conclude that RIPAT has been a relevant project in terms of both the technologies offered and the way in which they were offered, through the innovative use of a basket of options as a pragmatic ‘mixture of a traditional extension approach and an FFS approach’, allowing the ‘highly qualified team of staff’ at RECODA to introduce unfamiliar technologies. They explain how the intervention may have succeeded in closing the technology gap in the sense that they judge that the technologies introduced will have reduced the risk of agricultural failure during drought and increased the agricultural production during years of adequate rains, although this still remains to be seen in practice. The authors compare the method of learning in RIPAT groups with that of FFS and conclude
that, because the learning contains a larger element of training, it is ‘a much faster way of spreading proven techniques’.

Overall, the authors assess RIPAT to be effective, drawing special attention to the use of built-in diffusion mechanisms and of biologically based inputs (which can be produced locally) as efficient ways of ensuring sustainability and promoting further spread of the technologies introduced. However, the authors also point to some of the potential weaknesses of RIPAT compared with FFS, their main concerns being a lower level of sustainability of the groups due to the lack of long-term user rights over group fields and relatively weak organizational capacity within groups to address common challenges, such as implementation of joint marketing.

In Chapter 7, Mogensen and Pedersen, who were part of the context and adoption study team, focus on intra-household dynamics and the everyday lives of women in some of the RIPAT 1 villages. They explain how farming and small-scale trading are integral elements of the women’s lives and a means of fulfilling their responsibility to provide food for the family; how men and women continuously negotiate over the resources in the household; and how some crops are under the man’s authority, often the cash crops, whereas other crops are under the woman’s control, e.g. traditionally the banana. With the introduction of new crops through RIPAT and the new social relationships arising from the RIPAT groups, traditional roles and rights over crops and other resources are challenged; new negotiations take place within homes, often with RIPAT women becoming more empowered because they now have the ‘backing of the project’ in their new productive activities and because they have engaged in more formalized social relationships with other project participants in the home villages of their husbands.

The authors point to how the women’s traditional authority over banana cultivation is being challenged, because the improved banana variety is becoming such a valuable crop – a crop that can be used both for food and for cash. On the other hand, one of the women interviewed by the authors explains how a man is restricted in his authority over the banana: ‘It is very difficult for him to refuse a child school fees, or refuse to help a child who is sick, as long as the bananas are out there in his garden.’ If there are only beans or maize to sell once a year, the man has to save the money and the woman has no control over it, even when food supplies are low.

In Chapter 8, Lilleør and Pedersen step outside the household and consider the role and characteristics of the RIPAT groups, as they constitute a crucial component of the intervention. The authors conclude that the main selection criteria for becoming a group member have generally been fulfilled, although some RIPAT farmers own more land than the maximum of 5 acres. The ‘lower middle-class farmer’ target group seems to have been a good choice, as most of these farmers remain group members even after the intervention period comes to an end, more than is the case for the wealthier farmers who may have been included in the project. Although most of the dropouts report having left the RIPAT groups because they found the group work too demanding, some of the farmers report dropping out from RIPAT 1 due to poor leadership, which resulted in RECODA increasingly addressing capacity building and group leadership in the subsequent RIPAT (2, 3, and 4) projects. Even so, the authors found that around 70 per cent of the original participants stated that they were still group members, and 13 out of the original 16 RIPAT 1 groups were still active in the sense that they were continuing to make joint agricultural investments in January 2011, four-and-a-half years after their formation; many of them had also developed into savings groups. Thus, although the authors of
Chapter 6 express concern over the institutional sustainability of the RIPAT groups as compared with FFS groups, the findings in Chapter 8 suggest that the existing groups do exhibit a degree of sustainability, and also that many of them have come to play important roles in advocating for improved conditions for their members’ interests in their local communities.

Gausset in Chapter 9 goes one step further and considers the extent to which the social technology promoted by the use of groups and the agricultural technologies promoted through the basket of options have been adopted by the participants, the permanence of this adoption, and whether non-participants have also adopted the social and agricultural technologies promoted, suggesting that these three levels of adoption represent three different indicators of the success of RIPAT.

Gausset concludes that the social technology has been well adopted, as most participants have stayed in the groups and many of the groups have evolved into savings or investment groups, which are likely to achieve a high degree of permanence or sustainability. However, he also concludes that farmer groups as a social technology are unlikely to be adopted by non-RIPAT participants because there is a ‘discrepancy between the collective nature of RIPAT farming groups and the individual or household nature of farming as it is practised on a day-to-day basis’. The social technology of farming groups is not a prerequisite for farming per se. On the other hand, in many villages the only means to save cash and access credit on reasonable terms is through savings and loan groups, where the social technology thereby becomes a necessity for those who want to save or to access loans. Farmers’ groups that also act as savings groups are therefore likely to be more sustainable because the joint savings and loan activities require the group structure, while farming does not.

Turning to the adoption of the agricultural technologies, Gausset concludes that the adoption of perennial crops (bananas and trees) has largely been successful; the improved banana varieties in particular have been ‘a genuine success at all levels of adoption’. The degree of adoption is more varied when it comes to other elements from the basket of options, such as conservation agriculture and improved annual crops. Most of the latter have been an adoption success at all three levels – i.e. non-participants have also adopted the crops – and in many cases these new improved varieties complement the traditional crops. Conservation agriculture, however, is a complex holistic technology; it has been adopted to some extent by many RIPAT participants on a permanent basis, but it has not spread to non-participants in the local communities, mainly due to its complexity and the cost of experimenting on an individual rather than on a collective basis, as is done in the RIPAT groups. Overall, Gausset finds that both the social and agricultural technologies introduced through RIPAT have been well adopted by the project participants, and with a high degree of permanence, and that, in addition, some of the agricultural technologies have also been adopted by non-participants.

