



PANDA MITI
KIBIASHARA
PRIVATE FORESTRY PROGRAMME

PRIVATE FORESTRY PROGRAMME

PHASE I COMPLETION REPORT

Version 31.5.2019



United Republic of Tanzania
MINISTRY OF NATURAL RESOURCES AND TOURISM
Forestry and Beekeeping



MINISTRY FOR FOREIGN
AFFAIRS OF FINLAND

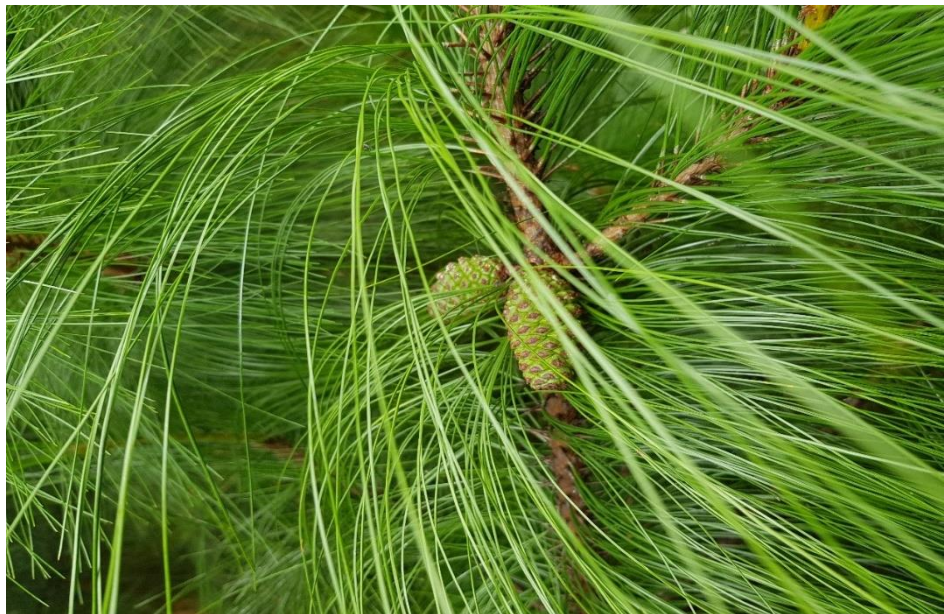


Private Forestry Programme

Phase I: 1 January, 2014 to 30 April, 2019

Phase I Completion Report

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Cover photo: *Pinus maximinoi* starting to bear cones after three full growing seasons at a PFP-supported seed orchard in Idete, Mufindi District

TABLE OF CONTENTS

1.	PROGRAMME DESCRIPTION.....	1
1.1	Introduction.....	1
1.2	Background.....	1
1.3	Rationale.....	1
1.4	Intervention logic.....	2
1.5	Arrangements for management and coordination.....	4
2.	MAIN ACHIEVEMENTS OF PFP PHASE 1.....	6
2.1	Main achievements in Result 1 – An enabling environment.....	6
2.2	Main achievements in Result 2 – Development of smallholder-based plantation forestry.....	9
2.3	Main achievements in Result 3 – SME support and product innovation.....	11
3.	PROGRAMME DELIVERY AS PER THE LOGICAL FRAMEWORK.....	14
3.1	Progress towards achieving the Project purpose.....	14
3.2	Result 1: Enabling environment exists for the expansion of sustainably managed private plantation forestry.....	18
3.3	Result 2: Increased high-quality tree growing and private plantation forestry based on the principles of sustainability and inclusiveness developed in the programme area.....	55
3.4	Result 3: Profitability and sustainability of SMEs within the forestry value chain improved.....	82
4.	ADHERENCE TO PRINCIPLES OF FINLAND’S DEVELOPMENT POLICY.....	96
4.1	Delivery in relation to four specific priorities of Finland’s development policy.....	96
4.2	Human rights and social inclusion.....	98
5.	ASSUMPTIONS AND RISKS.....	102
5.1	Social risks.....	102
5.2	Environmental risks.....	103
5.3	Sustainability risks.....	104
5.4	Opportunities.....	106
6.	RESOURCE ALLOCATION.....	108
6.1	Human resources.....	108
6.2	Phase 1 assets.....	108
6.3	Finances.....	108
7.	PHASE 1 LEARNING AND RECOMMENDATIONS.....	112
7.1	Achieving broader understanding and buy-in for the vision.....	112
7.2	Human rights and industrial forestry.....	112
7.3	Market realities and the need for innovation.....	115
7.4	Tree growers’ organisations as a vehicle for private forestry.....	118
7.5	Value chain optimization and a role for forest industry cluster development committees.....	119
7.6	Encouraging investment.....	121
7.7	Protecting forest assets from fire.....	121

LIST OF ANNEXES

Annex 1	Results-based management framework.....	123
Annex 2	Programme fixed assets register as of 30 September 2018.....	130
Annex 3	Profitability calculations for Phase 1 pine and eucalyptus plantations.....	142
Annex 4	PFP publications.....	145
Annex 5	List of PFP-supported TGA villages.....	147

LIST OF FIGURES

Figure 1	Programme results chain	3
Figure 2	Programme management structure	5
Figure 3	Temporal comparison of wealth ranking data from beneficiary communities as per PPI score and WEMA methods	16
Figure 4	Proposed Southern Highland forest industry clusters.....	21
Figure 5	Sample planks dried in the FWITC high-frequency kiln prior to being sent to the TBS	26
Figure 6	Destructive testing (shear) done at TBS for establishing the strength values of sawn wood	26
Figure 7	<i>P. maximinoi</i> starting to bear male flowers after three growing seasons	34
Figure 8	<i>P. tecunumanii</i> planted in 2015 at Mufindi Paper Mill seed orchard in Makungu.....	34
Figure 9	PFP-supported seed orchards established during Phase 1	38
Figure 10	TGA-based facilitators participating in a training-of-trainers (ToT) event in plantation establishment at the FWITC.....	40
Figure 11	The FWITC facilities shown in a 3D-model compiled from drone-acquired aerial imagery.....	43
Figure 12	VSLA group meeting	50
Figure 13	SME VSLA group “Amkeni” from Njombe DC opening their bank account at the local CRDB branch.....	51
Figure 14	Businesses supported through VSLA, clockwise from top left: pottery workshop “Ushindi,” weaving group “Mshikamano,” carpentry workshop manufacturing a wooden door, and a beehive producer from Amkeni	52
Figure 15	Villages supported through the VSLA service provision	54
Figure 16	Dominant height in the TGIS woodlots by species group and year of establishment, as observed in the Phase 1 final plantation survey	56
Figure 17	PFP-supported VLUPs.....	58
Figure 18	Participatory land-use planning on a high-resolution satellite image turned into a map with standardised symbols and colour coding	59
Figure 19	PLUM team members from the districts of Kilolo, Ludewa and Makete participating in VLUP-related GIS training by PFP in November 2016.....	60
Figure 20	Number of known TGAs in Southern Highlands by year of establishment.....	62
Figure 21	TTGAU members at its annual general meeting (27 March, 2018)	63
Figure 22	Nursery established by the TGA UWAWI in Madaba	66
Figure 23	Smallholder <i>P. maximinoi</i> planted in 2015 under the TGIS scheme and photographed in October 2018 in Ngalanga, Njombe TC.....	67
Figure 24	Smallholder <i>E. urograndis</i> planted in 2015 under the TGIS scheme and photographed in October 2018 in Iboya, Njombe TC	72
Figure 25	Woodlot area distribution by planting season with box size corresponding to area achievement.....	73
Figure 26	Number of established woodlots vs. total area achievement by season	73
Figure 27	Eucalyptus plantation established for vulnerable households in Iboya, Njombe TC, in 2015 and photographed in August 2018.....	75
Figure 28	Pupils at Milo primary school following instructing on marking and pitting by a PFP-trained Ward Executive Officer.....	76
Figure 29	Distribution of new plantations established on the eroded ridge of Upolo Mountain district forest reserve, Nyasa District.....	78
Figure 30	TGA using a specially composed freely available satellite imagery with VLUP and previous planting information to plan their 2017/18 woodlots (Igumbilo, Makete DC)	79
Figure 31	Individual planting achievements during 2017 and 2018, and the 2018 planting area as planned by the TGA on a satellite image (Ihanga village, Makete)	80
Figure 32	Distribution of Southern Highlands plantation resources by ownership	86
Figure 33	Reported SME sawmill technology changes between 2016 and 2018.....	87
Figure 34	Slidetec sawmill on display at the trade fair in the FWITC in March 2018.....	87
Figure 35	Seedlings being raised at the FWITC container-based nursery	88

Figure 36	FITI VET-students being trained in eucalyptus-pole treatment at the FWITC treatment plant	89
Figure 37	SME businesswomen with their charcoal production at FWITC	90
Figure 38	Locally manufactured sawdust carboniser installed at the FWITC	92
Figure 39	South Africa's fencing standards applied to secure a seed orchard	93
Figure 40	Horizontal band saw in operation at the Makete industrial node	94
Figure 41	Tree growers in Makete node participating in training on pruning	94
Figure 42	Factors causing poor sector performance and impoverishment, and local level interventions to ameliorate impoverishment	99
Figure 43	Access to VSLA credits (as stated by beneficiaries) by PPI score with box size corresponding to no. of responses	100
Figure 44	Quarterly rate of expenditure during Phase 1 by budget category	111
Figure 45	Manual extraction of large pine logs from steeply sloping TGA woodlot in Ihela, Makete District	113
Figure 46	Smallholder fire damage in Uchindile, Kilombero (2016)	121

LIST OF TABLES

Table 1	Value of smallholder plantations of pine and eucalyptus established through TGIS as at December 2018	15
Table 2	Result 1 outputs and implementation status at the end of Phase 1	19
Table 3	Relevance and usefulness of the PFP policy interventions as assessed by the programme stakeholders	28
Table 4	List of PFP-supported seed orchards	36
Table 5	Cumulative participation in extension events organised by PFP EOs and TGA-based facilitators during Phase 1	40
Table 6	Programme's cumulative training delivery during Phase 1	44
Table 7	Short course training provision by the FWITC from September 2018 to the end of April 2019	45
Table 8	Key performance indicators of VSLA support at the end of intervention (31 October, 2018)	53
Table 9	Result 2 outputs and implementation status at the end of Phase 1	55
Table 10	Key statistics of the PFP-supported TGAs on 30 April, 2019	62
Table 11	Description of the three largest smallholder plantation forestry incentive schemes supported by PFP during Phase 1	68
Table 12	Cumulative number of beneficiaries supported directly in plantation establishment by support schemes implemented during Phase 1	69
Table 13	The PFP's cumulative planting figures by support scheme, season and species	70
Table 14	Established TGIS plantations destroyed by fire during Phase 1	70
Table 15	Mean results from the final plantation survey of Phase 1	71
Table 16	Progressive support model applied for pine and eucalyptus plantation under the PFP's standard TGIS in 2017/18	74
Table 17	Support model applied for teak plantations under the PFP standard TGIS in the FY 2017/18	77
Table 18	Result 3 outputs and implementation status at the end of Phase 1	82
Table 19	Comparison of SME saw lines sawing mixed sizes of pine logs at FWITC	85
Table 20	Results of the planting medium tests at the FWITC nursery	89
Table 21	Uptake of sustainable charcoal and briquette production	91
Table 22	Test results from wood-waste-based products and their comparison with some common values of other fuels	91
Table 23	Gender distribution in programme activities and human resources	96
Table 24	Greenhouse gas benefit potential of Phase 1 pine and eucalyptus plantations in terms of VCS credits	107
Table 25	FWITC financial statement for 10 months (July 2018 – April 2019)	108
Table 26	Technical assistance delivery during Phase 1	109
Table 27	Realised expenditure by financial year and percentage of total Phase 1 budget used (in EUR)	110

ACRONYMS AND ABBREVIATIONS

AIDS	Acquired immune-deficiency syndrome
CCRO	Certificate of customary right of occupancy
DC	District council
DSA	Daily subsistence allowance
EO	Extension officer
ERET	External Review & Evaluation Team
EUR	Euro
FAO	Food and Agriculture Organisation of the United Nations
FBD	Forest and Beekeeping Division
FDT	Forestry Development Trust
FICDC	Forest industry cluster development committees
FIS	Forest information system
FITI	Forest Industries Training Institute
FTI	Forestry Training Institute
FWITC	Forestry and Wood Industries Training Centre
FY	Financial year
GIS	Geographic information system
HIV	Human immune-deficiency virus
HOC	Home office coordination
IGA	Income-generating activity
KVTC	Kilombero Valley Teak Company
MFA	Ministry for Foreign Affairs of Finland
MIS	Market information system
MNRT	Ministry of Natural Resources and Tourism
NFC	New Forests Company
NGO	Non-governmental organisation
NLUPC	National Land Use Planning Commission
OSP	Out-grower support programme
PFCTT	Private Forestry and Carbon Trading in Tanzania
PFP	Private Forestry Programme
PLUM	Participatory land-use management
PPI	Poverty Probability Index
RBMF	Results-based management framework
SHIVIMITA	Tanzania Forest Industries Federation
SME	Small and medium enterprises
TA	Technical assistance
TASAF	Tanzania Social Action Fund
TFS	Tanzania Forest Service
TGA	Tree growers' association
TGIS	Tree-Growing Incentive Scheme
ToT	Training of trainers
TTGAU	Tanzania Tree Growers' Association Union
TTSA	Tanzania Tree Seed Agency
TZS	Tanzanian shilling
VET	Vocational education and training
VETA	Vocational Education and Training Authority
VICOBA	Village Community Bank
VLUP	Village land-use plan
VSLA	Village savings and loan association

CONVERSION RATE

EUR to TZS 1 EUR = 2,500.00 TZS

PROGRAMME FACTSHEET

The Private Forestry Programme (PFP) increases income in the Southern Highlands of Tanzania by supporting private plantation forestry and strengthening wood industries.

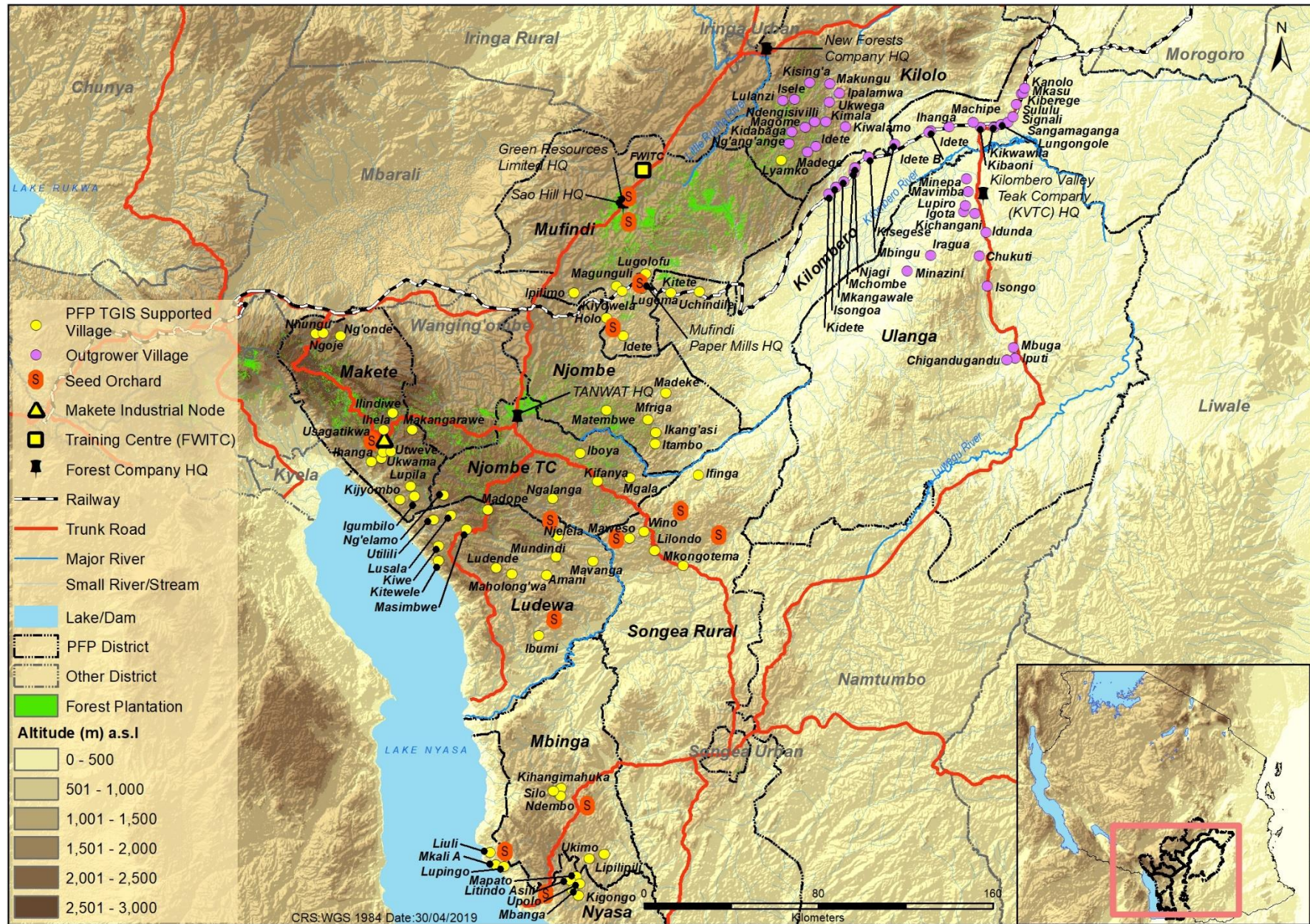
The rationale for supporting private plantation forestry in Tanzania is as follows:

1. Tanzania is one of the few countries in the world that still has land with the right climate and right soils for successful tree plantations.
2. Small-, medium-, and large-scale tree growers in the Southern Highlands are keen to expand tree plantation; in fact, a strong movement of tree growers exists.
3. Both plantation forestry and plantation wood-based processing are potentially profitable and environmentally and socially sustainable.
4. Private plantations and value-added production can have major positive economic, social, and environmental impacts at both the local and the national levels.

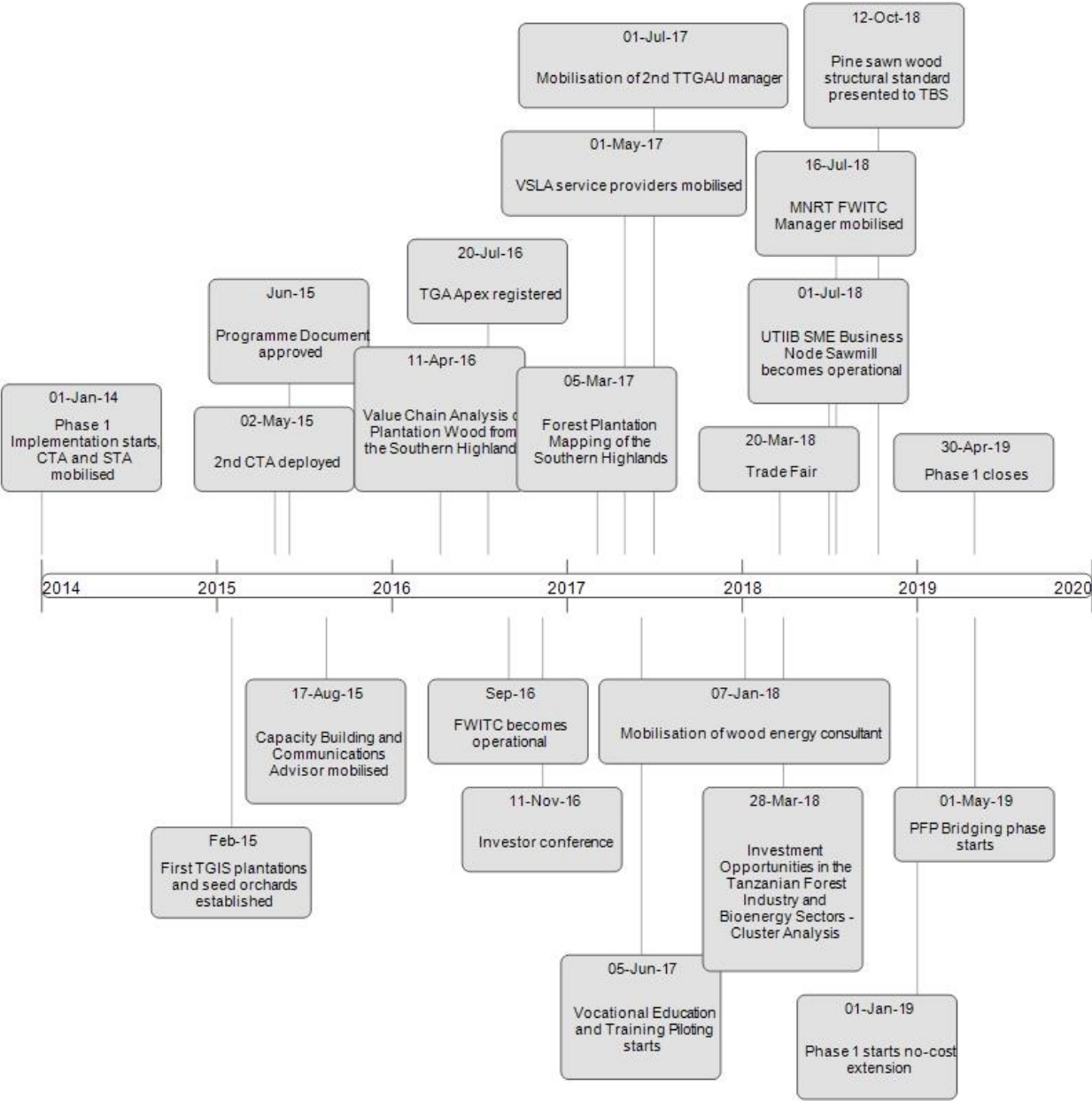
The programme is a long-term partnership. The first phase of the programme ran from 1 January, 2014, to 30 April, 2019. Its key features are identified below.

Overall objective	Promote sustainable and inclusive private forestry that boosts economic growth and helps alleviate poverty
Purpose of the first phase (2014–2019)	Ensure that economically viable, sustainable and inclusive plantation forestry and related value chains provide employment to and increase the incomes of private forest owners, small and medium enterprises and vulnerable households in the programme area
Funding frame	<ul style="list-style-type: none"> - MFA Finland EUR 19,500,000 - Government of Tanzania EUR 985,950 (5% of total budget)
Key stakeholders	<ul style="list-style-type: none"> - Ministry of Natural Resources and Tourism of Tanzania - Ministry for Foreign Affairs of Finland - Steering committee and supervisory board members - Tree growers, wood processors and wood users
Technical assistance	Indufor Oy and NIRAS Finland
Programme result areas and targeted results for the first phase	<ol style="list-style-type: none"> 1. <i>Enabling environment.</i> An environment which enables the expansion of sustainably managed private plantation forestry exists. 2. <i>Plantation forestry development.</i> High-quality tree-growing and private plantation forestry have increased in the programme area and uphold sustainable and inclusive principles. 3. <i>Small and medium enterprise development and product innovation.</i> The profitability and sustainability of SMEs within the forestry value chain have improved.
Geographic area	Southern Highlands and Kilombero Valley of Tanzania
Key beneficiaries	Private tree growers, and wood-processing enterprises and users
Human rights and cross-cutting objectives	The programme is a progressive one: it upholds human rights principles in its processes and supports those tree growers' associations, business associations, and NGOs that themselves respect, protect, and fulfil human rights. The needs, concerns, and capacities of different duty bearers and rights holders, especially vulnerable groups like women, the landless and the disabled, are addressed by programme activities and expected results. Gender disaggregated data is used systematically when planning and monitoring interventions and their results.
Environmental safeguards	<ul style="list-style-type: none"> - Informed villagers decide on planting areas using inclusive and participatory approaches during village land-use planning, which is itself facilitated by district land-use planning teams with PFP technical and financial support. - Natural forests, watercourses, wetlands, edaphic grasslands, and areas of scientific and/or cultural value are not disturbed. - Only the most viable of sites are selected. No planting is supported in areas that have less than an average of 1,000 mm of rainfall per year because problems could arise in downstream water supply.
Main environmental impacts	<ul style="list-style-type: none"> - Fewer wildfires - Improved forest carbon sequestration and storage by introduction of fast-growing species and conversion of about 12,000 ha of degraded grassland into forest plantations - Natural forest conservation through substitution of <i>miombo</i> [<i>Brachystegia spp.</i>] charcoal with sustainable wood-waste-based fuel and natural hardwood with eucalyptus in furniture manufacturing

PPF-SUPPORTED VILLAGES, SEED ORCHARDS, TRAINING CENTRE AND INDUSTRIAL NODE



PHASE 1 TIMELINE



EXECUTIVE SUMMARY

Private Forestry Programme (PFP) is a bilateral development cooperation programme implemented jointly by Ministry of Natural Resources of Tanzania and Ministry for Foreign Affairs of Finland. The programme builds on the identified potential of smallholder plantation forestry to contribute to Tanzanian rural economic growth and the fact that Tanzania is one of the few countries with excessive land areas both suitable and available for plantation forestry.

Planned as a long-term intervention, the programme was divided into phases. This report covers the PFP Phase 1, implemented from 1 January, 2014 to 30 April, 2019.

The operating area of Phase 1 included eleven districts across four regions in Southern Highlands and Kilombero Valley.

The purpose of the PFP Phase 1 was to ensure that economically viable, sustainable and inclusive plantation forestry and related value chains increased income for and provided employment to private forest owners, SMEs and vulnerable households in the programme area. To deliver this, the programme was divided into three results, each designed to contribute towards the project purpose with a different focus. Each result was furthermore divided into multiple outputs contributing towards their respective result.

Result 1 was formulated as “An enabling environment exists for the expansion of sustainably managed private plantation forestry”. It was set to address identified nine main barriers for expansion of private plantation forestry with a target of mitigating at least four of them. The barriers included lack of access to finance; fire hazard; lack of machinery, equipment and tools; lack of good quality seeds; long-term nature of forestry; lack of market information; lack of technical expertise; inadequate infrastructure; and, unsupportive land tenure laws.

The main achievements under Result 1 included ensuring broad stakeholder participation in the ongoing review of the National Forest Policy; strengthening the national practices for village land-use planning; mapping the existing plantation forest resources on Southern Highlands and providing comprehensive analyses for promoting forest sector investments; developing training capacity both in the form of national curriculum development and by establishment of a Forestry and Wood Industries Training Centre; establishing 170 ha of high-quality seed orchards that provide Tanzania the opportunity to become self-sufficient with improved tree seed; developing standards to allow for quality management and processing; and, reaching out a microfinance scheme to over 4,000 villagers which has allowed them small-scale business and access to social support.

Altogether, the Phase 1 interventions addressed eight of the nine identified business barriers, and effect of five barriers was reduced from substantial to moderate or lower.

Result 2 was formulated as “Increased high-quality tree growing and private plantation forestry based on the principles of sustainability and inclusiveness developed in the programme area”. This result included the physical establishment of smallholder plantations with selected communities – a process which was started by participatory land use planning and organising tree growers into organisations.

The main achievements under Result 2 were preparation of participatory land use plans for 59 villages with over 90,000 inhabitants in total; strengthening tree growers’ organisations and establishing an apex body to take increasing responsibility of their institutional development; introducing a public-private partnership model for afforestation of degraded district forest reserves; and, establishing almost 12,000 ha of new plantations with over 9,000 smallholder tree growers by applying improved tree seedlings and silvicultural practices. The established plantations, though juvenile, already represent a multimillion-euro asset for their owners (even with strong discount rates assumed), along with delivering the environmental benefits of carbon sequestration, waterflow regulation, erosion control and reduced wildfires due to increased awareness and active fire management.

Result 3 was formulated as “Production efficiency, product quality and new financially viable products developed with SMEs”. It was set to develop the industry side of the forest value chain through working with small and medium sized enterprises. Result 3 was closely linked with

establishment of the Forestry and Wood Industries Training Centre and only started its operations midway through Phase 1.

The main achievements under Result 3 included catalysing technology transfer of over 30 wood-processing SMEs with the potential of doubling their sawn wood production; piloting vertical integration of tree growers' organisations into the local SME scene; developing and demonstrating wood-waste-based products that provide business opportunities and an alternative to natural forest charcoal; and, introducing kiln-dried eucalyptus as a new raw material with high potential.

Delivery on the results contributed towards achieving the project purpose. Surveys done towards the end of Phase 1 indicated increase in wealth and wellbeing in the programme core operating areas, and the net present value of the generated assets was significant as discussed above. However, the limited lifetime of Phase 1 and the long-term nature of forestry as business mean that the major impact in form of increased income and employment will mainly be visible well after the programme Phase 1 has phased out. The fundamental value of the PFP interventions and innovations hence lies in the provision of new models for acting along the value chain. The increased revenues generated through the introduced improved practices are expected to cause a multiplier effect in the surrounding communities, since they will see the incentive to change.

The programme has shown adherence to the principles of Finland's development policy by actively promoting women's participation and general social inclusion throughout its activities. The support mechanisms engaged by the programme have been either pro-poor or poor-inclusive at the least. The programme also specifically targeted vulnerable people through two separately designed forestry interventions. While these provided mixed results, the piloted approach of plantation establishment for the vulnerable people will be worth further development.

Social inclusion and pro-poor policies were also among the programme's key mitigating strategies in relation to the identified social risks involved in its implementation. Environmental safeguards were applied to control the environmental risks related to monoculture plantations. Sustainability of the programme interventions after the end of the programme was recognised as a major risk throughout the Phase 1 implementation, and considerable emphasis was put into institutionalisation of the programme interventions in order to secure their continuation beyond the Phase 1 lifespan.

Phase 1 operated with a total budget provision of EUR 19,500,000 which was used to full length (EUR 79 remained at the end of the phase).

Based on the experience of Phase 1, the following recommendations were made for the further development of the smallholder-forestry-based plantation value chain in the Southern Highlands: a) actively communicate for broader understanding and buy-in for the vision concerning the development potential; b) promote human rights within the industrial forestry, including social justice and health & safety aspects; c) promote innovations to support SME development; d) support tree growers' organisations as a vehicle for private forestry; e) facilitate cluster-based approach for development of forest industries; f) assist in attracting private investments; and g) put integrated landscape-level solutions in place to protect forest assets from fire.

1. PROGRAMME DESCRIPTION

1.1 Introduction

Private Forestry Programme (PFP) is a bilateral forestry sector development cooperation project implemented jointly by Ministry of Natural Resources of Tanzania (MNRT) and Ministry for Foreign Affairs of Finland (MFA). The overall objective of the programme is to ensure sustainable and inclusive private forestry that contributes to Tanzania's economic growth and poverty alleviation. The programme was planned to be a long-term intervention divided into multiple phases. This report covers the PFP Phase 1, implemented from 1 January, 2014 to 30 April, 2019 within eleven districts across four regions in Southern Highlands and Kilombero Valley of Tanzania.

1.2 Background

Finland has been supporting the development of the forest sector in Tanzania for decades. In fact, forestry is one of the main sectors of Finnish-Tanzanian cooperation. From 2008 to 2009, the two governments cooperated on a public-private partnership consultancy and continued that initiative from July 2010 to July 2011 in a bridging phase known as the Private Forestry and Carbon Trading Project (PFCTP).

The objective of the PFCTP was to reduce poverty by ensuring that the forest sector would help improve the lives of the poor in an effective and sustainable manner, restore the environment, and aid in the sustainable economic growth of Tanzania. The PFCTP's purpose was to achieve a framework conducive to promoting private forestry by increasing public-private cooperation, the availability of information, and the capacity of 11 pilot villages in which citizens were involved in private forestry. The inception phase aimed to pave the way for getting commercially viable private forestry going in Tanzania and to carry out the background studies needed to prepare for the PFP. The PFCTP's key strategy was to support the changes needed in institutional and contractual arrangements for plantation forest management, utilisation and processing so that smallholder tree farmers could reap economic benefits from tree planting. A draft PFP Programme Document was prepared at the end of the PFCTP and a second planning phase focusing on integrating the key crosscutting objectives of the new Finnish development policy into the PFP design was conducted in 2012. In February 2013, a series of thematic workshops were organised with the key stakeholders to appraise the amended draft PFP document. This resulted in the "PFP Programme Document" used to mobilise the first phase. That document was again amended again in June 2015, after the inception period of the first phase.

1.3 Rationale

The rationale for supporting private plantation forestry in Tanzania was revalidated through several PFP studies and remains strong:

1. Tanzania is one of the few countries in the world that still has land with the right climate and right soils for successful tree plantations. The population density in the Southern Highlands has remained low, market access is improving through major investments in infrastructure and the land is suitable for fast-growing timber plantations. PFP studies have projected domestic Tanzanian wood supply and demand and detailed profitable investments that will impact the currently negative trade balance. These investments, which include investments in plantation establishment, sawmilling, plywood and veneer production, will reduce the trade deficit and make Tanzania self-sufficient in sawn wood, veneer and plywood.
2. Small-, medium-, and large-scale tree growers in the Southern Highlands are keen to expand tree plantation; in fact, a strong movement of tree growers exists. The year 2016 saw the mapping of some 207,000 ha of plantations, 70% of which are owned by small scale tree growers. Tanzania will need to utilise all of these resources if it is to optimise the sector and achieve self-sufficiency in sawn wood, veneer and plywood.

3. Both plantation forestry and plantation wood-based processing are potentially profitable and environmentally and socially sustainable.

The development impact of the identified investment in Tanzanian forestry and forest industry is based mostly on income generation and employment creation. The investments identified by the PFP will create some 1,500 additional decent jobs directly and, through the multiplier effect, many more indirectly. Additional income will be generated in the area as people (employees, service providers, and the like) gain business from the proposed investment.

4. Private plantations and value-added production can have major positive economic, social, and environmental impacts at both the local and the national levels. Properly established tree plantations are likely to result in many positive environmental impacts both locally and globally. These high-yielding plantations will sequester carbon efficiently both in above- and below-ground biomass. Plantations do not require irrigation systems and they have little impact on groundwater levels if they are established according to proper site-species matching. Smallholder plantations are mostly managed manually, which imposes a minimal carbon footprint.

Other environmental benefits include, for example, improved water regulation and less pressure on natural forests and woodlands for wood products and firewood. Plantations do not commonly require chemical fertilisation and they often result in less soil sedimentation than many other land uses. For this reason, they improve downstream water as the high sediment and nutrient levels runoff associated with agriculture decline.

On the social side, it is expected that the plantations will generate much needed income and alternative employment opportunities in rural Tanzania, reduce the pressure for urbanisation, and create a more stable social situation through more even income distribution. The establishment of plantations and advancements in forest industry will also create more opportunities for women to be employed in decent working places.

1.4 Intervention logic

The overall objective of the programme was to introduce and strengthen sustainable and inclusive private forestry that contributes to Tanzania's economic growth and alleviates poverty.

The purpose of the first phase of the programme (2014–2019) was to ensure that economically viable, sustainable and inclusive plantation forestry and related value chains increased income for and provided employment to private forest owners, small and medium enterprises (SMEs) and vulnerable households in the programme area.

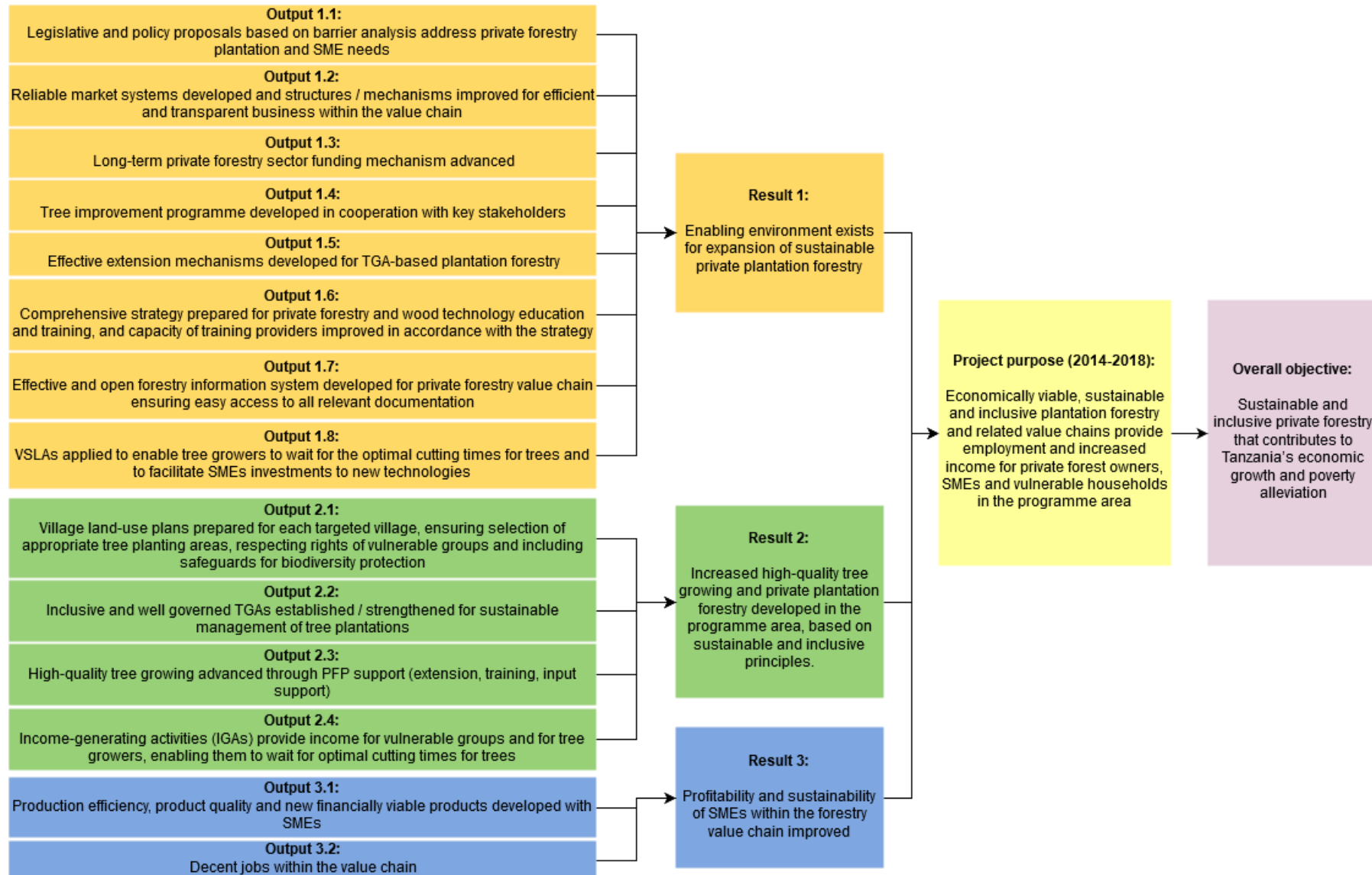
The programme was set to achieve its purpose through the delivery of three main results:

1. An enabling environment exists for the expansion of sustainably managed private plantation forestry;
2. More high-quality tree growing and private plantation forestry based on the principles of sustainability and inclusiveness is developed in the programme area;
3. The profitability and sustainability of SMEs within the forestry value chain is improved.

Each result was further divided into a number of specific outputs.

The programme intervention logic is shown in detail in the results chain included in Figure 1.

Figure 1 Programme results chain



1.5 Arrangements for management and coordination

The supervisory board was the programme's highest decision-making body: its members, who were representatives of the MFA and the MNRT (delegated by the Ministry of Finance), voted on matters related to the country agreement. The board's mandate was to agree on decisions affecting the programme at the country-agreement level.

The board had the following functions:

1. Approving the final Programme Document
2. Approving major changes in programme strategy and/or financing
3. Approving annual plans and reports

The members of the supervisory board were as follows:

- | | |
|---|----------------|
| 1. Permanent secretary of the MNRT | Co-chairperson |
| 2. Ambassador of Finland | Co-chairperson |
| 3. Director of Forestry and Beekeeping (MNRT) | Member |
| 4. Chief Executive of the Tanzania Forest Service (TFS) | Member |
| 5. Commissioner of External Finance (MoF) | Member |
| 6. Director of Sector Coordination | Member |
| 7. (Prime minister's office: regional administration and local governments) | Member |
| 8. Tanzania Private Sector Foundation | Member |

The board was assisted by a secretariat which comprised of the following two members:

1. Team leader of the PFP
2. MNRT coordinator for the PFP

The supervisory board met four times during Phase 1.

The programme's steering committee was responsible for operational supervision, networking and decision-making. It met quarterly and had the following key functions:

1. Monitoring programme performance and agreeing upon adjustments and revisions that were not made at the level of the country agreement (the latter fell under the purview of the supervisory board)
2. Monitoring the selection of short-term consultants by the programme management unit to ensure that consultants meet the criteria established
3. Discussing and approving the programme's annual work plans and budgets
4. Discussing and approving the programme's annual, quarterly, and other reports presented and agreeing on actions to take to ensure the effective progress of implementation
5. Serving as a forum for strategic discussions and networking among key stakeholders
6. Guiding and promoting the exchange of the experiences and communications
7. of the programme, discussing adjustments to the programme and its components and proposing them to the supervisory board
8. Channelling information from the programme to key stakeholders and vice versa
9. Guiding overall management
10. Approving the procedure for the procurement of short-term consultants

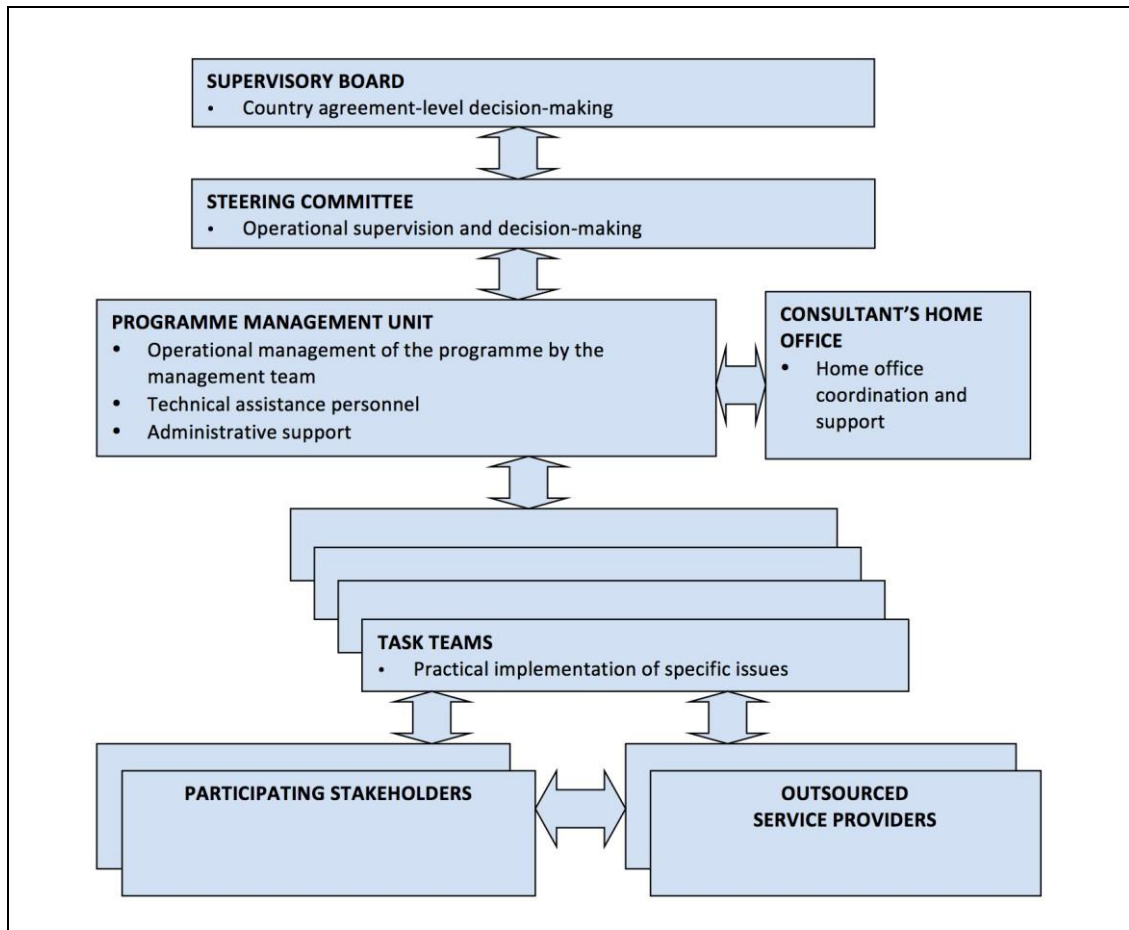
The steering committee comprised of the following members:

1. MNRT coordinator for the PFP – Chair
2. Regional natural resources advisors from Iringa, Njombe and Ruvuma
3. Representative of the Embassy of Finland
4. Representative of the TFS
5. Regional community development officers from Iringa and Njombe
6. Representative of the Tanzania Forest Industries Federation (SHIVIMITA)
7. Representative of the TGA apex body (TTGAU)
8. Team Leader of the PFP – Secretary
9. National Private Forestry Advisor of the PFP – Secretariat

The steering committee convened fourteen times during Phase 1.

The programme organogram is presented in Figure 2.

Figure 2 Programme management structure



Because the programme focused on private-sector development, it was not implemented within any government entity though it did cooperate with the government in active partnerships. The programme management unit was responsible for the practical management of the programme. It consisted of a technical assistance (TA) team and supportive personnel contracted through the consultant Indufor. The team leader and the national private forestry advisor were responsible for overall management and task teams were established for the practical implementation of specific outputs and/or specific tasks within the programme's ambit.

The TA team comprised members provided for in competitive tender as well as additional service providers recruited directly by the programme.

The need for a full-time forest industries development expert to focus on the forest industries value chain emerged during the first year of programme implementation as did the need to engage a capacity-building expert full time. It was also considered appropriate to invest in strengthening the TGA apex body with full-time professional staff.

2. MAIN ACHIEVEMENTS OF PFP PHASE 1

Here we examine the main achievements of Phase 1. The programme was designed to achieve its purpose by delivery of three results, as shown in Figure 1, and the main achievements are grouped below according to their contribution towards each respective result.

2.1 Main achievements in Result 1 – An enabling environment

The aim of Result 1 was to induce positive changes in the operation environment and in that way provide incentives for expansion of private plantation forestry, which in turn will lead to increased income and employment. Nine main barriers for expansion of plantation forestry were identified in the Programme Document: (1) lack of access to finance; (2) risk of fire; (3) lack of machinery, equipment and tools; (4) lack of good-quality seeds; (5) long-term nature of forestry; (6) lack of market information; (7) lack of technical expertise; (8) inadequate infrastructure; and (9) unsupportive land tenure laws.

The programme's target under Result 1 was to address at least four of the business barriers. For this, Result 1 was structured into eight areas of intervention called programme outputs, many of them addressing more than one barrier at the same time. This chapter presents the main achievements within these outputs as well as the changes (or expected changes) that the achievements have led to (or are expected to lead to). The respective interventions are presented in more detail in chapter 3.

The main achievements in Result 1 were as follows:

I. Support for review of the National Forest Policy through broad stakeholder participation

The MNRT-led review of the National Forest Policy is now complete. PFP supported the broad participation of stakeholders in the drafting process and provided specialist knowledge on issues relating to smallholder plantation forestry and small wood-processing industries.

This achievement is likely to bring about the following changes:

- ⇒ A National Forest Policy that is based on good understanding of smallholder private forestry and small wood processing industries and that will, therefore, provide an appropriate framework for inclusive and business-enabling forest strategy, legislation and regulations.
- ⇒ A National Forest Policy that reflects a “compromise of stakeholder opinions” and is therefore expected to be accepted and understood by stakeholders.

II. Strengthening of the process for preparing plans for equitable and optimized village land use

The programme strengthened the country's land-use planning process. It developed and piloted improved participatory planning methods and, in collaboration with the National Land Use Planning Commission (NLUPC), published a practical manual “Tools and Spatial Technologies for Village Land Use Planning – a Practitioner's Manual for Active Community Engagement”¹ for implementing those methods. The programme also helped update the national “Guidelines for Participatory Village Land-Use Planning, Administration and Management in Tanzania”, awaiting publication by the NLUPC at the time of reporting, and trained eight district planning teams in its area of operations in their use.

This achievement is likely to bring about the following changes:

- ⇒ An extension in land-use planning outreach by applying more efficient processes.

¹ <http://www.nlupc.go.tz/publications/guidelines>

- ⇒ Opportunities for i) improving land governance and village development planning, ii) making village land use, including water source management and biodiversity protection, more equitable and optimal, iii) formalising land tenure, iv) reducing land conflicts, and vi) boosting investment due to the drafting of village land-use plans.

III. Availability of information on existing plantations and investment opportunities

The programme mapped plantations in the Southern Highlands in order to quantify existing plantation forest resources and then carried out several comprehensive analyses of plantation value chains and opportunities for investment into plantations and forest industries in the area. The analysis also included further discussion of barriers to investment, information essential for generating a greater understanding of the barriers to and opportunities for forest-sector development among decision-makers and potential investors. The programme utilised the information to promote investment in the plantation value chain in the Southern Highlands.

One outcome of the studies was the identification and description of six existing and potential forest industry clusters in the Southern Highlands. Developments in the identified Mafinga/Mufindi cluster and Makete cluster were facilitated by awareness raising on the forestry sector opportunities in these clusters, involving the local government and value chain actors.

This achievement is likely to bring about the following changes:

- ⇒ Relevant and useful information that will inform the improvement of policy, legislative and regulative processes.
- ⇒ An increase in private investment in forest plantation value chains amounting to the acquisition of 19,000 ha of land.
- ⇒ Increases in rural employment and technology transfer (through the provision of models) of SMEs and the eventual improvements of local infrastructure.

IV. Greater capacity for much needed in-situ training as well as vocational education and training

The Forestry and Wood Industries Training Centre (FWITC) is now established and well equipped with a concrete road map for the future in form of business and training plans. The curricula for vocational education and training (VET) in forestry and forest industries have been updated and are being piloted with a batch of 40 students, partly at the FWITC. Short courses based on the needs of tree growers and entrepreneurs have been planned and are being carried out. This initiative brings training closer to the needs in Southern Highlands in terms of both content and location. Equity and health and safety in the workplace have been integrated into training courses. In short, the tools for providing the training needed to fill gaps in capacity are now in place.

This achievement is likely to bring about the following changes:

- ⇒ For practitioners along the value chain, a source of both much-needed skills and well-trained workers, both inputs which should improve productivity and the quality of products and services along the value chain, as well as encourage forest sector investment.
- ⇒ Improvements in occupational safety and health.
- ⇒ A major opportunity for uneducated youth to qualify for skilled employment in the formal economy by participating in VET-level training at the FWITC.
- ⇒ Acceleration of innovation in products processes and services.

V. Establishment of seed orchards, providing Tanzania with the opportunities to become self-sufficient in improved tree seeds of main commercial exotic species

A total of 170.5 ha of seed orchards, most of which derived from highly improved parent trees, has now been established in 13 different locations in the Southern Highlands. They will provide

seed for five different species of pine, three different species of eucalyptus, as well as teak (*Tectona grandis*) and white teak (*Gmelina arborea*). If these orchards are properly managed, within eight years, Tanzania will produce enough seeds of these ten major commercial tree species not only to make the country self-sufficient but also to export. The seed orchards are managed by the newly established Tanzania Tree Growers Associations Union (TTGAU) and its member associations in close cooperation with Tanzania Tree Seed Agency (TTSA) of the TFS.

This achievement is likely to bring about the following changes:

- ⇒ Diversification of plantation species to include more than the current focus on one species alone, *Pinus patula*.
- ⇒ A more secure (disease- and pest-resilient) forest sector due to a better domestic tree seed supply with a broad genetic base and less need to import planting material.
- ⇒ 15–20% increases in plantation productivity and the supply of saw logs to industries during first rotations. These increases will improve returns to growers and extend employment opportunities.
- ⇒ Improved technical quality of the produced wood due to better tree form (straighter stems with smaller knots and less structural faults).
- ⇒ Improvements in inclusivity by allowing 60,000 smallholders in Southern Highlands alone to access affordable high-quality tree seed and to compete with large-scale growers.
- ⇒ Eventual potential to breed tree species that are highly adapted to and thrive in local climatic and edaphic conditions.
- ⇒ Potential total annual seed production valued at EUR 1 million, of which EUR 200,000 will replace imports and the balance will be utilised locally by smallholders or exported.

VI. Development of standards to guide the sector and promote good-quality management and processing

The programme developed standards for timber logs and for pine sawn wood. Following research and broad consultation with the industry, it prepared a draft report “Specifications for Visually Strength-graded Pine Sawn Wood for Structural Use” and handed it over to the Tanzania Bureau of Standards (TBS) in October 2018. Also through consultation, PFP prepared log grade specifications and handed them over to the MNRT. Although these standards are still in draft format and further interventions will be needed before they guide the development of the sector, simply initiating this process was an important step toward good-quality management and processing.

This achievement is likely to bring about the following changes:

- ⇒ New high-value markets for wood with known load-bearing characteristics for use in load-bearing situations, such as use in prefabricated roof trusses.
- ⇒ Optimally economical use of sawn wood due to a reduction in the need to over-specify.
- ⇒ Increase in employment through new markets (including export markets) and the implementation of standards.
- ⇒ A movement away from bulk pricing towards new high-value markets for high-quality saw logs.
- ⇒ Optimally economical use of saw logs.
- ⇒ Improvement in employment in plantation silviculture incentivised through new high-value market opportunities for growers.
- ⇒ More open and transparent markets for logs.

VII. *Benefits for more than 4,000 villagers, almost half women, who participated in a microfinance scheme incorporating small-scale business and access to social support*

The programme trained the 4,284 members of 191 supported Village Savings and Loan Association (VSLA) groups and facilitated them in taking up business ventures like various agricultural activities, retail shop-keeping and forestry processing. About 48% of VSLA members are women and most are also members of tree growers' associations (TGAs).

