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Final Report
on the participatory impact evaluation of the
Root & Tuber Improvement & Marketing Program (RTIMP)
conducted by PDA with support from the MOFA/GOG

**Pilot Application of a
Participatory Impact Assessment & Learning Approach
(PIALA)**

developed with support from IFAD and the BMGF

Executive Summary

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Acronyms

ACDEP	Association of Church-based Development NGOs
AEA	Agricultural Extension Agent
ADVANCE	Ghana Agricultural Development and Value Chain Enhancement Program
AMSEC	Agricultural Mechanisation Service Centre
APFOG	Apex Farmers' Organisation of Ghana
ARB Apex Bank	Association of Rural and Community Banks
ASAP	Adaptation for Smallholder Agriculture Programme
BAC	Business Advisory Centre
BOG	Bank of Ghana
CSIR	Council for Scientific and Industrial Research
DADU	District Agricultural Development Unit
DDA	District Director of Agriculture
DDO	District Development Officer
DFR	Department for Feeder Roads
DOC	Department of Cooperatives
DSF	District Stakeholder Fora
ERB	Enterprise Record Book
FASDEP II	Food and Agriculture Sector Development Policy
FBB	Farmer's Business Book
FBO	Farmer Based Organization
FDA	Food and Drugs Authority
FFF	Farmer Field Forum
FGD	Focus Group Discussion
GASIP	Ghana Agriculture Sector Investment Programme
GLDB	Grains & Legumes Development Board
GLSS	Ghana Living Standards Survey
GOG	Government of Ghana
GPC	Good Practice Centers
GRATIS	Ghana Regional Appropriate Technology Industrial Service
GSA	Ghana Standards Authority
GSS	Ghana Statistical Service
ICO	IFAD Country Office
IEC	Information Education and communication
IITA	International Institute of Tropical Agriculture
KII	Key Informant Interview
MEF	Micro Enterprise Fund
MG	Matching Grant

MGF	Matching Grant Facility
MLGRD	Ministry for Local Government and Rural Development
MOAP	Market Oriented Agriculture Development Programme
MOFA	Ministry of Food and Agriculture
MOTI	Ministry of Trade and Industry
NIB	National Investment Bank
NORPREP	Northern Region Poverty Reduction Programme
NRGP	Northern Rural Growth Programme
OIC	Opportunities Industrialization Centre
PCA	Principle Components Analysis
PCU	Programme Coordination Unit
PFI	Participating Financial Institution
PPMED	Policy, Planning, Monitoring and Evaluation Division
PPS	Probability Proportional to Size sampling
QCA	Qualitative Comparative Analysis
R&T	Root and Tuber
RADU	Regional Agriculture Development Unit
RAFIP	Rural & Agricultural Finance Programme
RCB	Rural and Community Bank
REP	Rural Enterprise Programme
RIMS	Results and Impact Management System
RTIMP	Root and Tuber Improvement and Marketing Programme
SCF	Supply Chain Facilitators.
SEND	Social Enterprise Development Foundation
SIFS	India Forensic Science Institute& Training Center
SME	Small and Medium Enterprise
SNV	Stichting Nederlandse Vrijwilligers / Dutch Volunteers Foundation
SRID	Statistical Research and Information Directorate of the MoFA
VCF	Value Chain Facilitator
WAAP	West African Agriculture Programme
WEAI	Women's Empowerment in Agriculture Index
ZOC	RTIMP Zonal Office Coordinators

Executive Summary

1. This document presents the findings from the impact evaluation of the Root & Tuber Improvement and Marketing Program (RTIMP) in Ghana. The program was executed by the Ministry of Food and Agriculture (MoFA), Government of Ghana (GoG) from 2007 until end of 2014, and co-financed by the International Fund for Agricultural Development (IFAD) for a total amount of US\$ 18.83 million.¹
2. Anticipating the completion of RTIMP and the start-up of the new GASIP (Ghana Agricultural Sector Investment Program), the MoFA and the IFAD Country Office (ICO) jointly commissioned a full-scale and -scope impact evaluation for a total of about US \$ 233,000 covering the entire program nation-wide. The evaluation was conducted by Participatory Development Associates (PDA) using a novel Participatory Impact Assessment & Learning Approach (PIALA) developed with support from IFAD and the Bill & Melinda Gates Foundation (BMGF). In addition to the approved evaluation budget, the BMGF invested US \$ 20,000 in methodological innovation while IFAD added about US \$ 40,000 for procurement, training, supervision and meta-inquiry of the piloting of this novel approach PIALA as part of a broader methodological innovation project².
3. PIALA is not a methodology for the evaluation of performance. Hence the findings of this impact evaluation of RTIMP do not imply a judgment on the performance of program partners and do not question the professionalism and commitment of the Program Coordination Unit teams. Neither does it contest the findings of the IFAD Supervision Missions and the latest Program Completion Report about the performance and achievement of targets by the program. It offers a different perspective on program results that is complementary to these findings: a perspective of *relative influence* on changes that have impacted rural poverty, *beyond* the immediate effects of performance, and among many other influences. A program, for instance, can perform well, yet have no influence, due to various reasons that could or could not have been anticipated by the program. PIALA aims to unpack these reasons, understand why impact occurred or not in certain circumstances, and indicate where program mechanisms need to be revised or new ones may be needed.

Evaluation approach

4. PIALA is designed to produce rigorous quantitative and qualitative evidence and generate solid debate around such evidence in order to influence policy, planning, targeting and management for generating greater and more sustainable impact. Its purpose is threefold: (a) to *report* on a project's or program's contributions to impact on rural poverty; (b) to *learn* why impact occurred or not and where mechanisms need to be changed or newly created; and (c) to *debate* how impact could be enhanced and future program investments could have a greater influence. Different from process and performance evaluation approaches is the focus on 'impact' and 'contributions to impact' *broader* than the intended outcomes and performance against pre-set targets. Impact is viewed from a

¹ Cf. IFAD Loan No. 670, Program ID 1312. The total value of the loan was US \$ 18.96 million. The total amount used of this loan at program completion was US \$ 18.83 million. The total budget used at completion was US \$ 23.6 million, which was much less than the original estimated cost.

² In October 2012, a three-year methodological innovation project was launched by IFAD in partnership with the BMGF for developing and piloting PIALA. This was in response to a growing need for novel approaches that could help IFAD and partners assess and understand the impacts of complex government projects and programs on rural poverty and stimulate learning.

systemic perspective, as a *system* of interactions between various causes and changes, as opposed to a more linear approach that looks at the direct relationship between intervention and effect. The systemic approach seeks to move beyond a merely “what works” metrics and also answer the more difficult “why” and “how” questions and investigate the likely sustainability of the changes observed. It does so by looking at both the *intended* and *unintended*, *positive* and *negative*, *primary* and *secondary* effects of a project or program relative to other influences that *directly* or *indirectly* contributed to the impact on rural poverty.

5. Generally, the questions PIALA seeks to answer are: “what has changed (or not) for whom and why”; “how sustainable are these changes likely to be”; “what are the impacts and what has caused these changes”; “what has been the program’s contributions to these changes among other causes”; and finally, “what are the implications for future program strategy”. To answer all these, PIALA draws on a *systemic definition of impact*, a *dynamic Theory of Change (ToC) approach*, *participatory mixed-methods*, a *participatory sensemaking model*, and a *configuration analysis method*. This PIALA blend of processes and methods presents an alternative for the classic counterfactual-based evaluation in program contexts where it is quasi-impossible to find clean control groups or where institutional and policy work has purposively “contaminated” all.
6. In hopes of creating greater value, the PIALA processes and methods were designed³ and piloted around three quality dimensions: *rigour*, *inclusiveness* and *feasibility*. Rigour is understood in terms of methodological consistency and reliability, which in a participatory mixed-methods approach emanates from both the rigorous employment of methods and the rigorous facilitation of participatory processes. Acknowledging that an evaluation is never power-neutral and entirely free from political influence or organizational pressure, and particularly not when using participatory methods, rigor must be defined broader than in purely statistical terms and also include quality thinking, sharp observation, engaging multiple perspectives and systematic cross-checking.⁴ Inclusiveness refers to the meaningful engagement of stakeholders and the credibility of findings, requiring rigorous facilitation. Feasibility concerns the budget and capacity needed to meet the expectations with regards to rigour and inclusiveness. A quality assurance framework (QAF) was developed and piloted alongside the approach for assessing performance on these three dimensions in three to four subsequent phases of the evaluation⁵.
7. The approach was piloted in the impact evaluation of two IFAD-funded programs: first at a provincial scale of the DBRP (Doing Business with the Rural Poor Project) in southern Vietnam in 2013, and subsequently at a national scale of the RTIMP in Ghana in 2015. The first pilot in Vietnam experienced several limitations from which much was learned in the adjusted approach employed in the second pilot in Ghana. Issues of sampling related to the heterogeneity in program distribution and treatment, political influence and organisational pressure in the participatory processes, and systematic data collation and quality monitoring during fieldwork to ensure data integration, were adequately addressed in the evaluation in Ghana. This resulted in substantial improvements in the quality of evidence.
8. Major strengths of this evaluation include: (a) the selection and use of methods specific to the causal links in the ToC and the evaluation questions; (b) the comparative analysis of the relative