In Chapter 10, Gausset and Larsen take a closer look at what characterizes those farmers who have adopted the improved variety of bananas – the single most successful agricultural technology introduced – among both RIPAT and non-RIPAT households in RIPAT 1 villages. They use findings from the qualitative adoption study to inform and guide their quantitative data analysis, which draws on the large-scale household survey. They estimate that, by January 2011, approximately one in eight non-RIPAT farmers in RIPAT 1 villages had adopted the improved banana variety. They find that farmers endowed with natural (land and water), financial, and human resources are ‘in a better
position to take advantage of the opportunities offered by this new and profitable crop’. Such farmers adopt the improved banana varieties faster and on a larger scale than the poorer and more marginalized farmers. However, this is not to say that the farmers with fewer resources do not adopt the improved banana technology, but rather that they do so on smaller plots of land and at a slower pace. The improved bananas, being one of the options in the basket of technologies, are thus well suited for a wide range of farmers who all benefit from adopting the crop according to their available resources.

As RIPAT evolved and as several of the agricultural and social technologies introduced were adopted by RIPAT farmers, and to some extent by non-RIPAT farmers, a need arose for the development of sustainable institutional structures to support the RIPAT concept, a point highlighted by Aben, Duveskog, and Friis-Hansen in Chapter 11. They describe how RECODA has taken two main paths towards the promotion of such institutional sustainability. One is the establishment of the RECODA Academy to strengthen links with the local governmental agricultural extension system by offering short courses in the RIPAT approach to instruct both extension officers and super-farmers in how to bridge the technology gap among small-scale farmers. By deliberately bringing local extension officers and RIPAT 3 and 4 super-farmers together on courses, Aben et al. argue that RECODA has succeeded in facilitating a productive partnership between the two groups, as they have now jointly started new RIPAT-like farmer groups in their extension wards in Karatu and Korogwe districts.

The other path chosen by RECODA for strengthening institutional sustainability is the director’s ongoing advocacy efforts with local government officials at all levels, ensuring that they understand and accept the activities undertaken in the RIPAT model – and, according to the findings of Aben et al., the director has been successful in this respect, as the RIPAT project is perceived by government officials as empowering farmers and increasing their food security.

**Concluding remarks**

We suggest that there are five overall and largely overlapping conclusions to be drawn from the three analyses – the impact study, the implementation study, and the context and adoption study – of the RIPAT intervention as an approach to agricultural extension and technology adoption among small-scale farmers in Tanzania.

First, both the implementation study and the context and adoption study point to how the pragmatic and flexible approach that was used, both in drawing on different extension methodologies and in integrating local needs, resources, and conditions into the intervention design, has contributed to the achievements of RIPAT and to the sustained adoption of the technologies introduced. This pragmatic approach has largely been possible because RIPAT, being at a pilot stage, has continuously undergone design amendments, allowing RECODA and other stakeholders to identify strengths and weaknesses in the intervention; lessons learned from one RIPAT project have been used to further strengthen the intervention in subsequent RIPAT projects.

Second, all three evaluation studies point to the important element of choice among participating farmers over which technologies to adopt and to what extent. High levels of initial and sustained adoption of the agricultural and social technologies introduced as part of the RIPAT concept are found among the participating households. The implementation and adoption studies suggest that this may in part be explained by the
group-based technology adoption, which ensures joint learning, collectively enforced work ethics, and reduced individual risks associated with testing new technologies.

Third, the impact study finds substantial positive effects on the level of food security among participating households, in terms of having enough food during the typical hungry season, the consumption of animal proteins, and examples of considerable reduced stunting among some children less than five years of age, which is likely to be caused by improved nutrition. There are no measurable effects on poverty, but there are indications of a shift in the sources and uses of agricultural income. These quantitative findings are backed by qualitative findings, in particular in the implementation study, which found that farmers reported having more diverse diets and being less likely to suffer harvest failure. Government officials also reported that RIPAT farmers had become more food secure, had decreased their casual labour activities, and had become more empowered.

Fourth, empowerment has occurred not only on an individual or household level, but also at group level. The vast majority of RIPAT 1 groups were still active more than one year after the project came to an end, and there are repeated accounts of how some of these groups have grown into entities that have a say on agricultural matters in their villages. RECODA is perceived locally as an effective and responsive implementing organization with competent and dedicated staff who are well known and respected for their work, and this is likely to have contributed positively to the sustainability and role of the RIPAT groups in their communities.

Fifth, the further adoption by non-RIPAT participants of the full RIPAT concept, encompassing both the agricultural and social technologies, has been limited. The adoption and implementation studies report that several of the agricultural technologies contained in the basket of options have been adopted by non-RIPAT farmers; in particular, the improved banana variety has been adopted by non-RIPAT farmers to a substantial degree. However, the social technology, i.e. the creation of farmer groups for joint experimentation and learning, has not been adopted by non-RIPAT farmers without external facilitation.

Through RIPAT, RECODA has succeeded in closing the technology gap among the targeted small-scale farmers to such an extent that their food security has improved significantly. Although the intervention has not resulted in the adoption of the full RIPAT package among non-RIPAT farmers, the latter have adopted several elements from the set of introduced agricultural technologies. While part of the success that RIPAT has achieved may be attributable to the dedication and enthusiasm of the RECODA staff in implementing the project, the evaluation suggests that its management structure, with a focus on strong group organization, the integration of local needs and resources into the project design, and a pragmatic combination of traditional and participatory extension approaches were also important contributing factors.
ANNEX 1
Profiles of RIPAT projects

Catherine W. Maguzu and Dominick Ringo, RECODA

Arumeru District (RIPAT 1 and RIPAT 2)

Arumeru District is in Arusha region. It is divided into three major agro-ecological zones. The villages involved in RIPAT 1 are all situated in the mid-lowlands on the southern side of Mount Meru. The RIPAT 2 villages are situated on the south-western side of Mount Meru and are drier because they are on the leeward side of the mountain.