One key benefit of the VSLA system is that it gave people access to social support. Many VSLA members have purchased affordable group health insurance from the government through the Community Health Fund. Most of these insurance packages cover both the VSLA member and his or her family. Social loans were taken mostly to pay for education, funerals or medical treatment or to tide the borrowers over after local disasters such as floods and wildfires. VSLAs also helped some members improve their diets: from once being occasionally hungry they now have no difficulties getting proper nutrition. Having access to social funds has reduced the need to sell assets like trees or livestock when health emergencies have arisen, thus making VSLA members and their families more financially stable.

This achievement is likely to bring about the following changes:

- ⇒ The diversification of livelihood options and, as a result, an increase in opportunities for wealth creation.
- ⇒ More opportunities to educate children.
- ⇒ Increased household social security.
- ⇒ Greater equality by providing opportunities to all segments of the population.
- ⇒ Ability to keep trees growing to maturity and thereby earn more income from forestry.

Conclusion – progress towards an enabling environment

The achievements described above mainly addressed business barriers related to technical expertise, market information, availability of quality seeds, the long-term nature of forestry as well as the overall policy framework. Altogether, a total of eight out of nine business barriers were addressed by the programme and the effect of five barriers was reduced from substantial to moderate or lower, as described in more detail in chapter 3.

In other words, the programme has addressed and improved on several business barriers and therefore made progress towards an enabling environment for the expansion of sustainably managed private plantation forestry.

2.2 *Main achievements in Result 2 – Development of smallholder-based plantation forestry*

The aim of Result 2 was to, with the participation of all segments of a village society, establish high-quality smallholder plantations in locations that are economically, environmentally and socially sound as well as an institutional framework that can coordinate forestry and provide benefits to villagers. In addition to plantation establishment, other ways to create wealth were to be initiated for poor households. The achievements in Result 2 will increase income and employment in programme villages.

Result 2 was structured into four areas of intervention (i.e. outputs): i) land-use planning, ii) plantation establishment, iii) strengthening tree grower's organisational framework, and iv) provision of alternatives for income generation outside plantation forestry.

The main achievements in Result 2 were as follows:

I. Establishment of framework for optimal as well as socially and environmentally sound land use in 59 villages covering almost 850,000 ha of land and benefitting more than 90,000 villagers

The first step the programme took when working with a community was to develop a VLUP. It did so in 59 villages, all of which use their plans to guide land-use decisions. Because PFP emphasised inclusion of villagers in the planning, awareness about land tenure issues and the importance of participatory land-use planning has increased. Since VLUPs were prepared and methodology developed simultaneously, improvements were tested and utilised in actual land-use planning. Districts such as Kilolo and Mufindi have already replicated PFP-introduced processes outside the PFP area, and because PFP developed guidelines and tools together with the NLUPC its methods get adopted at the national level (see Result 1).

This achievement is likely to bring about the following changes:

- ⇒ Better village land use and fewer land conflicts, for example between farmers and livestock keepers.
- ⇒ Plantation forestry directed only to those areas where it is the optimal land use, is viable financially and will not cause social or environmental/hydrologic problems.
- ⇒ Improvements in economic productivity, water source management, and environment protection.

II. Establishment of almost 12,000 ha of smallholder plantations involving more than 9,000 tree growers

Establishment of almost 12,000 ha of smallholder plantations in only four growing seasons is a major achievement, as is the fact that 120 villages were involved and that good-quality procedures were introduced through the Tree-Growing Incentive Scheme (TGIS) and out-grower support programmes (OSPs).

By December 2018, the plantations established through the TGIS alone already carried a value of about EUR 17 million, assuming discount rate of 6%. More information on value of the established plantations is included in section 3.1.

This achievement is likely to bring about the following changes:

- ⇒ Diversification of livelihood options through income from tree growing. The emphasis on including all segments of the population give poor and disadvantaged small growers the opportunity to move from a subsistence-level existence to income-based growth.
- ⇒ Through the introduction of good-quality seedlings and more optimised management, an increase in growth from an estimated 10 m³/ha/year in a business-as-usual scenario to up to 20 m³/ha/year and, as a result, more income.
- ⇒ As the increase in income is realized, the model introduced by the programme with improved seed and plantation management will spread through the “power of example”.
- ⇒ An increase in biomass as more sites are planted and allowed to mature and a corresponding increase in carbon sequestration and mitigation of climate change. During their first rotation, the pine and eucalyptus plantations established on degraded grassland through the TGIS have a potential to sequester an additional 2.3 million tonnes of CO₂ from the atmosphere.

III. Strengthening of tree growers’ organisations and advancing their role in providing services and benefits to members

The programme reached out to over 10,000 members of 96 tree growers’ associations, most of which are young institutions with limited capacity. Through programme interventions they have gained strength and, in varying degrees, benefit their members through their efforts in coordination and service provision.

Thanks to the PFP's facilitation, an apex body for TGAs, the TTGAU, is now up and running, with a national mandate to represent smallholders in forestry. The TTGAU is now taking its first step in implementing its business plan for the timber trade. This is the first time in Tanzania that a tree growers' own organisation has stepped up to back individual tree growers in their most important endeavour, selling their timber. The TTGAU is looking toward adopting into a more comprehensive vision and strategy for moving beyond just the timber trade.

This achievement is likely to bring about the following changes:

- ⇒ Ability of well-functioning TGAs and the TTGAU to provide services, advice and advocacy to their members and thereby increase the profitability of tree growing as an income-generating activity.
- ⇒ Provision of models for learning and motivation for other tree growers to follow in order to get organised into TGAs, thereby developing existing TGAs and providing incentives for new ones to form.
- ⇒ The increase in employment opportunities associated with having more TGAs and more forestry.

IV. A model for PPP in the management of district forest reserves

Through the PFP's facilitation, 10 villages entered into public-private partnerships (PPPs) with the district governments of Mbinga and Nyasa to manage three degraded district forest reserves. The central implementing unit in each village is the TGA established with support from PFP. Through a memorandum of understanding, each village was granted the right to establish woodlots within the reserves. Under this scheme, the 10 villages afforested about 720 ha of degraded district forest reserves, land comprising the most degraded and erosion-prone sections of the reserves, including most hilltops and ridges within them.

This achievement is likely to bring about the following changes:

- ⇒ The same changes as described above under smallholder plantation establishment.
- ⇒ An enhancement of the functioning of the water catchment that will improve the supply of water downstream.

Conclusion – progress towards more high-quality tree growing and private plantation forestry based on the principles of sustainability and inclusiveness

Almost 12,000 ha of good quality plantation has been established with the participation of a variety of smallholders, guided by VLUPs and through the involvement of both local tree growers' associations and their umbrella organisation that is growing in strength. Microfinance schemes are providing tree growers, as well as other villagers not involved in forestry, with both opportunities for engagement in forestry and access to social support.

Hence, to conclude: although the Phase 1 target of 15,000 ha of plantations established was not met fully, the programme has made good progress in delivering on the main aspects that constitutes Result 2.

2.3 Main achievements in Result 3 – SME support and product innovation

Result 3 interventions focused on the processing of the raw material from plantations and the marketing of the resulting products. The aim was to induce a change in the wood-processing industry by encouraging investment in new technology and building capacity for operations. The main mechanisms for achieving this aim were establishing the FWITC and working with a number of SMEs that would develop models for a more profitable and sustainable way of working, thus providing incentives for other SMEs to adapt, too. These changes were expected to grow the industry, increasing income and employment and improving working conditions and safety in the wood industry sector.

The main achievements in Result 3 were as follows:

I. *More than 30 wood SMEs upgrading their processing technology and doubling the sawn wood they produce*

The programme encouraged investment in new technology through demonstration and capacity-building. Thus far, 34 SMEs that the programme has engaged with reported upgrades in their wood processing technology. The FWITC is at the centre of this approach. Its facilities and training and business plans provide a road map for it to continue acting as an incubator of further transformation of the industry and produce a skilled work force with a good understanding of safety and health issues.

This achievement is likely to bring about the following changes:

- ⇒ The TFS estimates that about 150 dingdong mobile sawmills need to be replaced. Most entrepreneurs understand that they need to change. Since models provided by the FWITC and SMEs who have already invested in new technology will demonstrate the alternatives available, they are expected to gradually update their businesses.
- ⇒ Improvements in technology changes and improvements in skills will make SMEs more professional.
- ⇒ A growth in market acceptance and business as product standards implemented and the reputations of products accordingly strengthened.
- ⇒ Improvements in worker health.

II. *Establishment of a model for integrating tree growers to the value chain through TGAs and development of a permanent SME processing industry*

Encouraging SMEs to invest in improved technology so they can better process raw material from smallholder forestry continues to be a challenge in the Southern Highlands. In fact, it is a fundamental barrier to the transformation of the forest sector. Getting SMEs to invest requires building their trust of tree growers, who must demonstrate they can provide a secure resource base in order to convince SMEs of the feasibility of doing business with them. PFP established a model for this integration when it initiated the Makete industrial node. At this node, entrepreneurs have invested in a small permanent band saw sawmill and smallholders have organised into a TGA to coordinate the supply and sale of logs to the Makete sawmill. Strengthened by training provided by the programme and guided by a business plan developed with programme support, the Makete model is taking its first steps.

This achievement is likely to bring about the following changes:

- ⇒ Improvement in conversion rates from just 25–30% to over 50% and a resulting increase in the efficiency of the utilisation of the plantations and reduction in wood wastage.
- ⇒ Enabling of the Makete sawmill to operate profitably and tree growers to sell their wood, hence providing income to entrepreneurs and tree growers as well as opportunities for employment at the sawmill and on plantations.
- ⇒ Documentation of experiences and learning that will, assuming that the Makete initiative continues and that awareness-raising is done well, provide opportunities for others to adapt. The more SMEs transform, the more rural employment opportunities will arise, and the more income tree growers and SMEs will earn.

III. *Demonstration of new ways to produce energy from wood and the consequent provision of alternatives to traditional charcoal and business opportunities for SMEs*

The production of charcoal-briquettes from wood waste is one of the key innovations and entrepreneurial endeavours promoted by the programme. The FWITC was instrumental in promoting this initiative as it boasts demonstration facilities and provides training. Interest in the production of sustainable charcoal from plantation-grown wood is growing rapidly. Ilindiwe TGA, being a part of the Makete industrial node, established a sustainable charcoal production hub with support from the programme and was scaling up its operations. Also, five SME businesses have already diversified into the manufacture of wood energy products through the programme's

facilitation, and sixth was in the process of diversifying. The programme promotes the local fabrication of charcoal manufacturing equipment to ensure that processing equipment will be available on a sustainable basis.

This achievement is likely to bring about the following changes:

- ⇒ Increase in the availability of alternatives to charcoal made in indigenous woodlands, thereby providing consumers with cheaper products and reducing pressure on indigenous woodlands.
- ⇒ The production of pulpwood, chips and sawdust is predicted to increase from 2 million m³ to 3 million m³ roundwood equivalent per year in Southern Highlands and could supply a substantial charcoal and briquette industry. If all the waste was economically utilisable around 300,000 tonnes of charcoal and briquettes could eventually be produced annually, with a Mafinga factory gate value of EUR 60 million per year.
- ⇒ Opportunities to utilise the full tree volume as value-added products instead of discarding the sawmilling side products as waste.
- ⇒ Opportunities for SMEs and increases in employment and wealth creation through the development of sustainable charcoal and briquette production.
- ⇒ Improvements in the market for wood from plantation thinning, and a consequent increase in income for tree growers, incentives for adopting forest management, and higher-quality logs (by delaying harvesting). The results of these changes will be greater incomes for tree growers and higher quality sawn timber.

IV. *Introduction of kiln-dried eucalyptus, a sustainable hardwood costing a fraction of the market price of natural hardwood*

The fact that hardwood timber from indigenous woodlands is getting increasingly scarce hampers the development of the furniture industry both in terms of the availability and the cost of raw material. Another innovation the programme introduced was the drying of sawn timber using the high-frequency vacuum kiln, the first such machine ever in Tanzania, commissioned at the FWITC. The improvement in wood drying has two key consequences:

- For pine: Reduces the time for drying before dispatch to markets and improves the quality of sawn timber by controlling drying methods.
- For eucalyptus: Allows the use of dried board in the high-quality furniture market and doubles the market value of the product.

This achievement is likely to bring about the following changes:

- ⇒ Gradual displacement of the natural wood-based products in furniture industry.
- ⇒ The diversification of pricing as standards and quality-pricing evolve. Dried and better-quality pine sawn timber commanding a higher price than poorer quality material, a change that will motivate stakeholders to manage the quality of both forests and the processing of raw material.

Conclusions – Improving the profitability and sustainability of SMEs in the value chain

The FWITC is becoming a centre for innovation and learning in the Southern Highlands. Its impact is becoming visible in the emerging transformation of the sawmilling industry as well as in the uptake of innovations along other value chains. The pilot in Makete provides for an interesting model on how to integrate tree growers into the value chain and have good opportunities to succeed. Although there is still a long way before the forest value chains in the Southern Highlands have undergone a transformation into a modern high efficiency industry, one can conclude that the programme has made good contribution to initiating such a transformation and hence strengthened profitability and sustainability of SMEs within the forestry value chain.

3. PROGRAMME DELIVERY AS PER THE LOGICAL FRAMEWORK

Here we examine how the programme has performed against specific indicators included in its logical framework. The included indicators concern three levels: i) Project purpose, ii) Programme Results; and ii) Programme Outputs. The structure is illustrated in the results chain of Figure 1. The result level and output level indicators and their respective targets are also incorporated by the programme results-based management framework included as Annex 1.

The programme additionally has an Overall objective as shown in Figure 1. However, the Overall objective incorporates a long-term target-setting designed to be examined in year 2030 and hence it is not included herein.

3.1 Progress towards achieving the Project purpose

<p>Phase 1 indicators:</p> <p>The percentage of households in targeted and reference communities that are classified under each wealth rank and a comparison between the two.</p> <p>Average return on plantation investments supported by PFP</p> <p>Average return on investments of SMEs having a support contract with the programme</p> <p>How well supported plantations and SMEs meet the sustainability criteria</p>	<p>Achievement:</p> <p>Socio-economic surveys indicate increase in wellbeing of target communities.</p> <p>Not measurable since plantations still juvenile, but projections indicate 20–30% IRR assuming that professional level of silviculture is maintained.</p> <p>In practice there were problems with measurability and attributability of this indicator.</p> <p>Plantations economically viable and ecologically sustainable. Supported medium size enterprises and SME groups demonstrated high business viability while micro and small enterprises less so.</p>
<p>Conclusion: The results indicate that the first phase has to a fair extent fulfilled its purpose.</p>	

The purpose of the first phase (2014–2019) was, through delivery under the three result areas, **to ensure that economically viable, sustainable and inclusive plantation forestry and related value chains increased income for and provided employment to private forest owners, SMEs and vulnerable households in the programme area.**

3.1.1 Economic viability, sustainability and inclusivity of plantation forestry

PFP studies² have demonstrated both the economic viability and sustainability of plantation forestry in the Southern Highlands. The PFP Annual Progress Report for 2014/15³ reports on an investigation into who was benefitting from the programme Tree-Growing Incentive Scheme and found at that time that the poorest were being included amongst the beneficiaries in a proportionate manner. Since then the programme has revised the TGIS twice and moved from income generating activity (IGA) support to Village Savings and Loan Association (VSLA) support to improve equity and inclusivity. These schemes have allowed the poor and vulnerable to participate in employment and wealth creation through plantation forestry and other business activities of the beneficiaries' choices.

² <http://www.privateforestry.or.tz/en/resources/view/investment-opportunities-in-the-tanzanian-forest-industry>

³ <http://www.privateforestry.or.tz/en/resources/view/annual-progress-report-2014-2015>

3.1.2 Increased income and employment provision

Plantation forestry is a long-term intervention, where the main return from the investment is coming at the end of the rotation. Through supporting establishment of nearly 12,000 ha of smallholder plantations the programme has, however, generated an asset of a considerable scale that already holds a value to its owners. The value can be estimated by discounting according to selected different discount rates as shown in Table 1. As it can be seen, discount rate of 6% gives the plantations' net present value of almost 17 million euros, while the undiscounted total expected value exceeds 40 million euros. Per one programme beneficiary this means 2,193 euros or 5,367 euros, respectively.

Table 1 Value of smallholder plantations of pine and eucalyptus established through TGIS as at December 2018

Discount rate	Net Present Value of plantations (EUR)		Example of a stakeholder group to whom the discount rate is relevant
	Total value	Average value per beneficiary	
Undiscounted	41,232,996	5,367	-
6%	16,850,764	2,193	Impact investor
12%	7,749,351	1,009	Forest industries
18%	3,990,219	519	Smallholder tree grower

Note: Seed orchards and OSP plantations are not included. Beneficiary numbers for minor support models without countable individual beneficiaries have been estimated on a pro rata basis.

The presented values only include the pine and eucalyptus plantations established through TGIS, so the plantations established through supported OSPs will add further to the estimated total value. The projected internal rates of return for TGIS plantations vary from around 20% up to 30%, depending on the species and the chosen management regime. The calculations assume that the woodlots are well managed and not cut prematurely, which may not be the realised case with many smallholders. However, the values represent the potential incorporated with the asset that is already on the ground. The full calculation tables including the applied assumptions are included in Annex 3.

The establishment of the nearly 12,000 ha of new plantations through the various support models would, under commercial management, imply creation of about 400 jobs. Additional jobs will be generated through facilitation of the investments covering 19,000 ha. Assuming that half of the area can be covered with new plantations this will add another 300–400 jobs.

There is also evidence that the annual income within the long-term beneficiary communities of the programme has increased and that tree growing contributes a major part of the income for those who have been able to harvest their matured woodlots. These are discussed in more detail below.

3.1.3 Socio-economic changes during Phase 1

The programme carried out a socio-economic end study consisting of a household survey and focus group discussions in late 2018. Its findings could be compared against a socio-economic baseline report compiled by WEMA Consult in 2015 and against other datasets previously collected by the programme and its collaborators.

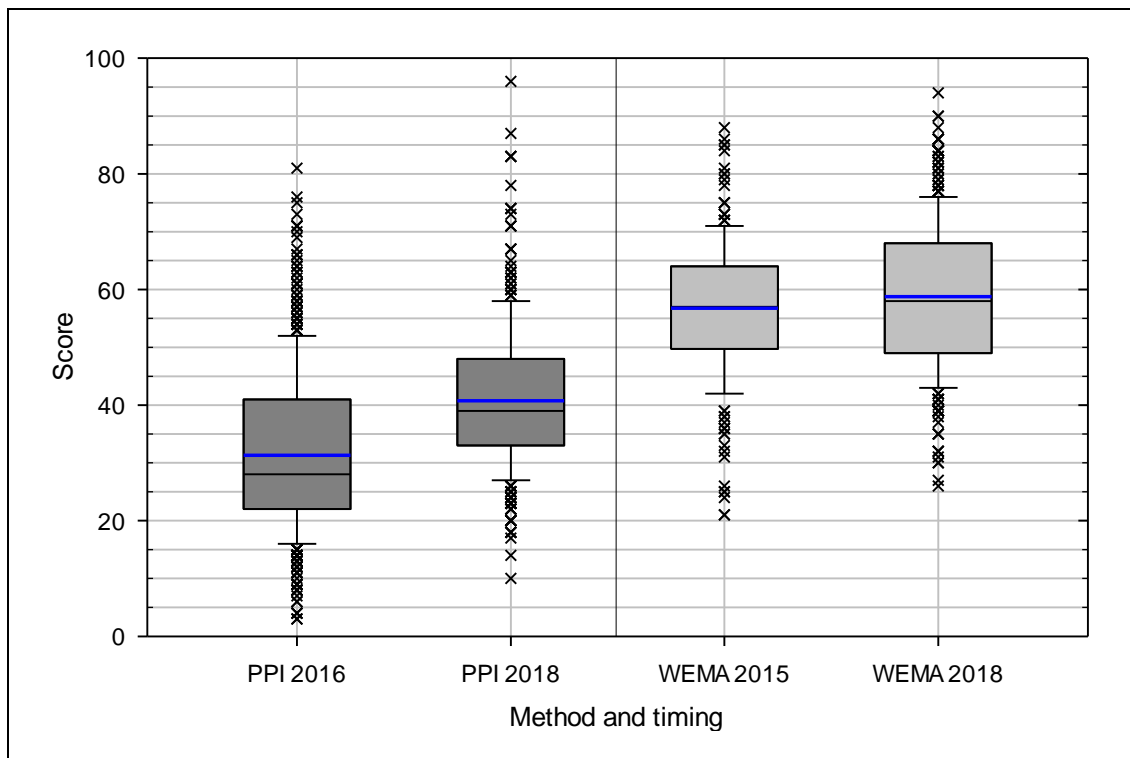
While the results from the household questionnaire do not allow for one-to-one comparison with the WEMA 2015 baseline report since the included villages were partially different, conclusions can nevertheless be made on a general level concerning the direction of change of the observed phenomena in the programme core operating areas. The reported average annual income has increased from TZS 1.8 million to over TZS 2.2 million. The results also indicate that the communities' food security and access to health services have improved. 90% of the interviewed TGIS beneficiaries reported that food needs had been met without assistance and 88% reported having been able to provide for health services for their household members. In 2015 the respective figures were 78% and 73%.

For now, only 22% of TGIS beneficiaries reported income from tree growing, since many own woodlots that are still too juvenile for harvesting. However, the reported individual tree growing

revenues were so high that they contributed more than half of the annual income of those who had sold wood. This speaks for the potential of tree growing as livelihoods in the programme operating area.

The household survey also included two quantitative wealth ranking methods: i) Poverty Probability Index (PPI)⁴, and ii) replication of the WEMA baseline report wealth ranking. The results could be compared with previously collected datasets from 2016 and 2015, respectively. The comparison is shown in Figure 3. The higher the presented score in either method, the better the respondent's estimated socio-economic status. The PPI scores allowed for temporal comparison with wide data in 14 villages in the PFP core operating areas of Njombe TC and Ludewa, Makete and Mufindi districts. Despite the limited time span of only two years, the results indicated a considerable rise in the scores. The WEMA method only allowed for more narrow comparison on a district-level. However, a slight increase in scores can be seen also in this data. While both methods apply a score range from 0 to 100, it should be noted that scores from the different methods are not intercomparable.

Figure 3 Temporal comparison of wealth ranking data from beneficiary communities as per PPI score and WEMA methods



1) The boxes represent observations between 25th and 75th percentile, and the whiskers represent observations between 10th and 90th percentile. Additional bars show medians (black bars) and arithmetic means (blue bars).

2) Despite of the same y-axis, scores can only be compared within the PPI and the WEMA method and not between the two methods.

Focus group discussions showed that majority of the beneficiaries themselves considered that their wealth and wellbeing had improved over the past five years, which has been the Phase 1 lifetime. However, up to one third also considered that their wealth and wellbeing had gotten worse. The main reasons stated for improved wealth and wellbeing were improved silvicultural skills, loan availability through the VSLA mechanism and provision of improved seedlings, all of which were PFP-originating interventions. The main reasons for the opposite development were

⁴ <https://www.povertyindex.org/country/tanzania>

stated to be falling markets and prices for agricultural products, and the need to allocate resources such as labour and cash for plantation silviculture. The latter was required from the smallholders to benefit from the plantation forestry support provided by PFP. The benefits are expected to materialise in future, as shown above.

The programme conducted a separate exercise to assess the viability of its supported SMEs, which showed that programme support has assisted them e.g. to improve on their entrepreneurship skills and technological awareness. While the general business viability of the medium-sized enterprises was considered promising by the assessment, the business viability of the micro and small enterprises was less promising, and they were still generally in need of support. SME issues are discussed in more detail under section 3.4.1.

3.1.4 Expected long-term benefit from the programme

Due to the long-term time horizon in plantation forestry, much of the impact in form of increased income and employment will only be visible beyond the lifetime of the Phase 1 of PFP. Apart from the achievements discussed above, the fundamental value on PFP interventions and innovations lies in the provision of new models for acting along the value chain. These models will, through higher returns than business-as-usual, provide incentives for change and hence have a good opportunity to spread.

- Models for plantation forestry with availability of improved tree seed, high-quality seedlings and proper establishment procedures.
- Models for processing industry related to processing technology, practises and management of the business.
- Models for strengthening equality as well as safe working standards through raising awareness and training on the subject matters.

The programme's Phase 1 has provided a good foundation for a continued support to equitable economic development through plantation forestry value chains. Now the next step is to further institutionalize and spread the innovations.

- Models that improve operational practises and bring higher returns are available and being implemented.
- The framework for increasing knowledge and skills has been brought closer to the beneficiaries. This has been done both in the form of a physical training institution (FWITC) and the substance of the training (VETA).
- The institutional framework to support tree growers has been strengthened (TGAs) and developed further (TTGAU).

3.2 Result 1: Enabling environment exists for the expansion of sustainably managed private plantation forestry

<p>Phase 1 indicators:</p> <p>To mitigate at least four of the nine business barriers identified in the Programme Document, reducing their impact from substantial to moderate or lower impact.</p> <ol style="list-style-type: none"> 1) Lack of access to finance 2) Fire hazard 3) Lack of machinery, equipment and tools 4) Lack of good quality seeds 5) Long-term nature of forestry 6) Lack of market information 7) Lack of technical expertise 8) Inadequate infrastructure 9) Unsupportive land tenure laws 	<p>Achievement:</p> <p>Impact reduced from substantial to moderate (see output 1.3)</p> <p>Impact reduced from substantial to moderate in selected villages (see output 1.5 and output 1.6)</p> <p>Impact reduced from substantial to moderate (see output 3.1)</p> <p>Enough pine seed of <i>P. tecunumanii</i> and <i>P. maximinoi</i> to meet national demand from 2020 onwards (see output 2.3)</p> <p>Copious good quality seed from 2025 onwards. Impact will be reduced from substantial to minor (see output 1.4)</p> <p>Microfinance scheme piloted (see output 1.8)</p> <p>Market Information System piloted (see output 1.2)</p> <p>Impact reduced from substantial to moderate (see output 1.5 and output 1.6)</p> <p>NLUPC supported in developing improved national guidelines for land use planning (see output 1.1)</p>
<p>Conclusion: Targets were achieved. Eight business barriers addressed in total; impact of five barriers reduced from substantial to moderate or lower.</p>	

The aim of Result 1 was to induce positive changes in the operation environment and that way provide incentives for expansion of private plantation forestry, which in turn will lead to increased income and employment. Nine main barriers for expansion of plantation forestry was identified in the Programme Document and the programme was to address at least four of them. Table 2 on the next page provides an overview of the achievements, through PFP’s interventions, in addressing the business barriers.

Result 1 was structured into 8 areas of interventions (i.e. outputs) to address the business barriers. below shows the outputs and an estimation on the level of achievement based on the indicators in the results-based management framework (RBMF). The interventions are described in the following chapters, including a more detail assessment of the achievement as compared to the targets.

Table 2 Result 1 outputs and implementation status at the end of Phase 1

Result / Output		Status as reflected by RMBF indicators
Result 1:	Enabling environment exists for expansion of sustainably managed private plantation forestry	
Output 1.1:	Legislative and policy proposals based on barrier analysis address private forestry plantation and SME needs	Achieved
Output 1.2:	Reliable market systems developed and structures / mechanisms improved for efficient and transparent business within the value chain	Minor deviations
Output 1.3:	Long-term private forestry sector funding mechanism advanced	Achieved
Output 1.4:	Tree improvement programme developed in cooperation with key stakeholders	Achieved
Output 1.5:	Effective extension mechanisms developed for TGA-based plantation forestry	Achieved
Output 1.6:	Comprehensive strategy prepared for private forestry and wood technology education and training, and capacity of training providers improved in accordance with the strategy	Achieved
Output 1.7:	Effective and open forestry information system (FIS) developed for private forestry value chain ensuring easy access to all relevant documentation	Achieved
Output 1.8:	VSLAs applied to enable tree growers to wait for the optimal cutting times for trees and to facilitate SMEs investments to new technologies	Minor deviations

3.2.1 Output 1.1: Legislative and policy proposals based on barrier analysis address private forestry plantation and SME needs

<p>Phase 1 indicators:</p> <p>Proposals submitted to SC / SVB by the end of year 3</p> <p>TGA and industry apex bodies rate developments as highly relevant and beneficial</p>	<p>Achievement:</p> <p>Achieved</p> <p>TGA and industry apex bodies broadly rated the developments as highly relevant and beneficial</p>
<p>Conclusion: The programme adopted a wide range of interventions to address legislation and policy issues. Whilst it is difficult to attribute these interventions to the PFP directly, the programme contributed clearly towards national forest policy of 2018 and other positive policy-level developments.</p>	

The main interventions under this output are related to providing an overall policy framework for the sector, mechanisms for inducing improved quality in wood management and processing, as well as guiding land use planning. In addition, the programme undertook a number of interventions to encourage private forest investments.

Practical changes implemented to encourage private forestry investments

Village land afforestation investment opportunities were identified using recently prepared VLUPs that PFP had supported, additional field-based research and consultations with villagers and district and regional governments. These opportunities were documented and promoted at a national forestry conference in November 2016. Subsequently, 10,000 ha were acquired by Sokoine University of Agriculture and 5,000 ha were taken by Tanganyika Wattle Company. Several other investors took smaller areas.

In addition to these village land opportunities, the PFP was also able to secure leasehold arrangements for TGAs to invest in reforesting three degraded district forest reserves. This landmark achievement sets a precedent for similar agreements throughout Tanzania. Many district forest reserves in Tanzania have been degraded and encroached because the MNRT has lacked the resources to protect them. Since some of these reserves are important water catchments, their denudation, soil compaction and regular burning has damaged water catchment functions. Prospective tree growers, for their part, have lacked access to land. The PFP support included site assessment, negotiation between the partners, support for finalising concession arrangements, site mapping and raising seedlings, all of which led to plantation establishment starting from the FY 2017/18.

A thorough and systematic approach was adopted in preparing the "Investment Opportunities in the Tanzanian Forest Industry and Bioenergy Sectors - Cluster Analysis".⁵ This intervention led to the documentation of investment opportunities in six forest industry clusters (Figure 4) in the Southern Highlands by assessing the future demand for plantation wood products, assessing the current and potential new plantation resources, and proposing viable investments to fill in projected gaps between supply and demand in Tanzanian markets.

An industry cluster is a group of firms and institutions located close together whose businesses are interlinked through value and supply chains, labour, and the use of similar inputs, technology, and complementary products. Industry clusters create new business opportunities that would not be available if companies operated in isolation.

Research in Tanzania and elsewhere indicates that active management of the complex value chains of clusters has the potential to improve their overall performance. This approach has already proven itself in Tanzania with successful sunflower-cultivation and rice milling clusters in Mbeya and a seaweed cluster in Zanzibar.

⁵ <http://www.privateforestry.or.tz/en/resources/view/investment-opportunities-in-the-tanzanian-forest-industry>

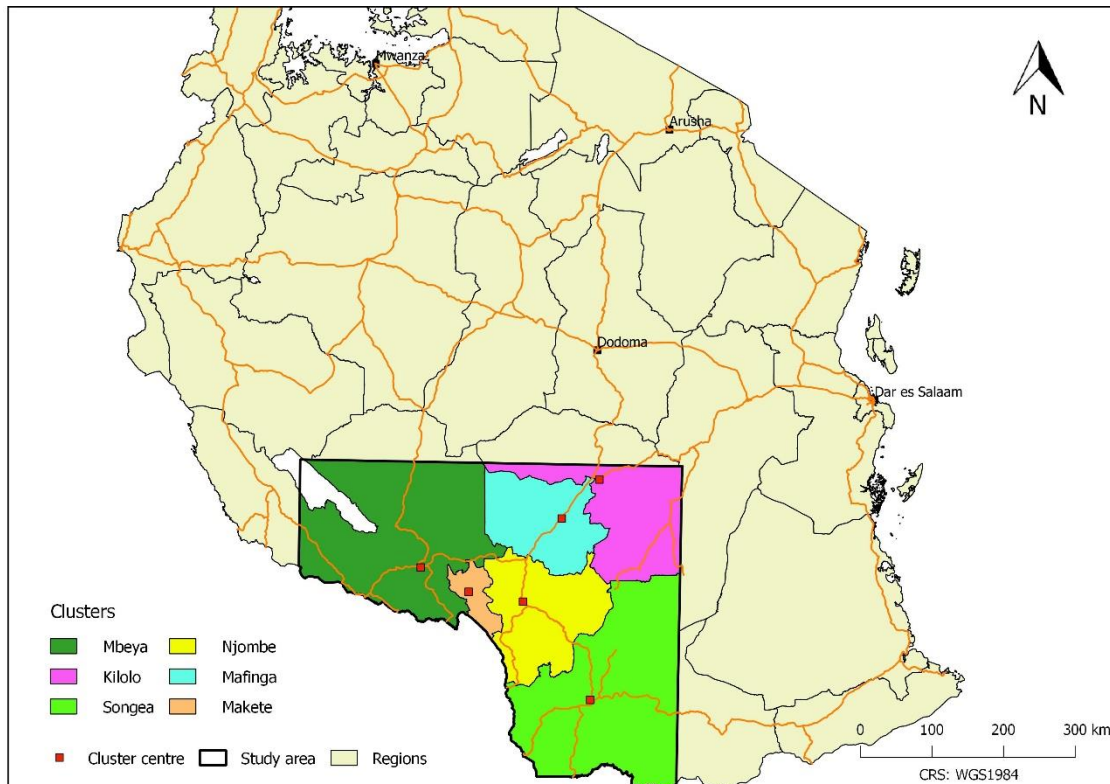
Benefits of forest industry clusters include:

1. Better utilisation of raw materials and/or manufacturing,
2. Improved cooperation among cluster members,
3. Ability to attract more suppliers,
4. Greater opportunity to add value by vertical integration of cluster members, and
5. Improved manufacturing innovativeness and competitiveness.

Further development of the clusters was facilitated starting from the Mafinga Forest Industry Cluster value-chain optimisation workshop in August 2018, laying the way forwards. Stakeholders of the Makete Forest Industry Cluster, including the local government, were sensitised with the findings of the cluster analysis and prompted with the forestry sector's potential through a joint workshop and study tour in March 2019.

In addition to these targeted interventions, the PFP promoted the investment opportunities at several forums. Its investment opportunities report will support the MNRT in its work to encourage investment in the sector in line with its Draft National Forest Policy of May 2018.

Figure 4 Proposed Southern Highland forest industry clusters



The work on promoting investment opportunities has been highly relevant, effective and efficient but it has required a multidisciplinary approach from a team of highly trained international experts. The investment opportunity profiles will need to be updated periodically and more in-depth studies of some high-value clusters designed to support integrated cluster management are justified.

Background studies providing analytical information for sector development

- Private Forestry Programme (2016). Forest Sector financing Study. Private Forestry Programme. Iringa, Tanzania.
- Private Forestry Programme (2016). Value Chain Analysis of Plantation Wood from the Southern Highlands. Private Forestry Programme. Iringa, Tanzania.

- Private Forestry Programme (2016). Ruvuma private forestry investment opportunities – site profiles. Private Forestry Programme. Iringa, Tanzania.
- Private Forestry Programme (2016). Financial and Economic analysis of private forestry investment opportunities in Ruvuma Region
- Private Forestry Programme (2017). Forest Plantation Mapping of the Southern Highlands. Private Forestry Programme. Iringa, Tanzania.
- Private Forestry Programme (2018). Investment Opportunities in the Tanzanian Forest Industry and Bioenergy Sectors. Cluster Analysis. Helsinki, Finland.

VLUP guidelines issued by the NLUPC

VLUPs are prepared to direct land use and village development over a ten-year period. This decentralised planning and management of village-level land is legislated in the Land-Use Planning Act No. 6 of 2007 and the Village Land Act of 1999. Land is the most important asset of the rural poor in the Southern Highlands yet progress on village land use planning has been slow and the quality of VLUPs has often been poor.

The PFP, the University of Turku, the NLUPC, district land-use planning teams and local NGOs worked together to improve participation and spatiality in land-use planning processes and to reduce the demand for resources during the process.

Today free spatial technologies are used to support information-sharing and the participatory collection and analysis of data in a multitude of societal applications. The rapid evolution of mobile technology, open-source software and open-access global datasets has enabled this development. Spatial technologies offer new opportunities to enhance cost-efficiency and stakeholder participation in the VLUP process. Participatory spatial technologies were thus the starting point for developing improved tools for the PFP's VLUP practices.

Tools and practices were adapted or developed by the programme to address five common challenges in the planning process:

1. Participatory mapping with freely available high-resolution satellite or aerial images was developed to enable the collection, analysis and discussion of location-based information by villagers even from areas that are inaccessible to field tracking using the global positioning system (GPS).
2. Satellite imagery is used because it yields detailed, accurate and standardised VLUP maps without increasing the costs of VLUP process.
3. Spatial data produced with the use of satellite imagery can reliably be matched with other spatial data such as data on vegetation and soils.
4. Mapping and group-work tools were developed to increase the active participation of villagers, especially women and other disadvantaged groups, to encourage them to share their views, and to discuss and learn about village land and other resources.
5. The participatory tools were chosen to address villagers' lack of commitment to implement their VLUPs through enhancing a sense of self-efficacy and ownership.

The result of the interventions are revised ***Guidelines for Participatory Village Land-Use Planning, Administration and Management in Tanzania (third edition)***, completed and awaiting publication at the time of reporting. The guideline is still to pass through two approval meetings before being presented to the NLUPC board. Hence, in the future the planning practice will be guided by revised guidelines.

PFP has also supported the development of a manual ***Tools and Spatial Technologies for Village Land Use Planning – a Practitioner's Manual for Active Community Engagement*** including conducting different stakeholder meetings. This manual is intended to be a support document to the revised guideline, and it has already been published by NLUPC. The manual describes 17 practical participatory and spatial tools developed and adopted by the PFP.

Work on the land-use planning guidelines was highly relevant. However, there are concerns about sustainability. Field work on VLUPs is implemented through district land-use planning teams which are often under-resourced and poorly motivated. It will take more than updated national guidelines and improved tools to change this situation. Although the VLUPs are prepared through a participatory approach there is still room for improvement, especially when it comes to empowering particularly poor villagers in participating in the land use planning.

Sao Hill harvesting options evaluated by the TFS

Sao Hill industrial plantations, which are managed by the TFS, comprise the most important individual commercial forest resource in Tanzania. Their current harvesting and marketing arrangements revolve around the issuance of harvesting allocations for specific volumes to local industries. The system has been criticised for several reasons including the following:

1. Tanzanian investors are limited to small one-year allocations that, by themselves, cannot sustain a small business.
2. Allocation-holders must purchase and utilise the whole range of log types resulting from an allocation rather than being able to specialise in processing specific log types.

Mechanised, cut-to-length, integrated harvesting performed by specialised contractors is a modern approach that is practiced in many countries that have substantial commercial forest resources. In this approach, a specialised contractor harvests the plantations and stacks the wood at the roadside in categories that suit local industries. Industries then come and purchase the logs that meet their specific needs. This approach optimises the value gained from every tree because each bole can be precisely cut and logs allocated to the highest value end-use for which they are suited.

This programme evaluated this approach for use by the TFS at Sao Hill industrial plantations and concluded that annual revenue would increase 43% to TZS 36 billion (or about EUR 15.3 million) based on 2016/17 allocations. A proposal to adopt the approach was pursued at multiple meetings with stakeholders. At the time for preparing the PFP Completion Report, according to available information, the TFS is planning to buy the harvesting equipment this approach requires.

National Forest Policy revision

With the FAO, the PFP was a major contributor to the MNRT-led review of 1998 National Forestry Policy and formulation of the new National Forest Policy, expected to be published during 2019. The PFP facilitated broad public consultation in the policy-formulation process by financing six zonal stakeholder workshops and one national-level task force meeting. In addition, the PFP was given the opportunity to discuss its recommendations with the task force.

The “Draft National Forest Policy of May 2018” was a progressive and pro-business document with policy statements including “enhance private-sector participation in forestry investments”. It recognised the PFP and TGAs and addresses Government of Tanzania cross-cutting issues. Some of its policy statements were as follows:

1. Ensure the mainstreaming of HIV/AIDS protection and control measures in the forest sector
2. Ensure gender mainstreaming in all aspects of forest management and development.
3. Ensure equal opportunities to males, females, youths and vulnerable groups in forest ownership and management.
4. Ensure adherence to the principles and practices of good governance in the forest sector.
5. Ensure the mainstreaming of environmental conservation in all aspects of forest management and development.

The Draft National Forest Policy of May 2018 set the groundwork for the national forest strategy, legislation and regulations, all of which will follow in due course.

Support to broaden participation in the MNRT-led review of the National Forest Policy was highly relevant. The document will guide the sector for at least the next decade.

Log and sawn wood standards

Most industries need to develop product standards as they advance. Standards allow purchasers to specify exactly what they need and industries to receive market signals about what the market demands. The Programme supported both the development of **Pine Log Grading Standards** and **Structural Sawn Wood Standards**. The former were handed over to MNRT in November 2018, and the latter in October 2018.

The processes, which have been led by national consultants with support from Stellenbosch University and South Africa Technical Auditing Services, have included technical assessments of the properties of Tanzanian wood and broad industry consultation and collaboration. An inception workshop was held on 22 February, 2018, with representation from the wood industry, tree-growing companies, the MNRT, the Tanzania Bureau of Standards (TBS), NGOs and TGAs.

Construction and furniture-making industries were consulted to determine the common timber sizes and species they use in their operations and other timber requirements. The institutions visited included the Tanzania Building Agency (TBA), the National Housing Cooperation (NHC), the National Construction Council (NCC), the National Housing and Building Research Agency (NHBRA), the Tanzania Bureau of Standards, the University of Dar es Salaam / College of Civil Engineering, the Tanzania Wood Working Federation (TAWOFE) and the Watumishi Housing Company (WHC).

Log grading

Log grading is the classification of logs using predetermined criteria according to the highest value end-use for which they are suited and there is an established market. The classes may be broad, so that, for example, logs are classified according to primary processor requirements, such as veneer, sawn timber, and pulpwood. Alternatively, they may include sub-categories, such as small and large saw logs, if there are substantial price differentials within a category.

Log grading initiates three main benefits:

1. **Optimal economic use of wood resources.** This benefit is well aligned with national policies calling for increasing the contributions of natural resources to the national economy. The rules guide the conversion of trees into “best-value categories” and support processors so they can buy only those categories that they are best able to utilise.
2. **Fair pricing of forest products, i.e. fair shares to producers and processors.** This benefit is well aligned with national policies designed to reduce poverty in rural areas. The log-grading rules facilitate trading by introducing clear product categories and associated indicative pricing.
3. **Incentivise the improvement of efficiency and the development of vertical integration in the forest sector.** This benefit has a clear link to national policies on forest-sector development. Growers select tree species and protect, manage and harvest them to suit best-value markets. Processors can access logs that are grown, harvested and presented to meet their specific industry requirements. Improvements in saw-log quality will support the diversification of wood products and the production of high-value end-products.

In addition, the sawn-wood standards were discussed at a national forum hosted by the TBS that included participants from the TBS, the NCC, the NHBRA, the TFS, the PMO, the private sector, the TBA, the WHC and the NHC.

Some key points emerging from this broad consultation include the following:

1. As has been the case in South Africa since 1998, sawn-timber standards should be voluntary rather than compulsory.
2. The South African building code drove the demand for standardised sawn timber in South Africa. Similarly, in Tanzania, too, the National Building Code, which is being developed, should include suitable standards. National, regional, municipal and district building regulations should also be aligned with the National Building Code.
3. The International Accreditation Forum (IAF) can accredit enterprises to certify Tanzanian sawmills and their products. Both certification enterprises and certified sawmills and their products must comply with required standards and will be subject to regular and unannounced audits.
4. The establishment of standards and certification bodies will require continued high-level collaborative efforts. The ministries of Natural Resources and Tourism; Industries, Trade and Investment; the President's Office Regional Administration and Local Government; Works, Transport and Communication; Finance and Planning; Lands, Housing and Human Settlement Development and the private sector should come together at either the ministerial or the permanent secretarial level to develop a common understanding, goals and commitments. A strategic plan on who does what, when and how is needed.

Structural sawn wood standards

Sawn-wood grading provides benefits very similar to those of log grading:

1. **Optimal economic use of sawn wood.** Both secondary and tertiary processors as well as final customers benefit if they can purchase sawn wood that meets their specific strength and aesthetic requirements and is fit for their purpose without being over specified.
2. **Fair pricing of sawn wood, i.e. fair shares to producers and secondary and tertiary processors.** By being able to specify grades that are just what is needed there is no need to purchase over specified and expensive sawn wood.
3. **Incentivise the improvement of efficiency and the development of vertical integration.** Sawmills will gain a more specific understanding of their markets and be in a better position to decide how to improve their businesses.

This assignment cannot be boxed within the MNRT or even shared by the MNRT and the TBS. A broad front is required, but the MNRT could take the initiative and invite other relevant ministries to a round-table discussion.

In cooperation with the TBS technical testing of the strength values (tension, compression and shear) of the sawn wood generally available in Tanzania was conducted. The samples were prepared at the FWITC and sent to the TBS for destructive testing (Figure 5 and Figure 6). The results established the basis for the draft grades.

At the end of Phase 1, the MNRT was processing the submitted log standards and the sawn-wood structural standards were nearing publication by the TBS. The visual grading of eucalyptus proved more problematic. Technical difficulties encountered will necessitate the import of specialised mechanical or acoustic grading equipment, and hence it was not possible to publish eucalyptus sawn-wood grading standards during Phase 1.

The PFP has received widespread support for this work. Industry associations, reassured by the voluntary nature of the standards, have been supportive. They understand that this work will open new markets for them.

Figure 5 Sample planks dried in the FWITC high-frequency kiln prior to being sent to the TBS



Figure 6 Destructive testing (shear) done at TBS for establishing the strength values of sawn wood



Once log-grading standards are adopted by the MNRT, these standards will need to be promoted and training in their application provided, but the overall level of effort should be manageable. Achieving sawn-timber standards will require much more substantial effort. It will be necessary to establish IAF-accredited enterprises to certify and audit participating wood processors, and much additional effort will be required to ensure those enterprises are

accountable. Effort will also be needed to secure a large enough market for certified structural sawn wood and to promote and train people to apply sawn-timber standards.

Adopting structural timber standards is just a start in modernising Tanzania's forest industry. Pushing standards is not really the work of development agencies; instead, those agencies should enable wood-processing industry associations and the Tanzania Forest Research Institute to collaborate on developing standards that can open markets and help the industries progress.

Overall the work on establishing log and sawn-wood standards is highly relevant, but more effort will be required to secure the sustainability of the standards and to strengthen national capacity to develop new standards.

Establishing thematic national, district, and regional multi-stakeholder forums to address barriers to the sector at the national, sector and local levels

Thematic groups have been established at the international (forestry conference), national (value-chain analysis, log and sawn-timber standards), zonal (national forest policy), regional (investment opportunities), cluster (forest industry cluster development committees – FICDCs) and village (VLUP) levels.

Overall the work on establishing thematic groups to deal with business barriers has been logical, well-intended and relevant, but, apart from in the case of VLUP, it is hard to ascribe effectiveness, efficiency or sustainability to these interventions of the PFP. National-level working groups require a high level of sustained effort which can go beyond the scope of individual programmes. FICDCs have potential, but they will also require very significant and sustained support to get properly established.

Supporting well-aligned existing forums such as the Tree Improvement Research Working Group (TIRWG) has proven effective, efficient and sustainable. African Forestry might offer similar advantages.

Relevance and usefulness of policy interventions as assessed by the programme stakeholder organisations

The programme asked its stakeholder organisations to assess the relevance and usefulness of its various policy interventions. The received results are compiled in Table 3. Although some private companies had a narrow focus, the stakeholder organisations mostly felt that the policy development work by the programme was highly relevant.

Table 3 Relevance and usefulness of the PFP policy interventions as assessed by the programme stakeholders

Policy intervention	Scores given by the stakeholders on a scale 1–5									
	FDT	African Forestry	TTGAU	SHIVIMITA	KVTC	GRL	NFC	TFS	RFO* Iringa	RCDO* Iringa
Support NLUPC in revising village land use planning guidelines improving participation and spatiality	4	4	3	5	1	2	4.5	5	5	4
Support MNRT to have zonal consultations in their formulation of the 2018 National Forest Policy	4	5	3	5	4	3	4.5	5	4	4
Promoting cut-to-length harvesting in government plantations	don't know	5	Don't know	4	3	4	3	don't know	don't know	don't know
Facilitating establishment of log and structural sawn wood standards	5	5	4	5	4	5	5	5	5	5
Mapping and quantifying plantation forests in Southern Highlands	5	5	4	5	4	5	4.5	5	5	5
Identifying and promoting afforestation investment opportunities in Southern Highlands	4	4	4	5	1	5	4.5	5	5	4
Identification and promotion of investment opportunities in the Tanzanian forest industry and bio energy sector	don't know	4	3	5	3	5	5	5	5	don't know
Promoting establishment of forest industry cluster development committee for Mafinga/Mufindi	5	5	3	5	1	4	4	5	5	5
Promoting private sector investment in reforesting degraded forest reserves	don't know	4	2	5	1	5	5	5	4	don't know
Formation of sustainable charcoal and briquette union	4	4	Don't know	5	2	5	4	5	4	4
Establishment of vocational education curricula for forestry and wood industry attendants	Don't know	5	5	5	4	4	5	5	5	don't know
Establishment of forestry and wood industries training centre in Mafinga	5	5	5	5	4	3	5	5	5	5
Establishment of tree growers' associations and their apex body the TTGAU	5	5	4	5	3	2	5	5	5	5

* RFO = Regional Forest Officer; RCDO = Regional Community Development Officer

3.2.2 Output 1.2: Reliable market systems developed and structures and mechanisms promoting efficient and transparent business within the value chain improved

<p>Phase 1 indicators:</p> <p>75% of stakeholders have access to reliable market information</p> <p>Round-wood classification and processed wood grading system endorsed</p> <p>Wood sales organised through TGAs</p>	<p>Achievement:</p> <p>75% not achieved but advance made in developing an adequate MIS</p> <p>Under assessment by MNRT and Tanzania Bureau of Standards</p> <p>Different modalities of TGA wood sales implemented</p>
<p>Conclusion: Partially achieved, but the MIS will need continuous development.</p>	

The interventions under this output were to address the business barrier on lack of market information and includes studies and analysis for a better understanding of the wood markets as well as systems and mechanisms in the timber trade.

The Market Information System (MIS)

Up-to-date information on markets, potential supply for the industry, timber demand for the tree grower, as well as prices is central for a functioning trade. Hence, the programme engaged in development of a MIS to serve both the tree growers and the industry.

Whilst most tree growers have very little ability or willingness to pay for services they often have simple mobile phones with texting capability and some were used to agricultural market information systems based on this SMS technology. To minimise costs the programme negotiated a deal with a mobile phone company for sending bulk text messages and using its spatial database of growers it designed a system within which log buyers could target bulk text messages to growers in specific areas who had the desired types of trees. Growers who received the messages and who were interested in selling could then contact the buyers directly. The PFP piloted the system with commercial companies and it resulted in some sales. The MIS would potentially benefit about 4,000 people involved in sawmilling and about 9,000 tree-growing households, or an estimated 65,000 total beneficiaries (assuming five persons per household). However, an evaluation of the system in mid-2018 showed very little utilisation of the system for timber trade.

However, the MIS proved to be useful in disseminating information to tree growers about plantation management priorities and access to high-quality forest planting materials. As a concrete example, through the MIS five TGAs demanded improved tree seeds and were linked by TTGAU to TTSa/TFS in acquiring the seeds for the FY 2018/19 planting season.

The MIS was investigated as a part of the preparation of the business plan for the TTGAU in wood trade in early – mid 2018. As a result, it was decided to develop a more sophisticated MIS and the TTGAU business plan include a road map for developing the MIS.

Because of the renewed interest, key specialists in the PFP and the TTGAU were provided with an exposure visit to MTK in Helsinki during August 2018 to see its information system and meet with its users, operators and architects.

Neither the PFP nor sawmiller associations had the capacity to gather and analyse enough information for quarterly market information SMSs with regional wood prices disaggregated. The TTGAU did, however, have enough outreach to collect the information at low cost. When the new TTGAU MIS is established, it will be able to collect the data.

The work on the MIS has been relevant. With TTGAU new leadership and business plan in place and with its multiple sources of funding, the TTGAU will have the ability to sustain the new MIS when it is established. PFP has continued supporting development of the MIS and this support may have to be continued.

Mechanism for selling timber through TGAs

PFP planned to enable TGAs to provide a plantation yield regulation, harvesting and marketing service to smallholder tree grower members in exchange for a commission. The idea was to have locally based foresters assess members woodlots and provide individual woodlot silviculture and harvesting plans and TGA level harvesting plans that would in turn provide a basis for negotiating long term supply contracts with permanent village-based sawmill enterprises. This vision was not achieved, and it might not be achievable until understanding and capacities are further developed.

The industrial node sawmill at Makete was set up with this vision in mind but the participatory business planning processes that PFP facilitated found that it was not practical in the short-term. Instead and as the concerned SME eventually planned, it started operation by providing a contract sawing service to clients who delivered their own logs and took away their own sawn wood. This proved to be a simple and profitable business model for the sawmill and the clients benefited from better conversion rates (more sawn timber output) and better (more accurate) sawing.

Having built-up some operating capital, but whilst also relying on member contributions the industrial node sawmill at Makete has recently started buying woodlots and dealing with harvesting and hauling as well as sawmilling. Whilst many of the SME members are also TGA members this business does not involve the TGAs as institutions.

The key challenge being faced is that lacking suitable technologies the log haulage costs from tree stump to roadside are often prohibitive and this situation favours the use of less efficient sawmills that convert the logs to sawn wood at the tree stump because the sawn wood can be carried out relatively easily.