³ The PIALA methods and tools were designed by a core team of international methods experts comprising: Adinda Van Hemelrijck (project/team leader), Irene Guijt, Andre Procter and Jeremy Holland. Additional inputs were provided by Steff Deprez for developing the SenseMaker tools and conducting the analysis of the SenseMaker data.

⁴ Cf. IFAD & BMGF, 2013c: 7.

⁵ The QAF is attached in the PIALA methodological reflections report. The structure of the QAF was inspired by the “Better Evaluation Rainbow Framework” (cf. <http://betterevaluation.org/plan>).

contribution to impact of heterogeneous configurations of program treatment (as an alternative for a classic counterfactual analysis); and (c) the 2-stage participatory sensemaking process that engaged all stakeholders, including beneficiaries, in a collective analysis and discussion of the evidence. Alongside these strengths, there were also some challenges and constraints encountered by the research team in the conduct and management of this evaluation. Three key constraints requiring more attention in future evaluations using PIALA are: (a) the sampling of market-bounding systems such as supply chains centred around supply chain leaders, which have per definition open boundaries and thus are difficult to discern, particularly when interacting and thus overlapping in the same geographic and administrative location; (b) the time and capacities required from the people to participate in FGDs using PIALA methods, in particular when many are illiterate (e.g. the use of pen and paper or even tablets, the length of the FGDs, SenseMaker tools using abstract concepts, etc.); and (c) the rigid nature of the methodology that needed to be applied in a systematic manner across all locations, which sometimes clashed with the cultural settings in some communities and was difficult to maintain in the limited time that was spent in each district.

9. The main take-away for future PIALA applications is that (a) methods and tools need to be adapted to the participants' conditions as much as possible, and (b) sufficient time is needed in the field to accommodate cultural habits and events and address unexpected challenges with regard to sampling and mobilisation. Obviously, if PIALA methods and tools would be used regularly as part of ongoing M&E, then this would certainly help overcome these differences and challenges and contribute to building participants' capacities and empowerment. This is discussed in greater detail in a separate report on the PIALA methodological reflections.

Evaluation scale, scope and focus

10. Scale, scope and focus of the evaluation was agreed based on: (a) a projection of the potential cost-benefits of the different design options with the commissioners before procurement was started (as described in Section 1.3); and (b) the reconstruction of the program's **Theory of Change (ToC)** with national key stakeholders in a design workshop (as described in Paragraph § 16). The visualisation of the ToC (cf. Figure 2.1.1 on page 13) helped identify the program's impact and contribution claims to be evaluated.
11. The **impact claim** of the RTIMP (which is the link I2→I1 in the ToC diagram) is reflected in its goal statement, namely: *“enhanced income and food security of rural poor households through improvements in R&T-based livelihoods and strengthened market-based systems generating profitability at all levels of the commodity chains”*. At the design workshop, it was proposed to redefine *“enhanced income and food security”* to avoid a too narrow interpretation of food security as ‘food self-sufficiency’ and ensure ample attention would be paid to the profitability and sustainability aspects of improvements in R&T livelihoods and market systems. Hence impact was defined in terms of *“access to food and income to lead and sustain an active and healthy life”* and impact-level data collection focused on essential changes in access to food & income and R&T investments & profits.
12. Aiming at improving rural poor people's livelihoods in Ghana through the development of commodity chains for Roots and Tubers (R&T) supplied by smallholders, the RTIMP consisted of three main areas of work: a) linking of smallholders to existing and new markets; b) enhancing smallholder R&T production; and c) enhancing smallholder R&T processing. The program design and logical framework described the causal pathway for each of these three areas through which the

program was assumed to impact on rural poverty. The evaluation needed to conduct a **systemic analysis** of the interplay between these three components or **contribution claims** and its influences on impact across the entire country, thus nation-wide.

13. While the production component was started much earlier in the Roots and Tuber Improvement Program (RTIP)⁶ that preceded the RTIMP, interventions related to enterprise upgrading and market-linking were added under RTIMP, some of which became effective on a national scale only after the 2010 Mid-Term Review (MTR). Hence the main reference period for evaluating the interplay between the three components concerned the last 5 years of program implementation, starting at the start of 2010 (or at MTR). The 2008 RIMS baseline was used for comparison of findings only with regard to production.
14. The evaluation focused on the four main types of commodity chains developed during this period, namely: Gari, High Quality Cassava Flour (HQCF), Plywood Cassava Flour (PCF) and Fresh Yam for Export (FYE). Furthermore, the focus was on the four main program mechanisms that would be considered for scaling up in the new GASIP –namely: the District Stakeholder Forum (DSF), the Farmer Field Forum (FFF), the Good Practice Centre (GPC) and the Micro-Enterprise Fund (MEF). The evaluation serves to flag emerging issues from the RTIMP that merit closer attention in the GASIP, more innovative thinking, and more evaluative input, and therefore was framed as a **learning exercise** that complements other M&E and supervision processes.

Sampling and methodology

15. The catchment or ‘supply chain’ areas of the commodity chains formed the principle unit of analysis for inquiring the interplay between the three RTIMP components and its influences on impact. Supply chains consist of ‘supply chain leaders’ (such as gari and HQCF producing GPCs and factories, plywood factories and fresh yam exporters) and ‘suppliers’ (smallholder producers and processors), and are geographically defined by their location. Since the supply chains were administratively served at the district level, 25 districts were randomly sampled from the 67 districts treated by RTIMP⁷ at the time of the evaluation design across the main 3 agro-ecological and administrative zones. The 25 districts comprised 30 community clusters, each comprising 3 communities and locating a supply chain. The 30 community clusters contained samples of supply chains of the 4 commodities with probability proportional to size (PPS) of their total populations of supply chains. Some deviations (discussed in Section 3.3.1 of the main report) occurred in the supply chain samples though, which reduced the amount of researched supply chains from 30 to 25 (largely corresponding to the 25 districts). This made the fieldwork and data collation more onerous, but didn’t affect the quality of the evidence. The deviations are discussed in Section 3.3.1.
16. Sufficient coverage of heterogeneity in program treatment was ensured by including all the different with/without configurations of the evaluated program mechanisms in the sample. The sample also contained several districts where the mechanisms were mostly dysfunctional or not in place, which formed a useful comparison group that provided ‘counterfactual’ evidence at the level of the observed R&T livelihood changes (not at the household level).

⁶ The RTIP focused primarily on cassava research and development. The RTIMP extended this focus to other roots and tubers and added a strong marketing component designed to improve poor farmers’ access to food and income.

⁷ The programme’s completion report says that the programme had worked in 106 districts across all ten regions by the end of its operational period. At the time of the evaluation design though a list of 68 treated districts was provided by the program coordination unit for sampling.