The Highlands

The Highland area is densely populated. The altitude ranges from 1,400 to 1,800 metres above sea level, and the annual rainfall is about 1,000 mm or more. Both traditional and modern farming methods are practised. The major crops are coffee, bananas, maize, vegetables, avocado, cassava, Irish potatoes, sweet potatoes, and French beans. Livestock include cattle, goats, and sheep, kept in a semi-intensive zero-grazing system. The main soil is volcanic, with some patches of red soil. The forest, which is managed for water catchment, covers a large area.

The Midlands

The altitude ranges between 1,000 and 1,350 metres above sea level. The area is moderately densely populated. The Midlands receive 700 mm or more annual rainfall. The major activities are crop and livestock production; annual crops dominate, but there is some coffee and banana.

The Lowlands

The Lowland belt is 800–1,000 metres above sea level, and has a moderately undulating landscape. It has compacted clay loam soil and receives 400–700 mm annual rainfall, although this is not well distributed. The population density is relatively low. Most rivers and canals from the Highlands distribute water to this zone. The district has six major perennial rivers: the Burka, Kikuletwa, Nduruma, Ngaramtoni, Ngarenyuki, and Temi; some rivers that used to be perennial have become seasonal. Crops grown include horticultural crops, maize, beans, lablab, and cassava. The livestock system is free-range, with large numbers of cattle, goats, and sheep.

Karatu District (RIPAT 3)

Karatu District is in Arusha region and can be divided into three zones – Uplands, Midlands and Lowlands – with altitudes ranging from 1,000 to 1,900 metres above sea level. In the Highlands around Karatu, the vegetation becomes more lush and green. Extensive arable fields cover the slopes of the volcano and the land around Karatu town.
Rainfall

Rainfall is bimodal, falling between October and December and between March and June. Rainfall ranges from 300 to 700 mm per year in the semi-arid zone and from 700 to 1,200 mm for the sub-humid zone.

Soils

Soils vary depending on their origin and location. Shallow soils with low fertility are found on the summits and slopes. Clay soils of moderate fertility are found in the valleys, on gently rounded summits, and on slopes overlying soft gneiss rock. In the Ngorongoro area, where there are moderately steep foothill ridges of volcanic cones, lava plains, and foothills, the soils are of volcanic origin and predominantly clay. Some of these soils are very shallow, but they are very fertile.

Korogwe District (RIPAT 4)

Korogwe District is in Tanga region.

Topography

The terrain is made up of the Usambara Mountains, which form part of the Eastern Arc Mountains and rise to over 1,200 metres above sea level, and the Pangani river basin. The Pangani river and its tributaries – the Mbeza, Kizara, and Vuluni – form an important drainage system, and there are also other rivers including the Mkomazi, Soni, and Lwengera. The Pangani river is an important source of hydroelectricity and irrigation water.

Rainfall

The rains range from 2,000 mm on the mountains to 500 mm in the lower areas, with most of the rain being carried on the south-east monsoon winds that originate in the Indian Ocean. The leeward side of the mountain is drier because of the effect of the mountain. There are two rainy seasons: February to May and September to November.

Agro-ecological zones

The district can be divided into three zones. The mountainous zone rises to between 900 and 1,200 metres above sea level and has an annual rainfall of 1,000–2,000 mm per year. Major crops include bananas, beans, coffee, tea, and cardamom; livestock are also reared here.

The lower wetland zone lies at an altitude of 600–800 metres above sea level and has rainfall of 800–1,000 mm per year. Several rivers drain this area. The major crops include maize, paddy rice, beans, citrus fruits, and cashew nuts. Livestock are also kept. This area has the potential for irrigation using the water from the rivers draining the area.

The semi-arid zone lies 400–700 metres above sea level, and has less than 600 mm of rain annually. Crops grown include millet, cassava, cotton, paddy rice, and cashew nuts.
**ANNEX 2**

**Banana cultivation in the RIPAT projects**

*Dominick Ringo, RECODA, and Jens M. Vesterager, Rockwool Foundation*

**Why?**

Banana is one of the crops identified by RECODA as having considerable potential for food security, income, and environmental improvement. It offers several advantages compared with other crops: for example, 1) it is both a food and a cash crop and can give fruit throughout the year; 2) it provides employment all year round – unlike annual crops such as maize, which has very seasonal labour requirements; 3) it provides higher food production per area per year (the unit return) compared with maize and many other crops; 4) it fits very well with crop–livestock integration, where animals provide manure and the banana by-products are used for animal feed; 5) it is a perennial crop, which improves production stability over the years in areas that have a large variation in rainfall; 6) it improves the environment by providing permanent soil coverage.

**Where?**

In general, bananas will produce good yields under well-distributed rainfall conditions of 1,200 mm per year, at altitudes up to 1,800 metres above sea level. Soils should preferably be fertile, deep (2 metres), and not affected by salt (a pH value between 5 and 8). Banana is often (wrongly) described as a crop that can grow only under good rainfall conditions and/or with irrigation. Although high yields will be attained only under the optimal soil, water, and climate conditions, some varieties are more tolerant of drought and will withstand long dry seasons in a monsoon climate.