Separately, and as part of its business plan activities the TTGAU has started purchasing member woodlots (initially using operational funds from PFP) and converting them using contracted mobile band saws with the intention of selling the wood for a profit. The aim being to demonstrate another appropriate technology to members and finance TTGAU services to members.

Studies and analysis for better understanding of the markets

Some of the studies relating to market conditions were as listed below:

- PFP (15th June 2018). FWITC business plan
- TTGAU (June 2018). Tree Growers' Association Union Business Plan
- INDUFOR (April 2018). Investment opportunities in the Tanzanian forest industry
- PFP (January 2017). Financial and economic analysis of private forestry investment opportunities in RUVUMA region
- TFS (26th May 2016). TFS economics in forestry operations
- PFP (30th April 2016). Forest sector financing study

Links for these and other PFP reports are provided in Annex 4.

3.2.3 Output 1.3: Long-term private forestry sector funding mechanism advanced

<p>Phase 1 indicators:</p> <p>Report on prospects for forest financing through carbon sequestration and other environmental services prepared</p>	<p>Achievement:</p> <p>Deferred to Phase 2 on the advice of the steering committee</p>
<p>Conclusion: Targets were achieved.</p>	

Lack of access to finance was identified as one business barrier. The interventions under this output are designed to address that barrier. The main interventions here include studies and analysis for a better understanding of the barrier as well as various mechanisms for financing of small holder forestry and SMEs.

The original intention of the private forestry-sector funding mechanism was to develop a critical mass of plantations to allow the sector to become self-sustaining. With over 200,000 ha of plantations identified during the Southern Highlands forest resource mapping, achieving a critical mass was no longer an issue. Nevertheless, smallholders found it challenging to finance good-quality plantation management and small processors have difficulties in getting credit to invest in improved processing equipment.

The Village Savings and Loans Association as one means for forest sector funding

VSLAs were established to support TGA members in increasing their incomes and generating social funds for use during emergencies. Since surveys showed that many tree growers harvest prematurely to meet urgent education and health related costs, the PFP speculated that by reducing financial vulnerability, households would be more able to deal with financial shocks without harvesting their plantation investments prematurely. During piloting, participants were able to raise capital and social funds in groups beyond the PFP's investment. Because of this success, additional service providers were procured to make this service available to more PFP-supported TGAs and SMEs. In addition to benefiting from savings and social funds, VSLA members also benefitted from a range of training opportunities that built their understanding about operating small businesses. The VSLA is further described under output 1.8.

The Tree-Growing Incentive Scheme

The directly financed TGIS was adapted to incentivise small growers and encourage compliance with land-use plans. A cash incentive to support weeding was also tested. The hope was to gradually develop inclusive forest financing well suited to the needs of tree growers in the Southern Highlands. This scheme is discussed in more detail under output 2.3.

Tree growers' and small operators organising themselves to improve on the financing

The TTGAU was employed as a service provider to disseminate cash incentives as part of a broad effort to build that institution as a potential forest finance intermediary. Financial and institutional training were given to TGAs and SMEs to increase their transparency and overall performance. Small operators got support to invest in improved technologies by encouraging them to come together in groups and to receive training and savings support. By the end of the reporting period several such operators had already invested, and others were on the verge of investing in improved sawing and drying technologies.

Initiatives to assess international finance for Southern Highland tree growers

Two international workshops were attended to find opportunities for obtaining smallholder forest finance suitable for PFP beneficiaries:

- Workshop to explore mechanisms to link tree planting activities by farmers, indigenous peoples and communities with Climate Finance on 12–14 of March, 2019, in Nairobi, Kenya

- Expert meeting on “Catalyzing private finance for inclusive and sustainable forest value chains” on 2–3 April, 2019, in FAO Headquarters, Rome

The Nairobi workshop started from the premise that “smallholder farmers in many parts of the Global South have been establishing small-scale plantations for a number of years. While most individual plantations are small, they are making an important contribution to improving family livelihoods, and when aggregated at the landscape level, they are sequestering large amounts of carbon and making a significant contribution to reversing deforestation. Recognition of this work by the international agencies tasked with supporting global efforts to combat climate change has been very limited.

Three main barriers to establishing climate finance to support for this work were identified:

- Funds have tended to focus on single, narrowly defined contributions to climate change mitigation;
- Application requirements for the funds are highly complex;
- Especially for benefits that must be aggregated at the landscape level, organisations have lacked the technical capacity and organisational infrastructure for collecting baseline and annual increment data on a large scale

Recent contacts with representatives of the Global Environment Facility and the Green Climate Fund had suggested there may be a willingness to review these barriers. Other private funds such as the Althelia Climate Fund and Terra Global Capital may already be able to support “multiple-benefits” work. There is an indication of support in principle for addressing these barriers from the FAO and ICRAF.

The Department of Mitigation and Adaptation of the Green Climate Fund which has been set up under the UN Framework Convention on Climate Change finance large projects which typically have multiple objectives relating to forestry in Africa. The projects mostly involve smallholders. The Green Climate Fund however only acts through national implementing authorities.

The FAO meeting elucidated the proposed “Forest Finance Information Hub” that is intended to be a “...tool to catalyze private finance for inclusive and sustainable forest value chains.”

Fund managers complained that there was finance available but too few bankable projects, whilst those needing finance for forest value chain development struggle to attract investment. The two sides often have different vocabularies and have trouble to understand each other. The hub could play a role in linking investors with opportunities and Tanzania would (because of the work completed by the PFP in identifying investment opportunities) be a logical country to start.

3.2.4 Output 1.4: Tree improvement programme developed in cooperation with key stakeholders

<p>Phase 1 indicators:</p> <p>Capacity for 100% of projected demand established</p> <p>1,000 ha each of <i>E. urograndis</i>, <i>P. maximinoi</i> and <i>P. tecunumanii</i> established for plus tree seed collection</p>	<p>Achievement:</p> <p>Capacity established to fully meet the projected demand.</p> <p>Over 1,000 ha of each of the three species established.</p>
<p>Conclusion: Targets were achieved.</p>	

Another identified barrier for investment in private plantation forestry is the lack of good quality seeds. The interventions under this output are designed to address that barrier. The main intervention here is the establishment of seed orchards, for the country to get self-sufficient on high quality seeds of major commercial exotic species.

Rationale behind seed orchard intervention

Tanzania currently imports improved seed for commercial plantations at the rate of USD 800 to USD 1,200 per kg. During the FY 2016/17 the total cost of pine and eucalyptus seed imported through the TTSA reached USD 180,000, and the total documented cost of tree seed of all species was almost USD 270,000. Importing tree seed is not risk-free because there are no certified tree-seed sources in Southern Africa, and because tree seed can be a vector for transmitting tree diseases.

Improved tree seed is used by major companies but typically does not reach small-scale tree growers, who, collectively, do most of the planting. Internationally available improved tree seed is an expensive commodity, and the importation process involves strict regulatory procedures which furthermore add to the cost. Using improved instead of local seed, however, can increase the value generation of a plantation by around 15% to 20% during the first generation and establish a foundation for future incremental gains through successive generations of local tree breeding. In a recent survey, access to improved tree seed was the most commonly mentioned challenge to farmers practicing commercial forestry.

Since it was clear that Tanzania needed a secure domestic supply of disease-free improved seed for commercial tree species that was affordable for all growers, the PFP, as a long-standing member of the national TIRWG, collaborated with the TTSA and the TTGAU to establish seed orchards on village land. The ownership of the seed orchard sites was intended to be transferred to the local TGAs through facilitation of certificates of customary right of occupancy (CCROs).

Early seed orchards established in the FY 2014/15

PFP first established two seedling seed orchards in 2015 using *Pinus tecunumanii* and *Pinus maximinoi* bulk seed imported from Brazil. Its aim was to diversify Tanzania’s pine tree species with two flagship species proven to perform well internationally in areas with climatic and edaphic conditions like those in the Southern Highlands and to have superior early growth in local trials. These species also show resistance to *Fusarium circinatum*, a fungal pathogen which is decimating *P. patula* seedlings in nurseries as well as saplings in Southern Africa. The properties of the wood of *P. tecunumanii* and *P. maximinoi* are similar to those of *P. patula*, which is the pine species currently most common in Tanzania, so the Tanzanian market should have no issues accepting it as structural timber. The good growth of both species and large number of cone- and flower-bearing trees of *P. maximinoi* after just three full growing seasons suggests that the siting of the seedling seed orchards was excellent (Figure 7, Figure 8 and report cover page).

Figure 7 *P. maximinoi* starting to bear male flowers after three growing seasons



Figure 8 *P. tecunumanii* planted in 2015 at Mufindi Paper Mill seed orchard in Makungu



The two seed orchards were established on village land in Idete and Mufindi Paper Mill (MPM) land in Makungu. An MoU between the TTSA, the TTGAU and Makungu Village Council was prepared to specify arrangements relating to the management, protection and benefit-sharing of the Idete seed orchard and an MoU regarding arrangements with the other seed orchard was under preparation. The bulk seed -based orchards require a heavy silvicultural thinning regime for the best result, and they were given their first thinning in July and August 2018 with fifty percent of the trees being removed.

New seed orchard establishment started in the growing season of the FY 2017/18

During growing seasons of FY 2017/18 and FY 2018/19, a total of 127.5 ha of new seed orchards were established through PFP support using imported high-quality seed from improved origins. During these two seasons, the seed orchard interventions had the following three broad objectives:

1. To secure and enhance commercial production forestry and wood-processing industries through the local production of improved tree seeds in a financially and organisationally sustainable manner.
2. To make a broad selection of high-quality tree seed accessible for small-scale private growers as well as large-scale commercial enterprises.
3. To help the TTGAU and participating TGAs to invest in a business that would contribute to their long-term financial viability and to promote the TTSA.

The following broad objectives were to be achieved by a partnership between the TTGAU, the TTSA, and the PFP:

1. The TTGAU was to a) lead transfer of the seed orchard sites to the partnering TGAs through the issuance of certificates of customary right of occupancy (CCROs); b) recruit TGA labour and oversee remaining field activities; c) establish MoUs between the TTGAU and the partnering TGAs which define roles, responsibilities and benefit-sharing arrangements; and d) guide and coordinate the participating TGAs (i.e. those with seed orchards) and provide a link between them and supporting organisations (such as the TTSA and the PFP) and tree-seed markets. TGAs will look after the day-to-day management and protection of seed orchards. The TTGAU and the participating TGAs will act together as an enterprise, sharing profits in an open and transparent manner designed to keep all partners motivated regardless of which orchards seeds find a market and which do not. Such an arrangement is necessary in order to make sure a selection of improved tree species seed is available in the market.
2. The TTSA/TFS was to provide a) TGA training and long-term technical support; b) seed-orchard monitoring; and c) seed certification, testing and marketing in return for a negotiated proportion of the seed that is produced.
3. The PFP was a) to provide broad technical support, including covering the seed orchard establishment, maintenance and protection costs up to the end of March 2019, and b) to deliver specialist technical guidance and capacity building.

At the beginning of April, 2019, the responsibility was handed over by the PFP to the TTSA/TFS to provide the necessary support for completion of the FY 2018/19 seed orchard establishment.

Seed of individual tree families (*i.e.* known superior phenotype mother trees resulting from two or three generations of tree improvement) of strategically important species was procured internationally to diversify the species grown in Tanzania, mainly pines and eucalyptus. Seedlings raised from this seed were planted in multiple seed orchards in the 2017/18 and 2018/19 planting seasons.

Following the planting operation and in conformity with standard operation procedures which were developed in consultation with all stakeholders who are members of the TIRWG, dead and dying saplings were replaced with healthy saplings of the same family twice. No fillers were used so as not to distort the seed orchard designs. The layout of the seed orchards was being

made permanently clear through the placement of aluminium labels, and a process to draft detailed maps from the seed orchard sites applying aerial images was ongoing.

To avoid weed competition, orchards were weeded twice per season. By the time of reporting, the construction of fencing to protect the newly established seed orchards from grazing and trampling was still ongoing as was the preparation of firebreaks.

Table 4 includes a list of all the PFP-supported seed orchards established during Phase 1.

Table 4 List of PFP-supported seed orchards

Year of establishment	District	Village/Site	Altitude (m.a.s.l.)	Species	Planted area (ha)	
2015	Mufindi	MPM, Makungu	1,245	<i>P. maximinoi</i>	21.0	
				<i>P. tecunumanii</i>		
	Idete		1,492	<i>P. maximinoi</i>	22.0	
				<i>P. tecunumanii</i>		
2018	Ludewa	Ibumi	1,361	<i>P. oocarpa</i>	4.5	
				<i>P. tecunumanii</i>	6.2	
	Madaba	Njelela	1,665	<i>P. maximinoi</i>	5.3	
		Ifinga	1,297	<i>E. saligna</i>	5.3	
				<i>P. tecunumanii</i>	5.6	
	Mbinga	Maweso	1,301	<i>P. maximinoi</i>	5.6	
		Utili	1,394	<i>P. maximinoi</i>	4.5	
	Nyasa	Lwekei			<i>P. tecunumanii</i>	5.0
					<i>E. saligna</i>	4.1
					<i>P. caribaea</i>	1.2
				<i>P. oocarpa</i>	2.8	
2019	Ludewa	Njelela	1,613	<i>E. grandis</i>	2.3	
	Madaba	Ifinga	1,297	<i>E. urophylla</i>	3.2	
		Mkongotema	1,115	<i>P. caribaea</i>	3.8	
	Makete	Usagatikwa	1,933	<i>P. patula</i>	2.0	
	Mufindi	Holo		1,450	<i>E. saligna</i>	2.8
					<i>E. urophylla</i>	2.1
					<i>P. caribaea</i>	2.1
					<i>P. oocarpa</i>	1.8
		Sao Hill Div. I	1,992	<i>P. maximinoi</i>	9.9	
				<i>P. tecunumanii</i>	13.5	
	Sao Hill Div. II		1,883		<i>E. cloeziana</i>	1.0
					<i>E. grandis</i>	4.0
					<i>E. saligna</i>	4.0
Nyasa	Liuli		600	<i>G. arborea</i>	5.0	
				<i>T. grandis</i>	2.1	
	Lwekei		700		<i>G. arborea</i>	5.0
					<i>E. urophylla</i>	5.0
					<i>P. caribaea</i>	5.0
				<i>T. grandis</i>	2.8	
Total					170.5	

A map showing the locations of the seed orchards is included in Figure 9.

Overall considerations on the establishment and support to seed orchards

The business plan for the 2017/18 seed orchards considered financial viability and recognised many uncertainties in projecting market demand for improved seed. It considered that whilst the overall venture could be marginally financially viable, the economic case for investment was very strong.

Since the PFP was covering the bulk of the early investment, the financial viability of this seed orchard enterprise to TGAs and to the TTSA will be much higher than otherwise.

There were, however, weaknesses in the seed-orchard initiative. First, while major investments take place during years 0 to 3, annual cash flow will remain negative until around year 8. The

TTGAU will require technical, marketing and financial support until when annual cash flow becomes positive in around 2025. The TTGAU will need to secure alternative financial support for this gap period. The TFS, however, has committed to support the seed orchards in the event that the PFP is not able to.

The TTSA may also need some additional support to enable it to guide TGAs during the gap period until annual cash flow becomes positive.

Some growers may be reluctant to procure seedlings raised from improved seed because any returns from this investment will be far in the future and it is not possible to be sure that seedlings sold as those grown from improved seed are indeed grown from improved seed and not from cheaper alternatives. Work on creating and promoting tree-seed standards will be increasingly necessary as seed orchards proliferate.

Alternative seed suppliers may emerge although there is scant evidence of this happening, particularly for uncommon but high-performing species.

There were also opportunities in that there are few alternative domestic or East African sources of improved seed of important species such as *P. maximinoi*, and *P. tecunumanii* and those that exist in Zimbabwe are becoming over-mature.

The major threat was that a narrowly focused, commercially oriented enterprise may concentrate only on the most commercially viable species and neglect less popular species, a focus that would reduce choice for buyers and the sustainability of the sector. The TTGAU was, however, mandated to represent the interests of growers and grow all species.

The seed business is highly complex and will need to be managed in a hard-headed commercial manner if it is to sustain the TTGAU and allow that institution to continue providing services to members.

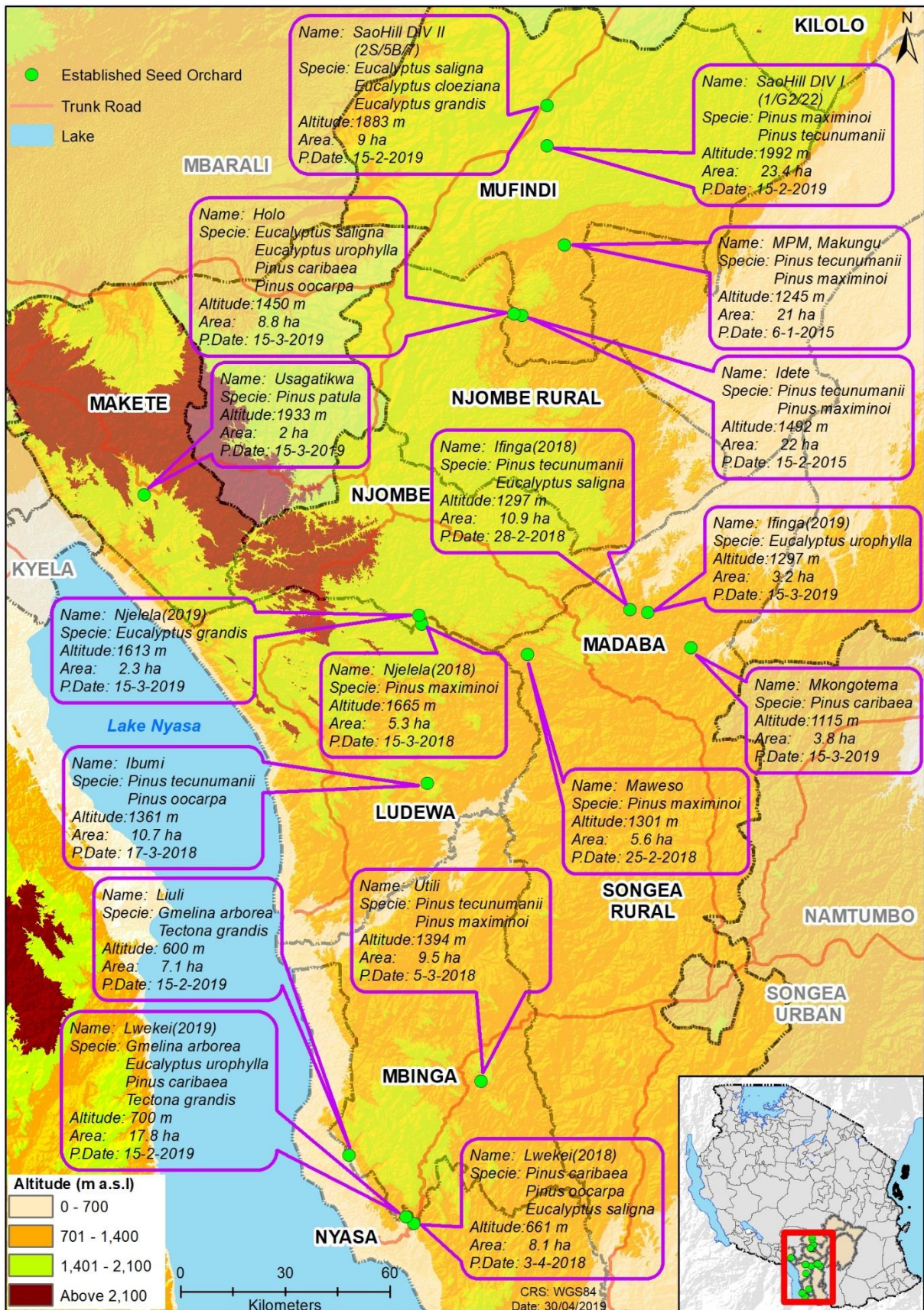
Neighbouring land may be planted with species that interbreed with seed-orchard trees. The partnering TGAs will have to take responsibility for ensuring that this does not happen. If they do not, they will risk losing their seed-source certification.

Relevance, effectiveness, efficiency and sustainability

The seed orchard intervention is relevant. The MNRT has accorded high priority to this intervention and the TFS has agreed to provide support for this work if the PFP cannot. The scale of the intervention was justified through a business plan which recognised the following facts:

1. Seed orchard productivity is highly sensitive to site effects, pests and diseases, and age;
2. Families that thrive in one type of site may not do well in another types, so separate breeding populations are needed for each major type of site;
3. There are risks from fire and extreme weather;
4. Buyers require a selection of species to suit local site conditions and markets;
5. The sector (which is of major economic significance) needs protection from the risk of new pathogens killing the entire population of an individual species; and
6. There is a growing export market.

Figure 9 PFP-supported seed orchards established during Phase 1



3.2.5 Output 1.5: Effective extension mechanisms developed for TGA-based plantation forestry

<p>Phase 1 indicators:</p> <p>Most tree growers satisfied with the provision of technical advice</p> <p>All PFP supported TGA members have access to PFP organised training and extension services</p> <p>At least 35 TGAs have an active PFP-trained facilitator</p>	<p>Achievement:</p> <p>Achieved according to TGA survey results</p> <p>Achieved; training and extension services made available for members of all supported TGAs</p> <p>TGA-based facilitators trained and commissioned for 58 villages</p>
<p>Conclusion: Targets were achieved.</p>	

TGA-based plantation forestry implies that tree growers are organised and that their association provides various services and benefits to the tree growers. In the long run the idea is that TGAs will develop and be able to provide advisory services (i.e. extension) to their members.

A lack of technical expertise was included among the business barriers identified, and this output was tasked to address that barrier specifically on village level. Here, the skills needed for TGA administration, nursery operations, plantation establishment and management, measuring trees and plantations, and forest fire control were inadequate. It was also found out that generally any previously existing extension services were not reaching the community members effectively.

An assessment of the availability of extension services in the PFP-supported communities was conducted by the programme early in the FY 2017/18. According to the findings, the PFP was the only extension-service provider in most of the programme working areas. Government support was found to be largely non-existent, mainly because of financial constraints, although there was also some indication that local governments did not recognise the potential forestry provides to the rural communities. The findings also included some positive secondary effects in the PFP-supported communities, including the fact that villages conducted road repairs to support forestry logistics and that local officials volunteered to help communities with their plantations.

Extension services through PFP, gradually moving towards TGA as service provider

Due to the inadequate extension services, in combination with the scale and complexity and limited time frame of the programme, it was deemed necessary for the programme to apply a different approach than to rely on existing extension services.

The approach taken included Extension Officers (EO) and TGA-based facilitators. From the outset of the programme, EOs were recruited and trained to deliver the necessary extension services directly.

From the FY 2016/17 onwards, TGA-based facilitators came onboard. The facilitators were recruited through TTGAU and trained in skills they needed to provide extension services in their villages. Engaging the facilitators was a more sustainable approach, and enabled PFP extension officers to assume an increasingly facilitative and supervisory role.

At the best, PFP had 13 trained EOs and 58 trained facilitators commissioned to provide services for 69 villages. While the EO training focused on village communications and technical forest management topics such as fire control and pruning and harvesting operations, TGA facilitator training covered more issues, from data collection and online reporting to plantation establishment, pruning, thinning, harvesting, occupational health and safety, and first aid. Further reporting concerning the provided training is included under section 3.2.6.

The TGA-based facilitators were considered more sustainable in the long-term than temporarily deployed EOs since trained facilitators were likely to stay in their villages. By linking the facilitators to the TGAs, the programme in fact induced a model of TGA providing advice to its members by hired professionals. Continuing with this approach will provide an opportunity for the TGA to gradually take over the costs for the facilitator as the institution develops. Hence, in

the end the TGA would have own dedicated professional for service provision and advice to its members. For the most developed TGAs this is most likely to happen within the coming 4–5 years.

During the FY 2017/18, for the first time, extension was delivered by TGA-based facilitators, whose capacity had been built sufficiently for them to start providing extension services to their respective TGAs (Figure 10). However, data concerning extension delivery was provided by only 35 out of 58 facilitators.

Since the systematic tracking of extension delivery was started in October 2015, the programme has delivered almost 48,000 beneficiary person-days of extension services (Table 5). 35% of those person-days were provided for women.

Overall the programme reached an estimated 14,000 individual beneficiaries and most of these participated in multiple extension events. Extension services reached more beneficiaries than the tree planting support.

Table 5 Cumulative participation in extension events organised by PFP EOs and TGA-based facilitators during Phase 1

Extension theme	Participation in extension events (in beneficiary person-days)		
	Male	Female	Total
Administration	352	200	552
Nursery operations	98	51	149
Plantation establishment	14,953	7,254	22,207
Plantation management	8,052	4,261	12,313
Measuring forest	192	304	496
Fire control	6,115	3,580	9,695
Harvesting and forest operations	106	68	174
Health and safety	574	391	965
Other	723	453	1,176
Total	31,165	16,562	47,727

Figure 10 TGA-based facilitators participating in a training-of-trainers (ToT) event in plantation establishment at the FWITC



Effect of extension provision to non-TGA community members

Participation in the PFP-organised extension events was not limited to the TGA members only. In addition, the organised extension events generally attracted non-TGA members either already engaged or initially interested in tree planting as livelihoods; a fact also evidenced in the extension participation figures presented above. Sometimes EOs and TGA-based facilitators were also approached directly by non-TGA members for instructions, or these extension personnel provided guidance upon observing poorly managed plantations regardless of their ownership.

Field observations by the programme staff indicated that management of not just the TGA members' plantations but also non-TGA members' plantations had improved during Phase 1. This was attributable both to the non-TGA members' exposure to the programme-provided extension and their observation of the good performance of TGA members' plantations managed according to the instructed practices.

Membership figures of individual TGAs also generally increased during the lifespan of Phase 1.

Relevance, effectiveness, efficiency and sustainability of the extension services

According to an FTI-conducted survey of TGAs, PFP support was deemed very relevant. Satisfaction was on average 83% for different aspects of the support (e.g. work done by EOs and TGA-based facilitators as well as training services). The feedback received from external evaluators also indicated that many TGAs had improved considerably, especially in terms of administrative capacity.

Capacity-building and the deployment of TGA-based facilitators were planned to address the sustainability aspect of extension provision. While some facilitators might not continue, some TGAs had plans to try to find funding for their facilitator to ensure that he or she would continue to provide technical services to members. One example of the facilitators' continued support to TGAs was that they took responsibility of high-quality tree seedling nurseries established locally by some TGAs for the season 2018/19.

Communication activities of Phase 1

The PFP has been engaged with the media informing the public about programme activities and participated in relevant Tanzanian exhibitions throughout Phase 1.

The exhibitions repeatedly participated by the programme included International Trade Fair in Dar es Salaam and Nanenane agricultural exhibition, during which numbers of people were made aware of the programme interventions as well as the best practices for plantation establishment and management. In addition, the programme itself in March 2018 organised the first forest industries trade fair in Tanzania (see section 3.4.1). The latter was one of the major PFP-related topics drawing media attention in 2017/18, along with the establishment of the Makete industrial node.

The PFP has produced monthly radio programmes each of which has been broadcasted twice. During 2017/18, the thematic choices of the produced radio programmes included a drama that featured a woman who is elected as a TGA chairperson, and two special radio programmes on TGA leadership and the empowerment of women by the TTGAU. At largest, the broadcasting area of the PFP radio programmes covered the districts of Kilolo, Kilombero, Mufindi, Njombe TC and Njombe DC, and parts of Makete, Ludewa, Madaba, Nyasa and Mbinga.

Since 2016 the PFP has produced calendars including forestry facts and distributed them widely to beneficiaries and stakeholders. Other material produced and distributed during Phase 1 included hardcopy versions of key programme reports and documents, posters, banners, VETA curricula, a prospectus and short-course brochures for the FWITC, PFP t-shirts and caps. The programme also supported the TTGAU in developing and printing business cards, and brochures for a forestry conference held in Morogoro in November 2018.

3.2.6 Output 1.6: Comprehensive strategy for private forestry and wood technology education and training prepared, and the capacity of training providers improved in accordance with that strategy

<p>Phase 1 indicators:</p> <p>Vocational training intake for long courses: 40</p> <p>Technical training intake for short courses: 400</p> <p>4 teachers for formal VETA education and 4 teacher/trainers available for VETA based short courses</p>	<p>Achievement:</p> <p>40 achieved for vocational training intake</p> <p>3,550 short course participants achieved of which 1,507 women</p> <p>Teachers available as per the target. In total, 31 people trained in conducting VETA level training</p>
<p>Conclusion: Targets were achieved.</p>	

The Programme Document recognised a critical need to develop the supply of high-quality training and education on different aspects along the forestry value chain. To meet that need, the Programme was to facilitate the preparation of a comprehensive strategy for private forestry and wood technology training, including both vocational education and short-course training. However, the training strategy preparation was not prioritised because the PFP discovered that needs were already well known, and that the real problem was a lack of funding and not a lack of strategy. The programme steering committee advised the programme to utilise its resources in areas that would provide practical benefits, so this target was removed.

The main interventions under this output included the development and piloting of the vocational training and education, establishment of the FWITC as well as various training interventions.

Vocational Education and Training pilot

One major capacity-building activity was the development of new curricula for vocational-level training in forestry and wood processing. This work involved all relevant training institutes at the national and regional levels. The curricula were completed in 2017, and subsequently piloted with 40 students enrolled in two full-time two-year study programmes. The PFP support included full financial support for the two training institutes engaged in the piloting (the FTI in Arusha and the FITI in Moshi) as well as scholarships for all 40 students covering accommodation, meals, stationery, identification cards, library cards and work clothes as well as most of the travelling costs to and from the training institutes.

By the end of the reporting period the students had finished VET levels 1 and 2 and were about to graduate by finishing level 3. The results of the students and the training implementation by the institutes were under constant evaluation, a process which culminated in comprehensive evaluations conducted by experts from the other training institute (the FTI evaluating the FITI and vice versa) after each level. The results were very positive, including the students' motivation. The final evaluation of level 2 found that neither the faculty nor the students had requested or required changes and that the issues found during the final evaluation of level 1 had all been addressed. Both institutes were also using the VETA online management information system for continuous monitoring.

Establishment of the Forestry and Wood Industries Training Centre in Mafinga

The programme was supposed to support the development of relevant training centres. Initially, it explored the possibility of re-establishing the Sao Hill Training Centre. It assessed whether to develop the centre into a key local training institution or whether to improve training capacity through collaboration with other institutions and determined in 2015 that re-establishing the Sao Hill Training Centre was impractical.

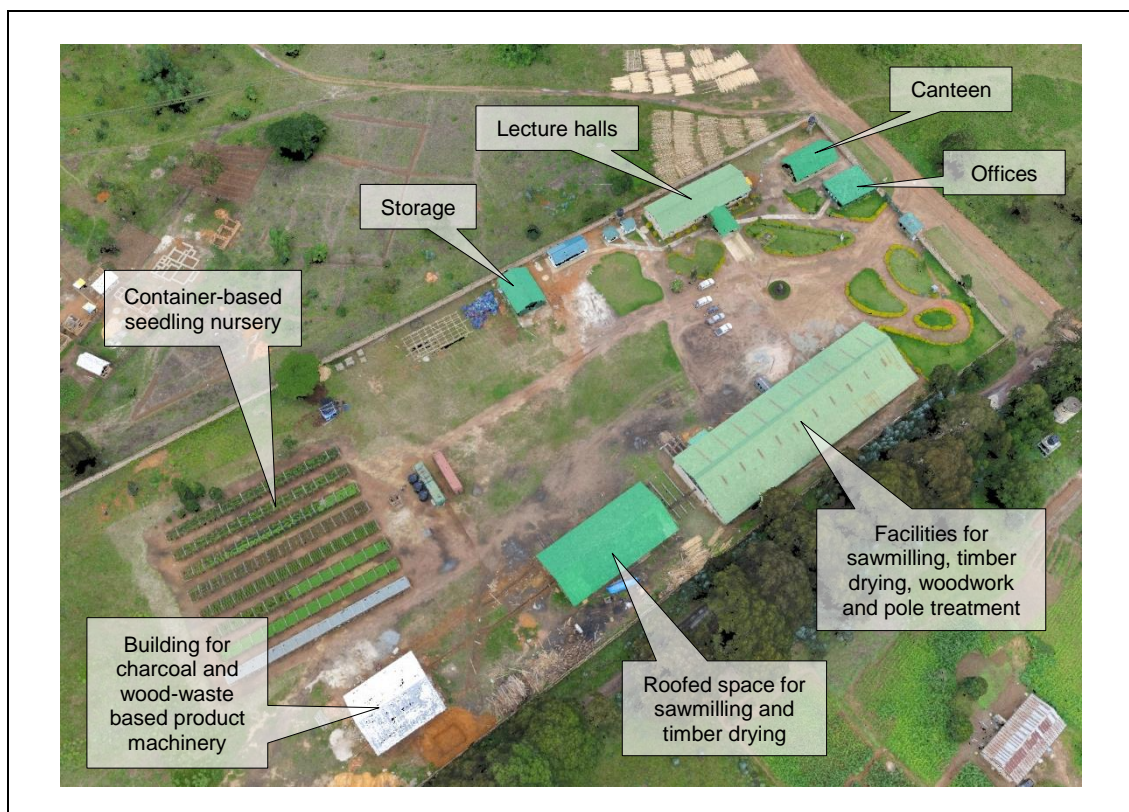
To fulfil the need for a practical training facility located near wood industries, the PFP leased an old industrial site in Mafinga and developed it into a vocational training institute. The FWITC was officially opened in December 2017. The buildings at the site were renovated to fit training needs

and sawmilling, pole treatment and charcoaling equipment suitable for small businesses was installed (Figure 11).

In 2017/18 the PFP helped the FWITC develop training and business plans and a prospectus, and to deliver its first short courses. The MNRT assumed administrative responsibility for the centre to improve its long-term sustainability and appointed a Centre Manager to take over responsibility for the centre's activities from the PFP.

While the FWITC has so far concentrated on short-term training on forestry and wood industry topics, its long-term plan also includes providing the two-year VET courses which were piloted at the FTI and the FITI during Phase 1.

Figure 11 The FWITC facilities shown in a 3D-model compiled from drone-acquired aerial imagery



Whilst forestry and wood technology training, skills development and advisory services were the core products and services of the FWITC, it also engaged in related commercial activities which sharpened the knowledge of the FWITC staff, financed its activities, and supported SMEs. Details on the status of such activities follow below.

1. Sawmilling was the major commercial activity the FWITC engaged in. On 13 September 2018, the FWITC was granted a Sao Hill's harvesting allocation of 3,500 m³. The sawn timber produced at the FWITC is of good quality compared with other sawmills in the area, so there has been a ready market for it.
2. Containerised tree seedling production was another service the FWITC provided. In 2017/18 the container-based nursery of the FWITC was test-used in the programme's own seedling production for high-quality seed orchard seedlings. In 2018/19 the first commercial batch of about 185,000 seedlings of both pine and eucalyptus species was produced, along with the second set of seed orchard seedlings.
3. Wood drying was another service the FWITC provided. Furniture industries were keen to buy eucalyptus dried at the FWITC because its better quality and affordability compared to natural hardwoods.

4. Different types of charcoal and briquettes made of waste from the FWITC and local industries promised to be profitable.
5. Furniture including beds and door frames was being produced and sold.
6. Saw-doctoring services were being prepared for provision on a commercial basis.

There were, however, challenges in getting employers to pay for training. It was particularly difficult to finance training for the most vulnerable of people, who, arguably, are those who could benefit most. To help this group, the PFP worked on a scheme for offering free tuition to vulnerable individuals as and when there was free capacity in the FWITC.

In September 2018 the FWITC was given permission to use the MNRT tax identification number, which allowed the centre to acquire timber business licence and get registered as a business operator in Mafinga District.

Training delivery

During Phase 1, the PFP's delivery of training included an array of thematic short courses and training sessions provided to TGAs (including TGA facilitators and leaders), SMEs, VET students, service providers, FWITC staff, government officials and PFP staff. Table 6 gives the cumulative training delivery figures of Phase 1. By the end of the reporting period, a total of 9,266 trainees had attended PFP-organised training events. Thirty-eight per cent of those trainees were women.

Table 6 Programme's cumulative training delivery during Phase 1

Beneficiary group	Participation in training events			Total delivery (in trainee days)
	Male	Female	Total	
TGAs, TTGAU and community members	5,155	3,089	8,244	32,555
SMEs and workers	168	219	387	3,581
VET students	53	47	100	1,460
PFP staff	155	83	238	1,089
Female-run enterprises and start-ups	0	72	72	1,080
Service providers and FWITC staff	123	27	150	1,021
Government officials	63	12	75	796
Total	5,717	3,549	9,266	41,582

* There were in total 40 VET students: 19 females and 21 males. The figures presented in this table represent each individual course, as PFP has organised additional training for the VET students.

During 2017/18 all TGA-based facilitators were trained in data collection and reporting. 43 of them were also trained in TGA administration and forest plantation establishment. Facilitators from 26 well-functioning TGAs that had pre-existing older plantations were also given training in pruning, thinning and harvesting techniques.

SME training of FY 2017/18 focused on women. Seventy-two female entrepreneurs from PFP-supported VSLA groups and SMEs were given a one-week training course on business management and marketing (FWITC short courses). VSLA service providers were also trained in reporting and the use of the online management information system.

In collaboration with the FTI, the PFP organised a major fire-prevention training campaign twice in all villages with PFP-supported plantations that had been established by season 2016/17. Villages introduced to plantation in 2017/18 were not trained by FTI experts due to time, capacity and financial constraints. Instead, they were trained by PFP EOs who had participated in ToT fire training run by the lead FTI expert. The fire-prevention training included organising villagers into village fire management teams and providing them with basic fire-fighting tools. The second round of training acted as a refresher of the first round and enabled the PFP to assess how well the delivered skills and strategies had been adopted and maintained by TGAs.

In 2018/19 the FWITC started to become increasingly independent, including delivery of short courses without direct initiative and involvement of the PFP. Table 7 shows the training provision by the FWITC from September 2018 until the end of the reporting period. 17 out of the 101 trainees involved were women. The figures are additional to those provided in Table 6 above.

The main challenge faced by the centre in commercial training provision was that the targeted beneficiary groups, while recognising the importance of training, reported limitations in their capacity to pay for it.

Table 7 Short course training provision by the FWITC from September 2018 to the end of April 2019

Period	Course	Number of beneficiaries by category					Total (trainee days)
		TFS	Wood industries	TGAs	Other	Total	
Sep-18	Plantation management of mature stands	12	-	-	1	13	91
Oct-18	Forest Inventory	5	1	-	6	12	60
Oct-18	Chain saw operation	-	-	10	-	10	50
Nov-18	Operation Safety and health	-	-	10	-	10	50
Dec-18	Pest and diseases	3	2	-	6	11	55
Dec-18	Band saw blade maintenance	-	2	-	-	2	20
Jan-19	Seed Orchard management	2	-	-	3	5	25
Jan-19	Plantation establishment & management of young stands	1	-	-	-	1	5
Mar-19	Basics of forestry value chain	-	-	-	16	16	80
Apr-19	Chain saw operation	-	10	-	-	10	40
Apr-19	Forest fire protection.	9	2	-	-	11	55
Total		32	17	20	32	101	531

Towards the end of Phase 1, the FWITC was also achieving increasing financial sustainability through revenue generation. While the centre did not reach full financial independence, it was on a good trajectory. Financial statement of the FWITC is included under section 6.3, in Table 25.

Relevance, effectiveness, efficiency and sustainability of the interventions

The resources used for training on the village and TGA level have, based on multiple reports, enabled the beneficiaries to make significant progress. Since the trained community members such as TGA leaders and TGA-based facilitators also generally stay within the communities, the intervention is sustainable well beyond the Phase 1 lifespan. The effects of other efforts, such as VETA training, will be seen only after a few more years.

The FWITC is more sustainable now that a MNRT-appointed officer has taken over the management of the centre. Financial sustainability was boosted when the FWITC got a harvesting allocation from Sao Hills Industrial Plantations. Financial sustainability and demand for training would both improve if the government enforced existing regulations requiring the certification of worker capabilities in forestry and wood industries. Industry associations also need to assume a role in ensuring that industry workers are properly qualified and that all workers receive national social security payments.

3.2.7 Output 1.7: Effective and open forestry information system developed for the private forestry value chain, thereby ensuring easy access to all relevant documentation

<p>Phase 1 indicators:</p> <p>Increasing number of registered users</p> <p>Increasing rates of hits and downloads</p> <p>Increasing rates of queries</p> <p>Comprehensive statistics and maps of Southern Highlands plantation forest resources</p>	<p>Achievement:</p> <p>These three indicators were discontinued because the forestry information system was deprioritised in favour of providing forest information as discussed below</p> <p>Produced and made available</p>
<p>Conclusion: Achieved.</p>	

One of the identified business barriers is lack of forestry information. The Programme Document calls for the PFP to support the development of an open FIS providing easy access to all relevant information, including information on legislation, policies, funding, projects, institutions, markets, and best practices, to support the actions of various stakeholders and ensure transparency. The FIS was to be web-based and developing it was to include assessing needs, developing the system’s structure, collecting baseline data, establishing a system for updating data continuously, and establishing a body to operate the FIS.

The steering committee did not however consider a web-based FIS as an early priority because most beneficiaries were unable to access the web and those that could already had reasonable access to available information. Lack of basic knowledge about the plantation forest resource was considered a much higher priority. Lack of knowledge about the resource was a concern at both the local (or individual woodlot) management level and at the Southern Highlands strategic planning level.

Preparation of the Forest Information System

Mapping of forest plantations at the local (or individual woodlot) level

During 2016 the programme planned a service procurement for large scale participatory mapping of individual woodlots in an initiative to support rapid issuance of certificates of customary rights of occupancy for such smallholder woodlots and to use the information to promote better integration of smallholders with industries. After a lot of debate though the steering committee decided to discontinue this initiative because of fears that influential people could capture the process and that the poor might not benefit.

A separate intervention mapped TGA woodlots using a questionnaire approach involving all TGA members who provided details on their households and the woodlots they owned. This did not involve field or remote sensed data verification but relied solely on information provided by owners. The resulting TGA member and woodlot database provided essential in-depth information about tree growers and their plantation resources, information which guided programme planning, allowing for their inclusion in the MIS. While this was useful, there was no system for keeping the data up to date and the data could not be triangulated or verified. For these reasons the TTGAU decided to seek for updating the system during 2018.

As a third intervention in local level resource assessment PFP recognised the need for local level forest information to promote vertical integration of the industry node with local tree growers who were organised into TGAs. High resolution satellite data was used to map plantations in the sawmill catchment area and then individual village meetings were used to identify owners in a participatory manner and organise them into logical management units or TGAs. This exercise was partially successful but was hampered by concerns of owners about revealing their assets. The work was then taken forward by the TGA business development advisor who met with the owners regularly, gaining their trust, assessing their woodlots *in situ*, and negotiating management prescriptions on a woodlot by woodlot basis. This information was critical for gradually optimizing the performance of the woodlots and integrating their management with sawmilling schedules.

Mapping of forest plantations in Southern Highlands

While the southern highlands had a substantial number of commercial and privately-operated forest plantations, little information about those plantations was available at the macro level. It was unclear, for example, what the geographical extent of forest coverage was, how much plantation forest was in each district of the Southern Highlands, and how large a proportion of plantation forest was privately run. The lack of spatially explicit information about forest plantations made strategic forest management planning a challenge. There was a dire need for forest plantation maps and statistics. More geo-spatial information about current forest plantations was needed to support plantation management, the monitoring of changes, the planning of future investments and the allocation of new land areas for planting.

To help meet this need PFP collaborated with University of Turku (UTU) to define the specific plantation forest resource and land cover information needs of the sector. The Food and Agriculture Organization of the United Nations (FAO) and the UTU with PFP technical and logistics support conducted the plantation mapping of the Southern Highlands between June and December 2016 under the framework of the FAO-Finland Forestry Programme. The area mapped included area in which the PFP and the Forestry Development Trust (FDT, 2016) operate as well as areas of interest identified by the SUSLAND project (UTU, 2016). Other partners of this study included the University of Dar es Salaam (USDM), the MNRT and the TFS.

The findings were compiled into a technical report issued jointly by the FAO and the UTU in December 2016 (Mankinen, Koskinen, Käyhkö, & Pekkarinen, 2016).

Under a financial and technical agreement with PFP the UTU continued to gather data and to produce a forest management-oriented report which contains the results of the original FAO-UTU study, refined statistical results, regional and district-level maps, and key statistics about the forest plantations in the Southern Highlands. This report also compared relative plantation density (ha of plantation per km² of land cover) across the Southern Highlands and between different districts. The fact that the report also contained practical guidelines on how the mapping was done enable the process to be repeated in order to monitor changes. All the work was done using open-source data, open-source tools and open-source software to foster methodological sustainability.

The spatial distribution of the forest plantation resource visualised in various maps of this Phase 1 Completion Report have been prepared using the data derived from the mapping.

Besides providing additional data, the mapping provided a basis for elucidating the overall scale of smallholder plantations and the problems they have utilising their resources, such as the small sizes of their individual plantations, their remoteness from markets, their poor road access; and limited rural electrification to support industrialisation.

The mapping also provided the basis for locating an industrial node to pilot vertical integration between small-scale local sawmills and local tree growers organised into tree grower associations. Such local-level integration will be the key to utilising remote smallholder plantations.

The 2016 forest plantation mapping work provided a springboard for further research that was published in "Investment Opportunities in the Tanzanian Forest Industry and Bioenergy Sectors: Cluster Analysis" of 2018. This technical report was part of a study that also included a diagnostic assessment of the investment climate of Tanzania. Together, these reports formed the foundation of a roadmap the Tanzanian government could adopt to provide an enabling environment for the development of wood product industries and to draft information packages for potential investors in the Tanzanian forestry sector.

This report identified investment opportunities in selected clusters in the Southern Highlands of Tanzania. It assessed the future demand for plantation wood products, current and potential new plantation resources and proposed viable investments which would work toward filling future gaps in the domestic market. The report specified investment opportunities by forest cluster and informed readers about early efforts to provide management and coordination for cluster development.

Relevance of the mapping exercises

The creation of up-to-date forest resource information was of extreme relevance at both scales. Local level information was needed for making management decisions and southern highlands level data was needed for more strategic level decisions and provided the basis for starting to optimise the industry.

The local level resource assessment (described above as the third intervention) making use of freely available satellite data in participatory forest resource assessment was appreciated by local people was effective and efficient.

The mapping methodology for the southern highlands was also effective and efficient and provided for low-cost replication which will be essential in monitoring this rapidly changing but economically very important resource. The methodology used freely available software and remote-sensed data. The processes were thoroughly documented, and several Tanzanian academic institutions and individual experts were trained and involved. This type of resource assessment should be repeated every four or five years. Though it requires high levels of technical expertise, a very solid start was made in developing this expertise.

3.2.8 Output 1.8: VSLAs applied to enable tree growers to wait for optimal cutting times for trees and to facilitate SME investment in new technologies

<p>Phase 1 indicators: Evaluation of the role of VSLA in relation to forest financing completed</p>	<p>Achievement: 57% strongly agreed, and 22% agreed, that VSLA has reduced the need to harvest woodlots prematurely (socio-economic end study)</p>
<p>Conclusion: Targets were mostly achieved.</p>	

Background of the VSLA service provision

Microfinance schemes were identified by the programme as a potential replacement for the unsuccessful Income Generating Activities (IGAs) introduced in 2016. The programme approach to IGAs during the first two years of implementation is described under output 2.4.

Following up on a recommendation from the steering committee, the PFP met with Village Community Banking (VICOBA) service providers and eventually decided to pilot village community banking. During September 2016, the PFP entered a memorandum of understanding (MoU) with Social and Economic Development Initiatives of Tanzania (SEDI) for the sensitization and formation of pilot village community bank groups of TGA members and SME owners and workers in both Mufindi and Njombe districts. Within a short period, it became apparent that the new approach was cost-effective and much appreciated by beneficiaries. Thus, a decision was made by the steering committee to implement it at a more significant scale.

Following literature reviews and meetings with key experts, it was decided to adopt the VSLA methodology that had emerged through monitoring and research during the previous VICOBA approach.

VSLAs are self-managed groups of 20–30 individuals that meet on a regular basis to provide their members a safe place to save their money, to access loans, and to obtain emergency insurance. Figure 12 shows a photo of a VSLA group meeting with standardised financial record-keeping equipment and stationery. Its locked savings box is on the left.

The VSLA approach is well-established and internationally proven. It is also well-documented and had an excellent online monitoring system. In fact, since setting out to scale-up VSLAs in 2009, CARE has expanded access to this savings-led, community-based financial solution from an initial 1 million members in 2008 to 6.7 million across 46 countries. These members represent 317,335 groups of predominantly poor rural women who collectively save and invest. On 30 June, 2018, these VSLA groups saved USD 433 million per year.

By the FY 2017/18, the PFP’s microfinancing scheme had expanded to cover the entire programme working area (Figure 15). By the time when the PFP-part of the intervention ended in October 2018, the programme included a total of 191 groups with 4,271 members, 49% of whom were women (Table 8). the attendance rate was 87%, and average dropout rate just 3.8%. The total capitalisation reached during the intervention lifetime was TZH 1.3 billion. The projected average annualised saving per member was expected to be about TZS 236,745. The average return on savings was 9% and return on assets, 8%. The average outstanding loan per member was TZS 205,417 and the average loan repayment time three months. The weighted loan-fund utilisation rate was 53%. The monthly interest rate varied between 5–10%. Loan defaults were reported to be very few. The most common uses for loans included paying school fees, purchasing agricultural input and livestock, constructing houses and increasing stock in retail businesses.

The age of the VSLA groups varied according to their time of establishment. At the end of October 2018, most of the groups were one year old, and 63% had finished their first saving cycle. Most of them continued to second cycle, as only one group decided to dismantle. The average seed money allocation was 16% of the overall savings from the first cycle. Overall, the health of the groups was good. Trust among group members seemed solid and conflicts, manageable.

Figure 12 VSLA group meeting



All VSLA groups received training in VSLA group management and entrepreneurial skills. The average duration of the complete administration and financial management training programme was 19 hours. For entrepreneurship, training lasted 15 hours. In one area (Kilolo, Kilombero and Mufindi) the service provider did not organise all the traditional VSLA entrepreneurship training modules, but instead opted to collaborate with RLabs to conduct a special entrepreneurship training. The groups also opened bank accounts (Figure 13).

The most common businesses were agricultural activities (including poultry- and livestock-keeping), beekeeping, carpentry, tree-growing, small shop-keeping, fabric-selling fabric, basket-weaving, tailoring, motorcycle maintenance, restaurant-running and charcoal production (Figure 14). New business ideas included the sale of timber, the production of green beans for export, the commercial farming of onions with irrigation, fish-farming, vegetable-gardening, rabbit-keeping, sawdust-briquetting, M-PESA shop-keeping, running a small gas station, photographing, shoe-shining and piggery. Loans were used to establish new businesses or expand old ones. One of the success stories included a woman in Ruvuma area who was able to expand her sawmill enterprise with a loan she secured from her VSLA group. Another, a male VSLA member from Ruvuma, was able to expand his small maize flour business from his humble beginnings in the village marketplace to Dar es Salaam. A shift from small-time peddling to serious enterprising was noticeable throughout the VSLA support scheme.

Joint business ventures involving two or more people were reported in Kilombero, Mufindi, Njombe CD, Njombe TC and Makete. In addition, there were 28 joint business ventures in the making. Ideas included the timber business, sawmilling, beekeeping, sawdust-briquetting, Irish potato-farming, poultry, fish-farming, rabbit-keeping, selling barbecue meat or sugar, cultivating beans and maize, waste collection and producing and selling soap.

Figure 13 SME VSLA group “Amkeni” from Njombe DC opening their bank account at the local CRDB branch.



One of the key aspects of the VSLA system was giving people access to social support. As a direct result of the PFP's VSLA activities, most of the over 4,000 members now have access to health insurance, as the groups have purchased affordable group insurance from the government through the Community Health Fund. Most insurance packages also cover family members. The most common needs for social loans included paying for education, funerals or health treatment or tiding group members over local disasters such as floods and wildfires. The VSLA has helped some members improve their diets: from once being occasionally hungry they now have no difficulties getting proper nutrition. Having access to social funds has reduced the need to sell assets like trees or livestock when urgent health problems have arisen, thus bringing financial stability to VSLA members and their families.

The trust required by the savings-and-lending system and the influence the money bestows on people have initiated changes in communities. Some of the biggest changes reported by VSLA service providers included empowering both men and women, enabling them to move from short-term thinking to future-oriented planning and increasing their faith in their own abilities. Many people have changed habits and lifestyles, reducing, for example, drinking. Some have improved their housing standard and engaged in community activities, like supporting an orphanage. The major change VSLA service providers reported was an increase in trust among VSLA members and a consequent increase in collaboration with a more diverse group of people than just extended family and friends. As a result, people's support groups grew and they developed an additional safety net of people who, if it had not been for the VSLA, would not have come together though they live in the same community. The system has also given senior members of communities the opportunity to advise young people, whom they consider to be more vulnerable than themselves because they are not focused on and thereby overlook opportunities that their own communities offer.

Relevance, effectiveness, efficiency and sustainability

While some of the positive human, social and economic outcomes of this work are difficult to quantify, the immediate financial outcomes are well documented, and overall there is strong evidence that VSLA interventions were much appreciated and very positive. The methodology used was standardised and there is strong evidence that VSLA groups tend to become self-sustaining.

Relevance could have been improved by better targeting support to highly vulnerable populations in geographical areas where smallholder forestry is already well established and providing opportunities for forest related IGAs. Areas where intensive short-rotation eucalyptus growing is integrated with small veneer-production industries could provide such an opportunity, as could areas where there is a lot of smallholder pine ready for integrating with small sawmills would also be appropriate.