17. With RTIMP effects spilling over and many other rural livelihoods programs influencing rural people's lives and livelihoods all over Ghana, it was very difficult (if not impossible) to find non-confounded or non-influenced communities and households that could serve as control groups for inquiring the net attributable impacts of RTIMP on household poverty. There was also no interest among the core learning group (established with the sponsors and key stakeholders at the design workshop in Kumasi on 12 October 2014⁸) to collect evidence from household-level control groups at the cost of a systemic inquiry of supply chains. Hence it was decided not to conduct a classic counterfactual inquiry of rural poverty impact at the household level, but instead to conduct a configuration analysis of the effects of different 'with/without' configurations of program mechanisms on changes in R&T livelihoods that impacted household food and income. The evaluation was framed as a learning exercise and thus sought to understand the explanations for their contributions in terms of *reach*, *effectiveness* and *sustainability*.
18. To assess changes in household food & income, and the influences of changes in R&T livelihoods on these, a brief **household survey** was conducted. For this, 30 households were randomly sampled in each of the 30 sampled community clusters, by systematically selecting every 10th or 5th household starting from the central community centre. Although the supply chains were reduced from 30 to 25, the original sample of 30 community clusters was upheld for subsampling the households, as to ensure the total sample size would be sufficient to arrive at 95 % statistical precision. In 2 clusters in the Kumasi Metropolitan Assembly, no suppliers could be found and thus no households sample as 'intended beneficiaries' (cf. Section 3.3.2 in the main report). Moreover, three household surveys could not be accounted for, which brought the total amount of surveys down from 900 to 837 (184 in the Northern, 424 in the Central and 229 in the Southern zone).
19. Also the participatory research participants were subsampled in the original sample of 30 community clusters, minus the 2 clusters in the Kumasi Metropolitan Assembly where no 'intended beneficiaries' could be found. Average 42 intended beneficiaries were selected in each of the 28 community clusters (in total 1180), using an 80/20 ratio of primary to secondary beneficiaries and a 50/50 gender ratio with 10-20% young adults (<35 years). In principle, the participants were selected separately from the household survey respondents and quasi-randomly from a list of beneficiaries obtained from the district officials or by using a snowballing technique where no lists were available. Due to some deviations though there was some overlapping though between the survey respondents and the participatory research participants in 4 districts (described in Section 3.3.2 of the main report).
20. The participatory research involved Focus Group Discussions (FGDs) using three different types of participatory data collection methods to further investigate the causes of the observed changes in R&T livelihoods that affected household food and income, and the contributions that the evaluated program mechanisms made in the area of production, processing and market linking. In total, 109 gender-specific FGDs (53 women and 56 men), in which 839 community members participated (411 women and 428 men; and 90 % intended beneficiaries) and 43 gender-mixed FGDs with a total of 341 participants (179 women and 162 men) were held. The methods were selected specific to the causal links in the program ToC, namely⁹:

⁸ The participants in this workshop were invited to further take part in the evaluation's Core Learning Partnership (CLP). These included: the RTIMP Coordination Unit and Steering Committee, the IFAD Country Program Office, the MoFA, PFIs, RIs and SCFs and TREND. The major outcome of the evaluation design workshop was the design paper (cf. Van Hemelrijck, A. & G. Kyei-Mensah, 2014). Also report on the workshop proceedings was produced separately.

⁹ Both the Constituent Feedback (cf. <http://www.keystoneaccountability.org/analysis/constituency>) and the SenseMaker (cf. <http://cognitive-edge.com/sensemaker>) were methodological experiments funded by the BMGF. There were limited in size and ambition and merely served the purpose to pilot-test their complementarity to the other PIALA methods and their added value for impact evaluation. The findings on this are presented in a separate report on the PIALA methodological reflections.

- The **generic change analysis**, which is a PRA-inspired method that combines two tools (a *change ranking* and a *causal flow mapping* of changes in wealth & wellbeing) to further investigate the impact claim, in addition to the **household survey**;
 - The **livelihood analysis**, which is a method that combines two PRA-inspired tools (*change matrix* and *causal flow mapping*) and a small **SenseMaker** exercise to investigate R&T livelihood changes and causes;
 - The **Constituent Feedback**, which collects quantified perceptual data on the reach and effects of the program mechanisms (DSF, FFF and GPC/MEF) on R&T livelihood changes and causes.
21. Additionally, over 100 **Key Informant Interviews (KIIs)** were conducted, of which 75 with district-level and over 25 with regional and national program stakeholders. At the regional and national level these included RTIMP and IFAD officials, managers from the PFIs, the FFF research leaders, and a few important off-takers or industry leaders. At the district-level these were district officials, leaders of GPCs and other SMEs, and the managers of the local branches of the PFIs.
 22. Special tools were also designed and used for early (almost instant) **data linking and quality monitoring** during fieldwork. This made it possible to organise debates with local stakeholders around the emerging evidence in district-level sensemaking workshops immediately after collecting the data in each district, and also ensured the evidence that was built would be robust enough to permit causal inference and stand up to scrutiny.
 23. A **2-stage participatory sensemaking process** was organised that engaged all stakeholders in a collective analysis and discussion of the evidence in relation to the links in the ToC. For this a workshop model has been developed and pilot-tested in Vietnam and Ghana. Half-day sensemaking workshops were organized in 23 of the 25 districts, engaging 640 research participants (average of 28 per workshop), of which 81 % intended beneficiaries (48 % female and 52 % male farmers and processors, mostly illiterate). A two-day national sensemaking workshop was organised on 6-7 May in Kumasi, involving 106 participants, of which 40 % intended beneficiaries (38 % female and 62 % male farmers and processors, many illiterate), 45 % local and national officials, and 15 % private sector actors (including bankers and service-providers). All the participants in the district and the national sensemaking workshops were purposively sampled from the research participants in the field research and the KIIs. Through these multi-stage sensemaking processes, local and national stakeholders were actively engaged in a collective analysis and debate of the evidence of RTIMP contributions to livelihood improvements and impact on rural poverty.
 24. Last, a novel **configuration analysis method** was developed for the impact evaluation of RTIMP that enabled clustering and comparing a large amount of evidence across the 25 districts to surface the patterns of interaction and influence in/between the different intervention areas (or contribution claims) of the program, and draw general conclusions with regard to program contributions to impact. This was done by first ‘unzipping’ the theory of change from the impact level to the level of the program mechanisms, in order to identify clusters of districts presenting different combinations of program treatment, outcomes and conditions for each of the causal claims in the ToC, and subsequently ‘zipping up’ the findings again along the ToC, in order to draw conclusions about program contributions to impact. Combining QCA¹⁰ techniques with a systemic ToC approach, the

¹⁰ Qualitative Comparative Analysis (QCA) is a methodology used for analysing large and small n data sets by identifying all possible combinations of variables observed in the data set, and then applying the rules of logical inference to determine which conclusions are supported by the data. In the case of the evaluation of RTIMP, logical inference was applied to different combinations of *program treatment* (or the functioning of the program mechanisms), *outcomes* (reflected in the scores of relative strength and consistency for each of the causal links in the ToC) and *conditions* (described in the qualitative evidence) in order to

method offers an alternative way to arrive at rigorous causal inference in the absence of clean control groups. This is particularly useful for programs/projects where it is quasi-impossible to find such clean control groups, or where institutional and policy work has purposively ‘contaminated’ all. The configuration analysis method is presented in Section 5.

25. The table below presents an overview of the PIALA methods and processes employed in the evaluation of RTIMP in Ghana, and the participants that took part in each of these. The **total net amount of participants** without overlap was **over 2000** (incl. 837 households, 1180 FGD participants with some overlap with the households in 4 districts, and over 100 KII participants).