The opportunity to promote improved banana varieties in the RIPAT projects was the result of research carried out at the Selian Agricultural Research Institute (SARI) in Arusha on new varieties brought to Tanzania as tissue cultures. Based on the initial good results at SARI, RECODA decided to conduct a pilot project to further test the potential under farm conditions. The pilot project was undertaken in two areas: in an area with relatively high potential, with good rainfall conditions and the possibility of supplementary irrigation; and in an area with low potential, with poor rainfall conditions and where farmers practise solely dryland farming. These two areas later became the RIPAT 1 and RIPAT 2 areas respectively. The pilot project revealed that the new banana varieties produced very well in the RIPAT 1 area, and that they could even be cultivated in the dry and harsh RIPAT 2 area. Through the RIPAT experience, it was further learned that under dryland farming conditions it is crucial to select adequate sites, i.e. lower-lying plots with windbreaks and the possibility for harvesting run-off water. Moreover, reducing the plant density, increasing the size of the planting hole, and applying higher levels of manure combined with mulching further improved the success of banana cultivation under dry conditions. It was found that, when cultivated using sound agronomy practices, banana is less vulnerable to dry spells than annual crops such as maize.
How?

It is quite labour intensive to establish a banana plantation. Using the general recommended spacing of 3 metres between rows and 3 metres within the rows, around 450 holes should be prepared per acre. A planting hole should be approximately 90 cm deep and 90 cm wide (approximately 0.6 cubic metres). When digging the holes, the upper layer of soil (45 cm) must be separated from the bottom layer. After finishing the digging, the upper soil should be well mixed with 5–10 buckets of farmyard manure or compost and then returned to the hole.

Bananas can be planted throughout the rainy season; however, they should grow vigorously and without water stress during the first four to six months after planting. Therefore, planting should not be done during the last month of the rainy season. The planting material (suckers) must come from a healthy disease- and pest-free plantation. The use of banana seedlings produced from tissue culture is recommended, but these are not yet available in Tanzania. In addition to the above, farmers need to learn techniques for: 1) removing suckers and preparing good planting materials; 2) avoiding and managing pests and diseases; 3) applying supplementary manure and fertilizer and irrigating (if possible); 4) harvesting, processing, and marketing the fruit.
ANNEX 3

Acronyms, abbreviations and glossary

Acronyms and abbreviations

ASDP  Agricultural Sector Development Programme  
DAC  Development Assistance Committee  
DIIS  Danish Institute for International Studies  
EDI  Economic Development Initiative  
EDI-RF  Economic Development Initiative–Rockwool Foundation  
FAO  Food and Agriculture Organization [United Nations]  
FFS  Farmer Field School  
NAADS  National Agricultural Advisory Services  
NGO  Non-governmental organization  
OECD  Organisation for Economic Co-operation and Development  
PPI  Progress out of Poverty Index  
RECODA  Research, Community and Organizational Development Associates  
RIPAT  Rockwool Initiatives for Poverty Alleviation in Tanzania  
SACCO  Savings and Credit Cooperative  
T&V  Training and Visit [extension system]  
VSL  Village Savings and Loan  
VSLA  Village Savings and Loan Association  
WDR  World Development Report

Glossary

Key concepts

Capacity building: The process through which individuals, organizations, and societies obtain, strengthen, and maintain the capability to set and achieve their own development objectives over time.

Effectiveness: The extent to which the development intervention’s objectives were achieved, or are expected to be achieved, taking into account their relative importance.

Efficiency: A measure of how economically resources or inputs (funds, expertise, time, etc.) are converted into results.

Empowerment: A gradual process in which people gain in self-confidence and feel more able to choose their own priorities and way forward.
**Evaluation**: The systematic and objective assessment of an ongoing or completed project, programme, or policy, in terms of its design, implementation, and results. The aim is to determine relevance and degree of fulfilment of objectives, development efficiency, effectiveness, impact, and sustainability. Evaluation also refers to the process of determining the worth or significance of an activity, policy, or programme.

**Facilitation**: Helping a group of people to achieve their aims through discussion, encouragement, and support, with planning and action.

**Hunger**: A condition in which people do not get enough food to provide the nutrients (carbohydrates, fat, protein, vitamins, minerals, and water) for fully productive, active, and healthy lives.

**Hunger season**: The seasonality of agricultural harvests leaves many poor people hungry during certain months of the year (e.g. the period right before the harvest of annual crops).

**Impacts**: Positive and negative, primary and secondary, long-term effects produced by a development intervention, directly or indirectly, intended or unintended.

**Mobilization**: Actions intended to encourage people to come together so as to support a certain idea that aims to achieve a certain goal or goals. It is also defined as an exciting process of encouraging and supporting communities to analyse their own situations and to take steps to work together to make changes for the better.

**Oversampling**: The use of a larger number of observations in order to correct bias in a sample.

**Ownership**: When local people take control and accept responsibility for issues that affect their own development.

**Participatory rural appraisal**: An approach that aims to incorporate the knowledge and opinions of rural people in the planning and management of development projects and programmes.

**Poverty line**: Tanzania operates with a national poverty line of TZS 492 per adult equivalent per day, representing the local monetary cost of fulfilling basic needs for food, shelter, and clothes. This largely correlates to the typical international poverty line for developing countries of US$1.25 per day, after correcting for purchasing power differences.

**Progress out of Poverty Index (PPI)**: A simple and accurate tool that measures poverty levels of groups and individuals and estimates the likelihood that individuals or households fall below the national poverty line. The poorest half of the population are below the national poverty line.

**Randomized controlled trial**: A specific type of scientific experiment, and the preferred design for a clinical trial. In medicine, these trials are often used to test the efficacy of various types of intervention within a population of patients.