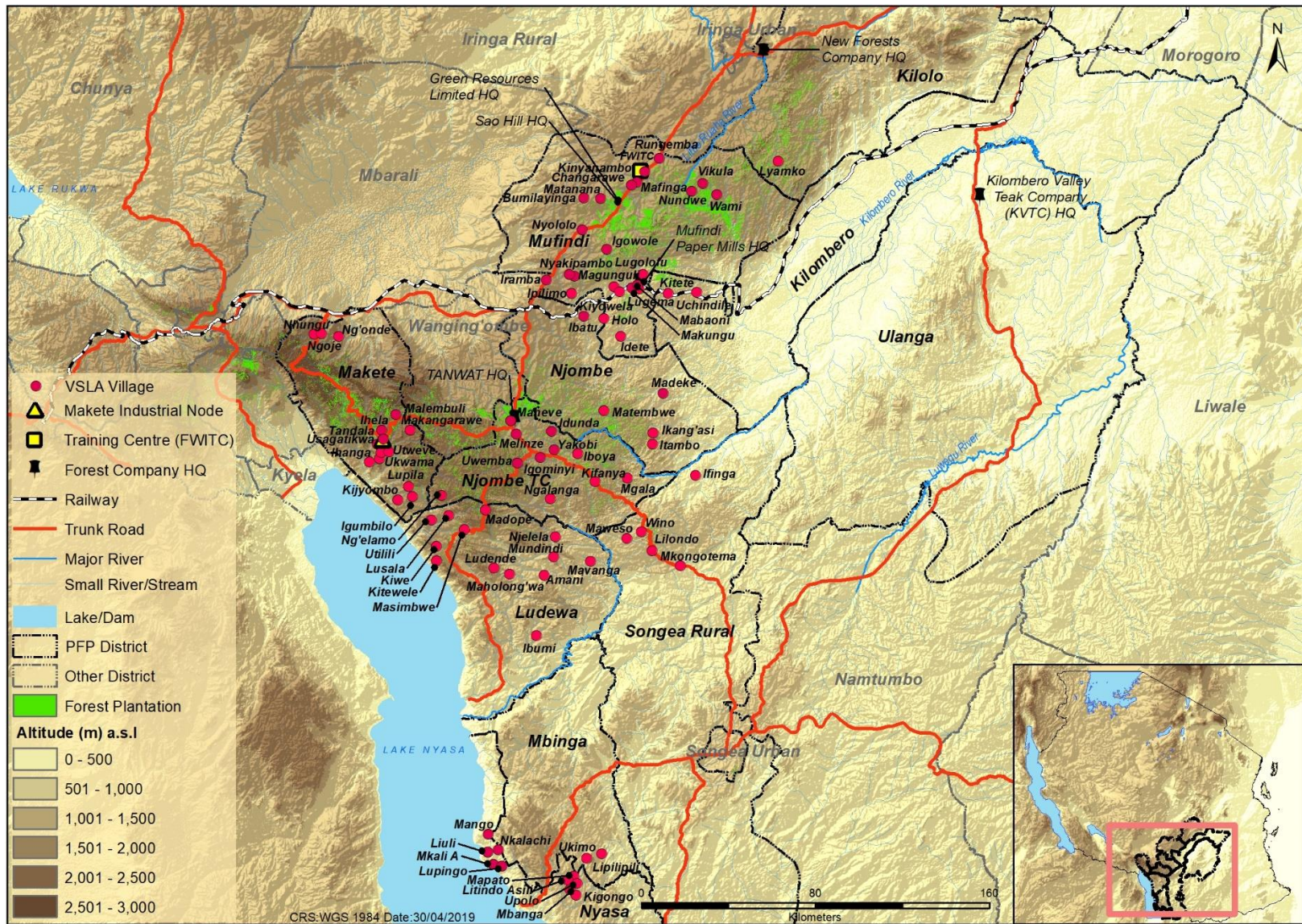
Figure 14 Businesses supported through VSLA, clockwise from top left: pottery workshop “Ushindi,” weaving group “Mshikamano,” carpentry workshop manufacturing a wooden door, and a beehive producer from Amkeni



Table 8 Key performance indicators of VSLA support at the end of intervention (31 October, 2018)

	Total	%	Average
PROGRAMME SCALE AND MEMBERSHIP PROFILE			
Members	4,271		22.0
Men	2,192	51.3%	
Women	2,079	48.7%	
Attendance rate		87.1%	
Dropout rate		3.8%	
Membership growth rate		17.2%	
Assets in circulation	TZS 798,392,815		TZS 4,158,296
Loan fund in cash box	299,559,925	37.5%	1,560,208
Bank balance	57,534,026	7.2%	299,656
Value of loans outstanding	381,869,973	47.8%	1,988,906
Property now	8,054,000	1.0%	41,948
Social fund balance	51,374,891	6.4%	267,578
Liabilities	TZS 120,000		TZS 625
External debts	120,000	100.0%	625
Credit loss (loan defaults)	434,800	0.14%	
Equity	TZS 798,272,815		TZS 4,157,671
Value of savings this cycle	665,891,225	83.2%	3,468,183
Social fund balance	51,374,891	6.4%	267,578
Property at start of cycle	2,160,000	0.3%	11,250
Net profit	78,846,699	9.9%	410,660
FINANCIAL PERFORMANCE			
Financial benefits to members	TZS 123,462,948		TZS 643,036
Net profit	78,846,699		410,660
Dividends paid	44,616,249		232,376
Service utilisation per member			
Average annualised savings per member			223,634
Average outstanding loan size per member			205,417
Key ratios (weighted)			
Return on savings		11.8%	
Return on assets		9.9%	
Weighted loan fund utilisation rate		52.2%	
Loans outstanding as % of total assets		47.8%	
% of members with loans outstanding		43.5%	
OPERATIONAL EFFICIENCY			
Cost per member			TZS 223,151

Figure 15 Villages supported through the VSLA service provision



3.3 Result 2: Increased high-quality tree growing and private plantation forestry based on the principles of sustainability and inclusiveness developed in the programme area

Phase 1 indicators:	Achievement:
TGIS pine height growth: 1 st year = 1 m 2 nd year = 2 m 3 rd year = 3 m Improved survival (baseline 83% for TGIS pine) At least 5,000 tree growers supported by PFP At least 65% of woodlots are family-owned	TGIS pine height growth: 1 st year = 0.5 m 2 nd year = 1.4 m 3 rd year = 2.3 m 80% for TGIS pine after the first year of growth 9,030 through TGIS and OSPs Target became irrelevant due to changes in incentive scheme which are discussed below
Conclusion: Targets were achieved only partially, yet considerable progress was made with the smallholder plantation scheme in the beneficiary communities.	

The aim of Result 2 was to have high quality smallholder plantations established with participation from all segments of the village, in locations that are from environmental and social perspectives sound and with an institutional framework that can coordinate forestry and provide benefits to the villagers. In addition to plantation establishment, also other alternatives were to be created for poor households in wealth creation. The achievements in Result 2 will in turn lead to increased income and employment in the programme villages.

Result 2 was structured into 4 areas of intervention (i.e. outputs). Table 9 shows the outputs and an estimation on the level of achievement based on the indicators in the results-based management framework. The interventions are described in the following chapters, including a more detail assessment of the achievement as compared to the set target.

Table 9 Result 2 outputs and implementation status at the end of Phase 1

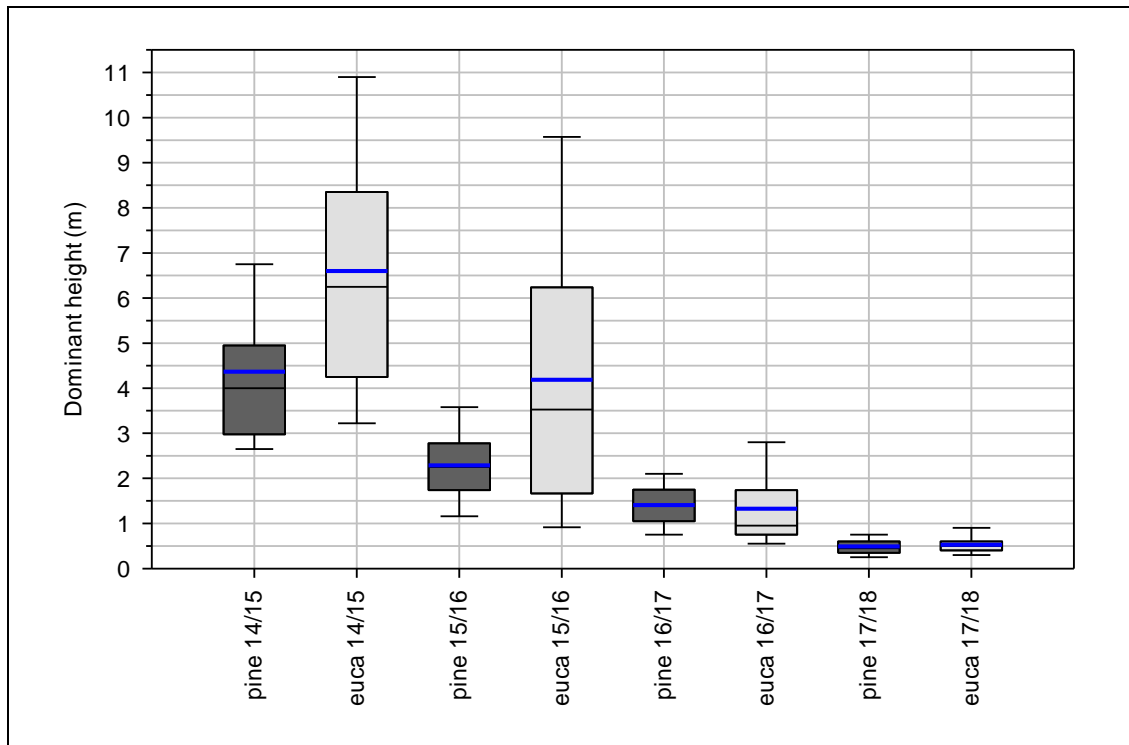
Result / Output		Status as reflected by RBMF indicators
Result 2:	Increased high-quality tree growing and private plantation forestry developed in the programme area, based on sustainable and inclusive principles	
Output 2.1:	VLUPs prepared for each targeted village, ensuring selection of appropriate tree planting areas, respecting rights of vulnerable groups and including safeguards for biodiversity protection	Minor deviations
Output 2.2:	Inclusive and well governed TGAs established / strengthened for sustainable management of tree plantations	Minor deviations
Output 2.3:	High-quality tree growing advanced through PFP support (extension, training, input support)	Moderate deviations
Output 2.4:	Income-generating activities (IGAs) (<i>Output is inactive</i>)	n/a

The result-level indicators listed above were mainly related to the established new plantations and their performance. The targets set for them were met only partially. Nevertheless, the achievements can be considered fair.

The height growth and survival of the plantations was assessed in the final plantation survey of Phase 1.⁶ While the plantations considered under the height growth indicator were not fully one, two and three years old by the time of measurement, the average results still clearly fell short of the target growth rate. By year four, however, the height growth of pine plantations had reached four metres on average. Distribution of the results was wide (Figure 16). Results from eucalyptus woodlots of three and four years of age showed that there is potential for considerably good height growth with eucalyptus.

⁶ <http://www.privateforestry.or.tz/en/resources/view/final-plantation-survey-report>

Figure 16 Dominant height in the TGIS woodlots by species group and year of establishment, as observed in the Phase 1 final plantation survey



Note: The boxes represent observations between the 25th and 75th percentiles, and the whiskers represent observations between the 10th and 90th percentiles. Additional bars show medians (black bars) and arithmetic means (blue bars).

Survival rate of one-year-old pine woodlots also remained slightly below the given baseline value. Most of the mortality was shown to take place during the first 1–2 years after planting, and the recorded survival rate results from older woodlots were considerably better.

The target of 5,000 smallholder tree growers supported by PFP was significantly exceeded. The beneficiary numbers, together with the share of family-owned woodlots, are discussed in detail under section 3.3.3.

While much of the result area 2 nominally revolved around the high-quality smallholder plantation establishment, the supporting activities played a significant development role also if reviewed as standalone interventions. The starting point, VLUP, has ensured that plantations are established in the most suitable areas and that community food security is protected. VLUPs also provided supported communities with the means to govern and optimise their overall land use over the next ten years. They have also helped to mitigate land use-related conflicts in supported communities.⁷ Improvements in the VLUP process developed by the PFP have enhanced the quality of the plans so much that that these improvements are being implemented at the national level.

TGAs have been a key approach in the plantation establishment as they allow for a higher level of organisation among beneficiaries and provide long-term sustainability for the development efforts of the PFP. Sustainability aspect was strengthened through founding of the TTGAU, since the organisation is expected to continue delivery of similar kind of forestry-related services and support currently provided by the PFP, once the programme has phased out.

⁷ <http://www.privateforestry.or.tz/en/resources/view/evaluation-report-of-the-village-land-use-planning-activities-implemented-b>

3.3.1 Output 2.1: For each targeted village, prepared village land-use plans ensuring the selection of appropriate tree-planting areas which respect the rights of vulnerable groups and include safeguards for biodiversity protection

Phase 1 indicators:	Achievement:
60 VLUPS prepared with PFP support	59/60 prepared
Needs of vulnerable groups identified and provided for in PFP supported VLUPS	76% (44 out of 59) achieved
Every VLUP has at least 1 ha per household dedicated to food production i) now; and ii) in 10 years' time	i) 95% (56 out of 59) achieved ii) 93% (55 out of 59) achieved
Critical habitats and sensitive areas (watersheds, natural forests, edaphic grasslands) identified and protection measures defined.	Incorporated in the VLUP process and marked on the VLUP maps
At least 80% of PFP VLUPS strongly followed; no violations of social or environmental safeguards	49% strongly followed
Conclusion: Mostly achieved	

The starting point for PFPs engagement on the ground, prior to any facilitation of small holder plantation establishment, was the selection of villages to engage with and carrying out land use planning. Hence establishment of plantations was closely integrated with land use planning.

The land use planning was carried out through engagement of service providers and in close cooperation with the district PLUM multisector teams, specifically dedicated for land use planning. In addition to the actual land use planning, other interventions to deliver on the VLUPS included development of methodology and tools (described also in Result 1), as well as capacity building of actors involved in the process.

In total 59 VLUPS were facilitated with 58 of them submitted to the district. 54 of the VLUPS proceeded further to the NLUPC and 31 to the Ministry for gazettelement. The 59 VLUPS prepared through programme support covered a total area of 884,513 ha (8,845 km²) with a total population of 91,244 people. Figure 17 shows the geographic coverage of the PFP-supported VLUPS in the Southern Highlands.

The VLUP implementation study conducted by the University of Iringa (PFP, 2018) found that 84% of the 44 surveyed PFP-supported VLUPS were being implemented.

Development of land use planning methodology

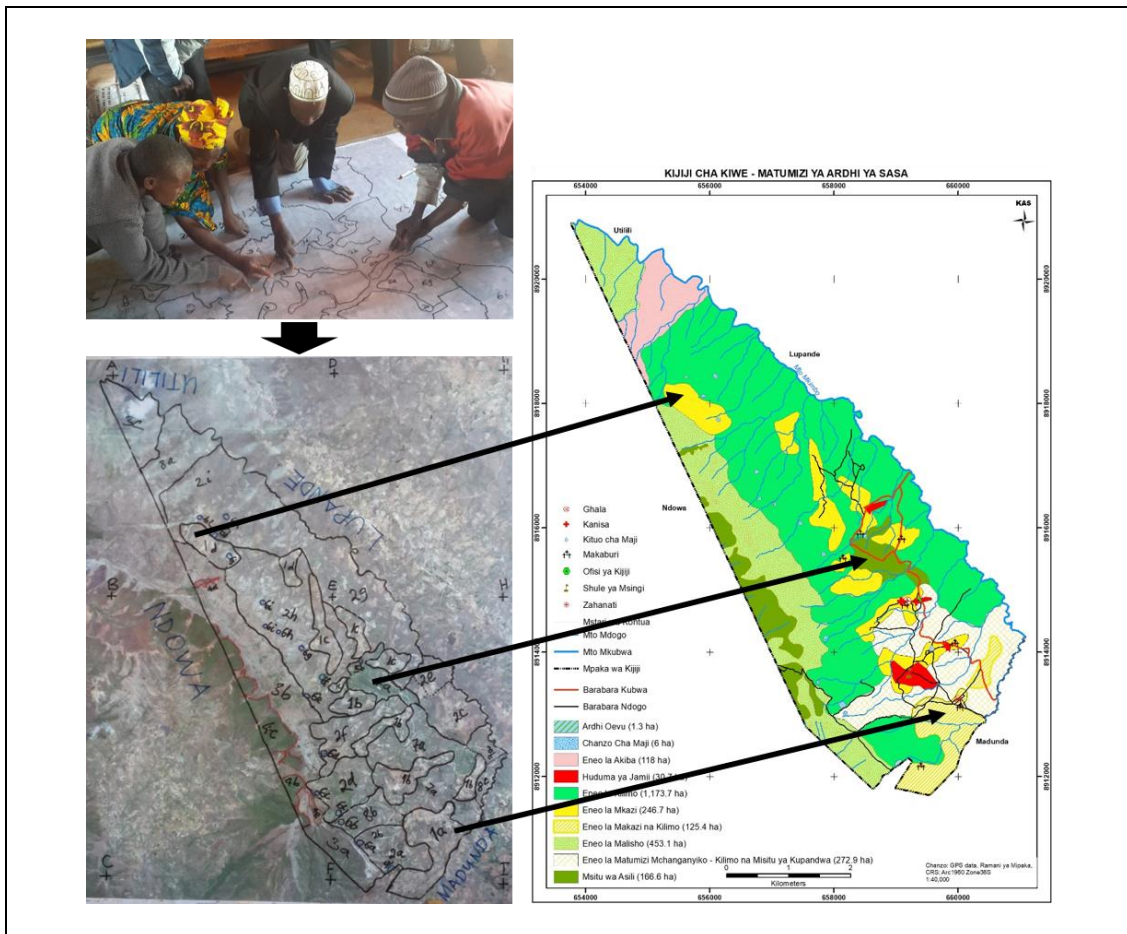
National guidelines for land use planning exists. However, they were not fully suitable to a context where land use planning was to include setting aside specific areas for tree plantation establishment. Furthermore, there was also a need for improvements in the methodology as such. Therefore, the existing participatory VLUP planning process was adapted and improved to suit the needs, but at the same making it more efficient, participatory, spatial, and inclusive than it had been. As explained in output 1.1, the developments in the VLUP process made within the programme were adopted by the National Land Use Planning Commission (NLUPC) on national level.

Figure 18 shows how, following the improved methodology, the participatory mapping and planning processes utilising a high-resolution satellite image get turned into a good-quality map for use in the VLUP.

Figure 17 PFP-supported VLUPs



Figure 18 Participatory land-use planning on a high-resolution satellite image turned into a map with standardised symbols and colour coding



The land use planning process

The capacity of duty-bearers in district PLUM teams was strengthened by the PFP through training, mentoring as well as the provision of equipment such as computers (Figure 19). Towards the end of the programme some district-level teams demonstrated clearly visible growth in capacity with ability to independently produce high-quality VLUP maps based on participatory processes.

Village rights-holders were made aware of land issues (legislation, right to ownership, the importance of VLUPs, the value of land, and the like) and prepared to work with district teams. The PFP commissioned R Labs as a service provider to engage with communities and raise awareness prior to preparing a VLUP. Awareness-raising aimed to promote broad and comprehensive inclusion involving all household members and community-level interest groups. Participants were divided to represent various beneficiary groups.

Vulnerable groups were identified prior to and included in the awareness-raising process so they would be aware of their land rights and VLUP-related issues. Unfortunately, this process was completed for only 76% of the VLUPs prepared with programme support. The PFP intended for this initiative to ensure that vulnerable groups were knowledgeable enough to present their needs and concerns during VLUP preparation, and confident enough to air their concerns during village assemblies. Some representatives of vulnerable groups were selected as members of the village land-use management committees which were responsible for preparing the first draft of a VLUP.

Figure 19 PLUM team members from the districts of Kilolo, Ludewa and Makete participating in VLUP-related GIS training by PFP in November 2016



Both awareness-raising and the subsequent VLUP preparation process considered biodiversity issues.

Allocation of land for agriculture

Using the area of land allocated for agricultural use and both current and projected number of households, the PFP calculated the average hectareage per household. In 95% of PFP VLUP villages, the area of agricultural land per household did not fall below one hectare now and in 93% of villages it was not projected to be less than one hectare in 10 years' time either. The largest areas of land reserved for agriculture per household were over 100 ha per household both now and in 10 years' time while the averages were 14.6 ha and 12.2 ha, respectively. The programme used this indicator to monitor the food security of villages. It should be noted that those villages that fell below the 1 ha target commonly included a mixed land-use zone in the VLUP that provided additional possibilities for food crop cultivation.

Interestingly, the size of the areas allocated to different land uses that were in the special focus of the programme (agriculture, forestry, area allocated for vulnerable people) neither had correlation between each other nor with the total size of the village land area. On the contrary, the size of the areas allocated for these land uses seemed to behave completely independently between the different villages.

Relevance, effectiveness, efficiency and sustainability

The optimisation of village land use and, at the same time, addressing the specific development needs of the vulnerable and protecting water sources and conserving biodiversity are relevant activities. The quality of planning broadly improved as the programme gained experience, but the care villages gave to providing for the vulnerable varied. The new methods were efficient and, as free high-quality spatial data became increasingly available, they became cheap enough to be sustainable.

3.3.2 Output 2.2: Inclusive and well-governed TGAs established and strengthened to provide for the sustainable management of tree plantations

<p>Phase 1 indicators:</p> <p>100% of the PFP-supported TGAs officially registered</p> <p>100% of TGAs fulfil the criteria set for governance and plantation management</p> <p>TGA management bodies consist of at least 40% women</p> <p>95% of TGA members pay membership fees in accordance with TGA bylaws</p>	<p>Achievement:</p> <p>84% of the PFP-supported TGAs officially registered</p> <p>TGAs scored 79% for their institutional capacity and 67% for their administrative functionality on average. (Plantation management is reported under output 2.3)</p> <p>27% of PFP-supported TGAs management bodies consist of women</p> <p>No reliable data could be collected. 53% of PFP-supported TGAs applied membership fees</p>
<p>Conclusion: Considerable progress was made but there were some deviations from the targets.</p>	

Interventions to strengthen tree growers’ organisations covered both organisations on village level (Tree Growers’ Associations – TGAs) and an apex body for these village-level organisations. TGAs were the entry point for engagement with tree growers, therefore in each village where the programme was supporting plantation establishment, either establishment of a TGA or strengthening of an existing one was a part of the programme’s support interventions. Consequently, “willingness to get organised” was also a criterion for the programme when selecting villages to work with.

The programme set a target to establish 60 new TGAs and a national TGA apex body. The TGA apex body (now called the Tanzania Tree Growers’ Association Union – TTGAU) was formed in 2015 and registered on 20 July, 2016 through PFP intervention. About 50 new TGAs were established and 12 dormant TGAs were reactivated with support from the PFP.

Interventions to strengthen the apex body became more prominent as a development issue during PFP implementation, and resources were allocated accordingly. Facilitation of the TTGAU included both institutional strengthening and development of the service delivery.

General status of the TGAs at programme completion

The programme has developed a database to manage information on the TGAs. By 30 April, 2019, there were a total of 139 known TGAs across the Southern Highlands (Figure 20) with over 12,000 members.

Out of these TGAs 97 were members of the TTGAU at the time of reporting. Table 10 shows key statistics collected from the TTGAU member TGAs. Almost 1/3 of the members were woman, the leadership except for the treasurer position was still dominated by men. The majority of the TGAs were registered with the district government and are having bank accounts, while about half of the TGAs were charging a membership fee.

Annex 5 the TGAs directly supported by PFP according to the types of support provided.

The programme engaged with FTI to evaluate the status of the TGAs at the end of 2017.⁸ The evaluation included 49 out of those 69 TGAs which had been engaged with PFP in tree planting and extension services. The PFP-supported TGAs not included in the evaluation were those that had been only engaged with during the last year of the PFP implementation and hence had received limited support in institutional strengthening. The evaluation looked into institutional capacity, daily TGA administrative functionality, technical abilities, equipment as well as the quality of PFP support as perceived by the TGAs. The evaluation found that most of the TGAs were in good managerial and administrative state. Out of the 49 TGAs, all except one got over

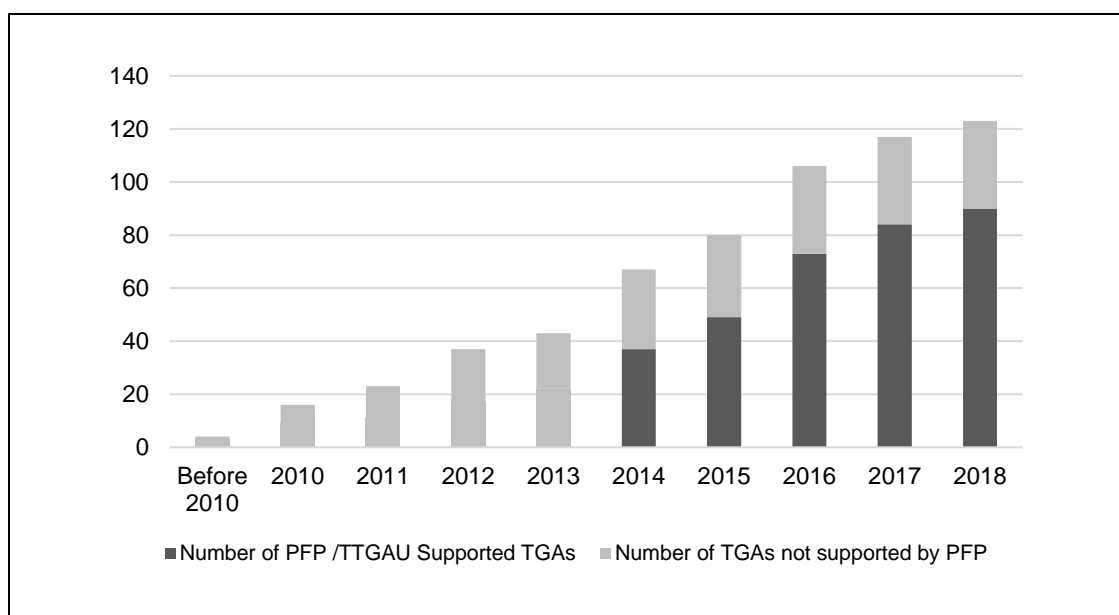
⁸ <http://www.privateforestry.or.tz/en/news/view/tga-evaluation-report>

50 evaluation points out of the maximum of 90. On average, the TGAs scored 79% of the maximum points for their institutional capacity, 67% for their daily administrative functionality and 19% for their technical abilities. Clearly, TGAs need capacity-building in their technical abilities. The quality of the PFP support scored an average 10 of 12 points, or, 83%.

Table 10 Key statistics of the PFP-supported TGAs on 30 April, 2019

Number of TGAs in the database	96	
Member households		
Category	No. of members	Percentage
Female representation	3,189	31%
Male representation	6,918	67%
Institutions	189	2%
Total	10,296	100%
Board representation		
Position	Females	Males
Chairperson	4%	96%
Secretary	27%	73%
Treasurer	54%	46%
Registration status		
Status	Number	Percentage
Registered	81	84%
Not registered	15	16%
Bank account status		
Status	No. of TGAs	Percentage
Having a bank account	77	80%
Not having a bank account	19	20%
Existing plantation area according to the reporting of the TGAs		
Total planted area	8,599 ha	
Membership fees		
Status	No. of TGAs	Percentage
Annual membership fees applied	53	55%
No annual membership fees applied	43	45%

Figure 20 Number of known TGAs in Southern Highlands by year of establishment



Note: Another 16 TGAs are not shown because their year of establishment is unknown.

Institutional development of the TTGAU

The TTGAU has made progress both when it comes to institutional capacity and service delivery. The road map is there, and the institution is taking its first steps in implementation of the business plan. The institution has also diversified its sources for support outside the PFP. By the time of reporting the TTGAU was getting additional resources from We Effect and DGD Agricord, and also the FFF under the FAO had approved TTGAU's funding proposal.

The second manager of the TGA apex body was mobilised on 1 July, 2017.

The TTGAU's financial management and transparency were strengthened in 2018 by recruiting an accountant, procuring accounting software (QuickBooks), and developing a finance and administration manual.

The TTGAU moving forward – Annual general meeting March 2018

On 27 March, 2018 the TGA apex annual general meeting approved the organisation's new name and constitution (Figure 21). The organisation is now called Tanzania Tree Growers' Association Union (TTGAU). The meeting decided, in response to requests from tree growers in other parts of the country, especially from Kigoma, Kagera and Mbeya, that the TTGAU should serve TGAs throughout Tanzania, not just those in the original eight districts. Following the changes two more districts, Mbinga and Nyasa, qualified for joining the union, bringing the current total of member districts to ten.

Figure 21 TTGAU members at its annual general meeting (27 March, 2018)



Due to resource constraints the TTGAU decided to focus its services in Southern Highlands and extend its outreach slowly according to need and resource availability.

To enhance female participation in the decision-making bodies of the TGAs and the TTGAU, their constitution templates were revised to ensure that at least one-third of the leadership positions in TGAs and the TTGAU would be held by women. To support this decision, women compete amongst themselves for specified positions.

The TTGAU also developed a gender policy, a gender strategy, and an action plan to implement these two.

The board of the TTGAU developed its vision and mission as follows:

- The TTGAU's vision was to be the principal organisation uniting private commercial tree growers to engage in lobbying and advocacy for increasing income and developing the forest sector in the country and for representing tree growers in policy-development, economic and social forums.
- The TTGAU's mission was to promote an inclusive and environmentally and socially accepted private commercial forest industry in Tanzania to improve people's' livelihoods.

District-level clusters of TGAs were proposed to improve local communication, responsibility and ownership among members. Furthermore, ward-level networks were developed in districts of Makete and Mufindi.

The annual general meeting the set entry and annual subscription fees for member TGAs at TZS 60,000 and TZS 15,000 respectively. Some TGAs started paying but others needed more awareness-raising.

Members expectations of TTGAU services were also prioritised as follows:

1. Support the marketing of members' woods (poles and timber)
2. Support TGAs in providing farm and forestry inputs to members
3. Support the establishment of high-value alternative sources of income for members.
4. Improve the productivity and quality of woodlots by adopting an inclusive and efficient model of advisory and extension service provision

The TTGAU now holds membership in the Forest Working Group operating under the Tanzania National Business Council, which has the President of the United Republic of Tanzania as its patron. It is in the process to join the International Forest Family Alliance as well.

To increase its visibility and learning the TTGAU also became a member of both MITI magazine and its editorial board. MITI magazine is a platform for forestry stakeholders to share information and express their concerns. It is printed quarterly and has been in operation for 10 years. Content is prepared by voluntary cooperation through members of editorial committees in Kenya (Nairobi), Uganda (Kampala) and Tanzania (Morogoro).

Twinning programme between the MTK of Finland and the TTGAU

The Central Union of the Finnish Forest Owners and Agricultural Producers (MTK) is the national umbrella body for private forest owners and their local level associations in Finland with a solid experience on service delivery to its members. As a part of AgriCord, the MTK is implementing twinning-type projects around the world to support farmers and tree growers and their local associations. To utilise this experience, the PFP initiated a twinning programme between the MTK of Finland and the TTGAU in 2017. The twinning arrangement continued through 2018 and focused on both organisational development of TTGAU and strengthening its service delivery to the member TGAs.

Interventions undertaken through the twinning initiative included co-hosting of the 2nd African Forest and Farm Producer Organisations (FFPOs) Conference, held in Morogoro in September 2017 with participation from seventeen African countries and different international organisations. This event was co-organised by Forest and Farm Facility (a partnership between FAO, the International Institute for Environment and Development, the International Union for Conservation of Nature, and AgriCord) and several other international institutions including the MTK. The event included a field visit to TGAs in the Southern Highlands organised by the TTGAU. Different countries liked the model and indicated their desire to copy it.

Development of TTGAU service delivery

Timber trade

During the first half of 2018, the programme facilitated the TTGAU to develop its business plan on engagement in the wood trade. The business plan defined the road map for improving the union's engagement in the wood trade and for operating a business that is:

1. Enabling tree growers to access markets and to increase the profitability of tree growing by ensuring that stumpage prices are competitive), and
2. Providing the TTGAU and TGAs with the income they need to sustain the services they provide.

The objective of the TTGAU's engagement in the wood trade was not profit maximisation but enhancing tree growers' returns on the harvest of their wood. The business plan also identified the development needs of the TTGAU and relevant procedures and systems to be developed for successful engagement in the wood trade.

By the end of the PFP Phase 1 the TTGAU had piloted supporting its members in woodlot harvesting, sawmilling and timber sales, and was recruiting field personnel to scale up these services within the member TGAs. The PFP supported the TTGAU by developing open-source-based tools for woodlot mapping, measurement and valuation, which are to form a basis for the union's forest information system.

Seed Orchards

The TTGAU and TGAs have a central role in the development and management of seed orchards described earlier under output 1.4. In collaboration with the TTSA/TFS, the PFP supported the TTGAU in 2017/18 and 2018/19 to establish about 128 ha of seed orchards for commercial tree species of high potential. The targets of this initiative were the following:

1. Secure and enhance commercial production forestry and wood-processing industries through the local production of improved tree seed in a financially and organisationally inclusive and sustainable manner.
2. Make a broad selection of high-quality tree species accessible to both small-scale private growers and large-scale commercial enterprises.
3. Invest in a business to contribute to the long-term financial viability of the TTGAU and the participating TGAs.

During the FY 2017/18, the TTGAU, in collaboration with the PFP, initiated the process for issuing certificates for customary rights of occupancy (CCROs) to the seed orchards. This process involved supporting villages to establish land registries and the required equipment for land registry. The CCROs are intended to enable the respective TGAs to own the land on which the seed orchards are established.

The Tea Research Institute of Tanzania was contracted to analyse the soil at the seed orchard sites. The TTGAU holds the results, which are to be used for targeted fertilisation of the sites.

Tree Growing Incentive Scheme – management of the cash incentives

The capacity of the TTGAU to support TGA forest financing was strengthened through its involvement in operating the PFP TGIS. The TTGAU, in collaboration with the PFP, distributed TGIS cash incentive payments to the TGA members who met plantation weeding standards during the planting seasons of both 2016/17 and 2017/18.

Support the establishment of high-value alternative sources of income for members

The TTGAU collaborated with the TTSA to raise awareness among TGAs and tree growers on the benefits of establishing nurseries (Figure 22) and using improved seed to generate income. With the support of the TTGAU, TGAs in the districts of Madaba, Njombe and Mufindi purchased 11 kg of pine and 8 kg of eucalyptus improved seed from the TTSA.

The TTGAU negotiated with Yara Tanzania to support TGAs in assuming agro-dealer roles at the village level. TGAs will collect information of their members' demands for inputs and forward them to the TTGAU, which will then procure those inputs in bulk. This approach aims to reduce the costs of producing agricultural crops and, more importantly, to glue members together while waiting for trees to mature and ensure food security and income to members. Four TGAs were identified for piloting in the next planting season.

Figure 22 Nursery established by the TGA UWAWI in Madaba



Relevance, effectiveness, efficiency and sustainability

Tanzania needs to make full use of all forest plantation resources if it is to optimise the forestry sector and reach self-sufficiency in the production of construction wood, veneer and plywood. This requires full utilisation of its 150,000 ha of smallholder plantation resources.

Smallholder plantations are mostly small, isolated, inadequately protected and poorly managed. They tend to be in locations with poor road access and no electrification. Their owners lack technical and market knowledge and are mostly unable to finance plantation management.

The TGA network under the auspices of the TTGAU has grown rapidly and now represents over 10,000 of the estimated 60,000 owners. The owners under the TTGAU network have reported ownership of 8,599 ha of plantations, and since the reports are known to have gaps the real area is likely to be notably higher. This means that the network represents 17% of growers owning a minimum of 6% of the smallholder plantation resources, likely more. The TTGAU is the only entity in Tanzania that has a mandate to represent small-scale growers and it is regularly called on to do so. Work to strengthen the TTGAU and TGAs is highly relevant. Effectiveness and efficiency are difficult to measure but starting from the FY 2017/18 and under its new management, the TTGAU achieved the major advances discussed above and appeared to be on a good trajectory.

During their early years, TGAs focused mostly on receiving the PFP's TGIS support, until the TTGAU was founded and it adopted the role of listening the expressed needs of tree growers and started responding as well as developing its own businesses to finance its activities. Whilst this network is not yet financially sustainable, it is on the right path.

3.3.3 Output 2.3: High-quality tree growing advanced through the PFP’s support

<p>Phase 1 indicators:</p> <p>A total of 15,000 ha of plantations established</p> <p>At least 85% of all TGIS-supported plantations fulfil PFP’s quality criteria for plantation management</p>	<p>Achievement:</p> <p>11,669 ha planted and verified through survey</p> <p>54% of one-year-old and two-year-old TGIS plantations found to be weeded in the end of dry season</p>
<p>Conclusion: The verified planted area fell short of the target but was still a considerable achievement in just four planting seasons. Weeding levels remained low despite of multiple interventions.</p>	

The target was to at the end of Phase 1 have 15,000 ha of high-quality plantations established (Figure 23). Facilitation of the plantation establishment was fully integrated with the land use planning process and with the support to strengthening tree growers’ institutions, the former a pre-requisite for PFP engagement and the latter the mode of operation in the villages.

PFP approaches for supporting high-quality plantation establishment

The programme applied multiple different models for delivering the facilitation to plantation establishment. These were:

- Tree Growing Incentive Scheme (TGIS)
- Out-grower support – The out-grower support programme (OSP)
- Establishment of plantations to vulnerable groups
- Other support models

Majority of the support was implemented through the TGIS and the OSPs. The main features of these two approaches are summarised in Table 11.

Figure 23 Smallholder *P. maximinoi* planted in 2015 under the TGIS scheme and photographed in October 2018 in Ngalanga, Njombe TC



Table 11 Description of the three largest smallholder plantation forestry incentive schemes supported by PFP during Phase 1

Category	Description of the support provided to beneficiaries	Support model		
		Standard TGIS ^a	KVTC-OSP	NFC-OSP
Capacity building	VLUP preparation support	x		
	Assistance in TGA / out-grower group formulation and official registration	x		x
	Training in administration	x		x
	Training in silviculture	x		x
Technical support	Extension support person made available	x	x	x
In-kind support	Provision of herbicides		x	
	Provision of fertiliser		x	x
	Free distribution of improved seedlings for planting	(x) ^b	x ^c	x
	Free distribution of improved seedlings for blanking upon need	x	x	x
	Fire-fighting equipment delivered	x		x
Labour cost support	Tree growers paid full standard unit rates weeding their 1–2 year- old woodlots up to the PFP's technical standard (<i>TGIS cash incentive pilot</i>)	x		
	Tree growers paid 50% of standard unit rates for conducting silvicultural activities on their woodlots as per the PFP's management regime		x	
End product market	Guaranteed market provided for the end product (assuming quality standards met)		x	x
	NFC reserved the right to 25% of the end product and the first right of refusal to the remaining 75%		x	

^a The PFP TGIS after the latest revision implemented during the FY 2017/18

^b Progressive model includes free seedlings for up to 0.8 ha per beneficiary

^c Maximum limit of 50 ha per beneficiary

The various support models engaged by Phase 1 are described in more detail below after presentation of the achieved beneficiary and planting area figures.

Number of beneficiaries and planted hectare achieved in plantation establishment support

Number of beneficiaries supported in plantation establishment

The largest beneficiary numbers were reached through the programme's standard TGIS. The cumulative total number of individual TGIS beneficiaries during Phase 1 was 7,415 (this includes the smallholder beneficiaries involved in afforestation of district forest reserves in 2017/18). Many developed valuable assets.

Since the FY 2014/15, the PFP supported the Kilombero Valley Teak Company (KVTC) in expanding its previously existing OSP to include significantly more beneficiaries per annum than before. From the FY 2015/16 onwards, the New Forests Company (NFC), in cooperation with the PFP, started its own OSP. The cumulative total number of individual beneficiaries supported under these mechanisms during Phase 1 was 1,615 (542 and 1,073 in the KVTC and NFC OSPs respectively).

As presented in Table 12, altogether **9,030 beneficiaries** in 120 villages were directly supported in planting trees during Phase 1 through these major planting schemes. Omitting institutions

and applying an average family size of 4.9 persons per household, that support is estimated to directly benefit over 43,000 people.

Table 12 Cumulative number of beneficiaries supported directly in plantation establishment by support schemes implemented during Phase 1

Support scheme	No. of villages involved	No. of beneficiaries			
		Male	Female	Institution	Total
TGIS planting*	65	5,042	2,196	177	7,415
KVTC-OSP	39	478	47	17	542
NFC-OSP	16	720	306	47	1,073
Total	120	6,240	2,549	241	9,030

* TGIS planting includes direct beneficiaries supported in establishing woodlots within district forest reserves in the FY 2017/18.

It is not possible to calculate the number of direct beneficiaries of the PFP's additional support schemes (establishing woodlots for vulnerable people, seed orchards, demonstration plots, the Lugarawa Hydropower Scheme and other minor seedling provisions) because they have distinctly different ownership and benefit-sharing mechanisms. It is, however, evident that a significant additional number of people benefitted through these additional schemes.

In their applications for TGIS support, private (non-organisational) smallholders stated whether the woodlot will be under individual or family ownership. The programme failed to reach its 65% target for family-owned woodlots. Family ownership, calculated cumulatively for all woodlots, was as high as 70% after the first two planting seasons, but fell to 38% after the third planting season and to 36% after the fourth and final season. The decline was likely the result of the TGIS review of the third and fourth seasons since applicants believed that support delivery in the new TGIS favoured individual ownership of multiple small woodlots over collectively owned large areas. It was estimated that the reviews mainly affected how woodlots were recorded in the PFP registry and had few practical implications in the field.

Area and quality of plantations established with the programme's support

A total of **11,669 ha of new plantations** had been surveyed and verified in subsequent monitoring campaigns by the time of reporting (Table 13). The figure excludes planted areas that were lost due to damages, most of which were caused by fire. The quantified lost hectareage during Phase 1 reached almost 400 ha (Table 14). Additional fire damages reportedly occurred during the dry season of 2017/18, most notably in Nyasa teak planting zone, but losses in the scale of a few tens of hectares were also reported in the villages on Ibumi and Mkongotema. However, accurate estimates of these damages were not available.

While the quantified total damages were only 3.3% of the total plantation area, within the villages worst affected this percentage was significantly higher. This underlines the importance of raising awareness about fires and the provision of adequate tools and mitigation strategies. In fact, multiple villages, including Idete, claimed that the experienced fire damage would have been greater if not for the fire-prevention campaign arranged by the PFP.

It should be noted that the figures for delivered seedlings suggest that the cumulative planting achievement was considerably higher than the quoted 11,669 ha (or 12,065 ha counting the hectareage destroyed by fire). The PFP was not, however, able to verify all established assets on the ground. Most of the discrepancies occurred during the FY 2016/17, the year in which the PFP established the greatest hectareage of plantations it ever has and greater hectareage than any other known single institution in Tanzania has established. The main challenge was the tendency of beneficiaries not to reveal the hectareage of their woodlots to surveyors, most likely to avoid the seedling payments called for in the newly revised TGIS. This shortcoming was addressed during the FY 2017/18 by improving transparency in the seedling delivery chain and in TGAs' internal control.

Table 13 The PFP's cumulative planting figures by support scheme, season and species

Scheme type	Planting scheme	Plantations established by season (ha)				Total (ha)
		2014/15	2015/16	2016/17	2017/18	
Schemes using PFP-provided seedlings	Standard TGIS	773	1,449	3,461	2,226	7,909
	<i>Pine</i>	506	1,098	2,986	1,555	6,145
	<i>Eucalyptus</i>	267	351	475	457	1,550
	<i>Teak</i>	-	-	-	214	214
	Plantations established for vulnerable groups	42	48	29	0	118
	<i>Pine</i>	14	36	29	-	78
	<i>Eucalyptus</i>	28	12	-	-	40
	Seed orchards	32	-	11	50	93
	<i>Pine</i>	32	-	11	26	84
	<i>Eucalyptus</i>	-	-	-	7	9
	Demo plots	-	4	4	-	8
	<i>Pine</i>	-	3	4	-	7
	<i>Eucalyptus</i>	-	1	-	-	1
	Afforested district forest reserves	-	-	-	720	720
	<i>Pine</i>	-	-	-	515	515
	<i>Eucalyptus</i>	-	-	-	205	205
	Lugarawa Hydropower Scheme	-	-	313	57	370
	<i>Pine</i>	-	-	313	57	370
	Other*	-	-	30	-	30
	<i>Pine</i>	-	-	29	-	29
<i>Eucalyptus</i>	-	-	1	-	1	
Schemes using own seedling sources	KVTC OSP	219	252	359	239	1,069
	<i>Teak</i>	219	252	359	239	1,069
	NFC OSP	-	90	605	657	1,352
	<i>Pine</i>	-	85	438	574	1,097
	<i>Eucalyptus</i>	-	5	167	83	255
Grand Total		1,066	1,843	4,812	3,949	11,669

* Other includes planting with schools for educational purposes in cooperation with the Southern Highlands Participatory Organisation (SHIPO) and seedlings donated for promoting tree planting during Iringa Safi Day.

Table 14 Established TGIS plantations destroyed by fire during Phase 1

Village	Plantations reported as destroyed by fire, by their year of establishment (ha)			Total (ha)
	2014/15	2015/16	2016/17	
Amani		6.8		6.8
Idete			9.4	9.4
Ikang'asi		10.1		10.1
Itambo	10.2	13.5		23.7
Kifanya		5.4		5.4
Lusala	2.7			2.7
Madope		74.6		74.6
Magunguli		1.7		1.7
Masimbwe		99.8		99.8
Nhungu		87.7	11.7	99.4
Utilili		62.1		62.1
Total	12.8	361.6	21.1	395.5

Note: The figures reported by Madope and Masimbwe in the FY2015/16 include damages by grazing.

Seedlings were also lost in the FY 2016/17 due to mortality during transportation and at inadequately managed temporary storages of some TGAs. However, the number lost was estimated to be much lower than the number of seedlings provided to those plantations which were not quantified.

The quality of the plantations established through the three main support models was assessed in the final plantation survey of Phase 1; the third large-scale plantation growth and quality survey implemented by PFP during its first phase (the first and the second being the end-of-dry-season surveys completed right prior to the planting seasons of 2015/16 and 2016/17).^{9,10} Compilation of the mean results from the survey is included in Table 15.

Table 15 Mean results from the final plantation survey of Phase 1

Support scheme	Variable	Unit or scale	Planting season			
			2014/15	2015/16	2016/17	2017/18
Standard TGIS	Stand density	trees/ha	966	858	905	983
	Survival rate	%	97%	93%	87%	80%
	Dominant height	metres	4.89	2.72	1.39	0.48
	Level of weeding	0/1/2	0.37	0.38	0.60	0.82
KVTC-OSP	Stand density	trees/ha	903	774	863	641
	Survival rate	%	100%	100%	94%	95%
	Dominant height	metres	6.90	3.70	2.67	0.98
	Level of weeding	0/1/2	1.13	1.31	1.74	1.41
NFC-OSP	Stand density	trees/ha	-	1,068	1,094	930
	Survival rate	%	-	100%	98%	81%
	Dominant height	metres	-	3.59	1.31	0.39
	Level of weeding	0/1/2	-	0.89	0.81	0.62

While the mean results from the study were mostly satisfactory, the distribution was wide with all variables: examples of both excellent plantations and poorly performing woodlots were found within TGIS.

As discussed above with the result-level indicators of result 2 (section 3.3), the height growth and survival rates fell below the target figures, while they can still be considered acceptable. Stand densities were somewhat lower than expected, given the instructed planting density of 3 x 3 metres, or, 1,111 trees/ha.

The average level of weeding also remained on the lower side with TGIS, though some improvement had taken place during the two years' time since the previous plantation assessment. Only 54% of the individual TGIS plantations of pine and eucalyptus were found to have been weeded, which is reflected in the low average weeding scores in Table 15. It should be noted that the timing of the survey late in the dry season likely affected the result, since plantations only weeded earlier in the rainy season would have seen the weeds largely regrown by this time, especially on fertile soils. Still, the 85% target for the good-quality plantation management was clearly not met despite the programme's best efforts to promote it through focused extension efforts and the cash incentive for weeding.

In 2017/18 the programme facilitated a study to assess smallholder tree growers' rationale to do, or not to do, weeding activities on their plantations. The extension provision by the PFP was found to have had a positive effect on the level of weeding. However, the results also showed that there were still negative traits attributed to weeding in terms of seedling performance and that many smallholders who kept leaving woodlots unweeded did so because the expected benefit was not considered to justify the required workload or resources under numerous competing priorities. The overall experience of Phase 1 indicates that effective facilitation of weeding is a complex problem that calls in for further development of elaborated and case-sensitive approaches.

⁹ <http://www.privateforestry.or.tz/en/resources/view/survival-and-quality-assessment-of-smallholder-plantations-established-with>

¹⁰ <http://www.privateforestry.or.tz/en/resources/view/end-of-dry-season-woodlot-assessment-2016-17-report>

The TGIS model

TGIS for plantation establishment

The original TGIS of the programme was designed to establish an agreement between the programme and each tree farmer that the programme would provide high quality seedlings for free at the nearest road head to the planting sites and the farmer would provide the in-kind inputs needed to establish and manage his or her plantation.

The original TGIS was implemented during the first two planting seasons of the programme (the FY 2014/15 and FY 2015/16), when the total planting area was quite modest in comparison to that of the two latter seasons. It introduced important new commercial plantation tree species to Tanzania including *Pinus tecunumanii* and *Pinus maximinoi*, and applied the fast-growing hybrid *Eucalyptus urograndis* (Figure 24).

Figure 24 Smallholder *E. urograndis* planted in 2015 under the TGIS scheme and photographed in October 2018 in Iboya, Njombe TC



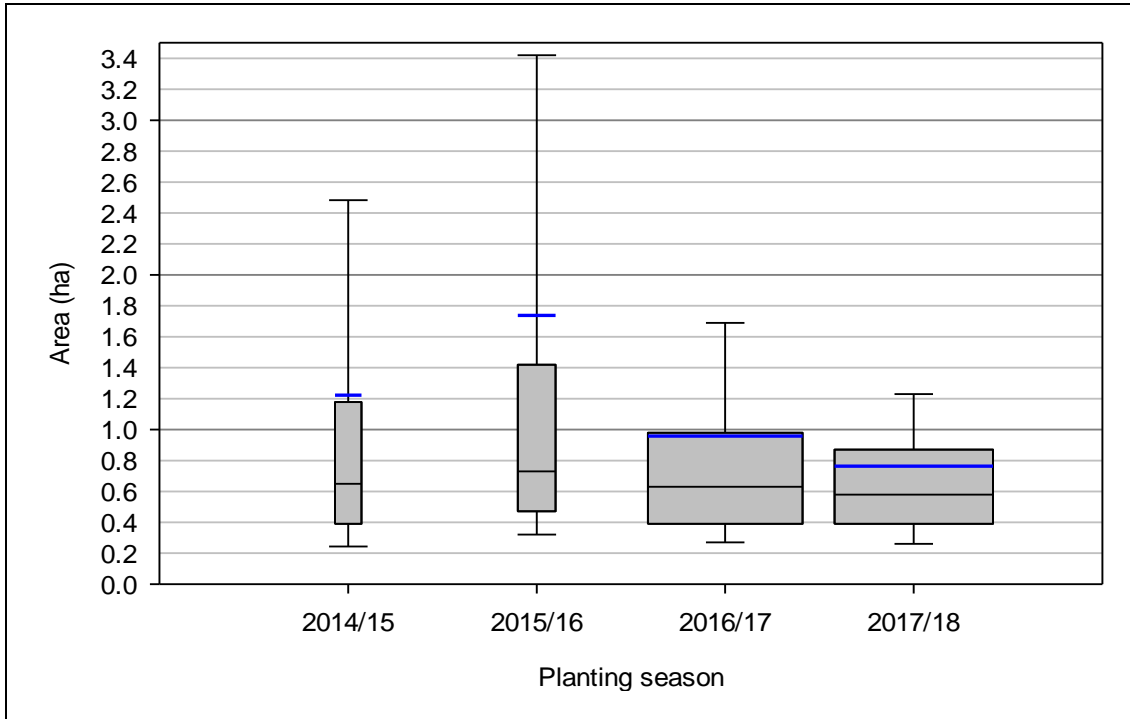
By the time the programme had moved to its third planting season, it needed to review the TGIS to better meet the challenge of the high planting target for that season, whilst also improving inclusiveness, equity, and manageability. Thus, it introduced a progressive seedling-provision model in the FY 2016/17 which charged tree growers for the seedlings they received in excess of 890 seedlings (enough to plant two acres). The charge was laid to reduce the risk of beneficiaries' overestimating their planting capabilities and thus jeopardising the quality of the result as well as to enable the poorest members of the supported communities to participate in tree planting. The progressive model also prevented large-plantation entrepreneurs from abusing the system. The effects of these and future adjustments can be seen in Figure 25 and Figure 26. The seedling payments collected remained with TGAs to serve as capital and to act as another means of building TGA capacity.

The renewed TGIS of the FY2016/17 placed most emphasis on TGAs but also made multiple other groups eligible for different levels of support. Planting was intended to be arranged mainly through TGAs, an approach which was another means of encouraging post-planting inputs in plantation management.