PROCESSES, METHODS & TOOLS	PURPOSES	PARTICIPANTS
I. DESIGN: Focusing and framing the evaluation		
<p><i>Projection of potential cost-benefits of different design options (Section 1.3)</i></p> <p>Methods/tools: Outline of 3 design options (full scale–full scope; limited scale–full scope; full scale–limited scope) in relation to the 3 PIALA purposes (reporting, advocacy, learning)</p>	<ul style="list-style-type: none"> • Enable commissioners to make a decision about scale, scope and purpose of the evaluation based on an adequate understanding of the different design options in terms of quality, outcomes and budget implications 	<ul style="list-style-type: none"> • the IFAD Country Program Manager • the RTIMP Coordinator representing the MoFA/GoG
<p><i>Reconstruction and visualisation of the program’s Theory of Change (ToC) (Section 2.1)</i></p> <p>Methods/tools: Emerging ToC diagram that shows the envisioned causal pathways (with codification of the causal links) elicited from the program documents and the discussions with national stakeholders\</p>	<ul style="list-style-type: none"> • Identify the program’s impact and contribution claims to be evaluated, and formulate evaluation questions focused on these claims and their assumptions • Create a shared understanding of the program’s ToC (including broader influences on impact) • Select the methods specifically in relation to the causal links in the impact and contribution claims 	<ul style="list-style-type: none"> • National key stakeholders who had been involved in program implementation, management and supervision (total of 32 participants –incl. RTIMP, IFAD, MoFA, PFIs, RIs & SCFs)
II. FIELDWORK: Collecting and linking the data		
<p><i>Sampling and developing methods and tools for data collection, collation and quality monitoring (Sections 2.3 & 3.1)</i></p> <p>Methods/tools:</p> <ul style="list-style-type: none"> • Sampling hierarchy • Data collection & methods table • ‘How-to’ guidance for employing the data collection, collation and quality monitoring methods • Standard note-taking formats 	<ul style="list-style-type: none"> • Enable a systemic inquiry of the impact of the combined changes in production, processing and market linking on livelihoods and poverty status in 30 random supply chains across the country • Enable comparative analysis of the systemic inquiries of the 30 supply chains • Ensure rigorous employment of methods and facilitation of participatory processes • Ensure systematic data capturing, data collation, data quality monitoring and reflective practice during fieldwork 	<ul style="list-style-type: none"> • PDA research team (incl. research assistants), GSS statistician, 2 methods consultants
<p><i>Data collection on changes in access to food & income and its causes (Sections 5.2 & 5.3)</i></p> <p>Methods/tools:</p> <ul style="list-style-type: none"> • Household survey • Generic change analysis (incl. 	<ul style="list-style-type: none"> • Collect and triangulate data on the link I2→I1 in the ToC • Engage beneficiaries of RTIMP in a discussion of changes in livelihoods affecting household wealth and wellbeing, based on a visual reconstruction of the actual causal 	<ul style="list-style-type: none"> • 837 households (random) were surveyed • 439 intended program beneficiaries (quasi-random; 51 % women and 49 % men) participated in the generic change analysis

arrive at solid conclusions about the program’s influences on livelihood improvements and poverty status. More information about QCA can be found on: <http://www.u.arizona.edu/~cragin/fsQCA/index.shtml>.

change ranking and causal flow mapping of changes in wealth & wellbeing)	pathways	
<i>Data collection on changes in R&T livelihoods and its causes (Section 5.4)</i> Methods/tools: <ul style="list-style-type: none"> Generic change analysis (see above) Livelihood analysis method (incl. change matrix exercise, causal flow mapping, and SenseMaker) 	<ul style="list-style-type: none"> Collect and triangulate data on the link O1+O2+O3→I2 in the ToC Engage beneficiaries of RTIMP in a discussion of changes in production, processing and market linking affecting their livelihoods, based on the visual reconstruction of the actual causal pathways 	<ul style="list-style-type: none"> 400 intended program beneficiaries (quasi-random; 47 % women and 53 % men) participated in the livelihood change analysis, of which 393 did the SenseMaker exercise <p>(participants in the generic change analysis see above)</p>
<i>Data collection on reach and effects of selected program mechanisms (DSF, FFF, GPC/MEF) (Sections 5.5 & 5.1)</i> Methods/tools: <ul style="list-style-type: none"> Livelihood analysis (see above) Constituent Feedback (using a specific set of facilitation and scoring questions for each mechanism) Semi-structured interviews (mirroring the scoring questions in the Constituent Feedback) 	<ul style="list-style-type: none"> Collect and triangulate data on the causal links between the program mechanisms (DSF, FFF & GPC/MEF) and the observed changes in production, processing and market linking (O1, O2 & O3) Engage beneficiaries of RTIMP in a group discussion and anonymous scoring of the reach and benefits of the services provided through the program, and the effects of these on the changes in production, processing and market linking that affected their livelihoods 	<ul style="list-style-type: none"> 341 beneficiaries participated in the Constituent Feedback (53 % women, 47 % men) 100 officials and service providers (75 district-level and 25 regional/national) participated in the KIIs <p>(participants in the livelihood change analysis see above)</p>
<i>Data consistency and quality monitoring (Section 5.6)</i> Methods/tools: <ul style="list-style-type: none"> Standard data collation table Daily team reflections using five standard sets of questions (use of methods, facilitation of processes, data capturing, sufficiency of data on causal links, and sufficiency of data on program mechanisms) 	<ul style="list-style-type: none"> Identify data gaps and weaknesses early on in fieldwork to enable researchers to probe for more information in the sensemaking workshops Ensure evidence is robust (inclusive, statistically rigorous) Instant data processing and cross-checking during fieldwork making it possible to organise debates with local stakeholders around emerging evidence in district sensemaking workshops 	<ul style="list-style-type: none"> PDA field research teams supervision by the PDA research coordinator and the IFAD consultant
III. ANALYSIS: Synthesizing the evidence and analysing and debating program contributions		
<i>Participatory sensemaking (Section 5.7)</i> Processes: <ol style="list-style-type: none"> half-day local sensemaking workshops in 23 of the 25 sampled districts 2-day national sensemaking workshop Methods: <ul style="list-style-type: none"> reverse engineering active listening patches & nodes iterative & recursive design vantage points soft systems modelling contribution analysis 	<ul style="list-style-type: none"> Obtain additional information and fill in remaining data gaps Help program stakeholders develop a more systemic understanding of the development processes impacting rural poverty Engage program stakeholders in discussing and valuing program contributions to rural poverty impact, and identifying priority areas for investment Give voice to those who were intended to benefit, while offering decision-makers and service-providers the opportunity to engage in dialogue with these voices, based on evidence 	<ul style="list-style-type: none"> 640 local research participants in district sensemaking workshops (81 % intended beneficiaries of which 48 % women and 52 % men) 106 local, regional and national participants in national sensemaking workshop (40 % intended beneficiaries of which 38 % women and 62 % men; 45 % officials; 15 % private sector actors) <p>Participants were selected from the field research participants (with exception of households)</p>
<i>Configuration analysis (Section 6)</i> Methods/tools: <ul style="list-style-type: none"> aggregated data collation table 	<ul style="list-style-type: none"> Arrive at rigorous causal inference in the absence of clean control groups 	<ul style="list-style-type: none"> IFAD consultant (PIALA project leader) PDA research coordinator and research team leaders

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| • configuration analysis method | | |
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Training, implementation and management

26. The design of the evaluation and the training of the research team was headed by Adinda Van Hemelrijck (IFAD consultant / PIALA project and team leader) while the management, coordination and field supervision was led by Glowen Kyei-Mensah (PDA managing director). The two worked closely together in partnership, thus both contributing and taking joint responsibility for the design, quality and results of the evaluation.
27. Design and training took place from mid-October until mid-December 2014, and involved two days of PIALA design training, one week¹¹ of desk review and reconstruction of ToC, one week of stakeholder consultations and design workshop, one week of methods training and tool development, and three days of field-testing. The products that came out of this process included the evaluation design paper¹² and a researchers' handbook based on the PIALA guidance provided by the PIALA design team. During this period, improvements were made to the methodology in response to the feedback received from IFAD and external reviewers on the first PIALA pilot in Vietnam. The methods and tools used in Vietnam were revised and new methods and tools were developed specifically for the impact evaluation in Ghana. This was all done as part of the design and field-testing.
28. The evaluation was conducted by three teams each consisting of four researchers speaking multiple local languages: one team per zone (North, Central and South). Each team was divided in two sub-teams of two working in parallel. Field research was undertaken during six weeks (from early January until mid-February 2015) in twenty-five districts in eight regions across the country. An average of 4-5 days was spent in each district for mobilising research participants, collecting data and organising a sensemaking workshop. Fieldwork was supervised by Glowen Kyei-Mensah and Adinda Van Hemelrijck who alternately accompanied the teams in the North, Central and South.

Program assumptions and evaluation questions

29. RTIMP's Theory of Change consists of one impact claim and three contribution claims.¹³ The impact claim is reflected in the program's goal statement and consists of two causal links: (1) the link I2→I1 in which R&T livelihood improvements creates greater access to food and income for the rural poor, and (2) the link O1+O2+O3→I2 in which enhanced market linking, production and processing realize the R&T livelihood improvements. The contribution claims reflect the RTIMP's three intervention areas through which it sought to realize these outcomes: market-linking, production and processing.

¹¹ A week counts for 5 days of work.