**Selection bias**: A statistical bias in which there is an error in choosing the individuals or groups to take part in a scientific study, so the sample does not exactly represent the
population from which it is drawn. The term most often refers to the distortion of a statistical analysis resulting from the method of collecting samples.

**Sensitization:** An attempt to make oneself or others aware of and responsive to certain ideas, events, situations, or phenomena. Sensitization creates an awareness of the present situation in order to encourage positive change in the future and a readiness to act.

**Solidarity chains:** In RIPAT, two types of solidarity chain were applied: 1) **animal** (goats, sheep, pigs): each group is supplied with pure-bred female and male animals as initial improved breeding stock. Members pass on female offspring to others in the group according to a list worked out by the group. Only after having distributed two female offspring to the next person on the list will the group member be able to claim ownership of the female animal received; 2) **banana**: each farmer who adopts the improved banana technology is expected to give three times the number of banana suckers received through the project to other interested farmers in the community and to train them in improved cultivation techniques.

**Statistically significant:** In statistics, a result is called ‘statistically significant’ if it has less than a predefined level of probability of having occurred by chance.

**Sustainability:** The continuation of benefits from a development intervention after major development assistance has been completed, and the probability of continued long-term benefits.

**Target group:** The specific individuals or organizations for whose benefit the development intervention is undertaken.

**Technology gap:** The gap between the farm production that is achieved with the agricultural technologies currently being used by farmers and the production that could be achieved by the same farmers if they had access to better, and currently available, technologies and had the capacity to adjust them to local conditions. The gap is caused both by lack of knowledge of techniques and training in their use, and by lack of access to equipment and agricultural inputs for implementing better technologies.

**Triangulation:** The use of three or more theories, sources, types of information, or types of analysis to verify and substantiate an assessment. By combining multiple data sources, methods, analyses, or theories, evaluators seek to overcome the bias that comes from single informants, single methods, single observers, or single theory studies.

**Agricultural terms**

**Annual crop:** A crop that grows for only one season (or year) before dying, in contrast to a perennial, which grows for more than one season.

**Banana (improved varieties in RIPAT):** The improved banana varieties Grand Nain, Paaz, Chines, Williams, and Lakatan were tested and demonstrated. In some areas the local or indigenous variety Mshale was used for comparison. These improved banana varieties were selected and imported by the Tanzania Banana Coordinator for higher production yields, food security, and sales (including export sales). The improved banana varieties can be used for both cooking (plantain) and as fruit, and have a wide tolerance to drought, lodging, and diseases.
Banana stools: Suckers spring up around the stem of the main plant and form a clump called a ‘stool’. The eldest sucker replaces the main plant when it fruits and dies, and this process of succession continues indefinitely.

Banana suckers: Offshoots taken from the base of the mother plant. Bananas are propagated (to produce more plants) from suckers (or from tissue culture). If the suckers are not removed they will compete with the mother plant and reduce yields.

Chaka hoe: The chaka (Zambian) hoe is promoted in conservation agriculture for reduced tillage as an alternative to the traditional hand hoe. It is used to till only the spots where seeds are to be placed by making permanent planting basins. It is a heavy hoe with an extra-strong, long blade and a long handle that can be swung to reduce effort, and that makes it possible to prepare basins in the dry season. The basins are 20 cm deep and 30 cm long and are spaced 70 cm apart along the row; the rows are 90 cm apart. Each year the basins are re-dug in exactly the same place as the year before.

Conservation agriculture: In the RIPAT context, this is an agricultural method based on three principles that aims to produce high crop yields while reducing production costs, maintaining soil fertility, and conserving water. These principles are: 1) disturb the soil as little as possible (reduce tillage using chaka hoes or a ripper); 2) keep the soil covered as much as possible (apply mulch and/or cover crops); 3) use intercropping and crop rotation.

Contour farming: Field operations such as ploughing, planting, cultivating, and harvesting on the contour, or at right angles to the natural slope, to reduce soil erosion, protect soil fertility, and use water more efficiently.

Cover crops: Crops used to cover and protect the soil surface, to decrease erosion, and to shade the ground. A cover crop should be a fast-growing species – usually a legume. In RIPAT, the legumes lablab and mucuna are promoted as cover crops.

Crop rotation: The growing of different crops, in recurring succession, on the same land to preserve the productive capacity of the soil (i.e. to avoid depleting the soil of nutrients and to control weeds, diseases, and pests).

Elephant grass: A perennial, high-yielding grass that grows over 3 metres tall. It is also known as Napier grass.

Extension: In this book, extension is understood as a government service designed to ‘extend’ research-based knowledge and relevant technologies to the rural sector to improve the lives of farmers.

Farmyard manure: A mixture of animal dung, urine, and straw or litter used as manure.

Intercropping: Growing two or more crops in the same field at the same time, either mixed together or in rows or strips, e.g. pigeon pea and maize intercropping.

Legumes: Plants that are notable for their ability to fix atmospheric nitrogen biologically and to improve soil fertility through nitrogen acquisition. They are important components in crop rotation and intercropping. The comparatively high protein content of their seeds and foliage makes legumes desirable for livestock and human consumption. In RIPAT, various legumes have been promoted, including lablab, mucuna, pigeon pea, soya bean, and cowpea.
**Perennial crop**: A crop that grows more or less indefinitely from year to year (e.g. banana).

**Ripper**: An implement promoted in conservation agriculture for reduced tillage as an alternative to the traditional ox-pulled mouldboard plough. It consists of a frame and a long tine attached to it for breaking up compacted soil and hardpans, and for making planting furrows. The ripped lines, usually spaced 75–90 cm apart, are as far as possible in the same place every year and the soil in between remains undisturbed.