The TGIS was revised for a second time for the final planting season, that in the FY 2017/18. The purpose of this revision was to further streamline the support model, making it more efficient and better able to maintain the PFP-promoted TGA system and to comply with VLUPs. This also enabled better control over the seedling delivery process. In the revised model, the

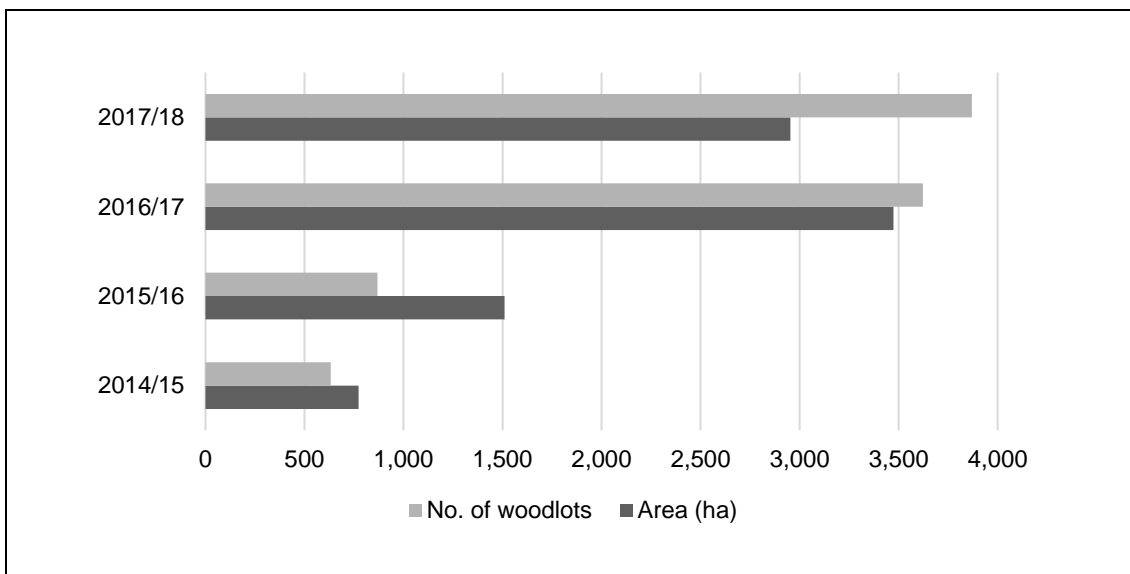
progressive seedling-provision model was maintained, and types of supported institutions were narrowed down to schools planting for educational purposes (Table 16).

Figure 25 Woodlot area distribution by planting season with box size corresponding to area achievement



Note: The boxes represent observations between 25th and 75th percentile, and the whiskers represent observations between 10th and 90th percentile. Additional bars show medians (black bars) and arithmetic means (blue bars).

Figure 26 Number of established woodlots vs. total area achievement by season



Note: Number of woodlots and total area achievement (ha) apply same x-axis despite of the different unit.

Table 16 Progressive support model applied for pine and eucalyptus plantation under the PFP’s standard TGIS in 2017/18

Area (ha)	Number of seedlings	Charge for pine and eucalyptus seedlings	
		TGA members’ planting on land designated to TGAs in the VLUP	Primary and secondary schools (for educational purposes)
0.0–0.8	≤ 890	Free	Free
0.8–5.0	891–5,555	50% of nursery gate cost	No support
≥ 5.0	≥ 5,556	Full nursery gate cost	

Cash incentive for weeding

During the planting season of the FY 2015/2016, the programme piloted a cash incentive for weeding under TGIS for the first time. Beneficiaries in two villages were offered the chance to receive cash support in return for carrying out weeding according to an adequate technical standard in their newly established woodlots. The rationale for providing support was, through incentivisation, to increase the level of weeding among the beneficiary communities, the benefit of which is expected later to materialise as improved yield of quality wood from the woodlots. The PFP made payment with the support of the TTGAU.

The first pilot year of the TGIS cash incentive resulted in some improvement in weeding, while showing partially mixed results¹¹, and the pilot was expanded in the two subsequent years to a larger geographical area to acquire more data from its functioning. The final plantation survey of Phase 1 found improvement in the weeding levels of: i) one-year-old woodlots of both pine and eucalyptus, and also ii) two-year-old eucalyptus woodlots, as opposed to figures recorded two years earlier. The result was positive in the sense that plantations belonging to these two groups are generally the most vulnerable to damages by uncontrolled weed growth. It could not be established, however, which extent of this achievement was strictly due to the TGIS cash incentive.

The out-grower support programme (OSP)

Out-grower support programme of the KVTC

The KVTC began its OSP in 2008, before the PFP’s intervention. Its OSP is an intensive programme in which private farmers, referred to as “out-growers”, enter into an agreement with the company in which the company provides farmers both teak stumps and the technical extension and follow-up they need to succeed as teak planters. The company also compensates farmers in cash for completing the activities it includes in its strict silvicultural management regime, a regime which is a prerequisite for producing a good yield of high-quality teak timber. In exchange, the farmers commit to the management regime, and the company reserves for itself a certain percentage of the end product as well as the right to the first tender for the rest of the timber harvested.

From the FY 2014/15 onwards, the additional support provided by the PFP enabled the KVTC to considerably scale up its OSP, from its standard planting target of 75 ha per season to as much as 359 ha per season. The total number of people benefitting directly from the OSP also increased accordingly.

Out-grower support programme of the NFC

The OSP of the NFC was initiated as a joint venture between the PFP and the NFC starting from its first season, in the FY 2015/16. The company provides OSP beneficiaries with seedlings and technical extension as well as training related to silviculture and administration.

¹¹ <http://www.privateforestry.or.tz/en/resources/view/main-results-and-lessons-learned-from-the-field-exercise-assessing-tree-gro>

The OSP started with four villages and relatively modest planting figures in its first season but scaled up considerably during the two following seasons to include 16 villages.

Establishment of plantations for vulnerable people

During Phase 1, two approaches were tested with special consideration of vulnerable people in the supported communities in mind. Initially, supported communities were encouraged to set aside an area in their VLUPs in which vulnerable households could plant trees with the programme support. Multiple villages allocated land areas to vulnerable people ranging from 8 ha to 50 ha in which tree planting was supported, while other villages were supported to establish plantations for the vulnerable people in their common tree-planting areas.

During the FY 2016/17 the programme took another approach and engaged in a joint intervention with the Tanzania Social Action Fund (TASAF) to support vulnerable people through a special forestry-related component implemented under its Public Works Programme (PWP).

Having experienced issues with implementation, both approaches were largely deemed unsuccessful during Phase 1. However, the final assessment of the results of these interventions found that 90.4 ha of the initial plantations and 27.8 ha of the TASAF intervention plantations remained commercially viable and were overseen by the village governments. Some of the woodlots were found to be of very good quality, although there was a lack of management and fire protection (Figure 27).

Arrangements were in place in the villages to keep and update a list of vulnerable people, and the expected profit from harvesting was planned to be divided, with 20–40% remaining with the village government and the remaining 60–80% allocated to those people included in the list.

In addition to these piloted approaches, the PFP's updated TGIS, with its progressive seedling delivery model, was pro-poor. Specific representation of vulnerable people was also included in the improved VLUP process developed and operationalised by the programme.

Figure 27 Eucalyptus plantation established for vulnerable households in Iboya, Njombe TC, in 2015 and photographed in August 2018



Other planting support approaches adopted by the programme

Tree planting within the Lugarawa Hydropower Project

In the FY 2016/17, the PFP cooperated with ACRA on the Lugarawa Hydropower Project to introduce tree planting as an income-generating activity for the Juwalu Association, a group comprising the beneficiaries of the project. About 370 ha of plantations in 20 Juwalu Association member villages were established that year. Some of these plantations suffered considerable fire damage during the following dry season, so the PFP supported the Juwalu Association again in the FY 2017/18 so it could replant 57 ha of those plantations worst affected.

Training on tree planting and gardening in primary schools (SHIPO cooperation)

In the FY 2016/17, the PFP collaborated with the Southern Highlands Participatory Organization (SHIPO) to conduct training on tree planting and gardening in 20 primary schools in Ludewa District, under the framework of the SHIPO MAMMIE-project. The objective of the intervention was to familiarise and engage school communities with the techniques of planting and growing trees, using the schools as a platform to increase awareness of the PFP and tree growing as livelihoods in the area (Figure 28). The practical part of the training included each school establishing a one-acre woodlot.

Figure 28 Pupils at Milo primary school following instructing on marking and pitting by a PFP-trained Ward Executive Officer



Teak-planting scheme implemented in the FY 2017/18

In the FY 2017/18, the PFP adopted a separate support scheme under the standard TGIS for establishing smallholder teak plantations. In close cooperation with the local government, the PFP conducted the scheme in a zone by the foot of the Livingstone Mountains in the lowlands of Nyasa District, a zone eco-physiologically highly suitable for teak.

Since teak requires intensive management, no beneficiary was supported to establish a plantation any greater than 0.8 ha in order to mitigate the risk of people's overestimating their capacity to look after the established woodlots (Table 17). Communities by Lake Nyasa traditionally made their livelihoods through fishing, so they had no foundation in tree planting that could serve as the foundation for plantation meeting commercial standards. For this reason, the 0.8 ha cap was imposed, and awareness-raising and extension services were intensive. PFP experts and government officials, including the regional commissioner, helped conduct an

intensive awareness-raising campaign and two EOs and a senior EO were employed to oversee the support delivery.

Cooperation with the local government was essential in ensuring the success of the teak planting scheme, especially as a land-use conflict with people from a neighbouring district who used the area reserved for teak planting for agro-pastoral activities had to be settled. Eventually, it was agreed that plantation and agro-pastoral activities would be carried out in different geographical locations.

Table 17 Support model applied for teak plantations under the PFP standard TGIS in the FY 2017/18

Area (ha)	Number of seedlings	Charge for teak seedlings	
		TGA member planting on land designated for TGAs in VLUPs	Primary and secondary schools (for educational purposes)
0.0–0.8	≤ 890	Free	Free

Whilst the uptake of this support was slow in the beginning of the planting season, local communities learned from the example of early adopters and the demand for the support went up quickly towards the end of the planting season. Since some cleared areas remained unplanted and there was still a risk of encroachment from the outside, the PFP responded to a request from the regional government to start preparations for provision of teak stumps to afforest another 200 ha which the TFS was set to oversee in 2019.

As the following undertakings demonstrate, the PFP instilled enthusiasm for commercial tree planting in the area.

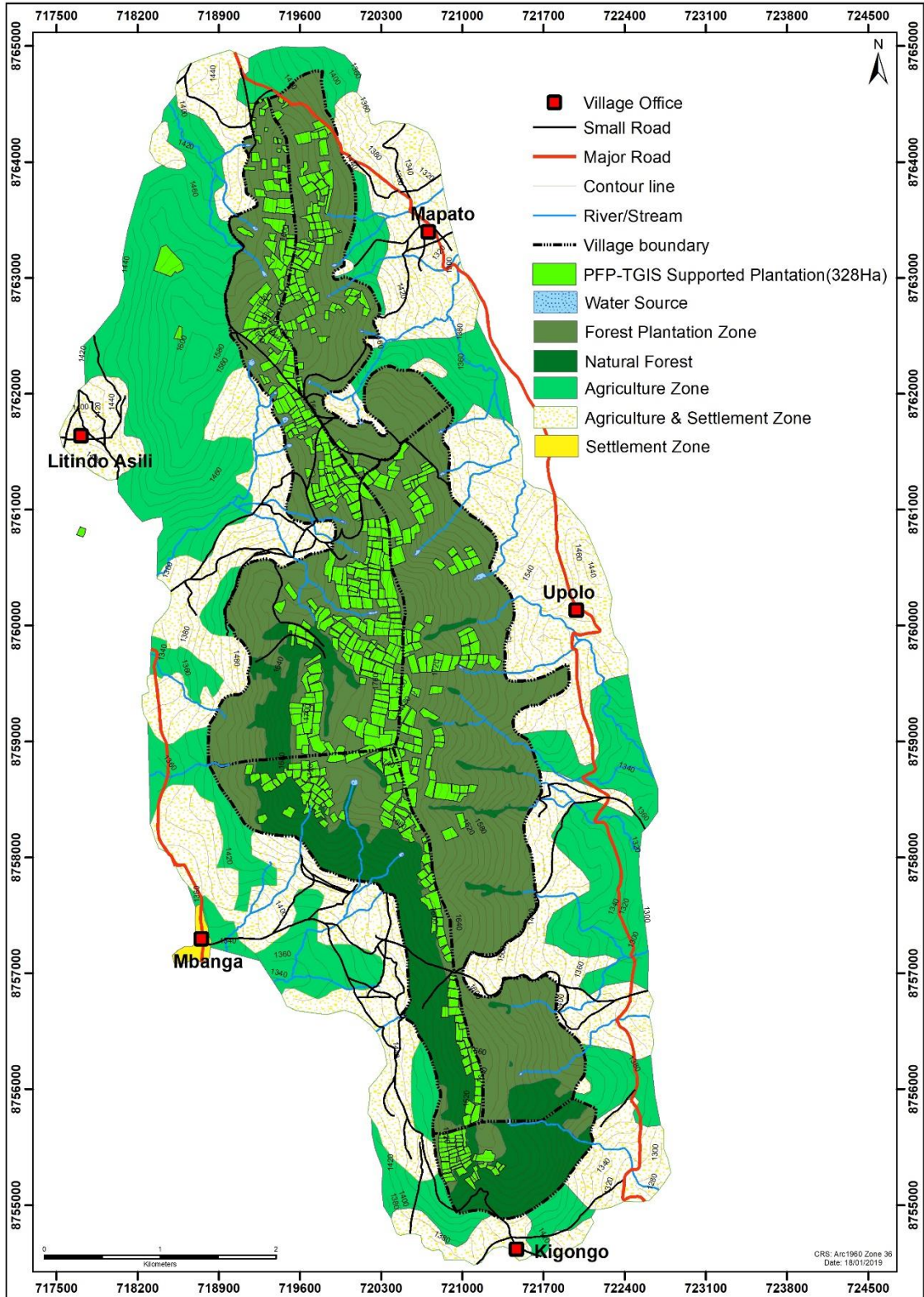
1. Nyasa District government procured 300 kg of teak seed and 18 kg of other species' seed for distributing to tree-planting groups;
2. The TFS distributed 82 kg of pine, eucalyptus, cedrela and *Gmelina arborea* seed in the district;
3. TGAs and other tree-planting groups in Nyasa District procured a total of 140 kg of teak seed;
4. Three villages in the neighbouring Mbinga District jointly reserved a 600 ha for teak planting.

Afforestation of degraded district forest reserves in the FY 2017/18

Another support model unique for the FY 2017/18 was the afforestation of degraded district forest reserves in the districts of Mbinga and Nyasa. Activities were conducted within three reserves that stretched across the land of ten villages. These reserves – Lihumbe Mountain Reserve, Upolo Mountain Reserve and Kihangimahuka Reserve – had been previously reserved for afforestation activities by the districts, but the districts had not been able to allocate the necessary resources to implement plantation.

The PFP assisted villagers in all ten villages in forming TGAs and facilitated the preparation and signing of MoUs between the villages and the districts, laying down in writing the TGA members' right to their established woodlots within the reserves. Local government representatives visited the areas during planting season to further promote plantation establishment, and the PFP supported the TGAs by providing seedlings and extension services as it did in its standard TGIS. About 720 ha of degraded district forest reserves were afforested under this scheme. These plantations cover the most degraded and erosion-prone sections of the reserves including almost all of the hilltops and ridges within these areas (Figure 29).

Figure 29 Distribution of new plantations established on the eroded ridge of Upolo Mountain district forest reserve, Nyasa District



Processes introduced in the FY 2017/18 for improved coordination of TGA annual planting programme

A revised process for planning and carrying out seedling delivery was implemented during the FY 2017/18 to incorporate programme learning.¹² The process with TGAs involved: 1) delineating an annual planting plan on a high-resolution satellite image printout with a PFP EO's guidance (Figure 30); 2) drafting lists of people willing to plant and the hectareage they intended to plant; 3) crosschecking the delineated area with the intended cumulative planting area to allow for necessary adjustments; 4) marking individual woodlots on the ground upon confirmation of seedling delivery by PFP; 5) receiving and planting seedlings; and 6) post planting survey (Figure 31).

Figure 30 TGA using a specially composed freely available satellite imagery with VLUP and previous planting information to plan their 2017/18 woodlots (Igumbilo, Makete DC)



For the first time, the TGAs made specific seedling-receiving committees whose responsibility was to make arrangement for accepting transported seedlings. EOs filed seedling requests for their villages with a PFP contact person, who then double-checked with the seedling-receiving committee to ensure that the TGA was indeed ready to receive seedlings before it scheduled a delivery with a nursery and a transportation service provider. The seedling-receiving committees received the seedlings on location, checked the number of seedlings received per delivery bag, and, together with the EO, signed a dispatch note copy, which was then quadruplicated for provision to different stakeholders for cross-checking.

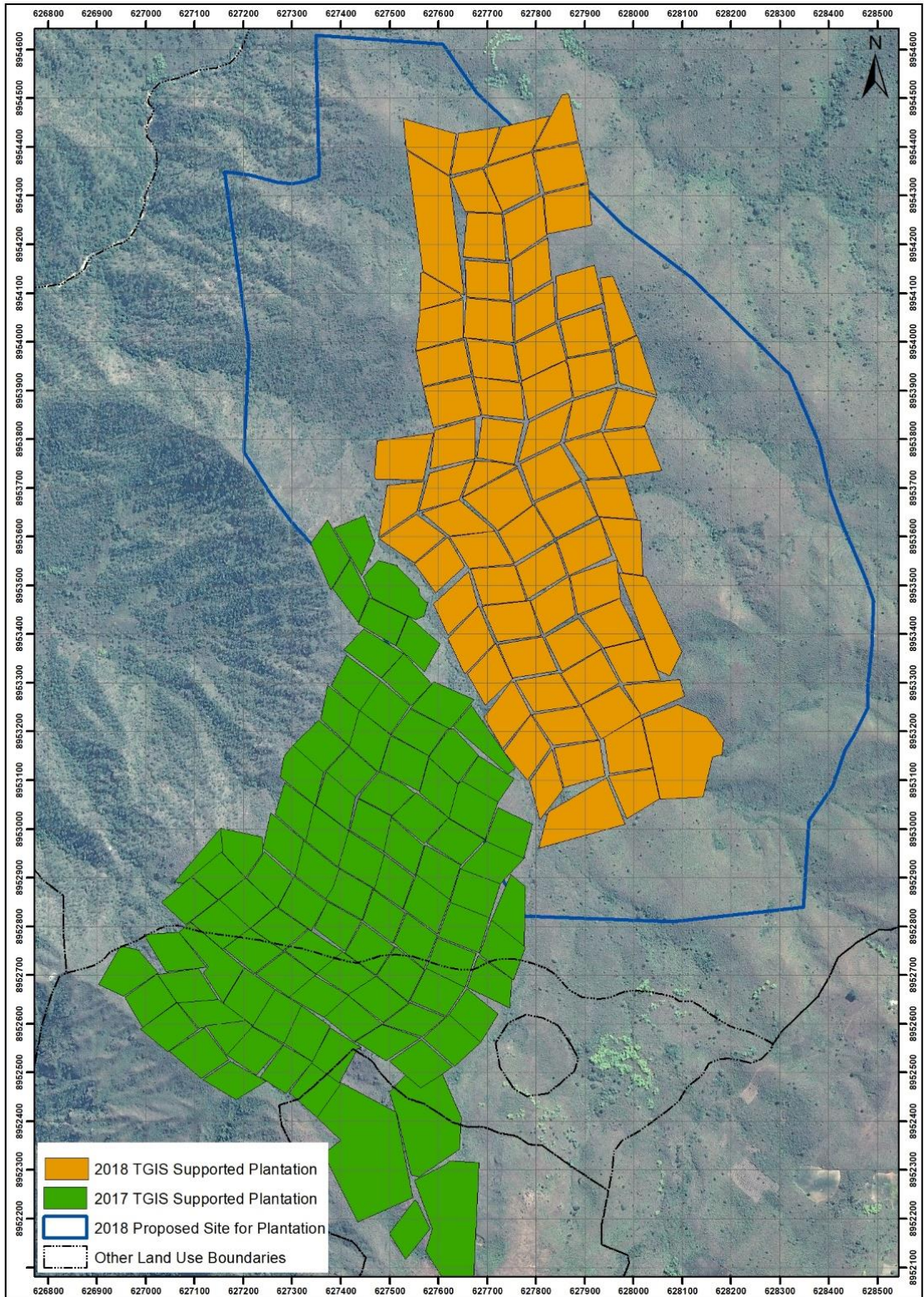
Relevance, effectiveness, efficiency and sustainability

Tree planting has been a core activity of Phase 1, carrying significant human, social, economic, financial and natural benefits. In terms of carbon sequestration alone, this intervention was highly relevant, effective and efficient.

Early concerns about plantations for the vulnerable appear, on reconsideration, to have been partially misplaced. Results from the programme-piloted approaches indicate that cooperation on this topic on a village-level could be successfully developed further.

¹² <http://www.privateforestry.or.tz/en/resources/view/seedling-delivery-report-for-fy2017-18>

Figure 31 Individual planting achievements during 2017 and 2018, and the 2018 planting area as planned by the TGA on a satellite image (Ihanga village, Makete)



3.3.4 Output 2.4: Income-generating activities provide income to vulnerable groups and tree growers, enabling them to wait for optimal harvest times

During the FY 2016/17, the PFP discontinued its IGAs as the programme steering committee had recommended after discovering that the IGAs were not only irrelevant but also excessively expensive, inequitable, and inefficient. Far from being widely beneficial, IGAs, in fact, benefitted a small proportion of villagers. The programme was instructed to find a more effective mechanism that would help mitigate tree growers' tendency to harvest their trees prematurely to meet their urgent need for cash.

Community-based microfinance models were identified as a potential replacement for IGAs. Proven pre-existing models included group saving, training in finance management, the selection and management of IGAs, and funding loans to meet domestic needs and launch selected IGAs. The programme piloted village community banking (VICOPA) with SEDIT. A total of 38 TGA- and SME-based savings groups were established in Mufindi District. Loans were commonly used to establish small-scale shops, raise poultry or fish, provide catering services, or brew beer. According to an independent evaluation conducted by the University of Iringa, the savings groups were satisfied with the services they got. Thus, the evaluators urged that the PFP continue its microfinance support.

The PFP's positive experience resulted in its decision to scale up its establishment of microfinancing groups to cover all the TGAs and SMEs supported within the programme area. VSLAs were selected to replace the PFP's IGA initiative and three service providers were selected to carry out the scaled-up microfinance work. These service providers were mobilised to undertake preparatory work in the communities in June 2017. The PFP's support for VSLAs is discussed above under output 1.8.

3.4 Result 3: Profitability and sustainability of SMEs within the forestry value chain improved

<p>Phase 1 indicators:</p> <p>All PFP-supported SMEs claim improved profitability</p> <p>50% of PFP-supported SMEs showing improved attention to worker occupational health and safety issues</p> <p>Market-based results showing 12% price premium over old-technology sawmill production</p>	<p>Achievement:</p> <p>44% reported improved profitability in the final SME survey</p> <p>44% showed improvement in relation to at least one occupational health and safety criterion in the final SME survey</p> <p>Maximum reported price premium 3% in the final SME survey</p>
<p>Conclusion: While progress was made with the supported SMEs, the reported results fell below their respective targets.</p>	

Results 3 interventions focused on the part of the forest value chain that goes beyond the plantations, i.e. processing of the raw material. The aim was to induce a change in the wood processing industry by encouraging investment in new technology and building capacity for operations. The main mechanisms were establishment of the FWITC and working with a number of SMEs that would develop and hence provide models for a more profitable and sustainable way of working, hence providing incentives for others to adapt.

The resource allocation in the original programme design was inadequate to deliver the envisaged support in Result 3. Therefore, appropriate revisions were made as follows:

- Forest Industries Development Advisor service provider was mobilised in January 2016.
- SME business development advisor and SME technology adviser were recruited in May 2016.
- Charcoal expert / Process engineer as service provider since January 2018.

Result 3 is structured into two expected outputs. Table 18 shows the outputs and an estimation on the level of achievement based on the indicators in the results-based management framework. The interventions are described in the following chapters, including a more detail assessment of the achievement as compared to the set target.

Table 18 Result 3 outputs and implementation status at the end of Phase 1

Result / Output		Status as reflected by RBMF indicators
Result 3:	Profitability and sustainability of SMEs within the forestry value chain improved	
Output 3.1:	Production efficiency, product quality and new financially viable products developed with SMEs	Minor deviations
Output 3.2:	Decent jobs within the value chain	Minor deviations

3.4.1 Output 3.1: Production efficiency, product quality and new financially viable products developed with SMEs

<p>Phase 1 indicators:</p> <p>5SMEs adopted improved technology</p> <p>Recovery rate improved by 5% in PFP supported sawmills</p> <p>Timber grading system piloted</p> <p>2,250 sawmilling trainee-days delivered</p> <p>Lake Nyasa boat design 100% complete</p> <p>Biowaste energy 100% complete</p> <p>Eucalyptus furniture 75% complete</p> <p>Biowaste nursery substrate 100% complete</p> <p>Eucalyptus fencing 75% complete</p> <p>A total of four new guides published</p>	<p>Achievement:</p> <p>34 SMEs reported improvements in sawmilling technology</p> <p>Achieved</p> <p>Grading system developed through research</p> <p>Not achieved</p> <p>Discontinued</p> <p>This has expanded to more than originally envisaged due to relevance and stakeholder interest</p> <p>Some furniture has been prepared but more effort on wood drying needed</p> <p>Tree nursery growing medium trials started</p> <p>Eucalyptus fencing meeting South Africa's technical specifications used for seed orchards</p> <p>Deprioritised</p>
<p>Conclusion: Minor deviations. Some major success on biowaste energy and sawmilling technology transfer, but fishing boat discontinued and guides not prioritised.</p>	

There was a dire need for innovation in the sector but with the construction industry in the doldrums and demand for construction timber low, few businesses felt confident enough to invest in improved wood-processing equipment. Thus, to boost confidence, suitable sawmilling equipment for small businesses was purchased and commissioned at the FWITC for demonstration and training purposes. In fact, the FWITC was the centre for interventions under Result 3, providing exposure to improved models of operation and technology as well as building capacity. A central theme was "Innovation", further described in the following chapter.

Another intervention for encouraging investment and strengthening capacity was the on-site advisory services visible e.g. in the establishment of the Makete industrial node. This model for integrating smallholder forestry into value chains through SME development is described later in this chapter.

Exposure to new ideas through trade fairs was yet another approach much appreciated for the contributions to business networking and innovation among the SMEs.

- The programme organised and hosted in the FWITC the first forestry and wood industries trade fair in Tanzania (20–21 March 2018).
- SMEs were facilitated to attend a charcoal trade fair in Dar es Salaam.
- The programme facilitated 13 delegates to a wood industry-machinery trade fair in South Africa, resulting in investments worth almost 60,000 Euro among four of the SMEs and included four modern band sawmills and tools for maintaining them.

The lack of markets for pulpwood, logging trash and industrial wood waste is a long-term problem with no solution in sight. The programme first concentrated on improving sawmill efficiency and reducing waste but the overall impact on wastage was minimal. During 2018 significant progress was made in processing of sustainable charcoal from wood waste. The small but growing charcoal production facility which the PFP set up at the FWITC for product development, demonstration, training and eventually commercial production purposes has been the focus of a lot of industry interest. The FWITC initiative has helped a growing number of

cottage and industrial-scale enterprises profit from sustainable charcoal manufacture through demonstration and training.

Bringing entrepreneurs together to share ideas, work together and/or jointly invest was another approach used by the programme visible for example through:

- Those small SMEs that had already formed groups to be able to purchase machinery were formalised and facilitated to participate in group savings and to receive training. Those SMEs that had the individual financial capacity to invest in improved machinery were strengthened individually.
- Various groups of SMEs were formed. Support was provided to a transmission pole business grouping, but it was dissolved once it had resolved a major problem with the state-controlled market (Tanzania Electricity Supply Company).
- The PFP facilitated a Mafinga Forest Industry Cluster charcoal enterprise group to work on issues of common concern. Under the PFP support the group grew to be the Sustainable Charcoal and Briquette Producer Union in Tanzania (SCABPU)
- Meetings convened with sawmillers to discuss their issues accelerated programme support for training and services in band saw maintenance.

Mobile, semi-mobile and portable sawmill technologies

The fact that most individual smallholder plantations are scattered (Figure 32), small-scale and have poor road access as well as limited availability to electricity are challenges to utilising smallholder resources. In this smallholder environment high road-transport costs often make centralised large-scale processing less economical than small-scale local processing. A range of mobile and semi-mobile sawmill and small permanent sawmill technologies can produce good-quality sawn wood even at small-scale as local mills. Table 19 with results from testing different technologies at FWITC shows clear advantages in moving from dingdong sawmills to more advanced technology.

Petrol-powered sawmills are commonly used where electricity is not available but rural electrification is spreading and providing more opportunities for efficient electricity-powered permanent sawmills.

Uptake of improved primary production technology to improve the quality of sawn wood and reduce waste was promoted by the following measures:

1. Demonstrating carefully selected sawmilling and drying options at the FWITC and at the Makete industrial node;
2. SME technology advisory services for small-scale industries; and
3. Hosting a trade fair at the FWITC and enabling SME owners to attend a charcoal trade fair in Tanzania and a wood-processing industry trade fair in South Africa.

One major constraint to the uptake of band saw technologies has been the lack of maintenance services for band saw blades. Thus, the FWITC sent three people to South Africa to be trained in saw doctoring and developed a commercial band saw maintenance service in its premises.

The programme conducted baseline surveys of all SMEs which had requested support (a total of 65) in April 2016 and then resurveyed them in August 2018. Some uptake of improved sawing technologies had been achieved (Figure 33) through a) training in sawmill operations; b) assistance in sawmill installation; c) linkage with machine suppliers; d) advisory services and support for recordkeeping; and e) support for the maintenance and alignment of narrow band saw machines.

Table 19 Comparison of SME saw lines sawing mixed sizes of pine logs at FWITC

	Dingdong saw (Amec)	Saw Spec 660	Band saw line Asia tech - Subhash company (breakdown & re-saw)	Multi-rip saw line Jinjiang Shengong Machinery Manufacturing Co. LTD (breakdown MJF143-1525 & re-saw MJY 142-25)	Slidetec Tommi Laine Trading Co. (15 m) mobile	Wood-mizer LT 15
Capital expenditure (EUR)	1,500	9,820	18,207	33,084	61,913	14,943
Power consumption (KW)	18	11	26	120	45	11
Operators required	7	3	7	6	6	3
Installation costs	none	low	medium	medium	none	none
Input log sizes	small	all	all	small	all	all
Processing capacity (m ³ of log input per 260 working day year)	2,600	1,820	3,640	3,900	6,500	2,340
Recovery rate	30%	55%	55%	45%	45%	55%
Timber output (m ³ /year)	780	1,001	2,002	1,755	2,925	1,287
Sawing accuracy	*	****	****	*****	****	****
Mobility	*****	*	—	—	***	****
Safety	—	*****	*****	*****	****	****
Power options	petrol, electric	petrol, electric	electric	electric	electric, tractor PTO	petrol, electric

Figure 32 Distribution of Southern Highlands plantation resources by ownership

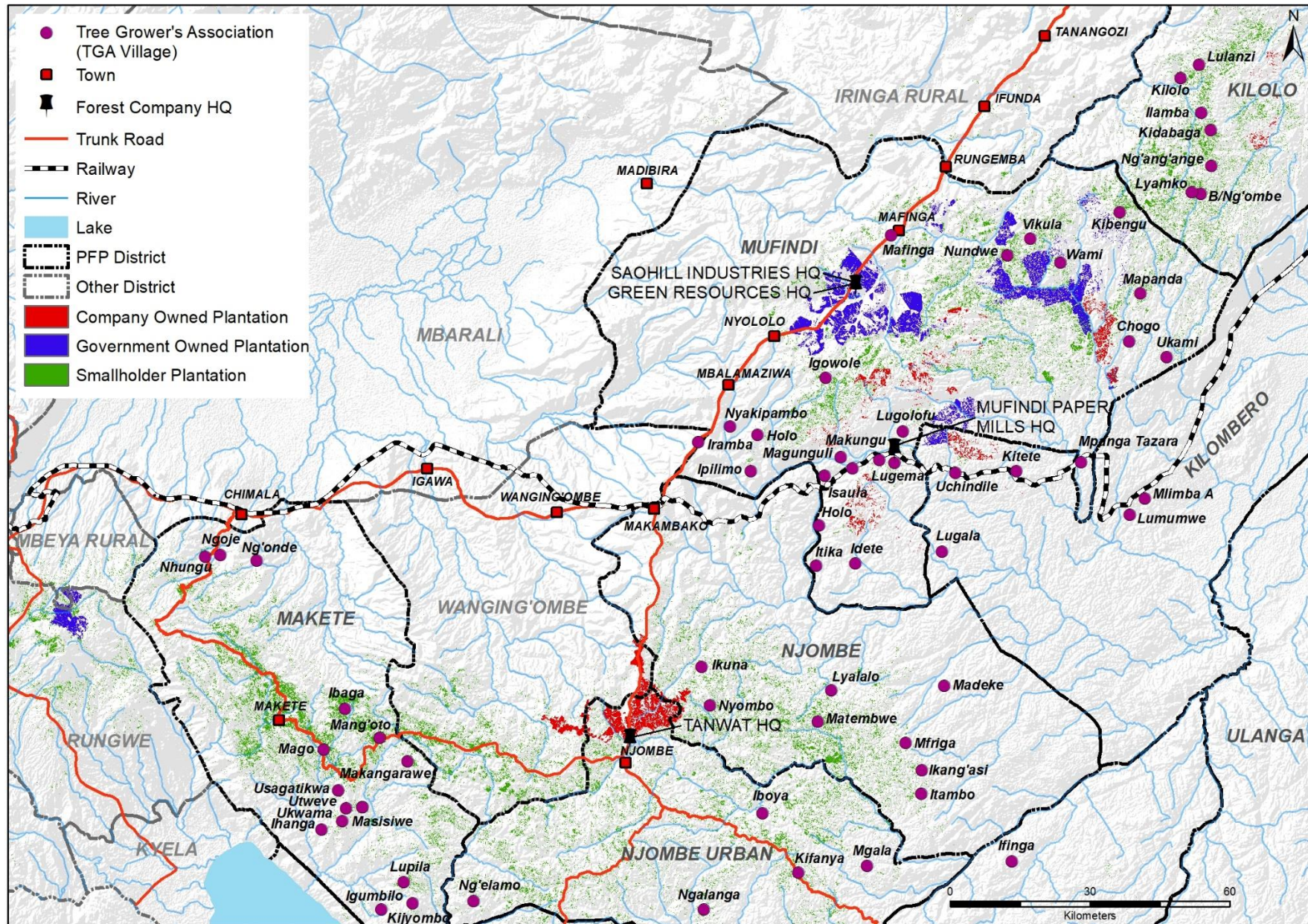
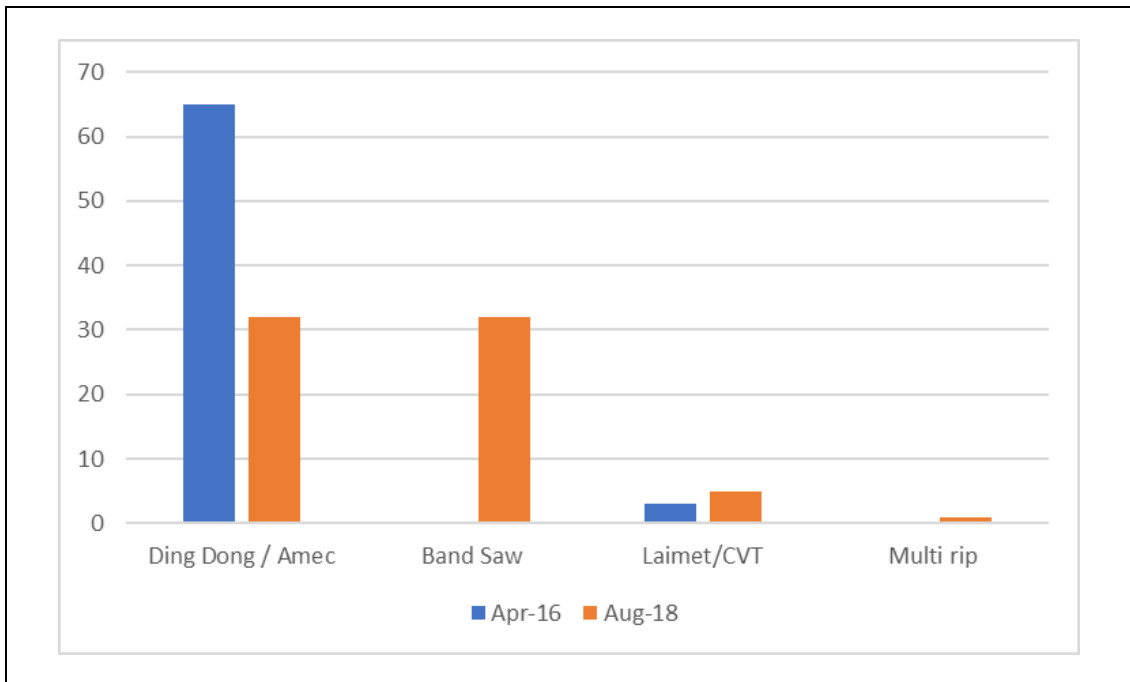


Figure 33 Reported SME sawmill technology changes between 2016 and 2018



The forestry and wood industries trade fair organised by the PFP at FWITC in March 2018 was the first of its kind in Tanzania. Participating exhibitors were received from Finland, China, India and South Africa in addition to Tanzania (Figure 34). During the trade fair exhibitors showcased their wide range of products, services, equipment and machines. These included for example sectoral associations, financial services, vocational training, forest harvesting, saw milling, wood treatment and wood-waste-based products. The trade fair promoted networking, spread awareness and raised interest in improved sawing technologies, new products and services among the participants, who represented the whole range of actors in the local forest value chain. Multiple exhibitors reported increased number of enquiries and successful sales after the event. The trade fair also spread awareness of the FWITC and lifted its profile.

Figure 34 Slidetec sawmill on display at the trade fair in the FWITC in March 2018



Product innovation

Containerised forest nursery business model development

Tanzania used to have just one semi-modern container-based tree nursery. It was highly capital-intensive, automated and relied on imported growing medium and produced robust, lightweight seedlings that tended to grow fast as soon as they were planted. Other tree nurseries were poly-tube-based. This meant that they required little capital investment but had higher operating costs than the semi-modern nursery and produced seedlings that were heavier, less robust, and more difficult to transport. To resolve the shortcomings associated with each type, the PFP sought to develop an intermediate container-based tree nursery business model that local entrepreneurs could manage and, in 2017, constructed a moderately capital-intensive 500,000-seedling capacity container nursery at the FWITC during 2017 (Figure 35). That same year, it was used to grow seed orchard seedlings under carefully controlled conditions and to raise commercial seedlings for small-scale tree growers.

Figure 35 Seedlings being raised at the FWITC container-based nursery



This first year of production also allowed programme staff to become more familiar with nursery operations and to solve teething problems before considering commercial production. Combinations of local materials (coco peat, mulled pine bark, carbonised rice husks and uncarbonised rice husks) were tested to find out which growing medium performed the best (Table 20).

For season 2018/19 the FWITC nursery produced their first commercial batch of seedlings, in addition to the seed orchard seedlings needed during that season. The commercial batch included about 185,000 seedlings of pine and eucalyptus brought up from improved seed. With the sales value of TZS 250 (EUR 0,10) per seedling, the total value of the produced stock was EUR 18,500.

The nursery is an asset which can now be used to generate profits for sustaining the FWITC's activities. Continued effort will be needed to drive down the cost of containers enough to make this business model viable for small operators.

Because the business model was still being refined PFP had not yet actively promoted it but one local businessperson has shown keen interest in replicating it and Forestry Development Trust has also shown interest in promoting uptake of this nursery technology.

Table 20 Results of the planting medium tests at the FWITC nursery

s/n	Applied mixture composition				Observed rate of seedling survival
	Coco peat	Mulled pine bark	Carbonised rice husk	Uncarbonised rice husk	
1	100%	-	-	-	90%
2	-	100%	-	-	90%
3	50%	50%	-	-	90%
4	-	50%	50%	-	90%
5	33%	33%	33%	-	90%
6	50%	-	50%	-	85%
7	25%	25%	25%	25%	85%
8	33%	33%	-	33%	75%
9	33%	-	33%	33%	68%
10	50%	-	-	50%	65%
11	-	33%	33%	33%	65%
12	-	-	100%	-	60%
13	50%	-	-	50%	55%
14	-	-	50%	50%	30%
15	-	-	-	100%	5%

Wood preservation – Eucalyptus transmission poles

Eucalyptus transmission pole treatment with CCA became a highly profitable industry after Tanzania invested in rural electrification. The three chemicals in CCA – copper, chromium and arsenic – protect wood from dry rot, fungi, mould, termites and other pests. These are, however, dangerous chemicals that pose serious health risks to workers in this largely unregulated industry. These chemicals also harm the environment. Both effective pole treatment and worker safety require that workers be trained and provided with health and safety equipment. For this reason, the FWITC acquired a small but fully functional wood treatment plant and started to train workers in wood preservation (Figure 36).

Training in wood preservation is highly relevant but demand is low. The major state buyer of transmission poles should require its suppliers to have their workers properly trained.

Figure 36 FITI VET-students being trained in eucalyptus-pole treatment at the FWITC treatment plant



Timber drying for better end products

Timber-drying trials using the high frequency vacuum kiln commissioned at the FWITC (the first such machine in Tanzania) paved the way to reducing the costs of drying and improving the dry wood value. Trials of drying eucalyptus sawn timber with this kiln produced positive results. The average drying time (from 40% to 15% moisture content) was reduced to eight days from the 40–50 days traditional kilns take. Quality results showed that sawn timber was stable after drying and furniture producers responded positively. Furniture made from kiln-dried eucalyptus does not experience shrinking or cracking, both common problems with air-dried eucalyptus.

Sawmill and plantation wood-waste processing innovation

Plantation silvicultural thinning and harvesting operations yield massive quantities of wood that cannot be marketed. Given that, at present, there are immense areas of young plantations and no pulpwood market this is a high-priority concern. In addition, antiquated wood-processing industries generate huge quantities of sawdust, off-cuts and slabs that are difficult to dispose of. Despite all this potentially energy-productive waste, natural forests are being destroyed to meet the demand for charcoal.

Interest in the production of sustainable charcoal from plantation-grown wood has grown rapidly. The PFP developed and commissioned commercial lump-charcoal and charcoal-briquette manufacturing capability to generate profit to use to sustain the FWITC's activities as well as to demonstrate the technology to and train SMEs.

Business incubation provisions were made with one SME for them to use FWITC facilities for a limited period to produce and sell lump charcoal from their own "wood waste" under programme guidance. This represented a first attempt to pilot business incubation (Figure 37).

Figure 37 SME businesswomen with their charcoal production at FWITC



Semi-transportable metal kilns were fabricated locally and their use in charcoaling pine and eucalyptus plantation waste and industry waste demonstrated. SMEs are now replicating these designs (Table 21). For situations where lump charcoal cannot be produced or marketed readily, charcoal-briquette manufacture was demonstrated. Early charcoal-related activities were focused in Mafinga, where there is a concentrated supply of raw material and easy market

access, but the PFP also started to extend the benefits of improved charcoal-manufacture technologies to poor rural households who do not share these advantages.

Table 21 Uptake of sustainable charcoal and briquette production

SME / Group	Location	Machinery	Status
Kajuna	Moshi (Kilimanjaro)	Charcoal kiln	Producing
Uwamilu	Mgololo (Iringa)	Charcoal kiln	Producing
MW LTD	Mafinga (Iringa)	Briquette technology	Producing
Tree growers	Mafinga (Iringa)	Briquette technology	Producing
Trinity Biological Energy	Mafinga (Iringa)	Briquette technology	Producing
New Energy	Morogoro	Briquette technology	In fabrication

To test and compare different wood-waste-based products the PFP organised an analysis in cooperation with Mbeya Cement Factory. The results are shown in Table 22. Heating values of the tested products exceeded those of unprocessed firewood and largely also brown coal, which is another competing product in the area.

Table 22 Test results from wood-waste-based products and their comparison with some common values of other fuels

Category	Product type	Ash (%)	HHV (kcal/kg)
Analysis results from wood-waste-based products	Uncarbonised briquette from hammer mill	7.5%	3,977
	Uncarbonised briquettes from extruder (13 cm diameter)	1.0%	4,403
	Uncarbonised briquettes from extruder (10 cm diameter)	6.3%	4,038
	Carbonised pillow briquettes (clay binder)	28.8%	4,576
	Carbonised hexagonal briquettes (clay binder)	21.9%	5,276
	Carbonised unbonded briquettes	9.8%	4,325
	Hardwood lump charcoal from eucalyptus	2.0%	5,461
Other fuel products (for comparison)	Firewood	1–2%	2,400–3,600
	Brown coal (lignite)	6–19%	2,400–4,800
	Hard coal (anthracite)	10–20%	6,200–7,900
	Diesel	-	10,300
	Cooking gas (LPG)	-	11,000

SME scale charcoal and briquette manufacture has the advantage that most of the equipment is relatively simple and can be fabricated in local engineering workshops. The programme has worked with local workshops to help them produce suitable equipment and take advantage of this emerging local market (Figure 38).

Whilst the focus of utilising wood that was not otherwise marketable has been on bioenergy (pine, eucalyptus, and wattle lump charcoal and briquettes) the programme has also demonstrated wood vinegar, pine tar and soap manufacture from the condensates of charcoal production. The use of crude wood tar in preserving the external woodwork at the FWITC and in caulking leaky fishing boats was also demonstrated. In the future when there is enough supply pine tar can be fractionated to yield creosote, oils, and pitch.

By the time of reporting, the PFP-facilitated producer union SCABPU, bringing together the wood-waste-based product operators, had grown to have over 20 member organisations. The union has requested the TBS to adopt official definitions for different charcoal and briquette products for their certification. The union has also requested the Ministry of Industry, Trade and Investment of Tanzania to address the export ban of sustainably produced charcoal products. Other ongoing activities of the union included development of digital marketing and creating awareness in the Dar es Salaam market in order to get established there.

Figure 38 **Locally manufactured sawdust carboniser installed at the FWITC**



Graded sawn wood

In 1989, “Timber Grading of Coniferous Sawn Timber (Cypress and Pine)” was first published as TZS 387:1989. Since then, notable changes have occurred in the forest resource base, forest management practices, and wood-processing technologies, all of which have necessitated the revision of the grades.

The draft of the most recent grade revision (TBS 387:2018) specifies requirements for two stress grades of visually graded structural timber derived from trees of the genus *Pinus* grown in Tanzania. It specifies the method of grading, namely visual stress grading. It expatiates on some important terms of timber, defects and their measurement and gives limiting values for the two stress grades, T16 and T18.

These two stress grades will allow architects and designers to specify graded timber for load-bearing construction applications with confidence. Graded sawn wood will be a new product and it will open very significant opportunities for the manufacture of prefabricated roof trusses, which are not currently used in Tanzania. Roofs will be safer, and less wood will be used.

Standardised fencing

Fencing provides a major market for CCA-treated wood in many countries, but no standards appeared to be in use locally. An attempt was made to replicate a standard design used in South Africa, for securing seed orchards (Figure 39).

Normal farm fencing in South Africa uses fencing standards (posts) standing 1.2 m above the ground. Corner posts are 2 m tall with 0.8 m in the ground. Other posts are 1.8 m tall with 0.6 m in the ground. Standards (posts) are usually placed eight to ten meters apart. Corners are erected using a corner post with an inline post approximately 1.5 m on either side of it, with a 1.5 m pole fixed to the top. High-tensile strength steel wire is tensioned and fixed to the posts with “U” nails. Between the posts, two or three thin 1.2 m treated dropper poles are fixed to the wire equal distances apart to make a strong and very robust fence. Using dropper poles saves money. This fencing design costs approximately a third of what more traditionally used fences cost due to the reduced need for posts.

Figure 39 South Africa's fencing standards applied to secure a seed orchard



Utilisation of smallholder resources - the Makete industrial node

The PFP identified an emerging opportunity for permanent local sawmill businesses to be set up near smallholder plantations to operate in vertical integration with the growers. These sawmills can operate profitably with a plantation resource base of 250–300 ha and there are about 150,000 ha of smallholder plantations in the Southern Highlands. To demonstrate and prove this approach, the PFP partnered with tree growers and small-scale businesspeople in Makete District.

Makete District (population 100,000) has over 27,000 ha of smallholder commercial plantations. The district is rich in forest land, but its people are amongst the poorest in Tanzania. HIV rates are high and child malnutrition is prevalent. Family dissolution due to AIDS is commonplace, and 17.1% of children are orphans.¹³ Knowledge about scientific forest management is inadequate, and plantation productivity is poor even though biological growing conditions are exceptionally good. There were no permanent sawmills prior before the PFP's intervention. The district's immense forest resources are being squandered and the scale of preventable suffering is immense.

Groups of entrepreneurs in Makete were supported to establish the first permanent sawmill in that district (Figure 40). The sawmilling operation was vertically integrated with local tree growers organised into TGAs. Tree growers received support for plantation silviculture and local businesspeople were taught to operate the simple sawmill, which employs ten people. During its first month of operation (July 2018), the sawmill made an operating profit of 34% from contract sawing, a level of performance that would see the capital expenditure recovered in three years.

The breakdown saw was able to process 1.69 m³ per hour and so assuming an 8-hour working day and 210 working days per year this comes to 2,839 m³ per year. There are 27,696 ha of plantations in Makete and so assuming a very conservative mean annual increment of 10 m³ per ha per year the potential productivity of saw logs is at least 276,960 m³ per year there is space for at least 100 such sawmills. In Makete alone, there is scope for establishing around 100 such sawmills and employing around 1,000 people. If forestry and haulage operations and possibly secondary wood-processing are considered, the sector could employ many more.

¹³ Makete District Council Socio-Economic Profile, 2016

The plantations in Makete have never been subjected to scientific management and following a resource assessment of the local PFP-supported TGAs it was estimated that 46% of the plantations were in an urgent need of pruning and thinning. Tree growers were subsequently trained in pruning and thinning operations, so they could use scientifically proven methods to make their plantations more productive and produce high-quality logs. Over time, scientific management can lead to more high-value local processing opportunities. Figure 41 shows TGA members participating in tree pruning training.

Figure 40 Horizontal band saw in operation at the Makete industrial node



Figure 41 Tree growers in Makete node participating in training on pruning



3.4.2 Output 3.2: Decent jobs within the value chain

<p>Phase 1 indicators:</p> <p>50% of SMEs report decreased accident rates</p> <p>Average salary increased to TZS 7,000 per day</p> <p>75% of the PFP-supported SMEs employ women</p> <p>70 trainees trained through gender-targeted training</p> <p>70 disabled persons trained in technical short courses</p> <p>60 SMEs and 300 SME employees reached by the PFP occupational health and safety training</p>	<p>Achievement:</p> <p>24% reported decreased accident rates (and 76% reported no change) in the final SME survey</p> <p>Average salary of TZS 9,130 per day reported in the final SME survey</p> <p>53% of the supported SMEs were found to employ women in the final SME survey</p> <p>72 female entrepreneurs trained</p> <p>14 men trained, of which 3 physically disabled and 11 hearing impaired.</p> <p>301 people trained as part of FWITC and PFP technical courses, of which 80 (27%) women.</p>
<p>Conclusion: To be assessed.</p>	

The average salary per worker has increased constantly within the companies included in the PFP SME support programme since delivery on Result 3 started in 2016. The final figure available on this, recorded in the final SME survey of the programme in late 2018, was TZS 9,130 per day, exceeding the Phase 1 target by TZS 2,130 per day.

The final SME survey found that 53% of the PFP-supported SMEs included in the study employed women. Herein the previous reports by the supported SMEs have shown figures as high as 66% at the best. The difference to the baseline figure of 29% is nevertheless clear.

During the FY 2017/18 the PFP organised entrepreneurship training specially targeted at women in Njombe and Makete districts. A total of 72 women from 11 enterprises participated and learned about a variety of topics related to the entrepreneurial approach to business, SME management within the local forest value chain and applying marketing concepts in practice. Feedback suggested that the women participants appreciated the targeted training. Indeed, they said that they would like to receive further mentoring and business coaching in the future.

Specially targeted training was also organised for disabled people, involving 11 hearing-impaired and 3 physically disabled participants.

One disabled person, a professional woodworker, was employed full-time at the FWITC. He, too, participated in the training on health and safety issues and first aid with the rest of the FWITC staff.

The programme has produced two drafts of an occupational health and safety manual with an emphasis on forestry and forest industries. Neither, however, was practical enough to be officially launched for all programme beneficiaries and have, as a result, been read by only a limited audience. The drafts will be handed over to Phase 2 for revision.

4. ADHERENCE TO PRINCIPLES OF FINLAND'S DEVELOPMENT POLICY

4.1 Delivery in relation to four specific priorities of Finland's development policy

4.1.1 Gender inclusion and the rights and status of women and girls

Programme staff were trained on human rights-based approaches to development at the beginning of Phase 1.

The importance of gender balance was emphasised in all programme activities and special efforts were made to enhance female participation. Particular attention was accorded to gender balance during recruitment of extension officers to maximise the representation of women.

Wherever appropriate monitoring data was gender disaggregated. The proportion of women who had been involved in various programme activities by the end of Phase 1, is presented in Table 23. The figures indicate that the programme recruited 27% women among its human resources (33% excluding the all-male employee group of drivers).

Table 23 Gender distribution in programme activities and human resources

Category	Group	Female	Male	% Female
PFP employees	Long-term international experts	1	3	25%
	Long-term national experts	5	9	36%
	Long-term extension officers	4	10	29%
	Drivers	0	8	0%
	Other long-term support staff	2	2	50%
PFP training and extension participants	Extension-event participation (in beneficiary person-days)	16,562	31,165	35%
	Short-course trainees	3,343	5,212	39%
	VET students	19	21	48%
Tree planting scheme beneficiaries	TGIS beneficiaries	2,192	5,012	30%
	KVTC OSP beneficiaries	47	478	9%
	NFC OSP beneficiaries	306	720	30%
TGAs	TGA members	2,494	5,348	32%
	TGA-based facilitators	2	56	0%
	TGA chairpersons	4	91	4%
	TTGAU board members	4	12	25%
	TGA Secretaries	27	67	29%
	TGA Treasurers	38	38	50%
SMEs	SME employees	263	1,137	19%
VSLAs	VSLA group members	2,041	2,243	48%

Female participation in TGIS gradually increased year by year to reach 32% in the FY 2017/18. Female participation varied greatly from village to village. The personality of the extension officer was clearly important in explaining some of this variation, as was his or her gender. In general, it was male extension officers who achieved the highest female participation. Tree species selection and woodlot areas were independent of the gender of TGIS beneficiaries.