¹² Cf. Van Hemelrijck, A. & G. Kyei-Mensah (2014). *Design Paper for the impact evaluation of the Root & Tuber Improvement & Marketing Program (RTIMP). Participatory Impact Assessment & Learning Approach (PIALA) developed with support of IFAD and BMGF.*

¹³ See also Paragraph § 11 of the Executive summary, and Sections 2.1.1 and 2.1.2.

30. The **assumptions of these causal claims** that needed to be inquired were:
- With regard to **impact**:
 - livelihoods and poverty status could be improved by commercializing smallholder R&T production and processing businesses and developing competitive market-driven and inclusive supply chains;
 - With regard to **market linking**:
 - DSFs would help develop sustainable and inclusive R&T commodity chains;
 - more recourse-poor R&T farmers and processors (including women and young adults) would commercialize and become part of the supply chains, if they would obtain the knowledge and capacity to increase their production, access markets and develop viable businesses;
 - With regard to **production**:
 - FFFs would enable resource-poor R&T farmers and seed producers to become commercial growers by organising into FBOs and adopting improved planting materials and technologies;
 - With regard to **processing**:
 - well-trained processors and farmers would be able to obtain a loan through the MEF to invest in their businesses;
 - GPCs would reach and teach resource-poor farmers and processors about good quality processing practices and the use of improved technologies and standardized equipment, hence helping them access the MEF and develop profitable businesses.¹⁴
31. The **evaluation questions** were:
- to what extent these assumptions held true (or not) and under which conditions; and
 - what the major barriers were for farmers and processors to commercialize and access old and new markets.
32. In addition, insights were sought in relation to the following **learning questions**:
- what is needed to make the DSF an effective mechanism for business- and market-linking;
 - what is needed to make GPCs profitable and attractive businesses; and
 - what supports or hinders GPCs to better link farmers and processors to old and new markets and how is this influenced by the DSF.

Summary of evaluation findings and answers to the questions

33. A summary of the key findings from the aggregated analysis of the evidence collected on each causal claim and each causal link is presented here in reverse order, starting from the changes and causes at the impact level and ending with the effects of the evaluated program mechanisms (DSF, FFF, GPC

¹⁴ Although all assumptions were extensively discussed, reviewed and approved at the evaluation design workshop (before fieldwork began), RTIMP officials who had participated in this workshop explained at the national sensemaking workshop (after the field work was finished) that in general it was not the responsibility of the GPC to reach and teach farmers and processors. Amendments to the assumptions however should have been made in the design workshop. Moreover, IFAD funding targets rural poverty by enhancing small farmers' and processors' ability to develop businesses and access markets, and thus one would expect that the funding for the upgrading of enterprises into GPCs should contribute one way or another to the development of these small businesses by exposing farmers and processors to good practices and providing them with access to improved technologies and equipment. The extent to which this was realised has been inquired by this evaluation as 'reach'.

and MEF). Based on these findings, answers are formulated to the evaluation questions for the program's impact claim and three contribution claims (market-linking, production and processing).

Key findings regarding impact

34. In terms of impact on rural people's access to food and income (cf. the link I2→I1 in the ToC diagram, presented by Figure 2.1.2 on page 13) in the RTIMP treatment areas, the evidence shows three major trends that have occurred in past 5 years (2009-2014).
- *First*, there has been an increase in access to food and income among rural households. However, R&T livelihood changes did not predominantly affect access to food but rather access to income. This has been confirmed by evidence from two independent sources. The pattern analysis of 373 micro-narratives collected from the livelihood change FGDs showed that 93.5 % of the farmers and processors consider these changes as having an impact mainly on income. The statistical analysis of the 837 household surveys showed a more direct thus linear correlation of households' total value of R&T production/processing with total household income (p.54; sig.000) than with households' access to food (p.22; sig.000).
 - *Second*, 15 % of the households have raised their income above USD 2/day between 2009 and 2015, which largely can be attributed to improvements in R&T livelihoods, and thus can be considered as a **positive impact**. However, when looking at the percentages of households who invested in R&T production (50 %) or processing (11 %) in the past 5 years, as compared to the relatively small percentage of households (10 %) that gained value up to USD 2-4/day from R&T production and processing, and the zero amount of households (-1 %) that moved into higher R&T livelihood values above USD 4/day, it is clear that the impact has remained **limited** and **unsustainable**. These figures came out from the statistical analysis of the household surveys, while explanations were produced by the 'livelihood change' and 'generic change' FGDs, for which the evidence was found robust and consistent across all 25 researched districts.
 - *Third*, as more households moved into R&T farming and consequently production volumes increased, investments in R&T farming decreased while also access to technologies decreased, partially due to a shift from production to processing. Investments and profits from enhanced R&T production and processing remained limited though, and livelihood improvements lingered fragile. Again, quantitative figures from the statistical analysis were confirmed and explained by the evidence from the 'livelihood change' and the 'generic change' FGDs, which was found robust and consistent across the country.
35. In terms of changes in livelihoods and the influence of enhanced market linking, production and processing on these changes (cf. the link O1+O1+O3→I2 in the ToC diagram, presented by Figure 2.1.2 on page 13), four major findings came out from the aggregated analysis of all the evidence collected from district KIIs, 'livelihood change' mappings and constituent feedback scorings in the 25 researched districts. The evidence was found quite strong and consistent across all the districts.
- *First*, in 52 % of the researched supply chains¹⁵, improvements of R&T-based livelihoods between 2009 and 2015 were found relatively strong though not all attributable to RTIMP. The other 48 % generally performed weak in this regard. In **32-33 %** of the researched supply chains,

¹⁵ Originally, 30 community clusters in 25 districts were randomly sampled (each comprising 3 communities and locating a supply chain) with probability proportional to seize (PPS) of the total populations of supply chains of the four researched commodities. Some deviations occurred in the supply chain samples though, which limited the actual amount of researched supply chains from 30 to 25 (corresponding the 25 districts). See also Paragraph § 15 of the Executive summary.

positive as well as negative livelihood changes were clearly **attributable to RTIMP**.¹⁶ Overall, its strongest contribution was made in the area of production; it's weakest in the area of market linking¹⁷. In a few cases (e.g. North Dayi/Kpando, Agona East, Pru, Tano North/Dua Yaw Nkwanta, and Wassa Amenfi West), RTIMP mechanisms were dysfunctional or not in place, hence providing **counterfactual evidence** for the difference that the program has made in the supply chains where changes were found clearly attributable to RTIMP. In these few cases, livelihoods improvements were very weak or virtually absent and barely influenced by RTIMP or other programs.

- *Second*, FFFs undoubtedly made a positive difference in 84 % of the supply chains. R&T production boomed across the country largely due to the introduction of new seed varieties and farming technologies by the RTIMP and its predecessor RTIP. The new varieties increased the value and volume of raw and processed R&T produce and contributed to the increase in household income. This initially caused an influx of people into R&T farming, which led to a substantial increase of production volumes and triggered a spill over into processing.
- *Third*, markets largely failed to absorb the increasing production volumes, which turned the tide and caused prices to drop, hence negatively affecting farmers' and processors' livelihoods from 2013 onward. Accelerated by the economic downturn¹⁸, inadequate market linking due to weak DSF performance in 84 % of the cases hampered the growth of farmers' and processors' profits and investments, rendering improvements in their livelihoods fragile.

Key findings regarding market-linking

36. Regarding the changes in market-linking and the influence of the DSFs on these changes (cf. the link C1a+M1 → O1 in the ToC diagram on page 13), the following four key findings came out from the aggregated analysis of the evidence collected from the KIIs, the FGDs on 'livelihood change' and the constituent feedback scorings on DSF performance in the 25 districts. The evidence was found generally quite strong and in most cases fairly consistent.

- Market linking of supply chains through the DSF was found **weak and ineffective in more than 84 %** of the researched districts across the country. In 57 % of these, DSFs to some extent contributed to **strengthening the supply chains**, but largely failed to link the supply chains to sufficient markets. In 43 % of the cases, DSF contribution to developing the supply chains was virtually nil and no efforts were made to link farmers and processors to markets.
- Where supply chain development and livelihood improvements were found relatively strong, despite weak market linking, this was due to a stronger performance of other RTIMP mechanisms (in particular GPCs and FFFs) and the influence of other organisations. Where livelihood improvements were weaker, generally RTIMP and other organisations had a weaker presence and consequently negative trends such as high inflation and dropping prices exaggerated by poor infrastructure had a bigger impact on income levels. Where also the supply chains were weak, resource-poor farmers and processors were much more vulnerable to **unfair**

¹⁶ This came out from the configuration analysis as well as the SenseMaker analysis (cf. Paragraphs § 142-144 in the main report).