**Stuka maize**: An improved, open-pollinated maize variety. Its name comes from an abbreviation of the Swahili words *stahimili ukame*, which mean ‘tolerate drought’. The variety was produced by Selian Agricultural Research Institute and became one of the technologies promoted by RIPAT.

**Tied ridges**: A water conservation method that uses small dams made of earth at regular intervals in the furrows, to trap rainwater and prevent it from flowing along the contours.

**Water conservation**: The protection, development, and efficient management of water resources for beneficial purposes. In RIPAT, the term is understood as covering improved agriculture practices promoted to reduce water loss from the surface, run-off (e.g. using tied ridges), and evaporation (e.g. using mulch).
Index

adaptation, local 104
advocacy 16, 129–30
age, population 97, 118, 118fig
age-set system 81, 82
agricultural exchange, historical 37, 38
agricultural liberalization policy 40box
Agricultural Sector Development Programme see ASDP
‘agro-scepticism’ 2
Anderson J.R. and Feder G. 3, 6
Anderson, J.R., Feder, G. and Ganguly, S. 8, 10
Anthropological Analysis 31
artificial insemination 17, 18t
Arumeru: RIPAT 1 17, 18t–19t, 27, 29, 37, 51, 53, 56box, 104; RIPAT 2 20
Arush WaMaasai 37
Arusha: data collection 4fig; importance of banana cultivation 114; and market for produce 84, 86; RIPAT 1 17, 18t–19t, 37, 80; RIPAT 2 20; RIPAT 3 20
ASDP (Agricultural Sector Development Programme) 30, 71, 74, 75, 129, 130–1
Assmo, Per 40box

banana cultivation: constraints on adoption of improved varieties 113–23;
cultural significance 105; female authority over 80, 85, 86; as fertility symbol 86; importance on Mount Meru 39; improved technology 15, 96, 98; improved varieties 66, 67box; intensive 38; irrigation 75, 116, 119; as labour intensive 60; and RIPAT 14, 53, 105–7, 115, 116; secure source of income 110; ‘solidarity chain’ 73
Banerjee, A. and Duflo, E. 58
beans: as annual crop 49; as cash crop 51, 52t; as main crop 37, 38; and women 83, 85, 122box, 137
bottom-up approach 10, 11, 41, 42
Braun, A. and Duveskog, D. 8
Braun , A., Jiggins, J., Röling, N., van den Berg, H. and Snijders, P. 3
Britain 39
business opportunities, agricultural 64
capital, group 16
Carlsson, E. 16
cash crops 51, 52t, 83, 84
casual labour 59, 60, 70, 119
cattle: and boundaries 39; and drought 20, 74; as indoor 83, 85; and traditional agriculture 108
chickens 39box, 54, 58, 67box, 73, 85 see also poultry
cildcare 117
children, stunting of 49, 57fig, 58, 61, 140
coffee 39
collaboration 9, 11, 16, 21
communication, importance of 12–13, 16, 17
conservation agriculture 20, 107–8
context and adoption study 5, 30–2
Cooksey, B. 40box
Copenhagen, University of 27, 31
crop productivity, African 8
crops: annual 107–8; cover 107; improved varieties 53figs, 66, 86; perennial 14, 39, 98, 105–7
cultivation, traditional 13

DAC (Development Assistance Committee, OECD) 64
Danish Institute for International Studies see DIIS
Dar es Salaam 130
data collection tools 26
Davis, K., Nkonya, E., Kato, E., Mekonnen, D.A., Odendo, M. and Miiro, R. 3, 6
Deitchler, M., Ballard, T., Swindale, A. and Coates, J. 49
Denzin, N.K. 25
development, agricultural, failure of 2
development, historical 40–2
‘development ambassadors’ 64
Development Assistance Committee, OECD see DAC
development policies, centralized 40box
diet, improvement in 67
‘Difference-in Differences’ 55, 56box
diffusion: after end of project 10; analysis of 27; conservation agriculture 108;
government support 12, 41; groups
93, 105, 110; improved animal breeds
15; mechanisms 30, 135, 137; RIPAT
aims 16–17; RIPAT success 5, 64, 98; solidarity chains 73, 76; speed of 73; and
super-farmers 69; women 88

DIIIS (Danish Institute for International
Studies) 5, 26, 29, 70, 74
donor dependency 9, 15, 20, 21
drop out rate 92, 97, 109
drought: effect on project period 20,
55, 65; and effectiveness of RIPAT 70;
importance of closing technology gap
66; and ox-drawn cultivation 74; and
women's projects 84