It is also noteworthy, that while only two women were contracted as a TGA facilitators, the TGA facilitators have made great strides in supporting female TGA members. While 33% percent of PFP EO guided extension activity participators were women, more than 43% of TGA facilitator guided extension event participators were female. This result is probably due to better timing and accessibility for women, as the trainer comes from their own community.

In its revised constitution, the TTGAU requires that at least one-third of its board members be women. The revised constitution also recommends that at least one-third of the board members of individual TGAs to be women, and the TTGAU follows this guideline when supporting TGAs in revising their constitutions.

By focusing on gender and social exclusion issues in VLUPs, the programme improved local awareness and gave marginalised groups a voice in planning the use of their most important assets.

By focusing on improving wood-processing technology and concentrating these enterprises in permanent plots near population centres, the programme made employment opportunities more attractive and practical for women.

4.1.2 The growth of the economies of developing countries to generate additional jobs, livelihoods and wellbeing

Estimates of the contribution of the forest sector to the national gross domestic product range between 1.3% and 2.7%. Plantation forestry and wood processing in the Southern Highlands are estimated to provide between twenty and thirty thousand jobs depending on the season.¹⁴

By promoting major opportunities for investors, providing vocational training, and improving the performance of actors along the entire forest value chain, the programme is starting to have a significant impact on growing the economy.

The forestry and wood-processing sectors are big business in relation to Tanzania's economy, but they are under-developed and there is great untapped potential to grow this sector of the economy, thereby generating additional jobs, livelihoods and wellbeing. The economic benefits of expanding this sector are broad and some are difficult to quantify, but chapters 2 and 3 provide a rough guide to some of the more important of them. Enhancements at the beginning of the value chain (such as improved seed) have cumulative benefits along the value chain (such as more and better logs entering the value chain quicker) but it is not possible to quantify these benefits here.

4.1.3 Democratic and better-functioning societies

The PFP facilitated broad-scale participation in the revision of the national forest policy, making it an inclusive and participatory document. This new forest policy sets the frame for the strategy, legislation and regulation that will follow, making the sector highly progressive and enabling of broad participation.

The programme undertook various interventions for strengthening governance, cooperation and grassroots democracy development:

- While the piloting of FICDCs had only just started, the initiative was well received and established a platform for district governments and private enterprises to communicate, improve understanding, and progress jointly towards optimising local value chains.
- The formation of enterprise groups such as the utility-pole group and the wood-energy group provided platforms for businesses with common interests to come together and solve common problems.
- District government participatory land-use management teams from ten districts received and acted on training in inclusive participatory techniques for VLUP.
- With broad PFP support, the TTGAU has grown to represent 7,962 households in 96 TGAs. Training of the TGAs on democratic ways to elect duty bearers, conflict resolution, finance management and other administration issues is gradually empowering tree growers and strengthening their institutions. The constitutions of the TTGAU and TGAs were increasingly human rights-based.
- Similarly, the number of VSLA groups which largely overlapped with the TGAs, grew to include 4,284 members in 191 groups who also received comprehensive training on: groups, leadership and elections; development of policies and rules; development of association constitution and finance management.

¹⁴ <http://www.privateforestry.or.tz/en/resources/view/value-chain-analysis-of-wood-plantation-from-the-southern-highlands>

4.1.4 Food security, access to water and energy, and sustainable use of natural resources

Food security and water resource protection were promoted by developing and applying improved methods during VLUP. Food security was also improved by cultivating business and employment opportunities.

Water resources were enhanced by reforesting degraded grassland. This initiative was particularly relevant in hill forest reserves that had degraded to fire-climax grassland as it promoted the infiltration of water into the soil instead of allowing for the rapid runoff characteristic of compacted grasslands. In this way the programme was able to reduce flooding during rainy periods and increase the availability of soil moisture during dry periods.

Most Tanzanians rely on wood for energy, but urban centres rely on charcoal that is mostly made from unregulated degradation of natural *miombo* woodland. During 2018 the sustainable manufacture of wood energy products from sustainable forest wood waste expanded rapidly. The PFP strengthened this trend by demonstrating the technology to small-scale charcoal businesses and training and mentoring them.

4.2 Human rights and social inclusion

4.2.1 Broad interventions

Social exclusion takes various forms in the programme area. In addition to gender, poverty, disease, differing ability levels, rural isolation and lack of access to information, markets and services take their toll. The high incidence of HIV/AIDS and the associated HIV/AIDS-related deaths have resulted in the breakup of many families and the orphaning of many children. Childhood malnutrition and the associated stunting are relatively common. Young people are particularly vulnerable because they often lack the skills that employers need and there are relatively few employment opportunities. Jobs that are available are often in the unregulated grey economy where health risks are high and social security contributions are not made. Whilst forestry and forest industries have great potential for creating employment and wealth to mitigate these factors, they are underperforming.

The programme listed major factors causing poor sector performance and impoverishment. Some of these factors such as disease, poor rural roads and inadequate rural electrification are not strictly forestry sector issues, but they do affect performance of the sector, and the industry does exacerbate these problems. For example, by attracting rural youngsters to leave home for education and employment opportunities in urban centres with high HIV/AIDS rates the industry increases exposure to this disease. After listing the issues, the programme grouped and linked them to both existing and needed structures within which the programme has or could gain influence in reducing their negative impacts (Figure 42). The TTGAU and its network of TGAs has large and increasing rural outreach that can be utilised to foster broader inclusive rural development. Industry associations can similarly be developed to promote broad inclusive development. The overall exercise highlighted the importance of engaging with rural electrification and roading planning processes. Forest industry cluster development committees under the leadership of regional and district government could foster the above changes.

The programme started strengthening human rights by improving village land use planning processes and practical implementation, by rolling-out village savings and loan association services, by supporting vocational education and training, and by promoting innovation, investment and employment in the sector but these initiatives still required consolidation. The lessons learned in developing these initiatives need to be extended into environments with many smallholder forests, where they could be of immediate value.

Concerning the VSLA service provision, the programme double-checked whether the poverty level of the beneficiaries affected how well they could access the VSLA credits. The results, visualised in Figure 43, showed two main findings: 1) people with a higher PPI score were slightly more likely to consider that the credits were well accessible, but the effect was almost negligible; and 2) three-quarters of the beneficiaries considered that the credits were easily accessible while only 2% considered them inaccessible.

Figure 42 Factors causing poor sector performance and impoverishment, and local level interventions to ameliorate impoverishment

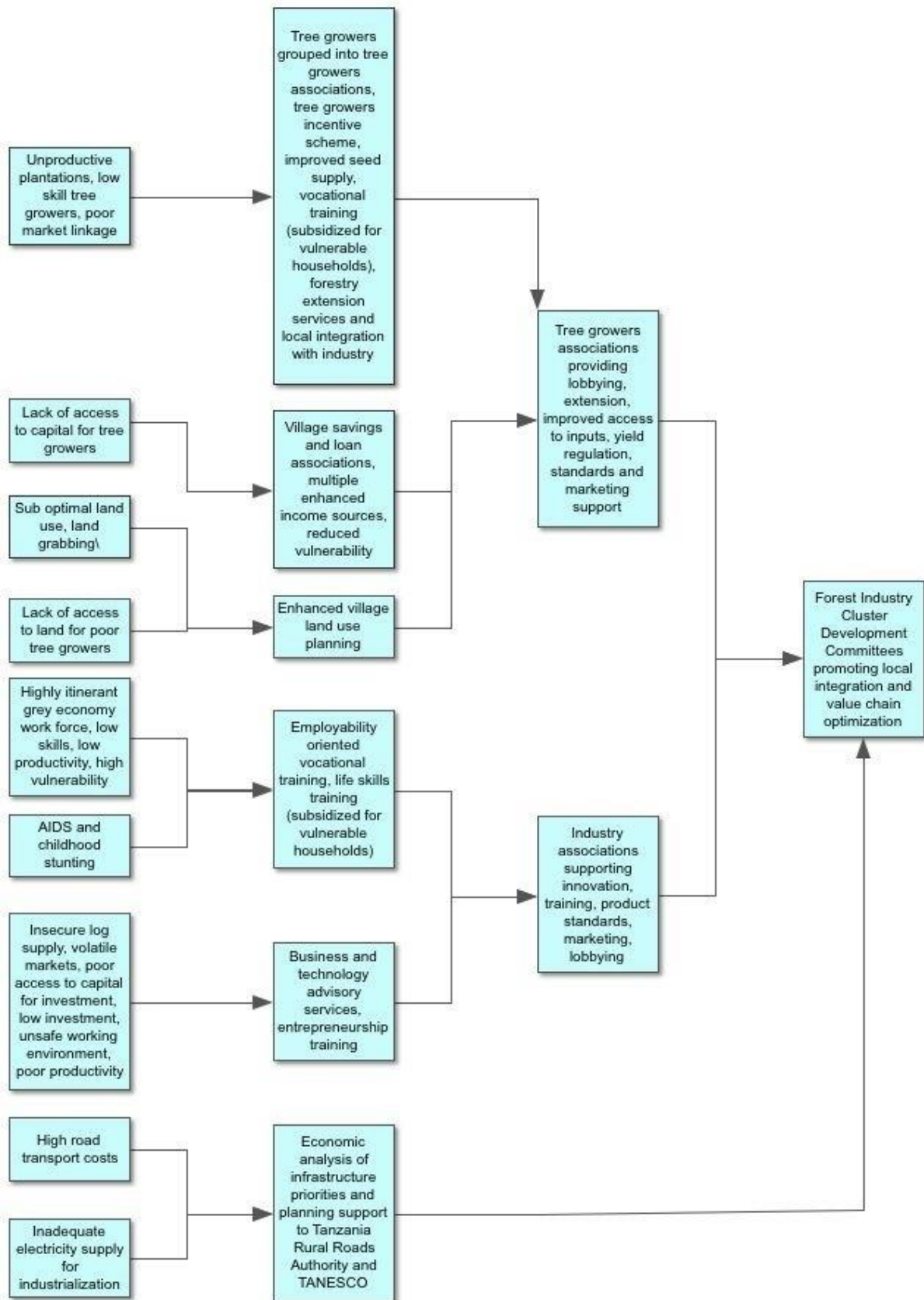
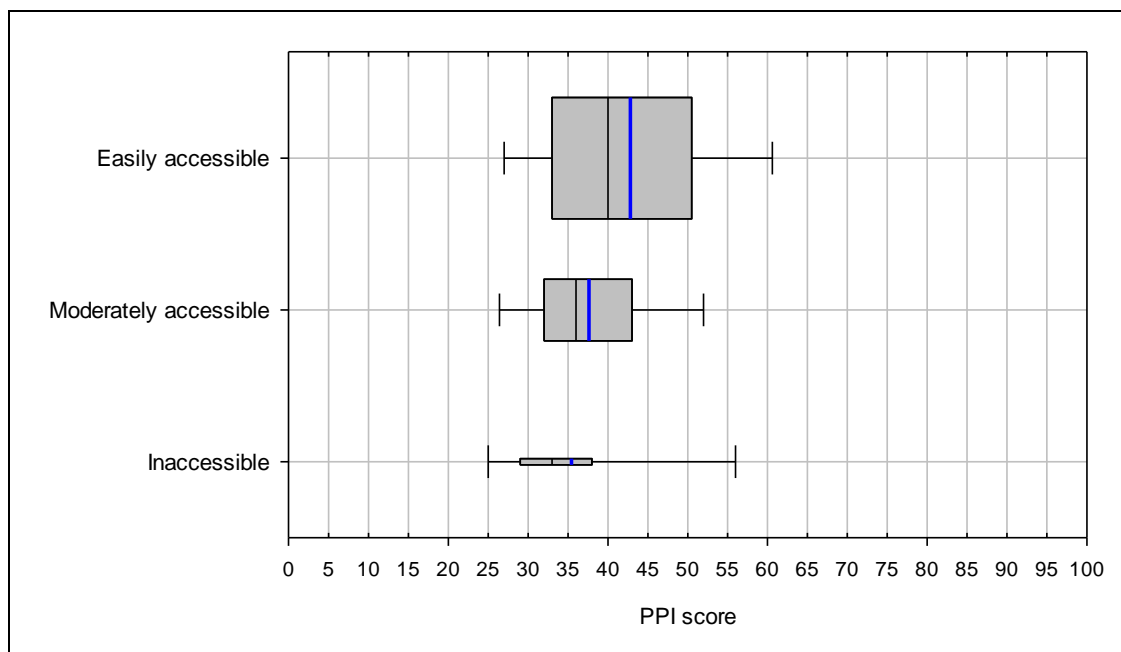


Figure 43 Access to VSLA credits (as stated by beneficiaries) by PPI score with box size corresponding to no. of responses



Note: The boxes represent observations between 25th and 75th percentile, and the whiskers represent observations between 10th and 90th percentile. Additional bars show medians (black bars) and arithmetic means (blue bars). No. of responses: Easily accessible = 253; Moderately accessible = 83; Inaccessible = 7.

4.2.2 Specific interventions

Directly implemented plantations for vulnerable households

During the planting seasons of the FY 2014/15 and 2015/16, the PFP worked with village authorities to establish plantations for vulnerable households. During 2018 the PFP returned to meet the concerned vulnerable groups and village authorities and to inspect the plantations. 90.4 ha of these plantations in ten villages were still commercially viable although almost no weeding had been carried out or fire protection provided since planting. Arrangements for sharing the benefits of harvests between the village and the vulnerable people varied, with villagers claiming 20–40% for use in village development works such as rehabilitating dispensaries, schools and public offices. The 60–80% that went to the vulnerable was to be spent on projects identified by the vulnerable themselves.

The PFP's Memorandum of Understanding with the TASAF

To better support the most poor and vulnerable, the programme signed an MoU with the TASAF in which the TASAF agreed to use its community driven-development approach to identify vulnerable households in the villages where the PFP operates. Eligible vulnerable households in those villages which had not previously received TASAF support were enrolled in the Productive Social Safety Net (PSSN) to receive conditional cash transfers from TASAF.

Under the MoU, PFP paid TASAF to create productive plantation forests for vulnerable households, as one of that organisations standard support interventions under its public works programme. TASAF organised establishment of these plantations for vulnerable households in six villages in Makete District. TASAF was responsible for implementing and supervising these activities and the role of PFP was limited to supplying high quality planting material. Those six villages set aside 255 ha for this purpose. The PFP supplied high-quality seedlings to plant the 204 ha designated for planting in 2017. According to TASAF reports, 73.5 ha was planted. Monitoring conducted by the PFP in August-September 2018 revealed that two of the six

plantations did not have any trees and that the remaining four held 27.8 ha of viable plantation area. Plantation establishment took place under the TASAF's Public Works Programme (PWP), which offers people identified as poor and vulnerable employment opportunities, including plantation establishment. According to the TASAF report, about 70% of PWP beneficiaries were women.

Vulnerability of itinerant workers

The vulnerability of itinerant workers in the forestry sector is a concern that the PFP shares with the Forest Policy and Resources Division of the Forestry Department of the FAO in Rome. Itinerant workers are at high risk of industrial accidents, but, as they are outside the formal economy, often do not have access to formal social protection facilities. The PFP hosted an FAO mission to PFP programme sites in May 2017 and has continued to share data with that organisation. In this way PFP supported FAO to plan its own intervention to support these vulnerable workers.

The programme also encouraged SMEs to make their workplaces safer and to bring their labour force into the formal economy so that they could access state benefits.

The programme also prepared a manual on occupational safety and health specifically for SMEs in the wood-processing business.

5. ASSUMPTIONS AND RISKS

The Programme Document described the key social, environmental, and sustainability risks of the programme as follows:

5.1 Social risks

Social risks related mostly to the concern that vulnerable groups might not benefit from the programme and might even have a negative impact on their livelihoods, if, for example, they had less chance to use resources from non-agricultural land. The PFP employed a participatory VLUP process which utilises the results of a mapping of areas important for vulnerable groups as its key mechanism to safeguard the rights of vulnerable people and strengthen their role in the community. In addition, the PFP promoted innovative measures for creating employment for the vulnerable in the value chain so they would benefit directly.

Local people have a long history of using mapping and other forms of spatial representation. Participatory mapping was first facilitated by outsiders in the 1970s and the recent phenomenon of freely available high-resolution satellite imagery has stimulated rapid advances in methodology. Since land-use planning and mapping is an exercise of power, it impacts people's lives and questions of who captures the technology, whose space it is, and whose power prevails apply.

The manual created by PFP "Tools and Spatial Technologies for Village Land-Use Planning: A Practitioner's Manual for Active Community Engagement" provides methods that level access to the technology, open discussion about whose space it is, and even out power. These technologies have the following results:

1. Enable the collection, analysis and discussion of location-based information by villagers even in areas that are impractical to survey in the field;
2. Strengthen the informed and active participation of villagers, especially women and other disadvantaged groups, in deciding how their land is allocated and used;
3. Enhance villagers' commitment to implementing their VLUP by developing a sense of self-efficacy and ownership;
4. Create more detailed, accurate and standardised VLUP maps without increasing the costs of the VLUP process; and
5. Provide spatial data that can be reliably matched with other spatial data such as data on vegetation and soils.

The quality of the outcome does, however, depend on the sincerity with which the tools are applied. Those who facilitate and those with power must have the vision and commitment to ensure that the processes lead to sustainable gains, not losses, for those who are the poorest, the most marginalised, and the least powerful. Doing so is a major challenge, one which requires training in human rights and possibly a shift in attitudes amongst some district government service providers and those who provide quality assurance. Quality-assurance processes need to be broadened to ensure that land-use planning is not employed to further marginalise the vulnerable.

Whilst advances in VLUP have certainly been made, there needs to be additional interventions to ensure that future land-use plans will be optimal.

Innovative measures applied by the programme for creating employment for the vulnerable in the value chain involved the following:

1. Inclusion of the vulnerable in the TGIS, which does not require land ownership or the ability to afford seedlings and weeding operations;
2. Strengthening the TTGAU to promote the interests of smallholders;
3. Delivering VSLA support to small tree growers and small-scale entrepreneurs;

4. Providing employment-targeted vocational education and training opportunities that do not require previous formal education or ability to pay;
5. Promoting wood-processing technologies that are appropriate in remote rural areas and do not require much physical strength;
6. Promoting a sustainable charcoal value chain that will reach into remote rural areas and not require significant capital investment;
7. Levelling access to business, technology and market information services by focusing on the delivery of these services to the poor;
8. Promoting forest plantations for the vulnerable both directly and through the TASAF;
9. Identifying vulnerable households and enrolling them in the TASAF's public social security network and linking them to the TASAF's conditional cash transfers; and
10. Promoting FICDCs, which should eventually result in better roads and electrification in remote rural areas where smallholder forestry takes place.

Whilst measures have been taken to include poor and vulnerable households, such measures do not by themselves guarantee the social justice of outcomes. Results from the programme monitoring indicated that vulnerable households were represented within TGAs and provided for under the TGIS rather proportionately. The socio-economic end study of the programme, however, only captured a few representatives from the poorest groups of the society among the interviewed TGA members.

5.2 Environmental risks

Environmental risks mostly related to concerns that extensive monoculture tree plantations may have a negative impact on biodiversity if plantation sites and management practices are not based on adequate biodiversity mapping and assessment of watershed protection needs. There were also concerns that some exotic tree species might invade areas adjacent to plantations and become an invasive species which displaces local natural species. Appropriate measures to ensure such invasion did not occur were to be taken.

The PFP applied environmental safeguards (refer to "Programme Factsheet"). It did not, for example, operate in or near edaphic grasslands but took place mostly on fire-prone grasslands that were themselves the result of past environmental degradation. By replacing degraded fire-climax grassland with plantations, the programme has improved water catchment characteristics as is evidenced by the streams emerging from Sao Hills industrial plantations. Consequently, the programme did not degrade water catchments but instead rehabilitated degraded hill catchment areas.

Environmental management and risk reduction in the programme is visible in the following:

- By retaining natural forest mosaics and corridors in planting areas, the programme contributed to their protection. This effect can be seen clearly in some of the older teak plantations in Kilombero.
- By promoting Tanzanian tree seed orchards the programme acted to remove the need for importing planting material, which carries with it the risk of introducing invasive pathogens.
- By reducing fire in the landscape, the programme not only protected the established plantations and their related benefits but acted to facilitate some natural environmental restoration processes such as the natural regeneration of indigenous species.
- Invasive exotic species were prevalent in the programme areas decades before the PFP began. The programme provided the options of sawmilling and charcoaling exotic tree species to use them productively or remove them.

5.3 Sustainability risks

5.3.1 Sustainability risks identified in the Programme Document

The Programme Document suggests that most sustainability risks are related to development of sustainable businesses for TGAs and SMEs.

The programme engagement with SMEs only started to during 2016. During the FY 2017/18, several SMEs were able to improve their sawmilling businesses as programme business and technology advisory services, technology demonstrations, and networking opportunity provision started to gain traction,. The sawmilling business is however linked to the construction industry, which is highly volatile, and most sawmills are also dependent on log supplies from the government plantations of Sao Hill, a source which, in the past, has also involved significant risk. Nevertheless, PFP-supported sawmills were in a better position to survive and prosper than those that were not supported.

VSLA support also started to show a large-scale impact during the FY 2017/18 with many tree growers and small-scale businesspeople either starting new businesses or improving existing enterprises. The VSLA methodology is well researched and VSLA groups tend to be self-sustaining when support is reduced.

Support for wood-energy product businesses only started in 2018. It achieved rapid take-up amongst medium-scale sawmillers needing to make fuller use of their logs (Table 21). Although the PFP gave small-scale operators the most attention, progress was only moderate with this group because they were risk-averse and tended not to have industries of their own with which they could integrate wood-energy product production. In September 2018 the PFP initiated a wood-energy product manufacturers' association to represent the interests of that emerging industry sector. The wood-energy sector is still in its infancy and to achieve its massive growth potential will need to overcome the several challenges facing and to secure the active support of the government.

FICDCs were initiated to promote enabling environments for SME and TGA businesses, but these forums will require continued support.

Towards the end of Phase 1, the potential for linking small-scale village-based veneer industries with eucalyptus growers emerged, but the PFP was no longer able to promote this opportunity because its remaining implementation period was too short.

5.3.2 Sustainability risks identified by the external mid-term evaluation

A midterm evaluation was carried out in May 2017. The midterm evaluation identified significant risks to the sustainability of established structures like the FWITC, VETA forestry and wood-processing courses, the TGA apex body and TGAs, TGA-based seed orchards, extension services, and plantations for the vulnerable. All these items are briefly discussed below.

FWITC, including saw-milling and wood technology, nursery sites and the industrial development node

The FTI assumed responsibility for the FWITC and deployed one of its officers to manage the centre. The MNRT also prepared to assign an accountant to the FWITC.

The FWITC developed a training and a business plan detailing multiple income sources (refer to 0). The MNRT promoted the FWITC by granted it a Sao Hills forest harvesting allocation, which will enable use its sawmill and wood-energy facilities to generate a substantial profit. Capital investment in the nursery was completed in 2017 and the FWITC was able to generate a positive cash flow from that operation from 2018 onwards. Capital investment in the industrial node was also completed, and the node generated a 34% profit against operational costs in July 2018.

Furthermore, the MNRT committed to procuring the FWITC site upon agreement from the current owner and initiated valuation processes.

Financing forest sector-worker training is never without challenges but in 2018 the FWITC was on a good trajectory.

VETA forestry and wood-processing courses

VETA forestry and wood-processing courses were piloted at the FTI and the FITI because these institutions did not have adequate staff to allow them to allocate full-time lecturers to the FWITC for this purpose. The current piloting will continue beyond Phase 1 up to June 2019. The PFP has set aside funding for this purpose in its approved work plan. To be sustainable, VETA must accredit these two-year courses, and to support this PFP has been facilitating reviews of course implementation as the first and second modules of both courses have been completed. Then they should be offered at the FWITC alongside the short courses. The FWITC business plan provides for these courses and the required staff to teach them.

Financing these courses into the future will remain challenging and require government support in enforcing existing regulations regarding worker training.

TGA apex body and TGAs

The ERET report states that *“The Apex will almost certainly not have adequate income to support its activities and pay for its experts. Without extended support, the TGA Apex (now TTGAU) is unlikely to survive.”*

The TTGAU got support to develop a business plan and started engaging in the wood trade. With the TTSA it supported the development of seed orchards that the PFP capitalised and which should generate positive cash flows from 2025 onwards. The TTGAU also applied for and obtained support from additional agencies.

The network will continue to need PFP support to be able to grow as it should, but its level of dependency is decreasing.

TGA-based seed orchards

PFP entered a three-way memorandum of understanding with TTSA and the TTGAU which details seed orchard sustainability plans. PFP provided training to both TTSA and the TTGAU on seed orchard management and prepared a seed orchard management manual for reference. Phase 1 completed the major capital investment seed orchards and the TFS committed to continuing support if the PFP is not able to.

Extension services

The ERET report states that *“the current extension undertaken by PFP, using contracted EOs and village-based facilitators, relies on programme support.”* It further stated that *“Without programme support, village-based (TGA) facilitator’s payment will depend on the TGA Apex body and/or TGAs. At this stage, it is not realistic to assume TGAs paying for their services.”*

At the end of Phase 1 it still is not realistic to assume that TGAs will be able to pay for the extension services that they and other tree growers need.

On the positive side, the TTGAU is actively evaluating its options for providing affordable extension services to its members. In addition, the newly conceived FICDCs could provide a forum for extension service providers to come together and plan how to optimise extension delivery where it is needed.

Whilst a low level of extension services should be sustainable, the level of service delivery that will be required by Phase 2 will demand external financing. As new TGAs are formed in more afforested areas with more immediate profit-generating opportunities, the possibilities for economically retaining extension service providers and local level consultants should improve.

Plantations for the vulnerable

During 2015 and 2016 the programme channelled support directly to vulnerable households through establishing plantation assets for them. Monitoring conducted during 2018 found that these plantations were mostly still in viable condition and that the villages had systems for identifying the vulnerable and for sharing maintenance responsibilities and profit. The plantations established for vulnerable in 2017 through the TASAF cooperation were found to have been less successful in silvicultural terms, with less than 40% of the reported planting found in a commercially viable state by the monitoring. For these surviving plantations, however, similar responsibility-sharing and profit-sharing mechanisms were in place as with the 2015 and 2016 plantations.

Forestry sector financing

The VSLA approach to forest financing was considered to be artificial but it is a well-established methodology for reducing the type of financial vulnerability that often leads smallholders to dispose of plantation assets prematurely.

The programme's work on identifying and promoting forest sector investment opportunities had positive results, thereby proving that finance is available for suitable opportunities.

5.4 Opportunities

The Southern Highlands forestry sector is replete with opportunities for growing the economy and improving the lives of all sectors of society. The PFP has started to develop some of these opportunities but has not had time to progress on all or optimise any of them. All the initiatives that have been initiated are also opportunities for further development. The recently emerging opportunities include the following:

1. Replicating work at the industrial node of integrating local tree growers organised into TGAs with local sawmills. In eucalyptus-growing areas local veneer mills would also be appropriate.
2. Establishing and strengthening district-level FICDCs to optimise local value-chain performance.

Opportunities are reported on more fully under the chapter on recommendations (chapter 7) below.

Carbon finance

Carbon finance might be able to support some continued smallholder participation in afforestation when the TGIS scheme is withdrawn. The Voluntary Carbon Standard (VCS) Programme is the world's leading voluntary programme for the certification of greenhouse gas emission reduction projects. Currently the small amounts on offer, the delayed timing of the release of finance, and verification costs make the system unattractive, but this might change.

Excluding OSPs and seed orchards, the pine and eucalyptus plantations established through the phase 1 support would have a theoretical undiscounted value of about EUR 5.0 million assuming the Verified Carbon Standard (VCS) crediting methodology. Discounting affects the total VCS value by bringing it into EUR 3.4 million, EUR 2.4 million and EUR 1.7 million with 6%, 12% and 18% interest rates, respectively.

VCS crediting methodology considers the long-term greenhouse gas benefits in relation to the baseline scenario. Through the VCS, each tonne of additional CO₂ equivalent (CO_{2e}) sequestration becomes available for sale in the carbon offset markets annually as the plantations grow, until a long-term average has been reached. A common minimum period for VCS projects is 30 years.

Table 24 summarises the VCS potential of the plantations established through the programme support, assuming that 19-year and 20-year rotations with multiple thinnings are applied for pine and eucalyptus respectively for producing large-diameter timber.

Table 24 Greenhouse gas benefit potential of Phase 1 pine and eucalyptus plantations in terms of VCS credits

Benefit / Feature	Pine	Eucalyptus
Greenhouse gas benefit during first rotation as opposed to the baseline scenario	251 tCO ₂ e/ha	268 tCO ₂ e/ha
Greenhouse gas benefit as 30-year average as opposed to the baseline scenario	87 tCO ₂ e/ha	119 tCO ₂ e/ha
Value* of the GHG benefit through VCS credits	Undiscounted	714 EUR/ha
	Discounted with 6% discount rate	527 EUR/ha
	Discounted with 12% discount rate	399 EUR/ha
	Discounted with 18% discount rate	309 EUR/ha
Timing of the credit availability	3–7 years after planting	1–4 years after planting

* EUR 6.0 (USD 6.8) per tCO₂e¹⁵

Note: tCO₂e = tonnes of CO₂ equivalent

The applied interest rate affects the net present value of the credits since they become available gradually. Table 24 presents the situation at the time of plantation establishment. However, since the first PFP-supported plantations had become over four years old by the time of reporting, significant areas of PFP-supported pine and especially eucalyptus could have been benefitting from the VCS credit sales already in the case the mechanism had been applied, as can be seen in the timing of the credit availability.

It should be noted that applying VCS requires multiple consultations, VCS project formulation, and third-party certification, which cannot be applied retrospectively. Hence the calculation for Phase 1 plantations herein is theoretical and does not consider the cost and the planning effort of pursuing these credits. The additionality requirements of the VCS would also need be fulfilled. Essentially, these VCS additionality requirements necessitate that the project would not have been feasible without VCS income.

¹⁵ Ecosystem Marketplace, State of the Voluntary Carbon Markets 2017; average price for Tanzania

6. RESOURCE ALLOCATION

6.1 Human resources

Table 26 shows the delivery of consultant months (technical assistance) by position against the provisions in the Programme Document for the original programme period (until 31 December 2017). It also shows the additional consultant month delivery during the no-cost extension of the programme (until 30 April 2019).

6.2 Phase 1 assets

The fixed asset register of PFP on 30 September 2018 was as presented in Annex 2. These assets and any additional Phase 1 assets are to be directly handed over to Phase 2.

6.3 Finances

Programme finances

Table 27 shows the Phase 1 budget provision and the respective expenditures by financial year. At the end of the phase, in 30 April, 2019, the programme had fully used its available budget. Figure 44 shows the programme's quarterly rate of expenditure, with the gradually increasing rate of delivery which peaked at the FY 2016/17 and FY 2017/18, until tuning down towards the end of the phase.

Financial statement of the FWITC

Capitalisation by the PFP has enabled the FWITC to start generating revenue through commercial activities, which is an important step in increasing its sustainability and eventually reaching financial independence. While the FWITC was still dependant of the PFP at the end of Phase 1 in covering e.g. multiple staffing costs, the centre was nevertheless on a right track. Table 25 shows a financial statement of the FWITC from the last 10 months prior to the end of Phase 1.

Table 25 FWITC financial statement for 10 months (July 2018 – April 2019)

Category	Activity	Amount (EUR)
Revenues generated	Training fees	9,130
	Saw doctoring service	16
	Wood Working	832
	Charcoal sales	129
	Nursery revenues	465
	Sawmill	66,336
	Others	800
	Revenues – Sub-total	77,708
Operational costs	Training costs	2,417
	Saw doctoring expenses	16
	Wood working costs	259
	Charcoal expenses	531
	Nursery costs	28
	Sawmill operating costs	64,423
	Costs – Sub-total	67,674
Gross profit before taxes		10,034

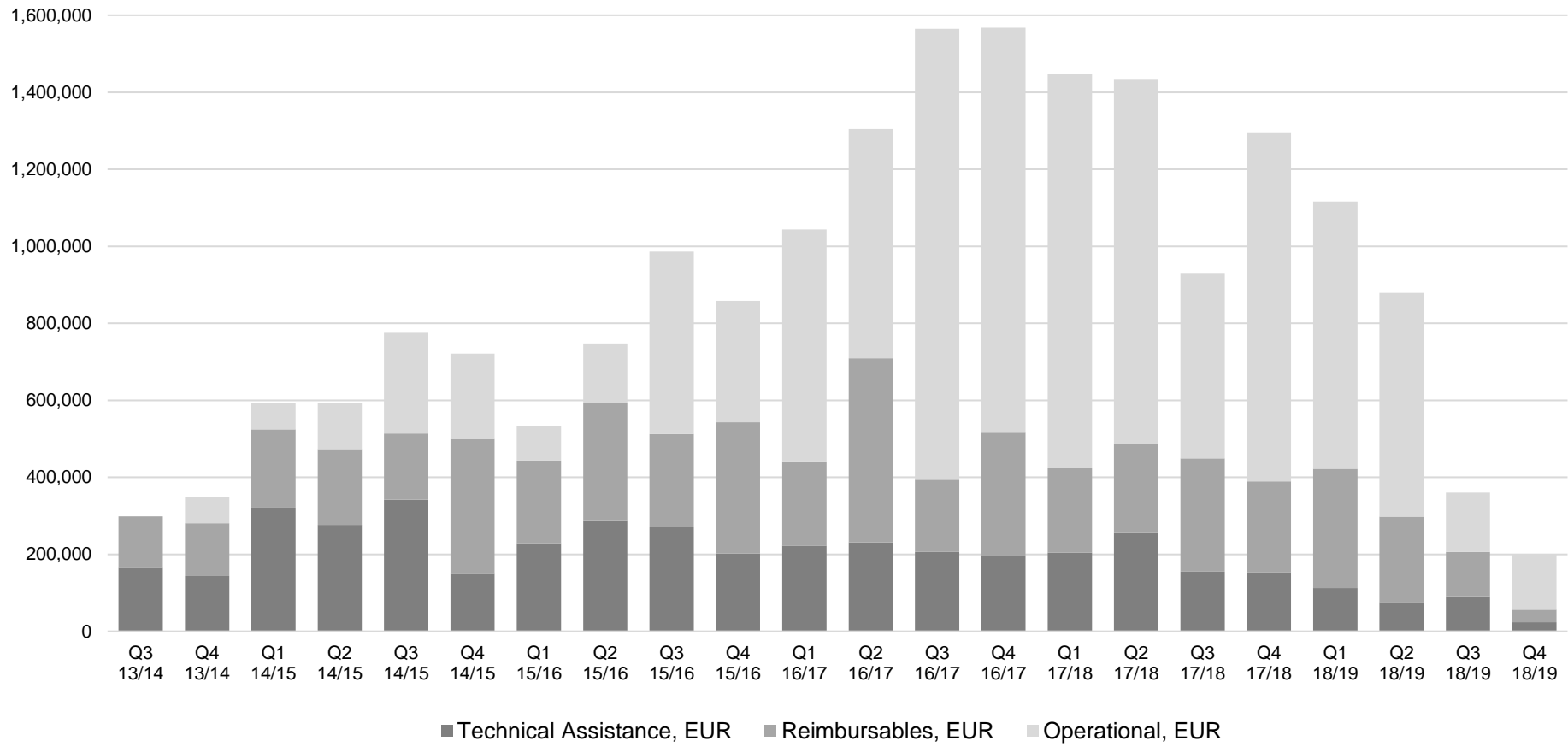
Table 26 Technical assistance delivery during Phase 1

Position	Original Programme Document period (until 31 Dec 2017)								No-cost extension (until 30 Apr 2019)	
	No. of months allocated in PD	1 Dec '13 – 30 Jun '14	1 Jul '14 – 30 Jun '15	1 Jul '15 – 30 Jun '16	01 Jul '16 – 30 Jun '17	1 Jul '17 – 31 Dec '17	Total TA delivery until 31 Dec '17	Balance against provision in PD	1 Jan '18 – 30 Apr '19	Total TA delivery during Phase 1
International LT	117.0	16.8	27.6	25.3	24.4	12.4	106.6	10.4	15.8	122.3
Team Leader	42.0	6.5	9.0	9.9	12.7	4.9	43.0	-1.0	13.7	56.7
Plantation Forestry Advisor	42.0	5.2	11.1	11.0	10.0	5.6	42.8	-0.8	-0.8	42.0
Financial Advisor	11.0	0.0	0.0	0.0	0.0	0.0	0.0	11.0	0.0	0.0
Capacity Building Advisor	22.0	5.0	7.5	4.5	1.8	2.0	20.8	1.2	2.9	23.7
National LT	279.5	11.8	86.8	69.0	77.1	35.9	280.6	-1.1	57.7	338.3
National Private Forestry Advisor	42.0	5.5	11.5	11.0	10.9	4.9	43.7	-1.7	13.7	57.3
Chief Finance Development & Administration Advisor	40.5	3.6	11.5	6.8	9.7	5.7	37.2	3.3	14.7	52.0
Communication Expert/Extension	41.0	2.7	13.0	8.7	12.3	5.1	41.8	-0.8	0.0	41.8
Community Development Expert	41.0	0.0	14.6	10.1	11.8	4.8	41.2	-0.2	5.6	46.8
National Training Expert	36.5	0.0	10.3	11.2	10.4	5.3	37.2	-0.7	11.0	48.2
Land-Use Planning & GIS Expert	39.5	0.0	13.5	10.8	10.3	5.8	40.5	-1.0	12.8	53.3
TGA Plantation Manager	39.0	0.0	12.3	10.5	11.9	4.3	39.0	0.0	0.0	39.0
International ST	28.5	0.7	4.6	13.9	3.3	4.3	26.8	1.7	3.0	29.8
National ST	34.5	1.6	13.7	2.7	0.0	1.0	19.0	15.5	0.0	19.0
Grand Total	459.5	30.9	132.7	111.0	104.9	53.6	433.0	26.5	76.4	509.4

Table 27 Realised expenditure by financial year and percentage of total Phase 1 budget used (in EUR)

	Budget, Prog' Doc' Phase 1	Expenditure 1/1/2014–30/6/2015	Expenditure 1/7/2015–30/6/2016	Expenditure 1/7/2016–30/6/2017	Expenditure 1/7/2017–30/6/2018	Expenditure 1/7/2018–30/4/2019	Total expenditure 1/1/2014–30/4/2019	Balance, Phase 1 30/4/2019	% of Phase 1 budget used 30/4/2019
Operational	10,400,566	738,637	1,033,235	3,420,297	3,352,683	1,575,013	10,119,865	280,701	97%
Result area 1	2,201,565	300,921	177,017	630,684	886,738	747,026	2,742,386	-540,821	125%
Output 1.1	256,222	94,085	52,277	62,547	159,548	39,858	408,315	-152,093	159%
Output 1.2	125,000	60,879	13	7,338	0	9,358	77,588	47,412	62%
Output 1.3	70,000	0	0	229	-229	0	0	70,000	0%
Output 1.4	171,698	0	4,257	85,945	35,313	170,802	296,317	-124,619	173%
Output 1.5	245,422	32,867	27,190	97,177	50,938	33,383	241,555	3,867	98%
Output 1.6	998,146	111,503	87,386	367,717	417,050	316,017	1,299,673	-301,527	130%
Output 1.7	335,077	1,587	5,894	9,732	0	0	17,213	317,864	5%
Output 1.8	0	0	0	0	224,118	177,608	401,726	-401,726	n/a
Result area 2	7,195,001	437,717	790,815	2,472,685	2,052,012	629,657	6,382,886	812,115	89%
Output 2.1	542,446	51,934	46,673	264,308	133,629	26,013	522,557	19,889	96%
Output 2.2	626,109	17,102	82,319	177,668	156,951	90,430	524,470	101,639	84%
Output 2.3	4,624,869	336,176	561,117	1,711,251	1,709,532	513,214	4,831,290	-206,421	104%
Output 2.4	1,401,577	32,505	100,707	319,457	51,901	0	504,570	897,007	36%
Result area 3	1,004,000	0	65,402	316,928	413,933	198,330	994,593	9,407	99%
Output 3.1	839,000	0	49,489	316,928	411,925	198,330	976,672	-137,672	116%
Output 3.2	165,000	0	15,913	0	2,008	0	17,921	147,079	11%
Reimbursable	3,578,754	1,191,440	1,104,515	1,203,715	984,861	679,384	5,163,915	-1,585,161	144%
Staff	1,390,218	278,368	407,204	196,413	198,318	152,926	1,233,229	156,989	89%
Travel	293,915	88,496	41,951	43,024	66,179	30,274	269,924	23,991	92%
Housing	384,989	115,150	61,765	120,788	71,815	10,407	379,925	5,064	99%
Duty travel	324,954	110,647	144,452	142,030	183,558	60,368	641,055	-316,101	197%
Office	587,629	242,083	182,602	206,790	183,942	121,387	936,804	-349,175	159%
Vehicles	313,009	143,226	86,833	123,883	181,671	96,974	632,587	-319,578	202%
Procurement	284,040	213,470	179,707	370,787	99,377	207,048	1,070,389	-786,349	377%
TA	3,920,000	1,302,623	988,401	856,185	766,373	302,560	4,216,142	-296,142	108%
Internat'l long-term	n/a	624,541	360,761	331,240	228,247	127,400	1,672,189	n/a	n/a
Internat'l short-term	n/a	73,173	189,140	66,216	165,073	0	493,602	n/a	n/a
Nat'l long-term	n/a	480,047	409,920	453,600	373,053	175,160	1,891,780	n/a	n/a
Nat'l short-term	n/a	124,862	28,580	5,129	0	0	158,571	n/a	n/a
Contingencies	1,250,680	n/a	n/a	n/a	n/a	n/a	n/a	1,250,680	n/a
Additional MFA commitment	350,000	n/a	n/a	n/a	n/a	n/a	n/a	350,000	n/a
Grand total	19,500,000	3,232,700	3,126,150	5,480,197	5,103,917	2,556,956	19,499,921	79	100%

Figure 44 Quarterly rate of expenditure during Phase 1 by budget category



7. PHASE 1 LEARNING AND RECOMMENDATIONS

7.1 Achieving broader understanding and buy-in for the vision

Some professional foresters in Tanzania cherish a vision, a vision of industrial plantations in the Southern Highlands being a major contributor of national, regional and local development by providing raw materials, infrastructure, high-value employment, income and environmental services. They see industrial plantations sustaining wood-and-biomass-processing industries that supply markets for strength-graded structural timber, utility poles, plywood, high-quality furniture, biochemicals, biomaterials, biofuels, paper, engineered wood products, laminated panels, and wood pellets and other energy products. They understand that the total trade balance of forest products was negative in Tanzania between 2010 and 2016 and that, by 2050, domestic demand for forest products will more than double to some 5 million m³ (roundwood equivalent). They understand, too, that there is still plenty of space for expanding the forestry sector and that, by developing domestic industrial capacity and wood supply, it is possible for Tanzania to become self-sufficient in utility poles, sawn wood and plywood and even pursue significant export opportunities. Then they remember that few have the specialised professional education and experience to understand or care about their vision and that they still have a long way to go if they wish to compete with their counterparts in other developing countries such as Vietnam and South Africa.

Through PFP support good progress was made on strengthening the supply side of the plantation value chain. In the continued support to the development of private forestry in the Southern Highlands, there is need for further facilitation of supply side developments. But above all there is a need to put more focus on the demand side, i.e. value addition that happens after the timber leaves the forest. Here there are opportunities to open up new high value markets and create wealth that can contribute to poverty reduction.

Recommendations relating to achieving broader understanding and buy-in for the vision:

There is a need to develop the understanding and buy-in of this shared vision within all relevant stakeholders including MNRT, local government, and the private sectors and civil society in Tanzania. A continued support to private forestry can have an important role to play in this regard.

Important interventions for promoting the understanding and buy-in need to include a more emphasis on communication and sharing of information with key stakeholders utilising both existing networks and communication channels, as well as new ones (e.g. the forest industry cluster development committees). A continuation of the PFP needs to have closer and more frequent engagement with regional and district governments to enhance buy-in as well as ensure the forestry vision contributing government annual planning procedures.

7.2 Human rights and industrial forestry

The programme sought to achieve a balance between the need to deliver tangible and measurable physical outputs and the need to develop the prerequisites of poverty alleviation, which include the development of people – their assets, opportunities, capabilities and relationships. For further development of forest plantation-based value chains, and thereby wealth, it is critical to significantly increase the take-up of improvements in highly technical aspects of optimising smallholder plantation productivity, smallholder plantation harvesting technology, wood and biomass processing technologies and value chain integration. At the same time, if the human side of the equation is neglected, these technical improvements may be misdirected or not gain traction at all, and therefore whatever beneficial outputs generated may not contribute to poverty reduction. Consequently, it is fundamental that poor people are an integrated part of the value chain development through inclusion, communication and collaboration.

One key area where industrial forestry conflicts with human rights is the so-called “timber rush” phenomenon in which outside urban investors race to grab rural land, land that is often needed

for food production, and turn it into investment plantations. In planned landscapes, there is generally space to accommodate both land uses, but land is becoming increasingly difficult to acquire and planning is not always as good as it could be.

Industrial forestry at its current stage of development in Tanzania has great potential for employment creation and wealth generation in poor rural communities. Unfortunately, the sector is underperforming. One challenge is that, since the sector is relatively un-developed, forestry work is largely manual and requires a lot of muscle-power (Figure 45). This problem is particularly severe for small woodlot owners who individually and even collectively have difficulty in affording mechanisation. At the same time many because of AIDS, poor nutrition and other issues, do not enjoy good health. Hand tools and basic mechanisation that could make their work easier are not commonly available.

Figure 45 Manual extraction of large pine logs from steeply sloping TGA woodlot in Ihela, Makete District



As the sector develops, many more high-quality employment opportunities that do not require physical strength will emerge if the current skill gap can be fixed. The programme began to address this skill gap: vocational curricula were developed and piloted, and a training centre was established. Much capacity-building was indeed delivered but the impact of the effort was limited due to the unwillingness of employers to finance training for workers who might then demand pay increases or move to competitors.

When it comes to working conditions, there is a need:

- To develop and enforce regulations relating to worker training and competency standards, occupational health and safety, and participation in state social security and pension schemes.
- For Tanzanian workers to organise themselves and demand rights, but, currently, with low skills and in an environment of high unemployment, they do not enjoy much bargaining power.

Recommendations relating to promoting human rights and industrial forestry:

Ensuring that human rights are adequately addressed as the forest sector develops in Southern Highlands will be essential. Here a next phase of PFP will have an opportunity to play an important role through various interventions around safeguards, capacity, adequate tools and monitoring mechanisms.

In a next phase of PFP the following is recommended on the promotion of human rights:

- Increased emphasis on the cooperation with regional and district community development officers as well as other key institutions (e.g. SHIVIMITA) on human rights and poverty eradication. A starting point could be the mapping of poverty and vulnerability and their causes in relation to smallholder forest resource-based opportunities. This would then be utilised in developing a strategy for maximising the programme's ability to improve the lives of poor and vulnerable people.
- Provision of training in the human rights-based approach (HRBA) to all programme staff to ensure a deep understanding on the issues. Offer training also to district government staff and other major service providers. In addition, supporting the government staff also in the systematic and participatory identification and monitoring of the poorest and most vulnerable and in the elucidation of the causes of their impoverishment.
- Identification and introduction of hand tools and basic affordable machinery to make smallholder forestry operations easier and safer. This change could be achieved by promoting market opportunities in the Southern Highlands with established manufacturers. It could also be promoted by working with local engineering workshops and helping them to develop "new", unpatented products.
- Continue support and building capacity on land-use planning, implementing the updated VLUP guidelines providing safeguards that ensure the poor and vulnerable are effectively provided for in land allocation.
- Continue on VSLA services to poor and vulnerable people in smallholder forest-rich areas where there are specific opportunities for short-rotation forestry and small-industry development.
- Continue subsidising vocational forestry and wood industry training in a safe and nurturing environment at the FWITC for those who are classified as poor and/or vulnerable. This effort is recommended to involve establishing a safe dormitory for female students at the FWITC.
- Developing forestry information services that are accessible to the poor and disadvantaged.
- Incubating and promoting the participation of the poor and vulnerable in value-chain-related wealth creation.
- Look into ways of promoting workers' rights both through the support to government enforcement as well as building capacity and understanding among workers as well as employers.

7.3 Market realities and the need for innovation

7.3.1 Market realities

Historically, the industrial forestry sector in the Southern Highlands was dominated by the harvest of government plantations that provided resources to processing mills in a traditional “supply push” business model. The model worked due to the presence of cheap land, logs, energy and labour as well as a large market in Dar es Salaam. Over the last two decades, however, private smallholder forestry has been spreading rapidly and is now the major supplier of raw material with small, traditional, primary-forest-commodity-producing enterprises proliferating.

International markets for traditional forest commodities such as sawn wood and commercial printing paper are becoming increasingly competitive because of market globalisation, volatile commodity prices, shrinking demand and increases in the cost of raw material and energy. At the same time, new markets for wood biomass are opening as the number manufacturers of bio-products, including materials, chemicals and energy products, grow.

The current low-value-commodity-focused business model in Southern Highlands will not continue to be economically competitive and will not be sustainable for the forest industry or forest-dependent communities. There is an urgent need for major product and process innovation in this industry. Fortunately, there are countries such as South Africa and Vietnam at roughly similar stages of overall development in which forest industry value chains have become globally competitive and from which Tanzanian entrepreneurs can learn, hence cutting short the development process.

Most of the private plantations in Southern Highlands are younger than 10 years. Therefore, huge areas of young plantations will require thinning if they are to produce valuable large logs, but tree growers need to be able to at least recover their costs if they are to implement these operations. In many countries, pulp wood markets finance these thinning operations but that is not the case in Tanzania. One key problem in the Southern Highlands is therefore the lack of a market for this small size wood (i.e. pulp wood).

However, the excess pulp wood is an opportunity which charcoal and briquette manufacturers are starting to make use of and which other industries, such as panel board manufacturers, may profit from when infrastructure improves sufficiently. Modernization of the sawmill technology will also enable profitable production of smaller size logs and hence increase the demand.

Improvements in road and rail transport infrastructure and the electrification of rural areas are slowly but surely transforming the forest business environment in the Southern Highlands and connecting it with domestic and international markets. These changes will have positive impact on marketing of processed products from Southern Highlands, but it will at the same time likely make it possible to transport primary commodities such as logs and chips for value addition elsewhere. Ideally, value addition should take place in the Southern Highlands. Retaining the potential benefits of developing high-value products locally, however, will require that local skills and infrastructure be developed and that local value chains be managed.

7.3.2 Innovation

Two decades have passed since innovation, or the introduction of novelties to the market, was identified as the key driving force behind economic development. Innovation is sometimes defined as the first economic use of a new product or process. “New” may mean new to the market, new to the sector or new to the enterprise.

The forestry sector is often considered as a mature low-tech industry, but one which can play a major role in employment and growth. Internationally, however, the forestry sector is shedding its drab image and becoming higher tech in response to competition. To catch up and keep pace with growing international competition, the Tanzanian forestry sector will have to undergo rapid innovation.

Most businesses in the sector are SMEs, and, because of their small size, do not benefit from the economies of scale or have access to decision makers, technical support, networks, finance and infrastructure the way large businesses do. The high cost of road transport and the scattered distribution of smallholder plantations does mean, however, that that in the Southern Highlands, small will remain beautiful for some time.

Indeed, the economic viability of small local processing enterprises integrated with local tree growers organised into TGAs is showing promising results. Makete. Variations of Makete's approach will likely continue until the advantages of large-scale centralised processing are seen to outweigh the three key inhibiting factors identified above: the smallness of plantations, the scattering of their locations, and the high cost of transport on poor rural roads.

The specificity of all small low-tech businesses implies that they need *specific* support for innovation. It is not enough to engage in knowledge creation alone. If they are to be successful, such businesses also need to improve their capabilities to make use of benefits of scale and to access decision makers, technical support, networks, finance, infrastructure, input supplies and markets. In addition, universities and other research organisations need to become more capable of meeting their needs.

Because of their limited capacities, small firms are not able to utilise knowledge-intensive consultancy services from the market. Thus, it is rational that public or semi-public organisations step in to fill the gap. Indeed, Tanzania has set up small industry development offices (SIDO), district business councils, district trade offices, forest industry clusters, and technology centres (such as FWITC) to support SMEs in rural areas.

Networks such as SHIVIMITA and the TTGAU also play an important role in stimulating innovation in SMEs operating in forest areas. Well-governed, stable and inclusive networks with shared strategic visions deliver economic benefits to members and build stable local communities that accumulate social capital, thereby providing a springboard for the large-scale uptake of innovation.