¹⁷ RTIMP had three intervention areas through which it sought to affect R&T livelihoods and household poverty status: market-linking, production and processing. See also Paragraph § 28 of the Executive summary.

¹⁸ Ghana experienced an economic crisis since 2013, with the Ghana cedi dropping up to 40% against the US dollar in 2014. Cf. The Guardian (8 August 2014), Reuters (13 May 2015), The Economist (20 June 2015).

competition/trade and **power abuse** by clan leaders and middlemen controlling the farm-gate prices and the gate to the local markets.

- Only in 16 % of the researched supply chains¹⁹, supply chain development and the attraction of new buyers was comparatively more effective, which enabled farmers and processors to expand their businesses. This was largely due to a **stronger performance of DSFs and GPCs**. Both mechanisms were instrumental in developing supply chains and linking these to new markets. Yet they have not proven strong enough to withstand external threads and prevent market saturation, due to the **GPC's insufficient capacity** to innovate and expand, which was further constraint by the **licensing requirements** of the Food & Drugs Authority (FDA) and the Ghana Standards Authority (GSA).

37. Regarding the commercialisation and supply chain linking resulting from enhanced production, processing and market-linking (cf. the link M1c+M1b+O3+O2 +O1→C1b), there are four major findings.

- The *first* is that R&T production and processing has changed across the entire country from a merely food producing subsistence to a commercial income-generating livelihood. Both household surveys and KIIs have confirmed this trend. Evidence collected from districts not treated by RTIMP (such as in Agona East, Pru and Wassa Amenfi West) showed the **necessity of supply chain development and market linking** for enabling smallholders to commercialise. In the absence of any intervention in this area, resource-poor farmers remain extremely vulnerable to unfair competition/trade.
- *Second*, commercialisation has remained limited and unsustainable in more than 88 % of the researched districts across the country largely due to market saturation as a result of **weak and ineffective market linking** combined with overproduction. **Poor roads** and **poor market infrastructure** further limited resource-poor farmers' and processors' market opportunities and in the absence of appropriate competition regulations rendered them more vulnerable to unfair competition/trade including monopolistic behaviour of GPCs.
- *Third*, in 12 % of the supply chains, commercialisation was found to be relatively stronger but inconsistent and not entirely attributable to RTIMP. In these cases GPCs (as supply chain leaders) have proved to be an important mechanism to make it possible for resource-poor farmers and processors (as suppliers) to develop small profitable businesses and gradually grow and commercialize. The success of this mechanism was largely due to its **capacity to innovate and create new market value/demand**, its **reach of farmers and processors** in the catchment area, and the trust it has built between the various supply chain actors and their buyers and service providers to establish strong supply chains.
- *Last*, while FFFs have been very successful in enhancing smallholder production by introducing improved planting materials and technologies in more than 84 % of the supply chains, they have proved insufficient to enable farmers to **organise and commercialise**. Although useful for various donor programs to better target and reach farmers, FBOs have not proven sufficient to enable farmers to better defend themselves against unfair competition/trade and power abuse, gain better access to finance and markets, and increase profits and investments.

¹⁹ Originally, 30 community clusters in 25 districts were randomly sampled (each comprising 3 communities and locating a supply chain). Due some deviations in the field, the actual amount of researched supply chains were reduced from 30 to 25 (corresponding the 25 districts). See also Paragraph § 15 of the Executive summary.

Key findings regarding production

38. Regarding enhanced production and productivity due the adoption of improved planting materials and technologies and farmers' organisation (cf. the link C2a+C3b →O2 in the ToC diagram on page 13), 2 key findings came out from the evidence from the KIIs, the FGDs and the constituent feedback scorings on in the 25 districts. The evidence was found generally quite strong and consistent (score 4-6).
- *First*, R&T production and productivity increased substantially in about 76 % of the researched supply chains due to the adoption of improved planting materials and technologies. The substantial increase though has caused a saturation of local markets, which hampered farmers' profits and investments and their ability to further commercialise. Where results were rather weak, this was due to a limited adoption as well as other influences such as beetle infestation, changing weather patterns, limited markets, land tenure issues, and a limited affordability of inputs.
 - *Second*, there is no evidence that supports the idea of FBOs as having been an effective mechanism for helping farmers bargain better prices, fight unfair competition, obtain business finance, access markets and commercialize. All evidence points to the need for more market opportunities (and thus better roads and market places, and policies and regulations more supportive of smallholder business development) to enable farmers to commercialise *in the first place*, and to the need for developing mixed agri-business organisations that are less centred around merely farming and more attuned to value creation (thus including agri-processing and market-linking activities).
39. As for the changes in resource-poor farmers' and seed producers' access to improved planting materials and technologies due to the FFFs (cf. the link M2a+M2b+M2c→C2a), there are three important findings:
- *First*, FFFs have proven an effective mechanism to promote the adoption of new planting technologies and seed varieties, because of their **highly participatory** character. Widespread adoption was mainly due to the **unsurpassed efficacy** of the planting in rows using appropriate distances and agrochemical application technologies, and the visible benefits in terms of a substantial increase in quantity/quality and value (in particular for cassava).
 - *Second*, although women are generally more involved in cassava production than men and traditionally do most of the work, FFFs mostly targeted and reached men, in particular small-scale male farmers between 40 and 60 years old who own a bit of land (max 2 ha). Since R&T changed from a food crop to a cash crop, men took a greater interest and FFFs have encouraged and supported this. As a result FFFs insufficiently reached and supported women.
 - *Third*, most FFF beneficiaries reported that they were able to apply what they learned at FFFs, which helped them expand their businesses, but young farmers (< 25 years) and women were less positive than adult men, and also felt less confident to express their needs and ask for help at FFFs. Since in most tribes, women don't talk or participate in FFFs, women-specific FFFs should have been organised.

Key findings regarding processing

40. Regarding changes in processing volumes and quality resulting from changes in farmers' and processors' access to improved technologies and equipment and their ability to develop profitable

businesses supported by the GPCs and the MEF (cf. the link M3b+C3c→C3b→O3 in the ToC diagram on page 13), three major findings came out of the configuration analysis of the evidence obtained from the 18 districts with gari and HQCF supply chains (which are the only 2 commodities that involve processing). The evidence came from the KIIs, livelihood change FGDs and constituent feedback scoring on GPC performance, and was overall found quite strong.

- *First*, processed volumes of cassava increased considerably in about 50 % of the gari and HQCF chains (or 9 out of 18) as a result of more people processing cassava and expanding their businesses by gaining access to training and facilities at GPCs. In only 3 of the 9 districts (all gari supply chains), this was found fairly robust and attributable to RTIMP due to **stronger performing GPCs** in terms of market creation, reach of farmers and processors, and the development of stronger and more inclusive supply chains. Adoption and use of improved technologies and equipment through the GPC was quite high. In the other 6 cases where enhanced processing was found strong but inconsistent, this was caused by GPC operations with a more limited reach on the one hand, and by the **spill-over of excess production into processing**²⁰ that used both new and traditional equipment on the other. Farmers started to process their excess cassava into gari but mostly in the old fashioned way, yet were able to produce more and better quality gari due to the new cassava variety. In the 50 % supply chains (or 9 cases) where enhanced processing was found weak, this was due the very limited reach of the GPCs (more than half of which were not functional) and the very limited use/adoption of improved technologies and equipment by resource-poor farmers and processors (which was found nearly nil in more than half of these cases).
- *Second*, where **improved processing technologies and standardized equipment** were effectively used, generally processing volumes and quality increased significantly. Access to these technologies and equipment was created by introducing a cassava processing equipment package, training local artisans to manufacture improved agro-processing equipment and provide repair and maintenance services, and by upgrading small processing enterprises to GPCs that could serve as demonstration, learning and practice centres and as market-hubs for processors and farmers. As the cost-benefit analysis of processing equipment conducted in 2014 clearly showed, the new technologies and equipment have proven **cost-efficient** and attractive in terms of their **potential return on investments** (MoFA, 2014a).
- *Third*, adoption/use of improved processing technologies and standardized equipment have proven ineffective in 15 of the 18 sampled cassava processing districts due to the limited **reach and effectiveness** of GPC's as learning and good practice centres and the **limited investment capital** of small processing centres and individual farmers and processors. Both the household survey and the FGDs undeniably showed limited profits and investments in R&T-based livelihoods and limited access to financial support to invest in existing or new livelihood activities. Farmers and processors attributed negative livelihood changes mainly to the lack of access to finance. Of those reached by GPCs (mostly women, average 35 % < 35 years), nearly one third found that these had helped them expand their businesses, and over half stated they were able to apply what they had learned at the GPC, thus showing the relevance of GPCs. Women were generally more positive and less neutral than men, although they appeared less confident to speak out, express their needs and ask for help at GPCs. Also people younger than

²⁰ Also the correlation analysis of the household survey data clearly indicated such a shift from production to processing as a result of excess production (cf. Paragraph § 126 in Section 7.1.2).