East Africa 29, 30, 38, 53, 71, 72, 74
EDI (Economic Development Initiative)
27, 48
education 51, 53, 59, 84, 118; 121
Elakonoto 66, 67
Ellis, F. and Biggs, S. 40, 41
empowerment 9, 75, 92
ethnic identity 38, 81
evaluation 63–77; basket of options 66–8,
70–1; components 65; context and
adoption 24; data collection 27, 28;
efficiency 74; group organization 68–9,
71–2; impact study 24; implementation
study 24; mechanism for spreading 73;
RECODA 69–70; sustainability 75–6
experimentation 68, 106
exports, agricultural 107
extension: approaches 2–4, 8, 10–11;
participatory 2, 8, 42; RECODA Academy
126, 127–8; traditional 2, 8, 68
extension officers: and best practice 74;
collaboration 9, 12, 16–17, 32, 41, 51,
52; problems encountered 131, 132;
training 126, 127, 128–9, 139
facilitation: active 11; by farmers 11; as
RIPAT focus 9, 10; technical competence
3
FAO (Food and Agriculture Organization,
UN) 2, 3, 5, 29
Farm Concern International 99
Farm Field School approach see FFS
farmer groups 9, 108–10
farming practices, current 11
Feder, G., Murgai, R. and Quizon, J.B. 3, 6
FFS (Farmer Field School approach):
advantages 69, 76; as bottom-up
approach 10–11, 43; cost-effectiveness
74, 75; description 8; RIPAT as modified
3–4, 68; sustainability 64; team expertise
in 29, 30, 77
firewood 15; 83, 108
flexibility 36, 65, 73, 76, 110
focus groups 26
Food and Agriculture Organization, UN see
FAO
food security: definition 49; and early
adoption 120; and education 121; as
goal of RIPAT 10, 64, 130; hunger as
measure 60; impact of RIPAT 4, 5, 47–58;
and population growth 2; RIPAT, FFS,
ASDP compared 74
Friis-Hansen, E. and Duveskog, D. 71, 74
funding 2, 69, 74, 128t, 129, 131

Gallagher, K. 8
Gallagher, K., Braun, A. and Duveskog, D.
11
Garmi 66
Gautam, M. 8, 10
gender issues: female farmers 83–5; impact
of RIPAT 86–8; gender politics 85–6; and
groups 12; household heads 28, 51, 122;
social organization 81–2; traditional
roles 80 see also women
Germany 39
Giller, K.E., Witter, E., Corbeels, M. and
Tittonell, P. 107, 108
goats: cross-breeding 19; improved 39;
54, 65, 66, 70; as indoor 85, 87; 80
solidarity chain 15, 18, 73
government institutions 125–32
grain cultivation 38
grazing, uncontrolled 98
groups 91–100: benefits 97, 98, 109;
constitutions 19; exclusion criteria 93;
fields 13–14; formation 12, 13; gender
balance 93; inactive 97; land rental
71–2; network for women 86, 88; organi-
zational capacity 16, 64, 65, 68–9, 71–2;
role of 98, 99–100; selection criteria
93–4; solidarity chain 20; support for
women 109; and sustainability 21