Other lessons learned from the programme's approach to support innovations for SME development include:

- The vertical integration of small-scale growers and small-scale industries that the programme piloted in Makete is showing promising results both when it comes to production of good-quality sawn wood and operating profitably. However, the capacity is still rather low both when it comes to processing and business management and continued mentoring will be needed to ensure this innovation taking off.
- Establishment of the FWITC, despite discussions on the sustainability, seems to be the right decision. The centre has introduced new products, processes and learning and is continuously developing. It's role in becoming the centre for learning among SMEs in Southern Highlands is increasingly becoming evident. However, the process of getting a centre like FWITC up and running sustainable is a long process and we are not yet there.
- Establishment of cluster development committee was promoted by the programme in Mafinga as a vehicle to facilitate stakeholder cooperation and industry development. However, while showing some initial promising results, the concept has yet to be of proven worth.
- Facilitated by the programme, the TTGAU has during the last year taken important steps towards becoming a network of importance for tree growers. There are obvious opportunities to strengthen SHIVIMITA through similar, well directed facilitation.
- The programme supported to SMEs through the FWITC, while support "on-site" in the field through e.g. extension services or village-based SME facilitator services was limited. Thus, while the PFP did foster some uptake of improved SME technologies, the scale of its impact in this area has been less than that achieved amongst growers. In addition, though the PFP engaged mostly with micro entrepreneurs, it has had a greater impact on already established business operators, who are often quick to capitalise on new ideas.
- The PFP directly supported innovation amongst growers through a number of interventions focusing on plantation establishment and silviculture during the first 3 years of age. The outcome of this support was tangible improvements in plantation establishment. Due to the targets of the programme, limited focus was put on management of older plantations. Obviously, in a continued support to private plantation forestry, there needs to be a shift in focus to now look into innovative approaches for

managing the plantation up to maturity, ensuring sufficient economy in tree growing and hence providing incentives for reforestation upon final harvest.

- As the forest-product sector develops, it will increasingly require clearly defined standards on both processes and products. The programme supported the MNRT in developing log standards and the TBS in developing structural sawn wood standards. However, these standards have recently been developed and not yet introduced or taken up by the industry. Therefore, there is an obvious need for continued efforts in this regard, both when it comes to strengthening of Tanzanian institutions and the development of additional standards.

Recommendations relating to promoting innovation:

To strengthen sector innovation, capacity development and high-value market penetration, continued support is advised:

- Strengthen Tanzanian capability in wood technology and innovation by providing long-term tertiary education scholarships, short term specialist courses, opportunities for SMEs to learn from recognised experts, and opportunities for SMEs to visit, learn from and network with their counterparts in countries such as Finland, Vietnam and South Africa, as well as with emerging industries in the Southern Highlands. It should advance the capacity of promising FITI graduates by linking them with programme experts through the junior expert scheme.
- Develop SHIVIMITA's capabilities in: a) promoting broad uptake of product and process innovation; b) providing networking and learning opportunities for members; c) helping members access government and donor private-sector grant and soft loan finance; d) developing and enforcing professional standards in the industry; e) accessing large-scale markets by standardising products and aggregation; f) accessing inputs through negotiated bulk procurement, and g) lobbying against ad-hoc taxation and regulation and for necessary infrastructure, a level playing field with international investors in accessing allocations from state forests, and h) coordinated cluster development. These efforts will involve the recruitment and resourcing of full-time professional and support staff and broadly participatory business plan development.
- Support the Tanzania Forest Research Institute in linking with, understanding and promoting small-scale growers and forest industries.
- Develop industry support outreach by directly recruiting FITI graduates as extension officers and FITI VET 3 certificate holders as village-based industry facilitators.
- Establish demand for improved value creation by supporting the establishment of specifications for visually stress-graded pine sawn wood and acoustically graded eucalyptus sawn wood for structural use
- Facilitate establishment of private-sector timber-auditing service(s) to certify and audit sawmills in producing stress-graded sawn wood for structural purposes.
- Support MNRT in introduction of pine and eucalyptus log grade standards.
- Enable SMEs to access new market opportunities such as a) standardised prefabricated roof trusses and finger-jointing pine and eucalyptus for compression and tension load-bearing purposes in roof trusses; b) village-based spindle-less eucalyptus veneer production, drying, low-tech plywood and blockboard manufacture, and secondary processing; and c) charcoal and briquette manufacture from wood waste.

7.4 Tree growers' organisations as a vehicle for private forestry

Tree growing farmers need services and advice to successfully undertake their forestry. They also need a common voice to speak towards decision makers as well as the industry. Experience during the programme shows that forest owners' own organisation (TGAs and the TTGAU) can be the vehicle to address these needs.

However, for this to happen, the organisation(s) need:

- Skills, knowledge and resources, including dedicated professional staff to provide the services.
- A service palette including interventions that also generate funds to the organisation(s).
- A road map for development, i.e. a vision on where to go and a strategy on how to reach there.
- Time, i.e. support to sustain operations and development until reaching a stage of being on sustainable grounds.

The PFP, especially during the latter half of programme implementation, emphasized the strengthening of tree growers' organisation(s) through a number of different interventions including the overall support to the TTGAU, capacity building of the TGAs, and the village facilitator approach.

The village facilitators are in fact having similar role as a "TGA forester", providing benefits to the tree growers in form of services and advice. By linking the facilitators to the TGAs, the programme is in fact inducing a model of TGA providing advice to its members by hired professionals. Continuing with this approach will provide an opportunity for the TGA to gradually take over the costs for the facilitator as the institution develops. Hence, in the end have a situation where the TGA have own dedicated professional for service provision and advice to its members. For the most developed TGAs this is most likely to happen within the coming 4–5 years.

The plantation target of 15,000 ha was high on the agenda for the programme and a decisive criterium when selecting villages to engage with. The downside of this emphasis was that the key entry point and focus was on plantation establishment, while development of village institutions became a secondary objective. The TGAs are still young institutions and will need to develop to be able to service their members in the changing environment, not the least when it comes to plantation management and timber trade. Stronger tree growers' organisations mean that they are able to provide better services and advice to their members. Hence, given the urgent growing need on improvements in plantation management, there are definite synergies in ensuring capable institutions able to coordinate, offer services and advice at the same time as developing standards, new products etc. in plantation management and utilisation.

The TTGAU business plan development, supported by the programme, identified timber trade as a viable business, providing tangible benefits to the tree growers and much needed income to the organisation(s). The Market Information System (MIS) is a fundamental part of the timber trade services. The business plan also identified the steps and development needs for having the timber trade services operational, including the necessary improvement in the MIS. Hence, the road map is there and the TTGAU is now taking its first steps in implementation of the business plan as well as the further development of the MIS. However, for the TTGAU to become independent and fully functional the organisation will need further facilitation as identified in the business plan. In addition, the business plan includes only timber trade, the TTGAU will need to develop a more comprehensive vision and strategy for its existence and development.

Recommendations relating to promoting tree growers' organisations as a vehicle for private forestry:

Forest owners' own organisation (TGAs and TTGAU) can be the vehicle to address the needs and provide benefits to tree growers and this way ensure that there are continued incentives for private tree growing in Southern Highlands. Therefore, a continued support to private forestry in Southern Highlands need to have as one key focus institutional development of tree growers' organisation(s).

In such a support the following is recommended:

- Provide necessary facilitation to the TTGAU for the implementation of the business plan and for development of a wider vision and strategy. Prepare a clear monitoring framework to ensure that the facilitation does not induce dependency but promotes sustainability.
- All support interventions on TGA level are to be identified, planned and implemented in close cooperation with the TTGAU, hence strengthening the ties between the layers of the organisation.
- Realize that all 100+ TGAs will not be able to develop at the same pace. Therefore, strive to support all, but identify a number of TGAs to become "Model TGAs", and have them in the forefront of development. The selection of "Model TGAs" need to be based on performance, commitment and opportunities, not on past history in PFP. Develop a clear strategy on what support, to whom and when.
- Continue with the TGA-based facilitator approach, especially in the "Model TGAs". Ensure that the facilitator becomes a closely integrated part of the TGA development efforts.
- Forest management and timber trade are key concerns for immediate and longer-term benefits from forestry to tree growers. Closely integrate tree growers' organisations in the coordination, delivery of services and advice to tree growers with regards to these key concerns.

7.5 Value chain optimization and a role for forest industry cluster development committees

7.5.1 Value-chain optimization

Whether they are performed by a single company or several companies, forest value-chain activities, including tree species selection, forest management, forest harvesting, log transportation, manufacturing, distribution, marketing and sales are not isolated. On the contrary, they are interdependent, and decisions made by one business have impacts on other businesses and their decisions. Value-chain activities need to be managed and coordinated so that products that meet consumer requirements are made and greater wealth is created. Uncoordinated business decisions, on the other hand, result in the existing situation of mismatched supply and demand and the attendant waste of resources, uncertainties, and customer dissatisfaction.

Value-chain-based thinking can help decision-makers focus on entire business processes and coordination to reduce costs and maximise values. A full understanding of the value-chain is needed to synchronise and optimise the decisions of tree growers and wood processors so that market opportunities are exploited while at the same time forest assets are sustained and improved.

Value-chain optimisation is challenging, however, because chains are complex and involve different stakeholders with divergent interests. That said, recent studies have improved our understanding of Tanzania's forest resources and associated value chains.

7.5.2 Forest-industry clusters?

Because transportation is an important cost element in all wood-procurement systems in the forest industry, a conglomeration of private plantations, forest industries and input suppliers have congregated around the state-subsidized plantations in Mafinga/Mufindi. Here, firms and institutions are located close together and have become interlinked through value-and-supply chains, labour, and the use of similar inputs, technology, and complementary products and services. Here, a forest-industry cluster has developed through market forces, but that cluster lacks the sort of overall management and coordination that is essentially for optimising local-level value chains. Forest industry cluster development committees could provide a forum for industry representatives to come together with government authorities and voluntarily agree on strategies for optimising sector performance to the benefit of all stakeholders.

Industry clusters create new business opportunities that are not available where companies operate in isolation. The benefits of forest-industry clusters include the following:

- Better utilisation of raw materials and/or manufacturing,
- Improved cooperation among cluster members,
- Attraction of more suppliers,
- Greater opportunity to add value by vertical integration of cluster members, and
- Improved manufacturing innovativeness and competitiveness.

Factors that lead to the successful development of forest-business clusters include the following:

- Availability of raw materials,
- Access to product markets,
- Labour availability,
- Low-cost transport and electricity,
- Financial support,
- Forest health concerns,
- Technical extension services,
- Training and research.

The PFP promoted the formation of a forest-industry cluster development committee for Mafinga/Mufindi to be led by the district government and to include relevant public, private and civil society participation. Whilst the concept was recognised as logical and welcomed politely, it gained limited traction. A lesson learned here is to review strategy altogether and perhaps consider building on existing institutions such as district business councils.

The clusters do, however, reflect resource realities and have implications for the organisation of both the TTGAU and a continued support to private forestry development.

Recommendations relating to promoting forest industry cluster development committees as vehicles for optimizing local forest industry value chains

Any continued support should explore options for developing effective forest industry value-chain optimisation through multi-sectoral cluster development and coordination. It should develop a strategy for promoting the best options and deliver specialised resource assessment and planning services and capabilities. It should start with the Mafinga/Mufindi, Njombe and Makete clusters and spread to Mbeya and Kilolo clusters once the first three clusters are well established and enough learning has been gained.

This effort will involve repeating the 2016 plantation forest mapping at a greater resolution, updating information on cluster value chains with regional and district government staff, updating information on road networks and electrification, and delivery of multi-disciplinary spatial planning support and capacity building.

7.6 Encouraging investment

Investment is needed to grow the sector, and this investment need to come from private sources. The programme attained early success in identifying, describing and promoting afforestation investment opportunities but later failed to attract additional investments through a more systematic identification, analysis and documentation of afforestation and industry investment opportunities.

Recommendations relating to increasing private investment of forestry and forest industries:

Any continued support needs to consider supporting MNRT and regional and district governments in documenting and marketing investment opportunities.

Large- and medium-scale investment opportunities exist in afforestation and processing that could be packaged and promoted to investors.

Small and micro investment opportunities in the primary and secondary processing of pine saw logs, eucalyptus veneer logs, and wood energy products are plentiful. These opportunities could be promoted through extension and linking SMEs with small grants and micro-finance schemes.

7.7 Protecting forest assets from fire

Fire is one of the major risks to investments in industrial plantation forestry. Fire damages existing plantations and inhibits further investment in the industry. Figure 46 shows an example of smallholder forest fire damage that occurred over large areas in 2016.

A lot of relevant knowledge and experience in both managing local risks and controlling active fires has been gained in South Africa in particular and southern Africa in general. Tanzania has a relatively young smallholder industry but has also gained relevant knowledge and experiences.

Figure 46 Smallholder fire damage in Uchindile, Kilombero (2016)



The programme encouraged investment in the afforestation of Ifinga, a village in Ruvuma Region with low human population but massive areas of grassland that are available and suitable for plantation forestry. Here, Sokoine University of Agriculture, Tanganyika Wattle Company, Tanzania Forest Service and TGAs all hold substantial young plantation investments in a fire-prone landscape. Their ability and willingness to spend on fire protection vary but all would benefit from the economies of scale that a joint approach would bring.

In addition PFP supported teak planting along the foothills of the Livingstone Mountains and coastal plains of Lake Nyasa in Nyasa District. Here the impoverished communities can benefit substantially from the teak plantations but lack the knowledge and culture to adequately maintain and protect their new plantation assets.

Recommendations relating to protecting forest assets from fire:

Any continued support should pilot current best practices in landscape-level integrated fire management and control through the formation of a territorial fire protection associations involving local governments and all land users in and around forest investments. Suitable areas for staging would include recent investments in forest plantation assets in the Ifinga investment block in Madaba and the teak plantation zone in Ruvuma.

Fire management planning will require a fresh look at land use planning at landscape level rather than being limited by village boundaries. These land use plans should be based on up-to-date knowledge of land cover and roading infrastructure which can be gathered using satellite-based sensors, the PFP drone, and ground survey.

Fire protection associations will have to be formed and formalized, with by-laws regulating the use of fire and mandatory membership and financial contributions in return for cost-effective risk mitigation. Establishing such a system will involve multi-sector organisational development and capacity-building in: a) awareness-raising to prevent fire ignition, b) fire hazard monitoring through freely available remote-sensing applications and local knowledge; c) fire control infrastructure such as fire breaks and communication and firefighting tools and equipment; d) fire detection through remote-sensing and local reporting; and e) coordinated firefighting.

By-laws by District Councils regulating the use of fire can be strengthened, including support to their adequate enforcement. A pilot for cash incentive supporting fire break preparation can also be considered.

Advantage could be taken of South Africa's expertise in both capacity-building in forest and grassland fire management, and in the leadership of fire protection associations.

Annex 1 Results-based management framework

Results and outputs	Indicators as per Logical Framework	Baseline	FY 2014-15	FY 2015-16		FY 2016-17		FY 2017-18		Target Phase 1	Achievement Phase 1 (Oct 2018)		
			Status at the end of June 2015	Target for FY 2015-16	Status at the end of June 2016	Target for FY 2016-17	Status at the end of June 2017	Target for FY 2017-18	Status at the end of June 2018				
Result area 1: Enabling Environment													
Result 1: Enabling environment exists for expansion of sustainably managed private plantation forestry	Degree of reduction of nine business barriers (access to finance; fire hazard; machinery, equipment and tools; availability of quality seeds; long-term nature of forestry; lack of availability of and access to market information; lack of technical expertise; inadequate infrastructure; and land tenure laws) as determined by a qualitative assessment	All nine barriers have a substantial adverse impact	Not defined	Not defined	Progress made on five business barriers	The adverse impact of at least four barriers has declined from substantial to moderate or lower impact	The programme has addressed eight business barriers	The adverse impact of at least four barriers has declined from substantial to moderate or lower impact	The programme has addressed a total of eight business barriers	The adverse impact of at least four barriers has declined from substantial to moderate or lower impact	Impact of five business barriers declined from substantial to moderate or lower		
Output 1.1: Legislative and policy proposals based on barrier analysis address private forestry plantation and SME needs	Progress in the processing of legal/policy proposals	n/a	Desk study on developing mechanisms and policies ready	Background reports for proposals prepared, multi-stakeholder forums established and international congress held	Background reports for proposals prepared.	Four proposals submitted to SC / SVB by the end of year 3	Work continued on eight business barriers and follow-up liaising investors & identifying opportunities	Practical changes implemented to encourage private forestry investments	Achieved	Proposals submitted to SC / SVB by the end of year 3	Achieved		
	Degree to which proposals address TGA and industry needs	n/a	n/a	n/a	n/a	n/a	n/a	Stakeholder study to assess the policy interventions designed	Survey being planned			TGA and industry apex bodies rate developments as highly relevant and beneficial	Largely achieved based on a survey among stakeholders
	Access to and usability of reliable market information for key stakeholders (tree growers, TGAs, SMEs, main industries) within the value chain	No reliable market information available	No reliable market information available	MIS operational	One MIS service provider identified	MIS operational	MIS operational	TGA Apex and SAFIA consider MIS relevant and useful	Partially achieved			75 % of stakeholders have access to reliable market information	75 % not achieved but advance made in developing an adequate MIS
Output 1.2: Reliable market systems developed and structures / mechanisms improved for efficient and transparent business within the value chain	Share of sales in which the grading of round and processed wood is as a price criterion in domestic markets	0%	0% of sales had grading as a price criterion	Study on timber grading ready	0%	5%	0%	Round-wood classification and processed wood grading system in use	Grading systems being developed	Round-wood classification and processed wood grading system endorsed	Handed over to MNRT and Tanzania Bureau of Standards respectively		
	Volume of timber sales through PFP-supported TGAs	0	0 cu.m of timber sales go through TGAs	TGA meetings on timber sales held	0	500 cu.m		500 cu.m	Partially achieved	Wood sales organized through TGAs	Different modalities of TGA wood sales implemented		

Results and outputs	Indicators as per Logical Framework	Baseline	FY 2014-15	FY 2015-16		FY 2016-17		FY 2017-18		Target Phase 1	Achievement Phase 1 (Oct 2018)
			Status at the end of June 2015	Target for FY 2015-16	Status at the end of June 2016	Target for FY 2016-17	Status at the end of June 2017	Target for FY 2017-18	Status at the end of June 2018		
Output 1.3: Long-term private forestry sector funding mechanism advanced	Progress in processing a proposal for a comprehensive private forestry funding mechanism	n/a	n/a	Background information for forestry funding proposal prepared	Forest financing report completed	Proposal submitted to SC / SVB by the end of year 3	Forestry financing report issued and access to finance improved through VSLA	Report on prospects on forest financing through carbon sequestration and other environmental services prepared	Deferred to phase 2 on advice of Steering Committee	Proposal submitted to SC / SVB by the end of year 3	Deferred to Phase 2 on the advice of the Steering Committee
	Relevance of the proposal for key beneficiaries (tree growers, industries), disaggregation by types of beneficiaries; gender disaggregation of tree growers	n/a	n/a	n/a	n/a	Stakeholders consider the proposal highly relevant and feasible		Targets achieved	Stakeholders consider the proposal highly relevant and feasible		
Output 1.4: Tree improvement programme developed in cooperation with key stakeholders	Established future capacity of high-quality seed production in Tanzania based on projected demand	n/a	n/a	All established seed orchards in good condition	43 hectares of seed orchards established and maintained by PFP	A total of 190 ha of seed orchards established and maintained by PFP	43 ha of seed orchards maintained in good condition	Practical arrangements made to safeguard value chain through improved availability of strategically important tree species seed	93 ha of new seed orchards established with multiple major commercial species	Capacity for 100% of projected demand established	Achieved
	Sufficiency of the area of priority species and provenances planted for genetic selection: a) <i>E. urograndis</i> , b) <i>P. maximinoi</i> , c) <i>P. tecunumanii</i>	0	a) 293.4 b) 95.6 c) 13.5	a) 800 b) 700 c) 600	a) 745 ha b) 710 ha c) 463 ha	a) 1,000 ha b) 1,000 ha c) 1,000 ha	Over 1,000 ha each of <i>E. urograndis</i> , <i>P. maximinoi</i> and <i>P. tecunumanii</i> planted	Targets achieved	1,000 ha each of <i>E. urograndis</i> , <i>P. maximinoi</i> and <i>P. tecunumanii</i> for plus tree selection	Achieved	
Output 1.5: Effective extension mechanisms developed for TGA-based plantation forestry	Access to extension services measured by frequency of contacts and relevance of assistance received	n/a	n/a	n/a	n/a	Most tree growers satisfied with provision of technical advice	EOs visit every assigned TGA monthly	Most tree growers satisfied with provision of technical advice	Most tree growers satisfied with provision of technical advice	Most tree growers satisfied with provision of technical advice	Achieved according to TGA survey results
	Number of TGA members given appropriate a) training and b) extension services by the PFP; figures disaggregated by gender	n/a	a) 0 b) 0	a) 0 b) Total: 2,000	a) 0 male, 0 female b) 1,500 male, 500 female	Total: a) 320 male, 120 female b) 2,100 male, 600 female	453 male and 255 female beneficiaries trained in 2016/17; Estimated 5,300 beneficiaries reached through extension in 2016/17	Extension and training services delivered in accordance with training plan (to be published)	Total: a) 320 male, 120 female b) 2,100 male, 600 female	All PFP-supported TGA members have access to PFP organized training and extension services.	Achieved
	Number of PFP-supported TGAs providing appropriate training and extension services to their members	0	0 PFP-supported TGAs provide training	Report on existing extension services available and PFP staff have the capacity to train TGAs	n/a	30 TGAs have an active PFP-trained facilitator	40 TGAs have a PFP-trained facilitator	At least 50 TGAs have an active PFP-trained facilitator	30 TGAs have an active PFP-trained facilitator	At least 35 TGAs have an active PFP-trained facilitator.	Achieved

Results and outputs	Indicators as per Logical Framework	Baseline	FY 2014-15	FY 2015-16		FY 2016-17		FY 2017-18		Target Phase 1	Achievement Phase 1 (Oct 2018)
			Status at the end of June 2015	Target for FY 2015-16	Status at the end of June 2016	Target for FY 2016-17	Status at the end of June 2017	Target for FY 2017-18	Status at the end of June 2018		
Output 1.6: Comprehensive strategy prepared for private forestry and wood technology education and training, and capacity of training providers improved in accordance with the strategy	Intake of trainees for a) vocational (VETA) and b) technical training (short courses) within the private forestry and wood processing value chains	a) 0 b) 0	a) 0 b) 0	VETA curricula and facilities ready for training	Total intake: a) 0 b) 0	Total intake: a) 20 b) 400	a) 40 b) 507	Totals: a) 40 students in training (20 FTI, 20 FITI) b) 400 course participants of which 100 women	a) 40 VET students achieved b) 3,550 course participants achieved of which 1,507 women	Vocational training intake for long courses: 40 Technical training intake for short courses: 400	Achieved; Intake 40 for long courses and 3,550 for short courses
	Number of trainers in recognized training institutions capable in delivering forestry and wood processing VETA curricula.	0	0	0	0	4 teachers for formal VETA education and 4 teachers/trainers for VETA-based short course available.	31 people trained in conducting VETA level training	Targets achieved	4 teachers for formal VETA education and 4 teachers/trainers for VETA-based short course available.	Achieved	
	<i>NEW:</i> National level forestry sector education strategy (FES) prepared	n/a	n/a	n/a	n/a	FES drafted	n/a	Target removed			
Output 1.7: Effective and open forestry information system (FIS) developed for private forestry value chain ensuring easy access to all relevant documentation	Number of registered users	n/a	n/a	FIS service provision ongoing	Geospatial FIS report finalised	Spatial database of TGA members' and their woodlots available	FIS delivered within the mandate given to the programme	Targets have been achieved	Increasing number of registered users	These indicators were discontinued	
	Rates of hits, and downloads from registered users from different user categories	n/a	n/a		0						
	Rates of queries relating to FIS data from non-system users	n/a	n/a		0						
	<i>NEW:</i> Progress of Southern Highlands Forest Resource Assessment (SH-FRA)	n/a	n/a	n/a	Study scope defined and possible supplier identified	Total area and spatial distribution of SH tree plantations estimated	Final report of the SH-FRA published	Targets have been achieved	Comprehensive statistics and maps of SH forest plantation resources	Achieved	
Output 1.8: <i>NEW:</i> VSLAs applied to enable tree growers to wait for the optimal cutting times for trees and to facilitate SMEs investments to new technologies	<i>NEW:</i> Number of VSLA saving groups established	0	n/a	n/a	n/a	28 VICOBA groups established	A total of 179 groups established	191 groups established	Evaluation of the role of VSLA in relation to forest financing completed	57% strongly agreed, and 22% agreed, that VSLA has reduced the need to harvest woodlots prematurely (socio-economic end study)	
	<i>NEW:</i> Total capitalisation of the groups	0	n/a	n/a	n/a	EUR 80,560	Total capitalisation of EUR 450,000	EUR 397,640 achieved			
	<i>NEW:</i> Total value of loans issued by the groups	0	n/a	n/a	n/a	EUR 34,500	Total value of lending EUR 300,000	EUR 260,836 achieved			
	<i>NEW:</i> Proportion of loans being repaid on schedule	n/a	n/a	n/a	n/a	n/a	95%	Achieved			

Results and outputs	Indicators as per Logical Framework	Baseline	FY 2014-15	FY 2015-16		FY 2016-17		FY 2017-18		Target Phase 1	Achievement Phase 1 (Oct 2018)
			Status at the end of June 2015	Target for FY 2015-16	Status at the end of June 2016	Target for FY 2016-17	Status at the end of June 2017	Target for FY 2017-18	Status at the end of June 2018		
Result area 2: Plantation Forestry Development											
Result 2: Increased high-quality tree growing and private plantation forestry developed in the Programme area, based on sustainable and inclusive principles	New PFP-supported pine plantations survival and height of the trees	1. year = 0.90 m 2. year = 1.85 m 3. year = 2.71 m Survival 83%	n/a	1. year = 1 m 2. year = 2 m 3. year = n/a Improved survival	No data	1. year = 1 m 2. year = 2 m 3. year = 3 m Improved survival	1. year = 0.51 m 2. year = 1.61 m 3. year = n/a Survival 79%	1. year = 1 m 2. year = 2 m 3. year = 3 m Improved survival	1. year = 1.6 m 2. year = 2.5 m 3. year = 4.2 m Survival data pending	1. year = 1 m 2. year = 2 m 3. year = 3 m Improved survival	1. year = 0.5 m 2. year = 1.4 m 3. year = 2.3 m Survival 80% for 1st-year TGIS pine
	Number of PFP-supported tree growers and respective plantation areas; figures disaggregated by type of support, type of beneficiary (individual, SME or organization) and land area; individuals disaggregated by gender	0	a) TGIS in-kind: 704 tree growers b) TGIS OSP: 66 tree growers	a) TGIS in-kind: 1,800 tree growers b) TGIS OSP: 300 tree growers	a) TGIS in-kind: 1,876 tree growers b) TGIS OSP: 296 tree growers	a) TGIS in-kind: 4,000 tree growers b) TGIS OSP: 1,000 tree growers	At least 5,000 tree growers supported by PFP support	Additional 3,000 tree growers supported by PFP support	About 3,000 additional tree growers supported	At least 5,000 tree growers supported by PFP support	9,030 through TGIS and OSP
	Number of PFP-supported tree-grower households disaggregated by land tenure ownership (family, husband, wife)	Husband: 30.7% Wife: 8.0% Family: 61.3 %	Husband: 27.3% Wife: 6.3% Family: 66.4 %	At least 65% family-owned	Husband: 25.1% Wife: 6.7% Family: 68.1 %	At least 65% family-owned	38% of the woodlots family-owned	At least 65% family-owned	36% achieved	At least 65% family-owned	Target irrelevant due to incentive scheme changes
Output 2.1: Village land-use plans prepared for each targeted village, ensuring selection of appropriate tree planting areas, respecting rights of vulnerable groups and including safeguards for biodiversity protection	Number of VLUPs prepared with PFP support	0	A total of 11 VLUPs prepared and SPs identified for scaling up the VLUP process	A total of 26 VLUPs prepared	A total of 13 VLUPs prepared by PFP and SPs identified for scaling up the VLUP process	A total of 40 VLUPs prepared with PFP support	A total of 49 VLUPs prepared with PFP support	Additional 12 VLUPs prepared through programme support	8 new VLUPs prepared	At least 60 new VLUPs prepared with PFP support for villages with TGAs.	59 achieved
	Percentage of PFP-supported VLUPs having specific safeguards for the protection of the rights of vulnerable groups	n/a	100%	100%	100%	100%	73%	100%	75% achieved	Needs of vulnerable groups identified in all PFP-supported VLUPs and specific measures (e.g. land allocation) defined for ensuring the protection of the rights of vulnerable groups.	44 out of 59 achieved
	Average land area per household reserved for food production on agricultural land according to the PFP-supported VLUPs (hectares)	n/a	29.1 hectares per household	At least 1 hectare per household	25.8 hectares	At least 1 ha	14.0 ha	Every VLUP has at least 1 ha per HH dedicated to food production i) now; and ii) in 10 years time	i) 95% (56 VLUPs) achieved ii) 93% (55 VLUPs) achieved	Every VLUP has at least 1 ha per HH dedicated to food production i) now; and ii) in 10 years time	i) 95% (56 VLUPs) achieved ii) 93% (55 VLUPs) achieved

Results and outputs	Indicators as per Logical Framework	Baseline	FY 2014-15	FY 2015-16		FY 2016-17		FY 2017-18		Target Phase 1	Achievement Phase 1 (Oct 2018)
			Status at the end of June 2015	Target for FY 2015-16	Status at the end of June 2016	Target for FY 2016-17	Status at the end of June 2017	Target for FY 2017-18	Status at the end of June 2018		
Output 2.1: (Cont.)	Percentage of total area covered by protection measures in PFP-supported VLUPs	n/a	19.1%	Critical habitats protected	17.7%	Critical habitats protected	13%	Critical habitats and sensitive areas (watersheds, natural forests, edaphic grasslands) identified and protection measures defined.	To be assessed	Critical habitats and sensitive areas (watersheds, natural forests, edaphic grasslands) identified and protection measures defined.	Incorporated in the VLUP process and marked on the VLUP maps
	Level of implementation of the VLUPs against plans using a general rating: a) VLUP not followed / b) VLUP moderately followed / c) VLUP strongly followed	a) 27% b) 18% c) 55%	a) 27% b) 18% c) 55%	No target	n/a	At least 80% strongly followed	a) 49% b) 35% c) 16%	At least 80% of PFP VLUPs strongly followed; no violations of social or environmental safeguards	49 % strongly followed	At least 80% of PFP VLUPs strongly followed; no violations of social or environmental safeguards	49 % strongly followed
Output 2.2: Inclusive and well governed TGAs established / strengthened for sustainable management of tree plantations	<u>NEW</u> : Share of PFP-supported TGAs registered in the programme area	49%	49%	53%	53%		100%	100%	81% achieved	100%	84%
	Share of supported TGAs fulfilling the criteria set for governance and plantation management	n/a	n/a	TGA apex body supported and demo plots established	TGA apex body supported	A total of 45 TGAs trained in institutional management A total of 72 quarterly TGA reports received	n/a	90%	Assessment pending	100%	TGAs scored 79% for institutional capacity and 67% for administrative functionality on average
	Percentage of women in TGA management bodies	32%	32%	24%	24%	40%	24%	At least 30% women	28% achieved	At least 40% women	27%
	Percentage of TGA members paying membership fees	86%	86%	No target	n/a	95%	57%	95% of TGA members pay membership fees in accordance with TGA bylaws	Assessment pending	95%	53% of TGAs apply membership fees
Output 2.3: High-quality tree growing advanced through PFP support (extension, training, input support)	Area of new PFP-supported plantations	0	1,075 ha	3,000 ha	3,445 ha	10,000 ha	10,000 ha	A total of 5,000 ha established during the season	3,949 ha reached	A total of 15,000 ha	11,669 ha achieved
	Area of PFP-supported plantations that fulfil PFP's quality criteria for plantation management; figures disaggregated by TGIS-supported and other plantations	n/a	Not known	Not known	Not known	6,000 hectares of PFP-supported plantations of high quality after the dry season	60% of the woodlots have survival percentage of at least 80%	At least 85% of all TGIS-supported plantations fulfil the criteria	Assessment pending	At least 85% of TGIS-supported plantations fulfil the criteria	Data collected and being analyzed
Output 2.4: Income generating activities (IGAs)	<i>Output is inactive; Refer to Output 1.8</i>										

Results and outputs	Indicators as per Logical Framework	Baseline	FY 2014-15	FY 2015-16		FY 2016-17		FY 2017-18		Target Phase 1	Achievement Phase 1 (Oct 2018)
			Status at the end of June 2015	Target for FY 2015-16	Status at the end of June 2016	Target for FY 2016-17	Status at the end of June 2017	Target for FY 2017-18	Status at the end of June 2018		
Result area 3: SME Development and Product Innovation											
Result 3: Profitability and sustainability of SMEs within the forestry value chain improved	Increase of profitability in the supported SMEs; scale: negative impact / no impact / improved profitability	no impact	n/a		n/a	n/a	Improved profitability	60% of PFP supported SMEs with new technology showing improved profitability	Data collection planned	All supported SMEs claim improved profitability	44% reported improved profitability
	Percentage of supported SMEs showing improvement in health, safety and environment issues.	0	n/a		n/a	n/a	Data not available	35% of PFP supported SMEs showing improved HSE issues		50% of SMEs showing improvement in HSE issues	44% showed improvement in relation to at least one occupational health and safety criterion
	<u>NEW:</u> Price premium increase on sawn timber produced by improved technology SME stakeholders	0	n/a		n/a	n/a	Data not available	Market based results showing 10% price premium over old technology sawmill production		Market based results showing 12% price premium over old technology sawmill production	3% achieved
Output 3.1: Production efficiency, product quality and new financially viable products developed with SMEs	<u>NEW:</u> Number of PFP-supported SMEs adopting improved technology that leads to improved product quality	n/a	n/a	Value chain report ready	Value chain report ready	5 SMEs adopted improved technology	8 SMEs adopted improved technology	10 SMEs adopted improved technology	8 SMEs adopted improved technology	5 SMEs adopted improved technology	34 SMEs adopted improved sawmill technology
	Percentage of recovery rate in saw mills supported by the PFP	27%	n/a	n/a	27%	42%	52% achieved with sawmills transitioned to new technology	42%	Data collection planned	Recovery rate increased by 5% of units in PFP-supported saw mills	Achieved
	Percentage of timber produced meeting timber grading criteria	0%	0%	0%	0%	Draft of grading standard submitted	Proposal for machine stress grading submitted to SC and not approved	No target for 2017/18	Timber grading system under development	Timber grading system piloted	Grading system developed
	<u>NEW:</u> Number of sawmilling trainee days	n/a	0	Sawmilling TNA done and short course training started	Not delivered	1,500	63	1,500	Not achieved	Total: 2,250	Not achieved

Results and outputs	Indicators as per Logical Framework	Baseline	FY 2014-15	FY 2015-16		FY 2016-17		FY 2017-18		Target Phase 1	Achievement Phase 1 (Oct 2018)
			Status at the end of June 2015	Target for FY 2015-16	Status at the end of June 2016	Target for FY 2016-17	Status at the end of June 2017	Target for FY 2017-18	Status at the end of June 2018		
Output 3.1: (Cont.)	<u>NEW:</u> Progress percentage in new product development measured against: 1) Product design, 2) Product development, 3) Production testing, 4) Product production and sales	0%	n/a	n/a	n/a	n/a	0%	Lake Nyasa boat design 100%	Original prototype abandoned and another design being fabricated	All product development processes completed 100%	Partial deviations
								Biowaste energy 75%	Achieved		
								Eucalyptus furniture 75%	Achieved		
								Biowaste nursery 100%	Tree nursery growing medium trials started		
	Eucalyptus fencing 75%	Achieved									
<u>NEW:</u> Number of new processing & production guides published	n/a	n/a	n/a	n/a	0	4 new guides published	Target deprioritised	A total of 6 new processing & production guides published	Deprioritised		
Output 3.2: Decent jobs within the value chain	Number of accidents reported by PFP-supported SMEs.	n/a	n/a	n/a	Work on health and safety not started	20% decrease in accidents	n/a	Not measurable		50% of the PFP-supported SME report decreased accident rates	24% reported decreased accident rates
	Average pay of workers per day.	TZS 5,400	TZS 5,401	TZS 5,400	TZS 5,400	TZS 6,500	TZS 7,160	TZS 6,750	Data collection planned	Average salary increased to TZS 7,000	Average salary increased to TZS 9,130
	Share of PFP-supported SMEs employing women.	29%	129%	29%	29%	55%	60%	65%	66% achieved	75% of the PFP-supported SMEs employ women	53% employed women
	<u>NEW:</u> Number of trainees trained through gender targeted training	n/a	n/a	n/a	0	Total: 55	No gender-targeted training	Total: 60	72 trainees achieved	Total: 70	72 achieved
	<u>NEW:</u> Number of disabled persons trained in technical short courses	n/a	n/a	n/a	0	Total: 50	No disabled persons trained	Total: 60	No disabled persons trained but training delivery prepared for Q1	Total: 70	14 achieved
<u>NEW:</u> Total number of PFP-supported a) SMEs; and b) SME employees reached by the PFP OHS training	n/a	n/a	n/a	n/a	n/a	a) 0 b) 0	a) 40 in total b) 200 in total	301 people trained	a) 60 in total b) 300 in total	301 individuals achieved as part of FWITC courses	

Annex 2 Programme fixed assets register as of 30 September 2018

						Subtotal, EUR	1,081,550		
S/N	Description	Specification	Date of purchase	Register Number	Qty	Amount in TSH/EUR (Purchase currency)	In EUR	User	Condition
1	Motor vehicle	Toyota Landcruiser VX	07.07.2014	DFPA 735	1		50,822	PFP	working
2	Motor vehicle	Toyota Hardtop Pickup	07.07.2014	DFPA 496	1		42,860	PFP	working
3	Motor vehicle	Toyota RAV4	07.07.2014	DFPA 493	1		23,579	PFP	working
4	Motor vehicle	Toyota Hardtop	03.07.2014	DFPA 494	1		40,672	PFP	working
5	Motor vehicle	Toyota Hardtop	03.07.2014	DFPA 495	1		40,672	PFP	working
6	Notebook	Dell	03.02.2014	PFP/OFF/0150	1	850,000	387	IT	working
7	Notebook	Dell	03.02.2014	PFP/OFF/0102	1	850,000	387	Sangito Sumari	working
8	Notebook	Dell	03.02.2014	PFP/OFF/0145	1	850,000	387	IT	working
9	HP LaserJet printer	HP Laser Jet Pro 400dn	03.02.2014	PFP/OFF/0148	1	850,000	387	IRINGA RECEPTION	working
10	HP Scanner	HP ScanJet 5590 Scanjet Digital Flatbed Scanner	03.02.2014	PFP/OFF/0002	1	510,000	232	IRINGA RECEPTION	working
11	HP Printer	HP M200CPM IN 25 COLOUR LASERJET PRINTER	03.02.2014	PFP/OFF/0094	1	452,482	206	FINANCE OFFICE	working
12	CANON COPIER	CANON IR 2420 DIGITAL COPIER	03.02.2014	PFP/OFF/0180	1	1,771,103	806	NJOMBE RECEPTION	working
13	Office chair	Black PU	27.02.2014	PFP/OFF/0018	1	350,000	159	FINANCE OFFICE	working
14	Office chair	Black PU	27.02.2014	PFP/OFF/0165	1	350,000	159	FINANCE OFFICE	working
15	Office chair	Black PU	27.02.2014	PFP/OFF/0037	1	350,000	159	CAPACITY BUILDING OFFICE	working
16	Office chair	Black PU	27.02.2014	PFP/OFF/0030	1	350,000	159	CAPACITY BUILDING OFFICE	working
17	Office chair	Black PU	27.02.2014	PFP/OFF/0164	1	350,000	159	CAPACITY BUILDING OFFICE	working
18	Office chair	Black PU	27.02.2014	PFP/OFF/0134	1	350,000	159	GIS & IT	working
19	Office chair	Black PU	27.02.2014	PFP/OFF/0198	1	350,000	159	NPFA OFFICE	working
20	Filing Cabinet	Robin 3 drawer	27.02.2014	PFP/OFF/0133	1	271,186	123	GIS & IT	working
21	Sliding Cabinet	B Low slide door cabinet	27.02.2014	PFP/OFF/0119	1	254,237	116	NJOMBE OFFICE	working
22	Office Safe	SS2K 2KEYS	27.02.2014	PFP/OFF/0128	1	457,627	208	TL'S RESIDENCE	working
23	LCD Projector	Opma	21.02.2014	PFP/OFF/0146	1	1,067,373	486	CONFERENCE ROOM IRINGA	working
24	Office table	Local	29.03.2014	PFP/OFF/0090	1	329,000	149	FINANCE OFFICE	working
25	Office table	Local	29.03.2014	PFP/OFF/0006	1	250,000	118	FINANCE OFFICE	working
26	Notebook	Dell	11.04.2014	PFP/OFF/1024	1	1,474,080	664	Farida Chande	working
27	Notebook	Dell	11.04.2014	PFP/OFF/0181	1	1,474,080	664	Tukuswiga Ikasu	working
28	Notebook	Dell	11.04.2014	PFP/OFF/0143	1	1,474,080	664	Judith Mdoti	working
29	Notebook	Dell	11.04.2014	PFP/OFF/0182	1	1,474,080	664	Fahma	working
30	Notebook	Dell	11.04.2014	PFP/OFF/0157	1	1,474,080	664	IT	working
31	Notebook	Dell	11.04.2014	PFP/OFF/0161	1	1,474,080	664	Linus Kombe	working
32	Notebook	Dell	11.04.2014	PFP/OFF/0179	1	1,474,080	664	IT	Not Working
33	Notebook	Dell	11.04.2014	PFP/OFF/0185	1	1,474,080	664	Anjela Thomas	Not Working

S/N	Description	Specification	Date of purchase	Register Number	Qty	Amount in TSH/EUR (Purchase currency)	In EUR	User	Condition
34	Notebook	Dell	11.04.2014	PFP/OFF/0116	1	1,474,080	664	Theresia Bashiri	Not Working
35	Notebook	Dell	11.04.2014	PFP/OFF/0184	1	1,474,080	664	IT	Working
36	Notebook	Dell	11.04.2014	PFP/OFF/0192	1	1,474,080	664	Mahendeka Jeremiah	Working
37	Notebook	Dell	11.04.2014	PFP/OFF/0103	1	1,474,080	664	IT	Working
38	Notebook	Dell	11.04.2014	PFP/OFF/0111	1	1,474,080	664	Deusidedit Bowyo	Working
39	Desktop	HP	11.04.2014	PFP/OFF/0085	3	1,496,656	674	FINANCE OFFICE Office	Working
40	Desktop	HP	11.04.2014	PFP/OFF/0095		1,496,656	674	ADMINISTRATION	Working
41	Desktop	HP	11.04.2014	PFP/OFF/0110		1,496,656	674	Reception Njombe	Working
42	Desktop	HP	11.04.2014	PFP/OFF/0200	1	2,260,920	1,019	Davis Chidodo	Working
43	Office table	Local	14.04.2014	PFP/OFF/0120	4	250,000	113	CAPACITY BUILDING OFFICE	Working
44	Office table	Local	14.04.2014	PFP/OFF/0032		250,000	113	GIS OFFICE	Working
45	Office table	Local	14.04.2014	PFP/OFF/0446		250,000	113	NPFA OFFICE	Working
46	Office table	Local	14.04.2014	PFP/OFF/0413		250,000	113	CAPACITY BUILDING OFFICE	Working
47	Office table	Local	28.05.2014	PFP/OFF/0121	1	260,000	117	Extension	Working
48	Office table	Local	28.05.2014	PFP/OFF/0173	1	260,000	117	Extension	Working
49	Office table	Local	28.05.2014	PFP/OFF/0109	1	260,000	117	Extension	Working
50	Office table	Local	28.05.2014	PFP/OFF/0404	1	260,000	117	CAPACITY BUILDING OFFICE	Working
51	Office table	Local	28.05.2014	PFP/OFF/0412	1	260,000	117	TL'S OFFICE	Working
52	Office table	Local	28.05.2014	PFP/OFF/0479	1	260,000	117	PFA OFFICE	Working
53	Office table	Local	28.05.2014	PFP/OFF/0496	1	260,000	117	PFA OFFICE	Working
54	Office table	Local	28.05.2014	PFP/OFF/0421	1	260,000	117	PFA OFFICE	Working
55	Office table	Local	28.05.2014	PFP/OFF/0478	1	260,000	117	ENVIROMENTAL EXPERT	Working
56	Office table	Local	28.05.2014	PFP/OFF/0461	1	260,000	117	CDE	Working
57	MOTORCYCLES	YAMAHA YBR125G	28.05.2014	DFPA 571	1	3,177,044	1,424	Njombe office	Working
58	MOTORCYCLES	YAMAHA YBR125G	28.05.2014	DFP 576	1	3,177,044	1,424	Linus Kombe	Working
59	MOTORCYCLES	YAMAHA YBR125G	28.05.2014	DFPA 573	1	3,177,044	1,424	Iringa office	Working
60	MOTORCYCLES	YAMAHA YBR125G	28.05.2014	DFPA 574	1	3,177,044	1,424	Iringa office	Working
61	MOTORCYCLES	YAMAHA YBR125G	28.05.2014	DFPA 575	1	3,177,044	1,424	Iringa office	Working
62	MOTORCYCLES	YAMAHA YBR125G	28.05.2014	DFPA 572	1	3,177,044	1,424	Mahendeka Jeremiah	Working
63	GPS	Garmin GPSMAP64	31.05.2014	PFP/OFF/0132	1	233	233	Mahendeka Jeremiah	Working
64	GPS	Garmin GPSMAP64	31.05.2014	PFP/OFF/0140	1	233	233	GIS Department	Working
65	GPS	Garmin GPSMAP62S	31.05.2014	PFP/OFF/0125	1	233	233	IT	Working
66	GPS	Garmin GPSMAP64	31.05.2014	PFP/OFF/0155	1	233	233	Linus Kombe	Working
67	Satellite Dish	Satellite dish	24.06.2014	PFP/OFF/0163	1	373,500	167	PFP OFFICE	Not Working
68	Wireless router	D Link w router	24.06.2014	PFP/OFF/0141	1	249,000	111	GIS & IT OFFICE	working
69	GPS	Garmin GPSMAP62S	30.06.2014	PFP/OFF/0138	1	241	241	IT	Working
70	GPS	Garmin GPSMAP62S	30.06.2014	PFP/OFF/0199	1	241	241	Sangito Sumari	working

S/N	Description	Specification	Date of purchase	Register Number	Qty	Amount in TSH/EUR (Purchase currency)	In EUR	User	Condition
71	OFFICE CHAIR	BLACK EXECUTIVE OFFICE CHAIR	03.07.2014	PFP/OFF/0135	1	395,455	183	Arttu	working
72	OFFICE CHAIR	BLACK OFFICE CHAIR	03.07.2014	PFP/OFF/0137	1	395,455	183	GIS & IT	working
73	OFFICE CHAIR	BLACK OFFICE CHAIR	03.07.2014	PFP/OFF/0056	1	395,455	183	Njombe office	working
74	OFFICE CHAIR	BLACK OFFICE CHAIR	03.07.2014	PFP/OFF/0160	1	395,455	183	Njombe office	working
75	OFFICE CHAIR	BLACK OFFICE CHAIR	03.07.2014	PFP/OFF/0114	1	395,455	183	Njombe office	working
76	OFFICE CHAIR	BLACK OFFICE CHAIR	03.07.2014	PFP/OFF/0107	1	395,455	183	Njombe office	working
77	OFFICE CHAIR	BLACK OFFICE CHAIR	03.07.2014	PFP/OFF/0136	1	395,455	183	Njombe office	working
78	OFFICE CHAIR	BLACK OFFICE CHAIR	03.07.2014	PFP/OFF/0106	1	395,455	183	Njombe office	working
79	OFFICE CHAIR	BLACK OFFICE CHAIR	03.07.2014	PFP/OFF/0197	1	395,455	183	Njombe office	working
80	OFFICE CHAIR	BLACK OFFICE CHAIR	03.07.2014	PFP/OFF/0129	1	395,455	183	Robert Parker	working
81	OFFICE CHAIR	BLACK OFFICE CHAIR	03.07.2024	PFP/OFF/0053	1	395,455	183	CONSULTANTS' OFFICE	working
82	Notebook	HP	11.07.2014	PFP/OFF/0189	1	1,300,000	581	Tukuswiga Ikasu	working
83	Notebook	HP	11.07.2014	PFP/OFF/0001	1	1,300,000	581	ANDREW FERDINANDS	working
84	Notebook	HP	11.07.2014	PFP/OFF/0455	1	1,300,000	581	Faraja Mbuduka	working
85	OFFICE TABLE	LOCAL	11.07.2014	PFP/OFF/0139	1	240,000	107	Njombe office	working
86	OFFICE TABLE	LOCAL	11.07.2014	PFP/OFF/0139	1	240,000	107	Njombe office	working
87	PHOTOCOPY TABLE	LOCAL	11.07.2014	PFP/OFF/0127	1	240,000	107	Iringa office	working
88	DIGITAL CAMERA WITH EXTRA BATTERY	Canon D650	11.07.2014	PFP/OFF/0120	1	1,865,000	833	IT	working
89	Camera Flash	Canon	11.07.2014	PFP/OFF/0159	1	450,000	201	IT	working
90	Wireless router	D-Link	17.07.2014	PFP/OFF/0124	1	253,500	113	GIS & IT OFFICE	Not working
91	UPS 1500KVA SMART UPS	APC SMART UPS	31.07.2014	PFP/OFF/0151	1	864,300	386	Njombe office	working
92	MONITOR	SAMSUNG MONITOR	31.07.2014	PFP/OFF/0171	1	402,000	180	TEAM LEADER	working
93	TRIPOD STAND FOR PROJECTOR		04.08.2014	PFP/OFF/0178	1	250,000	114	FWITC	working
94	PROJECTOR	EPSON	04.08.2014	PFP/OFF/0193	1	770,000	351	IT	working
95	DIGITAL CAMERA	SONY DSC H300	04.08.2014	PFP/OFF/0146	1	400,000	182	Dorice Nkawamba	working
96	DIGITAL CAMERA	SONY DSC H301	04.08.2014	PFP/OFF/0144	1	400,000	182	Mahendeka Jeremiah	working
97	DIGITAL CAMERA	SONY DSC H302	04.08.2014	PFP/OFF/0130	1	400,000	182	GIS	working
98	DIGITAL CAMERA	SONY DSC H303	04.08.2014	PFP/OFF/0152	1	400,000	182	GIS	working
99	DIGITAL CAMERA	SONY DSC H304	04.08.2014	PFP/OFF/0196	1	400,000	182	Peter Masseri	working
100	DIGITAL CAMERA	SONY DSC H305	04.08.2014	PFP/OFF/0113	1	400,000	182	Linus Kombe	working
101	SPEAKER SYSTEM WITH STAND&MIC	PSX 1200 PUBLIC SPEAKER SYSTEM	04.08.2014	PFP/OFF/0167	1	1,350,000	615	Iringa Office	working
102	STEEL CABINET	NOOR STEEL CABINET	15.08.2014	PFP/OFF/0166	1	450,000	205	FINANCE OFFICE DEPT	working
103	MOBILE PHONE	SAMSUNG S4 BLACK	19.08.2014	PFP/OFF/O495	1	950,000	433	GIS	working
104	NOTEBOOK	HP ENVY 14-K112 TOUCH	19.09.2014	PFP/OFF/0170	1	1,300,000	603	MARIAM MRUTU	working
105	MOTORCYCLES	YAMAHA YBR125G	30.10.2014	DFPA 873	1	3,300,000	1,542	Njombe office	working
106	MOTORCYCLES	YAMAHA YBR125G	30.10.2014	DFPA 871	1	3,300,000	1,542	Njombe office	working
107	MOTORCYCLES	YAMAHA YBR125G	30.10.2014	DFPA 872	1	3,300,000	1,542	MTUNDA MASERE	working
108	MOTORCYCLES	YAMAHA YBR125G	30.10.2014	DFPA 874	1	3,300,000	1,542	Njombe office	working