25 felt less confident. Interestingly, only 9 % of the GPC leaders were positive about the influence of the GPC on smallholder business development and people's ability to apply what they had learned.

41. Regarding the changes in access to business finance for investing in improved processing technologies with support from the MEF (cf. the link M3c+C1a+M3b→C3c in the ToC diagram on page 13, there is one major conclusion, for which strong evidence was drawn from the household survey, the KIIs and the livelihood analyses (including SenseMaker).
- The **MEF was not available and accessible** to the majority of farmers and processors as well as to most GPCs, hence did not make a noticeable difference to their adoption of improved technologies and equipment and the development of their businesses. The mechanism was formally unavailable in more than half of the districts. Only in a few cases was there evidence of groups of processors and farmers that obtained finance through the MEF or other channels to invest in their businesses. There were 3 important reasons for this: (i) the procedure²¹ for obtaining and paying off MEF funding appeared too onerous, making smallholders pre-invest and sustain operations without sufficient capital or immediate returns on their investment; (ii) PFIs showed reluctant to approve applications because of the perceived risk of investing in farming and agri-processing businesses; and (iii) the present conjuncture made R&T smallholder business investments too precarious for financing.

Answers to the evaluation and learning questions

42. The findings of this evaluation leads to the conclusion that, R&T-based livelihoods initially did improve between 2009 and 2013, which was relatively strong in about half of the districts and affected income levels with 15 % of households raising above the threshold of USD 2/day. This influenced households' access to food. However, these **positive impacts** remained limited and unsustainable largely due to market insufficiency starting from 2013. This was particularly so in those districts where supply chains and DSF performance was found weak and inadequate, and also where GPCs did not take up any role in the supply chain linking of small farmers and processors and did not contribute to the development of their businesses. In these districts, market insufficiency combined with an inadequate rural infrastructure and land tenure system negatively affected small and resource-poor farmers' and processors' livelihoods and poverty status from 2013 onward, when the economic downturn struck the country. Evidence points at a reasonable attribution of positive as well as negative livelihood changes to RTIMP in 32-33 % of the supply chains and of farmers' and processors' individual experiences (cf. Paragraph § 34 of this Executive Summary).

To what extent did the assumptions hold true (or not) under which conditions?

43. The assumption that livelihoods and poverty status could be improved by commercializing smallholder R&T production and processing businesses, and by developing competitive and inclusive supply chains, **only held true** where very **strong and concerted efforts** were made by the program partners to: (a) develop solid links between the supply chain actors; (b) address their

²¹ The MEF procedure was the following: The DADU undertook a needs assessment on the prospective beneficiaries as a basis for possible financing. Upon submission of an application (mostly ranging between 728 GHS to 60,000 GHS), the PFI then inquired if the potential beneficiary met the requirements. In the case of the Ecobank for instance, processors were required to submit firm orders with pro-forma invoices and contracts from key customers before loan approval. If the potential beneficiary met all criteria, then the loan was approved and the application was sent to the RTIMP national office that then granted authorization to transfer the matching grant component to the requested PFI. Finally, a supplier was paid to manufacture and deliver the requested equipment to the MEF beneficiary after s/he fulfilled his/her 10 % contribution to the investment.

capacity and relational issues; (c) create new market opportunities; and (d) expand the catchment area by widening and deepening the reach of resource-poor farmers and processors in the surrounding communities. In particular, where the performance of DSFs and GPCs in this regard were the strongest (12 %), supply chain development and commercialization was more successful, resulting in greater livelihood improvements. Where the performance of these mechanisms were weak, investments in smallholder businesses remained limited and profits stayed in the hands of a few, thus undermining the hypothesis of smallholder commercialization as the driving force for sustainable livelihood improvement and poverty reduction. However, also in those few districts with better DSF and GPC performance, livelihood improvements remained fragile due to insufficient capacity on the part of the GPCs to innovate and expand, further constrained by FDA and GSA licensing requirements, export regulations, border taxes, and the failing power supply and infrastructure.

44. The assumption that DSFs would help develop sustainable and inclusive R&T commodity chains largely **did not hold true**. In 84 % of the sampled districts, DSFs failed to help link farmers and processors to markets, and in 43 % of these also failed to help establish sustainable and inclusive supply chains. Lacking were the resources and capacities at the districts (and the higher support levels) to *make* this mechanism work –e.g. to conduct proper market analysis and integrated VC development planning, attract private investment, promote product diversification/innovation, support market creation for smallholder businesses, deepen and expand the reach and role of the DSF, and propose legislative and policy changes at higher levels needed to make actions at local levels more successful.
45. The assumption that more resource-poor R&T farmers and processors (including women and young adults) would commercialize and become part of the supply chains, if they would be able to increase their production, access markets and develop viable businesses, only **held true in the few cases** where these conditions were fulfilled by **strong GPC and DSF performance**. Generally, limited commercialization and ineffective supply chain linking was largely due to:
 - the limited reach and capacity of DSFs and GPCs to expand, innovate and develop markets;
 - unfair competition and monopolistic behaviour by traders, entrepreneurs (including GPCs) and popular leaders (including of MoFA officials);
 - lack of market opportunities due to a failing rural infrastructure and inadequate policy and regulations supportive and protective of smallholder business development (including unfair competition, licencing and certification, export and border tax, etc.); and
 - lack of trust and investment capital of resource-poor farmers and processors for the above reasons.

All these causes together hindered resource-poor farmers' and processors' ability to commercialize and enter new markets, and thus outweighed the initial benefits from enhanced R&T production and processing.

46. The assumption that FFFs would enable R&T farmers and seed producers commercialise by organising into FBOs and adopting improved planting materials and technologies has proven partially true. FFFs undoubtedly made a positive difference in 84 % of the supply chains due to farmers' massive adoption of the new varieties and technologies, which increased the value and volume of raw and processed R&T produce and contributed to the increase in household income. However, counterfactual evidence showed the necessity of strong supply chains and market links to enable farmers to commercialise. Also no evidence was found that FBOs could be an effective mechanism for helping farmers bargain better prices, fight unfair competition, obtain business

finance, access markets and commercialize. All evidence points to the need for agri-business organisations that are less centred on merely farming and are more attuned to market value creation.

47. The assumption that GPCs would reach and teach resource-poor farmers and processors to use improved technologies & equipment, access business finance and develop profitable businesses, held **true only in a few cases** where GPCs more deliberately took up this role (thus functioning more as social-private profit) and had a greater capacity. Adoption and use of improved technologies and standardized equipment by resource-poor processors has proven limited in 15 of the 18 sampled gari and cassava flour supply chains, due to the **limited reach and effectiveness** of GPC's as learning and good practice centres and the **limited investment capital** of small processing centres and individual farmers and processors.
48. Finally, the assumption that well-trained processors and farmers would be able to obtain a loan through the MEF to invest in their businesses **by large has proven untrue**. Resource poor farmers and processors were unable to access MEF as the mechanism was formally unavailable in over half of the sampled districts and mostly inaccessible in the other half due to the risks involved.

What were the major barriers for farmers and processors to commercialize and access markets?

49. The two most fundamental barriers that are conditional for addressing all other limitations are:
- Lack of market opportunities due to a failing infrastructure (in particular power supply, water, roads and market places);
 - Lack of investment capital (only 15 % of the households obtained some sort of financial support for investing in their R&T businesses in the past 5 years; 45 % of the negative livelihood experiences were attributed to the lack of access to finance).
50. Another important limitation is the lack of capacity of farmers and processors to organise into independent and collective agri-businesses that are able to create market value. A more conducive policy environment and rural infrastructure, however, are conditional to this.