Haram, L. 81, 82
historical background 39–42
‘Household Hunger Scale’ 49, 55
housing 53
illiteracy 20
impact study 26, 27
implementation study 4, 29–30
income, group 13, 14, 50
Indonesia 3
infrastructure 37
initialization 11
Iraqw 53
irrigation: access to 117; banana cultivation 19, 20, 106, 107; and crop selection 107; household comparison 51
ivory 38
Karatu: data collection 4; and RECOKA Academy 129; RIPAT 3 18t–19t, 20, 27, 29, 51–3, 56; and RECODA
Academy 129; RIPAT 3 18t–19t, 20, 27, 29, 51–3, 56; and RECODA
Kenya 77
Kikwe 75
knowledge transfer, bottom-up 3
knowledge transfer, top-down 2, 3
Korogwe 4fig, 17, 18t–19t, 21, 65, 129
Kwa Usguru 80, 81, 83–4, 86
lablab 14, 15; 53fig, 54, 56; 66, 105, 107, 108
labour 61, 117–19
land, ownership rights 81
Larsson, R. 39, 40box
leaders, village 12
learning exchange 16
livestock: adoption via RIPAT 54–5; cross-breeding 15, 19; cultural significance 39box; and drought 20; improved husbandry 66; indoor animals 85; new breeds 67box, 73; productivity 8; solidarity chain 15; see also cattle; goats; pigs; poultry; sheep
local conditions, important of 11, 108
Maasai plain 105, 106
Maguzu, C., Ringo, D.E., Mariki, W., Owenye, M., Kola, F. and Leseyo, C. 107
maize 51, 66, 98, 106, 107, 108, 114
Majimoto 68
malnutrition 48, 49, 50
marriage 81–2, 88, 122
Marurani 66, 67, 80–4
Meru 110
methodology 25, 28–32; qualitative 25, 26, 29, 31, 115; quantitative 25, 26, 92, 93
microfinance 19
migration 37, 40
mobilization 12–13
Moshi 37
Mount Meru 17, 20, 36, 37, 38, 40, 105, 106
Mungushi 116
NAADS (National Agricultural Advisory Services, Uganda) 30, 72, 77
NGOs (non-governmental agencies) 8, 69–70, 71
nutrition 49, 53, 57, 58
Nyerere, Julius 21, 40box
OECD (Organisation for Economic Co-operation and Development) 2, 64
Okoth, J.R., Nalyongo, W. and Bonte, A. 11
ownership, local 12, 21
pastoralism 39box
patrilineality 81, 122
patrilocality 81, 87, 122
Philippines 58
pigeon peas: as cash crop 51, 52; extension of 105; improved varieties 107, 108; intercropping 75, 107; problems 16, 98; RIPAT 1 37; 53fig; RIPAT 3 54
pigs 18t, 20, 54, 66, 67box
plantains 105
polygamy 81–2
population growth 2, 37, 105
poverty: developing countries 50; impact of RIPAT 4, 5, 10, 48, 58–61; indicators 59fig; national poverty line 50, 58
pragmatic approach 2, 36, 92, 139
production stability 67
productivity: importance of closing technology gap 66
‘Progress out of Poverty Index’ (PPI) 50, 50box, 51, 53, 58–9, 96, 120
RECODA (Research, Community and Organizational Development Associates): and accessibility of technology 70; and adoption of crops 53, 54; and adoption of livestock 54; assessment 69–70; commitment 71; consultants 95box; development approach 42–4; emphasis on empowerment 92; evaluation RIPAT 27; expertise 8; facilitation 99; group organization 71; importance for project continuation 64; and influence on
government 129; and local government institutions 29; participation of local peoples 11, 12; and savings groups 60; teaching role 68, 69; technology options, basket of 14
RECODA Academy 17, 75, 126–9, 131–2
relevance: groups 32, 97; implementation study 24, 29; and lasting change 9;
RIPAT 66–9, 77
RIPAT (Rockwood Initiatives for Poverty Alleviation in Tanzania): aim 9, 10; concept 9–11; core components 11–17, 65; data collections 4fig; effectiveness 69–74; efficiency 74–5; evaluation 4–5; extension approaches 10–11; Farmer Field School approach 3–4; implementation 8, 9, 17–21; implementation strategies 65; objectives 49–51; pragmatic approach 2; project characteristics 18t–19t; RIPAT 1 17, 19, 35–44, 51–3; RIPAT 2 20; RIPAT 3 20; RIPAT 4 21; time scale 11
Rockwool Foundation Research Unit: development approach 42–4; importance for project continuation 64; and RECODA 69; survey 27
Rosenweig, M.R. 121
SACCOs (Savings and Credit Cooperatives) 19
savings groups 54, 59, 60, 61, 83, 84box, 108–10
Schreiner, M. 50; Chen, S. and Woller, G. 62
seed production 97, 108
sensitization 12–13, 20
sheep 18t, 20, 65, 66
shops, small 83
social change: and development 40–2; food security 49–50, 52, 55, 57–8; measurement of 27, 32; poverty 50–1, 52, 58–61
social interaction, historical 38
social organization 81–2
social technology 104
socialism, African 40box
soil erosion 20
soil fertility 107
‘solidarity chain’ 73
soya beans 53fig, 54, 81box, 87, 122box
Spear, T. 38, 39, 40, 105
Spear, T. and Nurse, D. 38
status, male, and animal ownership 85
stuka 108
subsistence farming 2, 37, 43
sugarcane 38
‘super-farmers’ (lead farmers) 17, 69, 77, 126, 128, 129
‘super-household’ 44photo
sustainability 9, 10, 29, 64, 75–6
Talle, A. 81
Tanga 18t–19t, 21
Tanganyika 39
technology, adoption: 103–11; as success indicator RIPAT 104–5
‘technology gap’ 3
technology options, ‘basket’ of 3, 4, 9, 11, 12, 21; and effectiveness, RIPAT 70–1; elements 15box; and evaluation RIPAT 66–8; importance of local conditions 14, 15; as key component RIPAT 65; microfinance model 19; RIPAT 1 53–5; RIPAT outcome 74
Tengeru 86
top-down approach 10, 41, 42
Training and Visit approach (T&V) 3, 8, 10
tree cultivation 106
Uganda 30, 72, 77
‘ujamaa’ village reorganization policy 40box
UN (United Nations) 2
USAID (United States Agency for International Development) 49
Ushirikiano 99
value-chain analysis 15
van den Berg, H. and Jiggins, J. 3
vegetable cultivation 83, 84
village governments 93–4, 99box
WaArusha 20, 38, 39, 53, 105, 122
WaMaasai 20, 27, 37, 38, 39box
WaMeru 37, 38, 39, 40, 53, 105, 122
water 2, 51, 116–17 see also irrigation
wealth 118, 119–20, 121
weed control 81box, 107
Weiss, B. 86
women 79–89; authority in groups 86, 87; constraints 87–8; cooperative activities 84; as household head 28, 122; mobility 87, 88; position in society 93; rights given by RIPAT 86–7; and savings groups 83, 84box see also gender issues
World Bank 2, 8
FARMERS' CHOICE

Food security is once again an urgent international priority. Agricultural extension methods that rely on imposing centrally developed technological solutions have been ineffective, since small farmers in developing countries often cultivate marginal lands, working under constraints for which these solutions were not designed. Since 2006, a flexible agricultural extension approach has been implemented in northern Tanzania, inspired by the Farmer Field School approach, and offering farmers a ‘basket of technology options’ from which farmers can pick and choose what serves their needs and resources best. The focus is on extending improved low-cost farming techniques adaptable to local conditions in a pragmatic and flexible process. The interventions are locally known as ‘RIPAT’, and they have received financial and technical support from the Rockwool Foundation.

Farmers’ Choice outlines the RIPAT intervention, and examines how effective it has been. This evaluation of RIPAT brings together the analyses of economists, agricultural scientists, and anthropologists who studied the impact, implementation, adoption, and spread of the programme approaches. They asked: what has been the impact on poverty and food security among participating farmers? How effective has the implementation of the programme been? Which elements of the programme have been most enthusiastically and enduringly adopted? This book relates the sometimes unexpected outcomes and benefits of the programme among the farmers and their children.

Farmers’ Choice should be read by all those interested in improving the food security and incomes of poor farmers in the Global South: agricultural scientists, anthropologists, staff of NGOs, researchers and students of development studies.

Helene Bie Lillegård is the Head of Evaluation, Rockwool Foundation Research Unit. Ulrik Lund-Sørensen is the Evaluation Coordinator at Rockwool Foundation Research Unit. Both have years of experience working in developing countries, including Tanzania.

‘An innovative contribution for evaluating one of the most critical and strategic issues for smallholder agricultural development in Tanzania.’

Professor Kjell Havnevik, Nordic Africa Institute, Uppsala

‘A paradigm example of how comprehensive use of methods enriches our understanding of small-scale farmers and enables us to see how they can generate change and secure food production.’

Associate Professor Liv Haram, Department of Social Anthropology, Norwegian University of Science and Technology, Trondheim

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