What is needed to make the DSF an effective mechanism for business- and market-linking?

51. From the findings, it came out clearly that more **resources and capacities at district and regional levels** are needed to:
- conduct market analysis and develop plans for integrated VC development;
 - attract investments for transportation and infrastructure development;
 - promote product diversification/innovation and support market/demand creation among GPCs and other small enterprises with sufficient outreach in the VC catchment areas;
 - organise more regular DSF meetings that are open to all supply chain actors and accessible to more remote communities for discussing market opportunities and issues of unfair competition;
 - undertake appropriate action to address the issues raised at DSF meetings and propose changes in policy and regulations at higher levels needed to make actions at local levels more successful.

What is needed to make GPCs profitable and attractive businesses?

52. In the 3 cases where livelihood improvements were found strongest, GPCs were essential to make it possible for processors to develop profitable business and gradually commercialize. The success of this mechanism was largely due to its capacity to innovate and create new market value/demand, its reach of farmers and processors in the catchment area, and the trust it built between the various supply chain actors and their buyers and service providers to establish strong supply chains.

53. Of those reached by GPCs (mostly women, average 35 % < 35 years), nearly one third found that these had helped them expand their businesses, and over half stated they were able to apply what they had learned at the GPC, thus showing the relevance of GPCs to resource-poor farmers and processors (including women and young adults).

What supports or hinders GPCs to better link farmers and processors to markets, and how is this influenced by the DSF?

54. Most essential impediments identified by this evaluation include:
- Limited operational capital
 - Limited capacity to innovate and expand
 - Failing power and water supply
 - Expensive licensing and certification procedures
 - Rising export and border taxes
 - Rising transportation costs
 - Limited reach of farmers and processors
 - Private profit orientation centred on elite interests
 - Monopolistic behaviour (e.g. unfair price setting, breach of agreements, etc.)

Main recommendations

55. It must be clear by now that RTIMP has made an **substantial contribution** to the development of opportunities for resource-poor farmers and processors to improve their lives and livelihoods by *turning R&T (the most important crops grown by the majority of people in Ghana) from a merely subsistence into a cash crop*. There is no doubt that this very important shift is largely attributable to RTIMP. Plenty of evidence has been provided by this impact evaluation that supports this conclusion.
56. Having acknowledged this important step forward, there is also the need now for a more sobering reflection on the factors and conditions that have hampered the sustainability of the positive impact that RTIMP has generated on the lives and livelihoods of the rural poor in Ghana. Although FFFs have proven a very effective mechanism, its success has resulted in excess production that saturated local markets in almost all districts, hampering farmers' profits and investments and their ability to further commercialise. Evidence from districts not treated by RTIMP has sufficiently proven the necessity of strong supply chains and market links to enable resource-poor farmers and processors to commercialise. Without sufficient markets, impacts from enhanced production and processing are unsustainable.
57. Our first critical reflection and recommendation concerns the highly successful **FFF mechanism**. Intuitively, everyone would recommend a scaling-up of this mechanism –with adjustments to ensure greater gender and generation sensitiveness, e.g. by organizing gender- and youth-specific groups. This definitely would contribute not only to enhancing the value of R&T production, but also to women's and young farmers' empowerment. Being an important source of creativity and innovation that have remained largely untapped, women and youth (<25 years) would definitely benefit from their organization into business-oriented farming and agri-processing groups. The FFF concept might be a suitable mechanism to explore and unleash this idea. However we must inquire and carefully monitor the conditions that are essential to make this 'idea' successful in a conjuncture of rising inflation and failing markets. Hence we recommend the piloting and scaling up of the formation of

gender- and youth-specific groups with very careful monitoring of the conditions required to avoid harm to their livelihoods and trigger the successful growth of these groups into small collective agri-businesses.

58. RTIMP performance was generally weak in the area of market linking. Clearly, there is the urgent need to **rethink the DSF mechanism**. Commonly DSFs were organized around the *supply chain leaders*, mostly small and medium-sized agri-processing enterprises that were turned into GPCs. In doing so, its reach was limited to the farmers and processors in these specific supply chains, making them dependent on the supply chain leaders' benevolence, thus providing the leaders free rein to monopolize the supply chains and the local markets. The DSF should become a forum that supports *inclusive* supply chain linking and encourages *innovation* and *diversification* in value creation. By doing so it can provide room for *all farmers and processors* and engage them in multiple short and long value chains. Also traders, transporters, bulkers and off takers need to take part in DSF meetings. Sufficient resources and capacities at the districts (and the higher support levels) are needed to make this mechanism work –e.g. to conduct proper market analysis and integrated VC development planning, attract private investment, promote product diversification/innovation, support market creation for smallholder businesses, reach out for farmers and processors and particularly for women and youth to engage them in the development of strong value chain linkages, and propose changes in policy and regulations needed to create market opportunities and protect farmers and processors from unfair competition.
59. GPCs were crucial to make it possible for processors to develop profitable business and gradually commercialize. The one-third of processors (mostly women, average 35 % < 35 years) that expressed their satisfaction with the functioning of the GPCs and the benefits they gained has clearly shown its relevance to resource-poor farmers and processors (particularly women and young adults). However the success of the **GPC mechanism** was limited as it was unclear what is required to be an effective 'leader' in developing strong and inclusive supply chains. The potential power of strong business relationships was shown in a few cases where GPCs functioned as open social-private profit centres where resource-poor farmers and processors learned to use improved technologies and equipment and create added value of their produce. Where GPCs were profitable and attractive businesses in particular for women and young processors, this was largely due to its capacity to innovate and demonstrate innovation and thus create new market value/demand, its reach of farmers and processors in the surrounding communities, and the trust it built between the various supply chain actors and their buyers and service providers to establish strong and inclusive supply chains. Hence our recommendation here is to expand the concept of GPCs, properly define its leadership role, and use appropriate performance and feedback monitoring criteria and tools that help keeping track of the quality and effectiveness of its business relationship with farmers and processors in the surrounding communities (in particular those resource-poor). Moreover, similar as for the FFF/FBO-mechanism, careful monitoring is required of the conditions under which GPCs can become effective leaders of strong and inclusive supply chains.
60. To help GPCs and FFF/FBOs as small collective agri-businesses build their capital and investments, there is an urgent need for feasible finance mechanisms. Commercialisation and adoption of improved technologies has remained limited in most of the supply chains, not only due to a limited reach and capacity of GPCs and DSFs, but mostly due to the lack of finance and market *opportunities*. The **MEF mechanism** attempted to address the issue of finance, yet has largely failed. Its procedure for obtaining and paying off the loan made it difficult for beneficiaries to pre-invest and sustain operations without sufficient capital or immediate returns on their investment. Hence the mechanism needs to be completely restructured in order for it to be accessible to small farmer and

processor businesses. Repayment periods and requirements need to be feasible and agreed upfront. More thought need to be put in into ‘risk transfer’ and ‘risk distribution’ mechanisms and criteria for credit worthiness, and into developing different credit packages targeting different categories of businesses involved in the VCs. Finally, there should be a more comprehensive consultation and communication process to make all actors involved in the VCs fully understand the risks, the mechanisms and the requirements regarding repayment and investment. However, to make any credit mechanism work, feasible business and market opportunities must exist, which in many places in rural Ghana currently don’t exist.

61. In order to give all these mechanisms a reasonable chance to succeed and sustain, much more work is needed on creating an environment that is more conducive of the growth of small collective agri-businesses. Essential is a minimal **rural infrastructure** (roads, market places, power and water supply), which in many places in Ghana is failing. Crucial are also **policies and regulations** with regard to fair competition and the use of cassava in end products. A policy that compels industries producing flour, starch, beer or bio-fuels in Ghana, for instance, to include a percentage of cassava flour in their products, would definitely spur the demand for cassava. Second, a policy and authority that regulates competition to make it fair and inclusive, protect smallholder businesses, and prevent monopolistic practices would certainly aid the DSF and GPC mechanisms to build stronger business and market relationships between the value chain actors and stimulate greater inclusion of small farmers and processors. (ODI, 2010).