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109	GPS	GARMIN	30.10.2014	PFP/OFF/0126	1		226	LUDEWA DISTRICT	working
110	GPS	GARMIN	30.10.2014	PFP/OFF/0192	1		226	NJOMBE TC	working
111	GPS	GARMIN	30.10.2014	PFP/OFF/0112	1		226	Faraja Mbuduka	working
112	GPS	GARMIN	30.10.2014	PFP/OFF/0104	1		226	Veneranda Msemwa	working
113	GPS	GARMIN	30.10.2014	PFP/OFF/0172	1		226	NJOMBE TC	working
114	GPS	GARMIN	30.10.2014	PFP/OFF/0183	1		226	LUDEWA DISTRICT	working
115	GPS	GARMIN	30.10.2014	PFP/OFF/0118	1		226	MAKETE DISTRICT	working
116	GPS	GARMIN	30.10.2014	PFP/OFF/0169	1		226	MAKETE DISTRICT	working
117	GPS	GARMIN	30.10.2014	PFP/OFF/0186	1		226	LINUS KOMBE	working
118	GPS	GARMIN	30.10.2014	PFP/OFF/0105	1		226	Leo Kiliwa	working
119	GPS	GARMIN	30.10.2014	PFP/OFF/0176	1		226	GIS	working
120	GPS	GARMIN	30.10.2014	PFP/OFF/0154	1		226	GIS	working
121	GPS	GARMIN	30.10.2014	PFP/OFF/0115	1		226	GIS	working
122	GPS	GARMIN	30.10.2014	PFP/OFF/0188	1		226	Dorice Nkawamba	working
123	GENERATOR	JAING DONG 2500	24.11.2014	PFP/OFF/0190	1	550,000	258	Sangito Sumari	working
124	GENERATOR	JIANG DONG 2200	24.11.2014	PFP/OFF/0175	1	500,000	235	ARTTU's Residence	working
125	TEAK TABLE	FURNITURE CENTRE	01.12.2014	PFP/OFF/0473	1	4,590,000	2,170	CONFERENCE ROOM	working
126	TEAK TABLE	FURNITURE CENTRE	01.12.2014	PFP/OFF/0414	1	4,590,000	2,170	CONFERENCE ROOM	working
127	TABLET	SAMSUNG GALAXY 10.1" 3G	09.12.2014	PFP/OFF/0194	1	1,100,000	520	ALLOYS GASPER MAWERE	working
128	TABLET	SAMSUNG GALAXY 10.1" 3G	09.12.2014	PFP/OFF/0162	1	1,100,000	520	GUMBO BERNARD MVANDA	working
129	TABLET	SAMSUNG GALAXY 10.1" 3G	09.12.2014	PFP/OFF/0149	1	1,100,000	520	KINGAZI W.K SHEKILANGO	working
130	TABLET	SAMSUNG GALAXY 10.1" 3G	09.12.2014	PFP/OFF/0108	1	1,100,000	520	ELICE R. SIMONILE	working
131	TABLET	SAMSUNG GALAXY 10.1" 3G	09.12.2014	PFP/OFF/0174	1	1,100,000	520	BEN MFUNGO SULUS	working
132	TABLET	SAMSUNG GALAXY 10.1" 3G	09.12.2014	PFP/OFF/0147	1	1,100,000	520	DEUSDEDIT BWOYO	working
133	TABLET	SAMSUNG GALAXY 10.1" 3G	09.12.2014	PFP/OFF/0117	1	1,100,000	520	Sangito Sumari	working
134	TABLET	SAMSUNG GALAXY 10.1" 3G	09.12.2014	PFP/OFF/0142	1	1,100,000	520	Yohana Tweve	working
135	TABLET	SAMSUNG GALAXY 10.1" 3G	09.12.2014	PFP/OFF/0195	1	1,100,000	520	Hanne Vaarala	working
136	TABLET	SAMSUNG GALAXY 10.1" 3G	09.12.2014	PFP/OFF/0158	1	1,100,000	520	LAURENT MFUGALE	working
137	TABLET	SAMSUNG GALAXY 10.1" 3G	09.12.2014	PFP/OFF/0131	1	1,100,000	520	MARIAM MRUTU	working
138	TABLET	SAMSUNG GALAXY 10.1" 3G	09.12.2014	PFP/OFF/0168	1	1,100,000	520	IT STORE	working
139	OFFICE CHAIR	BLACK OFFICE CHAIR	09.12.2014	PFP/OFF/0258	1	400,000	189	Njombe office	working
140	Notebook	HP	10.12.2014	PFP/OFF/0464	1	1,549,840	727	Alloyse Mbisha	working
141	Notebook	HP	10.12.2014	PFP/OFF/0040	1	1,549,840	727	David Msuya	working
142	Notebook	HP	10.12.2014	PFP/OFF/0837	1	1,549,840	727	IT STORE	working
143	Desktop	HP PRO 3500 IS	10.12.2014	PFP/OFF/0212	1	1,336,000	627	NJOMBE TC	working
144	Desktop	HP PRO 3500 IS	10.12.2014	PFP/OFF/0095	1	1,336,000	627	RECEPTION OFFICE	working
145	Desktop	HP PRO 3500 IS	10.12.2014	PFP/OFF/0235	1	1,336,000	627	MAKETE DISTRICT	working
146	Desktop	HP PRO 3500 IS	10.12.2014	PFP/OFF/0250	1	1,336,000	627	MAKETE DISTRICT	working
147	Desktop	DELL OPTIPILEX	10.12.2014	PFP/OFF/0042	1	1,246,000	585	RECEPTION OFFICE	working
148	TABLE	LOCALLY MADE	13.01.2015	PFP/OFF/0262	1	427,494	208	Iringa office	working

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149	TABLE	LOCALLY MADE	13.01.2015	PFP/OFF/0251	1	427,494	208	Iringa office	working
150	TABLE	LOCALLY MADE	13.01.2015	PFP/OFF/0209	1	255,833	125	Iringa office	working
151	MOBILE PHONE	SAMSUNG GALAXY NOTE	26.03.2015	PFP/OFF/0231	1	1,250,000	629	DEUSDEDIT BWOYO	working
152	REFRIDGERATOR	WESTPOINT	07.05.2015	PFP/OFF/0244	1	1,300,000	598	PFA OFFICE	working
153	EXTERNAL HD	TRANSCEND	19.05.2015	PFP/OFF/0259	1	280,000	129	GIS & IT	working
154	EXTERNAL HD	TRANSCEND	19.05.2015	PFP/OFF/0236	1	280,000	129	Hanne Vaarala	working
155	EXTERNAL HD	TRANSCEND	19.05.2015	PFP/OFF/0228	1	280,000	129	Sangito Sumari	working
156	Notebook	HP ZBOOK	31.07.2015		1		1,718	Michael Hawkes	Working
157	CYBER ROAM	Cyber roam	15.07.2015	PFP/OFF/0256	1	2,161,080	930	Iringa office	Working
158	NAS	NAS Storage device	15.07.2015	PFP/OFF/0229	1	4,200,000	1,808	Iringa Office	Working
159	Digital weighting scale		17.07.2015	PFP/OFF/0218	1	472,000	203	Mafinga TMC	Working
160	Bed in Kifanya office		30.07.2015	PFP/OFF/0255	1	360,000	155	Dorice Nkawamba	Working
161	Laserjet colour printer	HP PRO 400 M451	30.07.2015	PFP/OFF/0205	1	1,050,000	452	Michael Hawkes	Working
162	Generator		07.08.2015		1	1,500,000	646	Musa/Simon/Chiko	Working
163	Display cabinet		19.08.2015		1	432,000	186	Iringa	Working
164	Microwave for office		24.08.2015	PFP/OFF/0261	1	295,000	127	Iri nga	Working
165	Notebook	Lenovo	31.12.2015	PFP/OFF/0232	1		1,633	Hanna Vaarala	Working
166	Mobile phone	Samsung Galaxy S5	12.10.2015	PFP/OFF/0260	1	1,016,949	414	Hanna Vaarala	Working
167	Office Table	TJMB 2926 -C	09.11.2015	PFP//MNRT/OFF/0224	7	3,258,475	1,418	MNRT Office	Working
168	Office chair	Black office chair	09.11.2015	PFP/MNRT/OFF/0215		381,357	166	MNRT Office	Working
169	Office chair	Black office chair	09.11.2015	PFP/MNRT/OFF/0245		381,357	166	MNRT Office	Working
170	Visitors chairs	Black pvc chairs	09.11.2015	PFP//MNRT/OFF/0204		550,847	240	MNRT Office	Working
171	Coffee table	Round table	09.11.2015	PFP/MNRT/OFF/0241		1,805,805	786	MNRT Office	Working
172	Office Cabinet	Semi circular cabinet	09.11.2015	PFP/MNRT/OFF/0216		550,848	240	MNRT Office	Working
173	Wooden bookshelf	Book shelf	09.11.2015	PFP/MNRT/OFF/0214		1,521,187	662	MNRT Office	Working
174	Air Condition	Samsung split unit	09.11.2015	PFP/MNRT/OFF/0223	1	1,305,932	568	MNRT Office	Working
175	Microfone KIT	Proton PV-99MK2	09.11.2015	PFP/OFF/0238	1	560,000	244	Iringa office	Working
176	Roll up screen for Projector	Roll up screen 240x240	09.11.2015	PFP/OFF/0248	1	350,000	152	NJOMBE OFFICE	Working
177	Projector	Sony VPL-DX 100 Projector	09.11.2015	PFP/OFF/0211	1	1,100,000	479	NJOMBE OFFICE	Working
178	Microfone amplifier	Amplifier 95W	12.11.2015	PFP/OFF/0239	1	466,102	203	NJOMBE OFFICE	Working
179	Office printer	HP LaserJet black	12.11.2015	PFP/OFF/0253	1	1,012,712	441	Drivers office	Working
180	NAS HARD DRIVE	SEAGAATE HDD 4TB 3.5	12.11.2015		1	682,859	297	IRINGA OFFICE	Working
181	NAS HARD DRIVE	SEAGAATE HDD 4TB 3.5	12.11.2015		1	682,859	297	IRINGA OFFICE	Working
182	NAS HARD DRIVE	SEAGAATE HDD 4TB 3.5	12.11.2015		1	682,859	297	IRINGA OFFICE	Working
183	NAS HARD DRIVE	SEAGAATE HDD 4TB 3.5	12.11.2015		1	682,859	297	IRINGA OFFICE	Working
184	Motor Vehicle	Ford Ranger Double cabin	24.11.2015	DFPA 2027	1	76,313,600	33,215	Iringa	Working
185	Mobile phone	Galaxy J1 Ace	24.11.2015	PFP/OFF/0208	1	250,000	109	Linus Kombe	Working
186	Mobile phone	Galaxy J1 Ace	24.11.2015	PFP/OFF/0210	1	250,000	109	Dorice Nkawamba	Working
187	Office Desk	Locally made	28.12.2015	PFP/OFF/0207	1	239,200	104	Njombe office	Working
188	Office Desk	Locally made	28.12.2015	PFP/OFF/0217	1	239,200	104	Njombe office	Working

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189	Office Desk	Locally made	28.12.2015	PFP/OFF/0252	1	239,200	104	Njombe office	Working
190	Office Desk	Locally made	28.12.2015	PFP/OFF/0227	1	239,200	104	Njombe office	Working
191	Office Desk	Locally made	28.12.2015	PFP/OFF/0201	1	239,200	104	Njombe office	Working
192	Office Desk	Locally made	28.12.2015	PFP/OFF/0237	1	239,200	104	Njombe office	Working
193	Office Desk	Locally made	28.12.2015	PFP/OFF/0230	1	239,200	104	Njombe office	Working
194	Office Desk	Locally made	28.12.2015	PFP/OFF/0247	1	239,200	104	Njombe office	Working
195	Office Desk	Locally made	28.12.2015	PFP/OFF/0213	1	239,200	104	Njombe office	Working
196	Office Desk	Locally made	28.12.2015	PFP/OFF/0226	1	239,200	104	Njombe office	Working
197	Office Desk	Locally made	28.12.2015	PFP/OFF/0203	1	239,200	104	Njombe office	Working
198	Office Desk	Locally made	28.12.2015	PFP/OFF/0233	1	239,200	104	Njombe office	Working
199	Office Desk	Locally made	28.12.2015	PFP/OFF/0206	1	239,200	104	Njombe office	Working
200	Office Desk	Locally made	28.12.2015	PFP/OFF/0240	1	239,200	104	Njombe office	Working
201	Office Desk	Locally made	28.12.2015	PFP/OFF/0234	1	239,200	104	Njombe office	Working
202	Office Desk	Locally made	28.12.2015	PFP/OFF/0219	1	239,200	104	Njombe office	Working
203	Office Shelf	Locally Made	28.12.2015	PFP/OFF/0202	1	239,200	104	Njombe office	Working
204	Office table	Locally Made	08.12.2015	PFP/OFF/0254	1	480,000	209	TL Office	Working
205	Backup generator	Honda Elemax	20.11.2015	PFP/OFF/0434	1	1,580,000	687	Iringa	working
206	Notebook	HP Envy 15	20.11.2015	PFP/OFF/0243	1	1,525,474	663	Teresia Mchome	working
207	Office Table	Loddally made	22.01.2016	PFP/OFF/0222	1	250,000	107	TL OFFICE	working
208	Iron Cabinet		21.02.2016	PFP/OFF/0246	1	730,000	304	RECEPTION	working
209	Canon Photocopier	CANON IMAGE RUNNE 2520	23.02.2016	PFP/OFF/0013	1	2,200,000	917	RECEPTION	working
210	Binding Machine			PFP/OFF/0073	1	490,000	204	RECEPTION	working
211	Mobile phone	samsung Galaxy J1		PFP/OFF/0225	1	295,000	122	Arttu Pienmaki	Working
212	Water dispenser	Water dispenser	06.05.2016	PFP/OFF/0249	1	335,000	137	Njombe office	working
213	Microwave oven	LG		PFP/OFF/0403	1	335,000	137	IRINGA OFFICE	working
214	Gas cooker	HOTPOINT	06.05.2016	PFP/OFF/0257	1	600,000	246	IRINGA OFFICE	working
215	Office chairs	CHINESE MADE	06.05.2016	PFP/OFF/0220	1	340,000	139	IRINGA OFFICE	working
216	Office chairs	CHINESE MADE	06.05.2016	PFP/OFF/0242	1	340,000	139	IRINGA OFFICE	working
217	Office chairs	CHINESE MADE	06.05.2016	PFP/OFF/0350	1	340,000	139	IRINGA OFFICE	working
218	Notebook	LENOVO	30.06.2016	PFP/OFF/0373	1		1,750	IRINGA OFFICE	working
219	Samsung PC Monitor	SAMSUNG		PFP/OFF/0384	1	440,000	181	IRINGA OFFICE/Michael Hawkes	working
220	HP Deskjet Plotter	DESKJET PLOTTER T5520	08.06.2016	PFP/OFF/0048	1	6,519,500	2,682	GIS OFFICE	Working
221	Chain Saws	HUSQVARNA 399	08.06.2016	PFP/OFF/0385	1	1,699,153	699	IRINGA OFFICE	Working
222	Chain Saws	HUSQVARNA 400	08.06.2016	PFP/OFF/0377	1	1,699,153	699	IRINGA OFFICE	Working
223	Chain Saws	HUSQVARNA 401	08.06.2016	PFP/OFF/0355	1	1,699,153	699	IRINGA OFFICE	Working
224	Chain Saws	HUSQVARNA 402	08.06.2016	PFP/OFF/0369	1	1,699,153	699	IRINGA OFFICE	Working
225	Chain Saws	HUSQVARNA 403	08.06.2016	PFP/OFF/0367	1	1,699,153	699	IRINGA OFFICE	Working
226	Chain Saws	HUSQVARNA 404	08.06.2016	PFP/OFF/O400	1	1,699,153	699	IRINGA OFFICE	Working
227	Mobile phone	SAMSUNG J1	30.06.2016		1	280,000	115	Habibu Mahanga	Working

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228	Mobile phone	SAMSUNG J1			1	280,000	115	Joseph Mahari	Working
229	Teak Wood for Furniture	Teak Wood for Furniture	03.06.2016		1	4,958,673	2,073	FWITC	Not fixed
230	Toyota Land Cruiser LX	Toyota Land Cruiser LX	30.03.2016	DFPA2026	1		51,729	IRINGA	Working
231	HP LaserJet printer	HP	15.07.2016	PFP/MNRT/OFF/0223	1	1,139,520	476	MNRT Office/Bwoyo	Working
232	HP LaserJet printer	HP	15.07.2016		1	1,139,520	476	Communication office	Working
233	Shredder		15.07.2016		1	1,400,000	584	ADMINISTRATION	Working
234	EXTERNAL HD	Trancend	21.07.2016		1	350,000	146	Faraja Mbuduka	Working
235	Video Conference	Polycom HDX 6000	28.07.2016		1	9,800,000	4,090	Meeting room	Working
236	Microphone for Video conf	HDX	28.07.2016		1	200,000	83	Meeting room	Working
237	Mobile phone	Samsung S7 Edge	31.07.2016		1	1,890,000	789	Desdedit Bowyo	Working
238	Notebook	Lenovo	01.09.2016		1	1,460,000	609	IT	Working
239	Notebook	Lenovo	01.09.2016		1	1,460,000	609	IT	Not Working
240	Notebook	Lenovo	01.09.2016		1	1,460,000	609	Nickson Marandu	Working
241	Notebook	Lenovo	01.09.2016		1	1,460,000	609	Anjela Thomas	Working
242	Notebook	Lenovo	01.09.2016		1	1,460,000	609	IT	Working
243	Notebook	Lenovo	01.09.2016		1	1,460,000	609	Marcel Mutunda	Working
244	Notebook	Lenovo	01.09.2016		1	1,460,000	609	Gaston Masalu	Working
245	Notebook	Lenovo	01.09.2016		1	1,460,000	609	Anastazia Kasase	Working
246	Notebook	Lenovo	01.09.2016		1	1,460,000	609	Hosea Kiyogama	Working
247	Notebook	Lenovo	01.09.2016		1	1,460,000	609	Godfrey Mwita	Working
248	Notebook	Lenovo	01.09.2016		1	1,460,000	609	Pendo Mapunda	Working
249	High frequency Vacuum Dryer	GZ-40111-DX-Hebei Haibo Machinery Equipment Co., Ltd.	30.09.2016	PFP/FWITC/MC/001	1		29,339	FWITC	Working
250	Multiblade MJF 142-25 or Double Arbor Log reackdown	SHENGONG	30.09.2016	PFP/FWITC/MC/002	1			FWITC	Working
251	Multiblade MJF 143-1525 or Double Arbor Resaw	SHENGONG	30.09.2016	PFP/FWITC/MC/003	1		33,084	FWITC	Working
252	TABLET	Samsung tab 4, 7 inch	10.10.2016		1	600,000	255	Arttu Pienimaki	Working
253	Drone Camera	Phantom 4	23.10.2016		1	3,850,000	1,636	Arttu Pienimaki	Working
254	Office Desk	Locally made	01.11.2016		1	1,090,000	469	Administration, Iringa	Working
255	WOODEN FILING SHELF	Locally made	01.11.2016		1	565,000	243	Finance office	Working
256	LCD Projector	OPTMA HD 28 DSE 1080P	03.11.2016		1	2,500,000	1,076	Meeting room	Working
257	Notebook	HP SPECTRE	11.11.2016		1	3,850,000	1,657	Pius Dominick	Working
258	Laserjet colour printer	HP MFP 477	11.11.2016		1	1,139,520	490	Finance office	Working
259	40 Feet Container	40 Feet Container	12.11.2016	PFP/FWITC/BL/001	1	4,500,000	1,937	Mafinga TMC	Working
260	40 Feet Container	40 Feet Container	12.11.2016	PFP/FWITC/BL/002	1	4,500,000	1,937	Mafinga TMC	Working
261	40 Feet Container	40 Feet Container	12.11.2016	PFP/FWITC/BL/003	1	4,500,000	1,937	Mafinga TMC	Working
262	40 Feet Container	40 Feet Container	12.11.2016	PFP/MAKETE/BL/001	1	4,500,000	1,937	Makete	Working
263	20 Feet Container	20 Feet Container	12.11.2016	PFP/FWITC/BL/004	1	3,500,000	1,506	Mafinga TMC	Working

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264	20 Feet Container	20 Feet Container	12.11.2016	PFP/FWITC/BL/005	1	3,500,000	1,506	Mafinga TMC	Working
265	20 Feet Container	20 Feet Container	12.11.2016	PFP/FWITC/BL/006	1	3,500,000	1,506	Mafinga TMC	Working
266	Hevy duty Car Jacks	Hydroric Jacks for vehicles	12.11.2016		1	350,000	151	DFPA2026	Working
267	Hevy duty Car Jacks	Hydroric Jacks for vehicles	12.11.2016		1	350,000	151	DFPA494	Working
268	Hevy duty Car Jacks	Hydroric Jacks for vehicles	12.11.2016		1	350,000	151	DFPA2968	Working
269	Hevy duty Car Jacks	Hydroric Jacks for vehicles	12.11.2016		1	350,000	151	DFPA496	Working
270	Hevy duty Car Jacks	Hydroric Jacks for vehicles	12.11.2016		1	350,000	151	DFPA495	Working
271	Hevy duty Car Jacks	Hydroric Jacks for vehicles	12.11.2016		1	350,000	151	DFPA2027	Working
272	Hevy duty Car Jacks	Hydroric Jacks for vehicles	12.11.2016		1	350,000	151	DFPA2788	Working
273	Mobile phone	Samsung J1	22.12.2016		1	230,000	101	Habibu Mahanga	Working
274	Mobile phone	Samsung J2	22.12.2016		1	230,000	101	IT	Working
275	Mobile phone	Samsung Note 5	31.12.2016		1	1,400,000	617	Sangito Sumari	Working
276	Marine Garmin devices	Marinea Garmin GLO	31.12.2016		45		2,620	Arttu Pienimaki/Facilitators/Extension	Working
277	Motocycles	Yamaha XTZ 125	31.12.2016	DFPA 2972	1		3,252	FWITC	Working
278	Motocycles	Yamaha XTZ 125	31.12.2016	DFPA 2973	1		3,252	Extension officer	Working
279	Motocycles	Yamaha XTZ 125	31.12.2016	DFPA 2971	1		3,252	Extension officer	working
280	Motocycles	Yamaha XTZ 125	31.12.2016	DFPA 2974	1		3,252	Extension officer	working
281	Motocycles	Yamaha XTZ 125	31.12.2016	DFPA 2975	1		3,252	Extension officer	working
282	Motocycles	yamaha AG 200	31.12.2016	DFPA 2969	1		3,252	Extension officer	working
283	Motocycles	yamaha AG 200	31.12.2016	DFPA 2970	1		3,252	Extension officer	working
284	APM-Automatic Generator	ATM Generator 20KVA	31.12.2016	PFP/IRINGA/MC/001	1		11,632	Iringa office	working
285	APM-Automatic Generator	ATM Generator 100KVA	31.12.2016	PFP/FWITC/MC/007	1		22,423	Mafinga TMC	working
286	Motor vehicle	Ford Ranger Double Cabin	19.10.2016	DFPA 2788	1		26,663	PFP	working
287	Motor vehicle	Toyota Hardtop LX	31.12.2016	DFPA 2026	1		51,729	PFP	working
288	Motor vehicle	Toyota Hilux double Cabin	31.12.2016	DFPA 2967	1		42,627	PFP	working
289	Motor vehicle	Toyota Hilux double Cabin	31.12.2016	DFPA 2968	1		42,627	PFP	working
290	Tractor -John Deere	John Deere	31.12.2016	T908DJH	1		23,174	FWITC	working
291	Licence	Sigma plotter licence	31.12.2016		1		2,340	Michael Hawkes/ Hanne Vaarala/Arttu Pienimaki	working
292	Office chair		01.02.2017		1	250,000	108	Hanne Vaarala	working
293	Handy Canon Recorder		24.02.2017		1	800,000	344	Tukuswiga Ikasu	working
294	Canon photocopier for Mafinga		28.02.2017		1	2,377,627	1,024	FWITC	working
295	Small shelf for VLUP Maps		03.04.2017		1	280,000	119	Iringa Office	working
296	Phantom 4 drone for video		03.04.2017		1	3,868,756	1,644	Arttu Pienimaki	working
297	Samsung Galaxy J7		01.04.2017		1	650,000	276	IT	working
298	Samsung Galaxy J7		01.04.2017		1	650,000	276	Godfrey Mwita	working
299	Samsung Galaxy J7		01.04.2017		1	650,000	276	Linus Kombe	working
300	Samsung Galaxy J7		01.04.2017		1	650,000	276	Marcel Mutunda	working

S/N	Description	Specification	Date of purchase	Register Number	Qty	Amount in TSH/EUR (Purchase currency)	In EUR	User	Condition
301	Samsung Galaxy J7		01.04.2017		1	650,000	276	Pendo Mapunda	working
302	Samsung Galaxy J7		01.04.2017		1	650,000	276	Judith Mdoti	working
303	Samsung Galaxy J7		01.04.2017		1	650,000	276	Anastazia Kasase	working
304	Samsung Galaxy J7		01.04.2017		1	650,000	276	Gaston Masalu	working
305	Samsung Galaxy J7		01.04.2017		1	650,000	276	Teresia Mchome	working
306	Samsung Galaxy J7		01.04.2017		1	650,000	276	George Bullenga	working
307	Samsung Galaxy J7		01.04.2017		1	650,000	276	Dorice Nkawamba	Working
308	Samsung Galaxy J7		01.04.2017		1	650,000	276	MAHENDEKA JEREMIAH	working
309	Samsung Galaxy J7		01.04.2017		1	650,000	276	Nickson Marandu	Working
310	Sony cameras				1		608	Hanne Vaarala	Working
311	Sony Camera				1		608	Yohana Tweve	Working
312	Sony Camera				1		608	MAHENDEKA JEREMIAH	Working
313	Sony Camera				1		608	Hanne Vaarala	working
314	Sony Camera				1		608	Hanne Vaarala	working
315	Wood working Machine-Planing width 300mm		03.05.2017	TOYO	1	2,800,000	1,155	FWITC	working
316	Wood working Machine-Planing width 350mm		03.05.2017	TOYO	1	2,800,000	1,155	FWITC	working
317	Water dispensers for office		03.05.2017		1	330,000	136	FWITC	working
318	Water dispensers for office		03.05.2017		1	330,000	136	Iringa	working
319	Optimal HD 28 Projector for training centre		03.05.2017		1	2,676,600	1,104	FWITC	working
320	Office chair for office		03.05.2017		1	260,000	107	Davis Chidodo	working
321	Nursery development costs		05.05.2017		1	161,207,612	66,569	FWITC-NURSERY	working
322	Samsung Galaxy J7		05.05.2017		1	650,000	268	Anjela Thomas	working
323	Samsung Galaxy J7		05.05.2017		1	650,000	268	Davis Chidodo	working
324	Hp Desktop		16.05.2017	PFP/MNRT/OFF/0223	1	1,600,000	660	MNRT Office/Bwoyo	working
325	Hp Desktop		16.05.2017	PFP/MNRT/OFF/0223	1	1,600,000	660	MNRT Office/Bwoyo	working
326	Hp Desktop		16.05.2017	PFP/MNRT/OFF/0223	1	1,600,000	660	MNRT Office/Bwoyo	working
327	Hp Desktop		16.05.2017	PFP/MNRT/OFF/0223	1	1,600,000	660	MNRT Office/Bwoyo	working
328	Hp Desktop		16.05.2017	PFP/MNRT/OFF/0223	1	1,600,000	660	MNRT Office/Bwoyo	working
329	Hp Spectre		16.05.2017	PFP/MNRT/OFF/0223	1	3,500,000	1,444	MNRT/Allen Richard	working
330	Hp Spectre		16.05.2017	PFP/MNRT/OFF/0223	1	3,500,000	1,444	MNRT/BWOYO	working
331	HP Probook		16.05.2017	PFP/MNRT/OFF/0223	1	3,500,000	1,444	MNRT/ Director	working
332	Bookshelf for Michael Hawkes		11.05.2017		1	650,000	268	Michael	working
333	Submersible pump for Mafinga training centre		25.05.2017		1	4,010,000	1,654	FWITC	working
334	Office chairs for office		17.06.2017			800,000	322	IRINGA	working
335	Office chair		21.06.2017			360,000	145	IRINGA	working
336	Television		03.07.2017	PFP/FWITC/OFF/030/1		1,450,000	579	FWITC	working

S/N	Description	Specification	Date of purchase	Register Number	Qty	Amount in TSH/EUR (Purchase currency)	In EUR	User	Condition
337	HP Probook		21.07.2018	PFP/OFF/0212		1,800,000	718	Davis Chidodo	working
338	HP Probook		21.07.2018	PFP/OFF/0095		1,800,000	718	Yohana Tweve	working
339	HP Probook		21.07.2018	PFP/OFF/0235		1,800,000	718	Edigary Mwaifweya	working
340	Drone eBEE Plus		31.07.2017	PFP/OFF/0250		22,311	28,067	Iringa-Arttu	working
341	Bee Drones customes clearance costs		01.08.2017	PFP/OFF/0042		15,014,318		IRINGA	working
342	OPTMA HD 28 Projector for MNRT office		17.08.2017	PFP/MNRT/OFF/0448		2,686,800	1,030	MNRT	working
343	Mobile phone for training expert		27.09.2017	PFP/OFF/0439	1	750,000	287	Yohana Tweve	working
344	Laptop for satellite image processing, Asus ROG Strix GL702VS		30.10.2017	PFP/OFF/0488	1	1,943	1,943	IT	working
345	Garage/Workshop mounted with two containers		09.05.2017		1	20,000,000	8,364	FWITC	Good condition
346	Dell		01.11.2017	PFP/OFF/0518	1	1,132,800	437	FITI	working
347	Dell		01.11.2017	PFP/OFF/0469	1	1,132,800	437	FITI	working
348	Dell		01.11.2017	PFP/OFF/0425	1	1,132,800	437	FTI	working
349	Dell		01.11.2017	PFP/OFF/0477	1	1,132,800	437	FTI	working
350	Charcoal Klin at training centre		01.11.2017	PFP/OFF/0415	1	2,820,000	1,087	FWITC	working
351	Pruning saws		01.11.2017		1	4,331,776	1,670	FWITC	working
352	GIS Maping table		28.11.2017	PFP/OFF/0471	1	630,000	243	Iringa	working
353	Scanner for training center		30.11.2017	PFP/OFF/0459	1	400,000	154	FWITC	working
354	Mobile Phone for David Msuya		05.12.2017	PFP/OFF/0493	1	780,000	293	David Msuya	working
355	Wireless mouse for Bwoyo		12.12.2017	PFP/OFF/0493	1	336,131	126	Bwoyo	working
356	Wood Treatment Plant		09.03.2018	PFP/FWITC/MC/018	1	37,712,812	13,943	FWITC	working
357	Mobile Phone for Edigary Mwaifweya		23.01.2018	PFP/OFF/0498	1	750,000	270	Edigary	working
358	Canon printer and Kaspersky internet 811security		12.02.2018	PFP/OFF/0498	1	740,000	268	Mafinga TMC	working
359	Printer for front office		05.03.2018	PFP/OFF/0051	1	1,269,396	458	Iringa/Tukuswiga	working
360	laptop for communication expert(Dell Inspiron 3567 i3/4GB/500B		23.04.2018	PFP/OFF/0462	1	1,386,500	507	Peter Masseri	working
361	Executive Cahir Code 271		23.04.2018	PFP/MNRT/OFF/01	1	1,120,000	410	MNRT	working
362	Visitors chair		23.04.2018	PFP/MNRT/OFF/02	1	504,000	184	MNRT	working
363	Visitors chair		23.04.2018	PFP/MNRT/OFF/03	1	504,000	184	MNRT	working
364	Visitors chair		23.04.2018	PFP/MNRT/OFF/04	1	504,000	184	MNRT	working
365	Visitors chair		23.04.2018	PFP/MNRT/OFF/05	1	504,000	184	MNRT	working
366	Visitors chair		23.04.2018	PFP/MNRT/OFF/06	1	504,000	184	MNRT	working
367	Visitors chair		23.04.2018	PFP/MNRT/OFF/07	1	504,000	184	MNRT	working
368	TV Stand BL 220		23.04.2018	PFP/MNRT/OFF/029/1	1	1,100,000	402	MNRT	working

S/N	Description	Specification	Date of purchase	Register Number	Qty	Amount in TSH/EUR (Purchase currency)	In EUR	User	Condition
369	Centre Table DM6321		23.04.2018	PFP/MNRT/OFF/08	1	765,000	280	MNRT	working
370	Computer Monitor and Internet security		09.05.2018	PFP/MNRT/OFF/0441	1	1,670,000	634	MNRT	working
371	Water tank 10,000ltrs		05.05.2017	PFP/FWITC/OFF/035/1	1	3,415,000	1,409	FWITC	Good condition
372	Water tank 10,000ltrs		05.05.2017	PFP/FWITC/OFF/035/2	1	3,415,000	1,409	FWITC	Good condition
373	Water tank 10,000ltrs		05.05.2017	PFP/FWITC/OFF/035/3	1	3,415,000	1,409	FWITC	Good condition
374	Adobe CS6 software for Communication department		01.08.2017		1	958,465	367	Peter Masseri Laptop	working
375	Nitro Pro 11 Licence		18.08.2017		4	1,568,253	601	Peter Masseri/ Hanne Vaarala/ Michael Hawkes and Arttu Pienimaki	working
376	8 Trolleys for training centre		07.08.2017	PFP/FWITC/MC/019/1-8	8	1,285,000	493	FWITC	
377	Small Pillow -shaped-briquette-machine		07.08.2017	PFP/FWITC/MC/013	1	8,545,913	3,276	FWITC	
378	Charcoal Muller Mixer		07.08.2017	PFP/FWITC/MC/014	1	8,567,288	3,303	FWITC	
379	Microsoft office for Team Leader computer		06.09.2017		1	444,169	170	Michael	working
380	Microsoft office licence		27.09.2017		1	253	253	Michael	working
381	Microsoft office for VETA students laptops		17.10.2017		4	1,318,352	508	FITI/FTI	working
382	Microsoft office for programme laptops		30.10.2017		1	204	204	Tunu Computer	working
383	Mobile phone for driver		05.05.2017		1	485,000	200	Mfaume Kambi	working
384	Makete Industrial		20.11.2017		1	76,356,439	31,739	Makete	working
385	Indian Horizontal Band saw(log breakdown)			PFP/FWITC/MC/004	1			Makete	working
386	Indian Vertical Band saw(Resaw)			PFP/FWITC/MC/005	1		13,936	Makete	working
387	Indian Horizontal Band saw(log breakdown)			PFP/FWITC/MC/020	1			FWITC	working
388	Indian Vertical Band saw(Resaw)			PFP/FWITC/MC/021	1		18,207	FWITC	working
389	Building of slide tech machine		28.02.2018		1	10,139,000	3,664	FWITC	Good condition
390	Canteen building		28.03.2018		1	7,263,000	2,618	FWITC	Good condition
391	FWITC Toilets				1	29,926,250	10,921	FWITC	Good condition

S/N	Description	Specification	Date of purchase	Register Number	Qty	Amount in TSH/EUR (Purchase currency)	In EUR	User	Condition
392	FWITC Containers Office				1	43,854,900	18,767	FWITC	Good condition
393	FWITC Classrooms, Stores and Conferences				1	108,764,500	45,456	FWITC	Good condition
394	Wireless router(D-Link)		04.06.2018		2	600,000	228	FWITC	working
395	Automatic Grinder Machine		06.04.2018	PFP/MKT/MC/003	1	3,545,920	1,297	Makete	working
396	Automatic Teeth Setting Machine		06.04.2018	PFP/MKT/MC/004	1	1,877,905	687	Makete	working
397	welding machine		06.04.2018	PFP/MKT/MC/005	1	1,668,015	610	Makete	working
398	Carbonizer tank		19.06.2018	PFP/FWITC/MC/020	1	8,360,000	3,181	FWITC	Working
399	HP Notebook 15, Core i7, 8Gb RAM		29.06.2018		1	1,942,000	739	Nuhu Salasala	working
400	HP LaserJet printer		29.06.2018		1	1,560,000	594	Nuhu Salasala	working
401	Mobile phone: Samsung Galaxy S7 edge		29.06.2018		1	850,000	323	Nuhu Salasala	working
402	Laptop for Faraja Mbunduka		29.06.2018	PFP/OFF/0447	1	1,942,000	739	Faraja Mbuduka	working
403	Laptop for Dorice Kawambwa		29.06.2018	PFP/OFF/0433	1	1,474,000	561	Dorice Kawambwa	working
404	Laptop for Kastory Timbula		29.06.2018	PFP/OFF/0449	1	1,942,000	739	Kastory Timbula	working
405	Mobile for Aloyce		29.06.2018		1	1,400,000	533	Aloyce Mbisha	working
406	Chainsaw MS382 50cm/20", 36		09.07.2018	PFP/FWITC/SAW/038/1	1	1,535,843	578	FWITC	working
407	Chainsaw MS382 50cm/20", 36		09.07.2018	PFP/FWITC/SAW/038/2	1	1,535,843	578	FWITC	working
408	Chainsaw MS382 50cm/20", 36		09.07.2018	PFP/FWITC/SAW/038/3	1	1,535,843	578	FWITC	working
409	Tipping trailer brand new 12T		24.07.2018		1	20,000,000	7,530	FWITC	working
410	TECHNO CAMON Xpro		15.08.2018		1	600,000	226	Farida Chande	working
411	SAW SPEC 660-ElectricBand saw Band saw		23.01.2018	PFP/FWITC/MC/015	1		9,820	FWITC	working
412	NBS 22-75 Band saw Sharpener		23.01.2018	PFP/FWITC/MC/016	1		7,862	FWITC	working
413	NBS 22-75 Band saw Dual Tooth Setter		23.01.2018	PFP/FWITC/MC/017	1		2,220	FWITC	working

Annex 3 Profitability calculations for Phase 1 pine and eucalyptus plantations

Pine plantations 19-year rotation, 2 thinnings

MANAGEMENT REGIME							
Year No.	Management activities	UMAI m3/ha	Util Vol >8 cm m3/ha	Harvest m3/ha	Harvest revenue EUR/ha	Management cost EUR/ha	Total cashflow EUR/ha
1	S, PL, W, FB	17.4	0.0			140.00	-241.55
2	W	17.4	0.0			18.00	-18.00
3		17.4	0.1				0.00
4	FM	17.4	3.8			18.00	-18.00
5	P1	17.4	19.3			10.52	-10.52
6		17.4	34.4				0.00
7	FM	17.4	57.2			18.00	-18.00
8	T1, P2	17.4	48.7	28.1	393.40	15.78	377.62
9		17.4	76.4				0.00
10	FM	17.4	96.8			18.00	-18.00
11		17.4	123.2				0.00
12		17.4	143.5				0.00
13	T2, P3, FM	17.4	111.6	55.9	782.60	39.04	743.56
14		17.4	132.4				0.00
15		17.4	157.4				0.00
16	FM	17.4	173.5			18.00	-18.00
17		17.4	193.3				0.00
18		17.4	208.0				0.00
19		17.4	225.5				0.00
20	H	17.4	0.0	247.3	3,462.20		3,462.20

NET PRESENT VALUE OF PLANTATIONS AS AT 31 DECEMBER 2018

VALUE, EUR/ha					
	2014/15	2015/16	2016/17	2017/18	Grand total
Undiscounted	4,519	4,501	4,501	4,483	n/a
Discounted 6 %	2,055	1,922	1,813	1,694	n/a
Discounted 12 %	1,037	910	812	709	n/a
Discounted 18 %	578	475	403	326	n/a

VALUE, EUR total					
	2014/15	2015/16	2016/17	2017/18	Grand total
Undiscounted	2,349,807	5,112,977	15,127,390	9,535,043	32,125,218
Discounted 6 %	1,068,825	2,183,512	6,094,526	3,602,471	12,949,334
Discounted 12 %	539,206	1,033,491	2,730,102	1,508,439	5,811,239
Discounted 18 %	300,792	539,548	1,352,814	693,084	2,886,237

IRR FOR WHOLE ROTATION 20%

Notes:

1) Average sawlog price assumed for all volume removals

VARIABLES

Seedling cost (EUR/ha)	84.88
Seedling transportation (EUR/ha)	16.67
Price, sawlogs (EUR/m3)	14.00

PLANTED AREA

Total area, 2014/15 (ha)	520.0
Total area, 2015/16 (ha)	1,136.0
Total area, 2016/17 (ha)	3,361.0
Total area, 2017/18 (ha)	2,127.0

Eucalyptus plantations
20-year rotation, 3 thinnings

MANAGEMENT REGIME							
Year No.	Management activities	UMAI m3/ha	Util Vol >8 cm m3/ha	Harvest m3/ha	Harvest revenue EUR/ha	Management cost EUR/ha	Total cashflow EUR/ha
1	S, PL, W, FB	18.5	0.0			140.00	-253.55
2	W	18.5	18.5			18.00	-18.00
3		18.5	37.0				0.00
4	FM	18.5	55.5			18.00	-18.00
5		18.5	74.0				0.00
6	T1	18.5	60.0	32.5	455.00		455.00
7	FM	18.5	78.5			18.00	-18.00
8		18.5	97.0				0.00
9		18.5	115.5				0.00
10	FM	18.5	134.0			18.00	-18.00
11	T2	18.5	100.0	52.5	735.00		735.00
12		18.5	118.5				0.00
13	FM	18.5	137.0			18.00	-18.00
14		18.5	155.5				0.00
15		18.5	174.0				0.00
16	T3, FM	18.5	128.5	64.0	896.00	18.00	878.00
17		18.5	147.0				0.00
18		18.5	165.5				0.00
19	FM	18.5	184.0			18.00	-18.00
20		18.5	202.5				0.00
21	H	18.5	0.0	221.0	3,094.00		3,094.00

NET PRESENT VALUE OF PLANTATIONS AS AT 31 DECEMBER 2018

VALUE, EUR/ha					
	2014/15	2015/16	2016/17	2017/18	Grand total
Undiscounted	5,090	5,072	5,072	5,054	n/a
Discounted 6 %	2,433	2,278	2,149	2,011	n/a
Discounted 12 %	1,339	1,180	1,053	925	n/a
Discounted 18 %	840	697	591	485	n/a

VALUE, EUR total					
	2014/15	2015/16	2016/17	2017/18	Grand total
Undiscounted	1,501,550	1,846,208	2,414,272	3,345,748	9,107,778
Discounted 6 %	717,776	829,349	1,023,145	1,331,160	3,901,431
Discounted 12 %	395,145	429,479	501,452	612,037	1,938,112
Discounted 18 %	247,912	253,684	281,136	321,250	1,103,982

IRR FOR WHOLE ROTATION 25%

Notes:

- 1) 100% small diameter assumed from the 1st thinning
- 2) 50% large and 50% small diameter assumed from the 2nd thinning
- 3) 60% large and 40% small diameter assumed from the 3rd thinning
- 4) 80% large and 20% small diameter assumed from the 3rd thinning

VARIABLES	
Seedling cost (EUR/ha)	96.88
Seedling transportation (EUR/ha)	16.67
Price, sawlog large diameter (EUR/m3)	14.00
Price, sawlog small diameter (EUR/m3)	14.00

PLANTED AREA	
Total area, 2014/15 (ha)	295.0
Total area, 2015/16 (ha)	364.0
Total area, 2016/17 (ha)	476.0
Total area, 2017/18 (ha)	662.0

CODES & UNIT COSTS				
Code	Activity	Notes	Unit cost EUR/ha	Source
S	Site preparation	Land clearing, marking, pitting	59.00	PFP, 2015. Guidelines for call for applications for in-kind support for individuals and organisations. Tree Growing Incentive Scheme (TGIS) (29 Sep 2015)
PL	Planting	Labour cost only; Includes blanking	12.00	PFP, 2015. Guidelines for call for applications for in-kind support for individuals and organisations. Tree Growing Incentive Scheme (TGIS) (29 Sep 2015)
W	Weeding	Both circle and slash weeding assumed	18.00	PFP, 2016. Proposal for a pilot cash incentive under the tree growing incentive scheme for the second growing season (3 Feb 2016)
FB	Firebreak preparation		51.00	PFP, 2015. Guidelines for call for applications for in-kind support for individuals and organisations. Tree Growing Incentive Scheme (TGIS) (29 Sep 2015)
FM	Firebreak maintenance	Assumed to have same cost as weedings	18.00	Assumption
P1	1st pruning	Access pruning; Rates for teak assumed	10.52	KVTC, 2018. OSP 2018 APO and Budget for Application
P2	2nd pruning	Rates for teak assumed	15.78	KVTC, 2018. OSP 2018 APO and Budget for Application
P3	3rd pruning	Rates for teak assumed	21.04	KVTC, 2018. OSP 2018 APO and Budget for Application

OTHER CODES	
T1	1st thinning
T2	2nd thinning
T3	3rd thinning
T4	4th thinning
H	Final harvest

Annex 4 PFP publications

24 January 2015. Inception Report

<http://www.privateforestry.or.tz/en/resources/view/inception-report>

29 May 2015. Quarterly report January – March 2015

<http://www.privateforestry.or.tz/en/resources/view/quarterly-report-jan-march-2015>

June 2015. Programme Document

<http://www.privateforestry.or.tz/en/resources/view/programme-document>

November 2015. Annual progress report 2014–2015

<http://www.privateforestry.or.tz/en/resources/view/annual-progress-report-2014-2015>

10 October 2015. Review of geospatial resources and forest information system (FIS) solutions for the private forestry

<http://www.privateforestry.or.tz/en/resources/view/review-of-geospatial-resources-and-forest-information-systemfis>

27 October 2015. Quarterly report July – September 2015

<http://www.privateforestry.or.tz/en/resources/view/quarterly-report-july-sept-2015>

2016. Main results and lessons learned from the field exercise assessing tree growing cash incentive pilot

<http://www.privateforestry.or.tz/en/resources/view/main-results-and-lessons-learned-from-the-field-exercise-assessing-tree-gro>

2016. Annual progress report 2015–2016

<http://www.privateforestry.or.tz/en/resources/view/annual-progress-report-2015-2016>

2016. Quarterly report January – March 2016

<http://www.privateforestry.or.tz/en/resources/view/quarterly-report-january-march-2016>

11 April 2016. Survival and quality assessment of smallholder plantations established with PFP support

<http://www.privateforestry.or.tz/en/resources/view/survival-and-quality-assesment-of-smallholder-plantations-established-with>

11 April 2016. Value chain analysis of plantation wood from the Southern Highlands

<http://www.privateforestry.or.tz/en/resources/view/value-chain-analysis-of-wood-plantation-from-the-southern-highlands>

30 April 2016. Forest sector financing study

<http://www.privateforestry.or.tz/en/resources/view/forest-sector-financing-study>

26 May 2016. TFS economics in forestry operations

<http://www.privateforestry.or.tz/en/resources/view/tfs-economics-ni-forest-operations>

3 June 2016. Quarterly report October – December 2015

<http://www.privateforestry.or.tz/en/resources/view/quarterly-report-oct-dec-2015>

19 October 2016. Ruvuma private forestry investment opportunities – Site profiles

<http://www.privateforestry.or.tz/en/resources/view/ruvuma-private-forestry-investment-opportunities>

November 2016. PFP Tree Growing Incentive Scheme Guidelines for 2016/17

<http://www.privateforestry.or.tz/en/resources/view/pfp-tree-growing-incentive-scheme-guidelines-for-2016-17>

December 2016. Six month progress report July – December 2016

<http://www.privateforestry.or.tz/en/resources/view/six-month-progress-report-june-december-2016>

2017. End-of-Dry-Season woodlot assessment 2016/17 report

<http://www.privateforestry.or.tz/en/resources/view/end-of-dry-season-woodlot-assessment-2016-17-report>

2017. Quarterly report October – December 2017

<http://www.privateforestry.or.tz/en/resources/view/quarterly-report-october-december-2017>

31 January 2017. Financial and economic analysis of private forestry investment opportunities in Ruvuma Region
<http://www.privateforestry.or.tz/en/resources/view/financial-and-economic-analysis-of-private-forestry-investment-opportunities>

5 March 2017. Forest Plantation Mapping of the Southern Highlands – Final Report
<http://www.privateforestry.or.tz/en/resources/view/forest-plantation-mapping-southern-highlands-final-report>

10 April 2017. Administration manual for Tanzanian Tree Growers' Associations - *English and Swahili version*.
<http://www.privateforestry.or.tz/en/resources/view/administration-manual-for-tanzanian-tree-growers-associations-english-and-s>

May 2017. Quarterly report January – March 2017
<http://www.privateforestry.or.tz/en/resources/view/quarterly-report-january-march-2017>

July 2017. Programme Implementation Manual – version of July 2017
<http://www.privateforestry.or.tz/en/resources/view/programme-implementation-manual-1>

July 2017. PFP Annual Progress Report 2016/17
<http://www.privateforestry.or.tz/en/resources/view/pfp-annual-progress-report-2016-17>

September 2017. PFP Tree Growing Incentive Scheme guidelines 2017/18
<http://www.privateforestry.or.tz/en/resources/view/pfp-tree-growing-incentive-scheme-guidelines-2017-18>

November 2017. Quarterly report July – September 2017
<http://www.privateforestry.or.tz/en/resources/view/quarterly-report-july-september-2017>

2018. PFP work plan 2017–2018
<http://www.privateforestry.or.tz/en/resources/view/pfp-work-plan-2017-2018>

March 2018. Evaluation report of the village land use planning activities implemented by PFP
<http://www.privateforestry.or.tz/en/resources/view/evaluation-report-of-the-village-land-use-planning-activities-implemented-b>

April 2018. Investment opportunities in the Tanzanian forest industry
<http://www.privateforestry.or.tz/en/resources/view/investment-opportunities-in-the-tanzanian-forest-industry>

May 2018. Quarterly report January – March 2018
<http://www.privateforestry.or.tz/en/resources/view/quarterly-report-january-march-2018>

June 2018. Tree Growers' Association Union Business Plan
<http://www.privateforestry.or.tz/en/resources/view/tree-growers-association-union-business-plan>

15 June 2018. FWITC business plan
<http://www.privateforestry.or.tz/en/resources/view/fwitc-business-plan>

27 June 2018. TGA evaluation report
<http://www.privateforestry.or.tz/en/resources/view/tga-evaluation-report>

12 July 2018. New updated administration manual for TGAs
<http://www.privateforestry.or.tz/en/resources/view/administration-manual-for-tanzanian-tree-growers-associations-english-and-s>

August 2018. Seedling delivery report for FY2017/18
<http://www.privateforestry.or.tz/en/resources/view/seedling-delivery-report-for-fy2017-18>

September 2018. Scoping study on existing extension services within the Southern Highlands
<http://www.privateforestry.or.tz/en/resources/view/scoping-study-on-existing-extension-services-within-the-southern-highlands>

November 2018. Participatory mapping and planning tools developed for village land use planning practice
<http://www.privateforestry.or.tz/en/resources/view/participatory-mapping-and-planning-tools-developed-for-village-land-use-pla>

March 2019. Phase I final plantation survey report
<http://www.privateforestry.or.tz/en/resources/view/final-plantation-survey-report>

Annex 5 List of PFP-supported TGA villages

No	District	Village	TGIS	Facilitator provision	Institutional capacity building (centralised)	Institutional capacity building (field)	Fire prevention and control training	Village Land Use Plan preparation	TGA-based seed orchard	VSLA groups	Income Generating Activities (2014–2016)
1	Kilolo	Lyamko	x	x	x		x	x			
2	Kilombero	Kitete	x	x	x		x			x	
3	Kilombero	Uchindile	x	x	x		x			x	
4	Ludewa	Amani	x	x	x	x	x			x	x
5	Ludewa	Ibumi	x	x	x		x	x	x	x	
6	Ludewa	Kiteweke	x	x	x		x	x		x	
7	Ludewa	Kiwe	x	x	x		x	x		x	
8	Ludewa	Ludende	x	x	x	x	x	x		x	
9	Ludewa	Ludewa town				x					
10	Ludewa	Lusala	x	x	x	x	x			x	x
11	Ludewa	Madope	x	x	x		x	x		x	x
12	Ludewa	Maholongw'a	x	x	x		x	x		x	
13	Ludewa	Masimbwe	x	x	x	x	x	x		x	x
14	Ludewa	Mavanga	x	x	x		x	x		x	x
15	Ludewa	Mundindi	x	x	x		x	x		x	
16	Ludewa	Njelela	x	x	x		x	x	x	x	
17	Ludewa	Utilili	x	x	x	x	x	x		x	
18	Madaba DC	Ifinga	x	x	x		x	x	x	x	
19	Madaba DC	Lilondo	x	x	x			x			
20	Madaba DC	Maweso	x	x	x		x	x	x	x	
21	Madaba DC	Mkongotema	x	x	x		x	x		x	
22	Madaba DC	Wino	x	x	x		x	x		x	
23	Makete	Ibaga						x			
24	Makete	Igumbilo	x	x	x		x	x		x	
25	Makete	Ihanga	x	x	x		x	x		x	
26	Makete	Ihela	x	x	x			x		x	
27	Makete	Ikete						x			
28	Makete	Ilindiwe	x	x	x			x			
29	Makete	Kijyombo	x	x	x	x	x	x		x	
30	Makete	Lupila	x	x	x		x	x		x	
31	Makete	Mago				x		x			
32	Makete	Makangalawe	x	x	x		x	x		x	
33	Makete	Malembuli						x		x	
34	Makete	Mangoto				x					
35	Makete	Masisiwe	x	x	x		x	x		x	
36	Makete	Ngoje	x	x	x		x	x		x	
37	Makete	Ng'onde	x	x	x		x	x		x	
38	Makete	Nhungu	x	x	x		x	x		x	
39	Makete	Ukange						x			
40	Makete	Ukwama	x	x	x	x	x	x		x	x
41	Makete	Usagatikwa	x	x	x		x	x	x	x	x
42	Makete	Usungilo						x			
43	Makete	Utweve	x	x	x		x	x		x	
44	Mbinga	Kihangi Mahuka	x	x	x						
45	Mbinga	Lipilipili	x	x	x			x		x	
46	Mbinga	Ndembo	x		x						
47	Mbinga	Silo	x		x						

No	District	Village	TGIS	Facilitator provision	Institutional capacity building (centralised)	Institutional capacity building (field)	Fire prevention and control training	Village Land Use Plan preparation	TGA-based seed orchard	VSLA groups	Income Generating Activities (2014–2016)
48	Mbinga	Utili							x		x
49	Mbinga	Ukimo	x	x	x			x		x	
50	Mufindi	Holo	x	x	x		x		x	x	
51	Mufindi	Idete	x	x	x		x		x	x	
52	Mufindi	Igowole								x	
53	Mufindi	Ipilimo	x	x	x		x	x		x	
54	Mufindi	Iramba								x	
55	Mufindi	Kiyowela	x	x	x		x	x		x	x
56	Mufindi	Lugema	x	x	x		x	x		x	
57	Mufindi	Lugolofu	x	x	x		x	x		x	x
58	Mufindi	Magunguli	x	x	x		x			x	x
59	Mufindi	Makungu							x	x	
60	Mufindi	Mtambula								x	
61	Mufindi	Nundwe								x	
62	Mufindi	Nyakipambo								x	
63	Mufindi	Wamimbabwe								x	
64	Mufindi	Vikula								x	
65	Njombe DC	Ikang'asi	x	x	x		x	x		x	x
66	Njombe DC	Ikuna				x					
67	Njombe DC	Itambo	x		x		x	x		x	x
68	Njombe DC	Madeke	x	x	x					x	
69	Njombe DC	Matembwe	x		x	x	x				
70	Njombe DC	Mfriga	x	x	x			x			
71	Njombe DC	Nyombo				x					
72	Njombe TC	Iboya	x	x	x	x	x	x		x	
73	Njombe TC	Kifanya	x	x	x		x	x		x	x
74	Njombe TC	Lilombwi						x			
75	Njombe TC	Liwengi						x			
76	Njombe TC	Mamongolo				x		x			
77	Njombe TC	Mgala	x	x	x		x	x			x
78	Njombe TC	Ngalanga	x	x	x	x	x	x		x	x
79	Njombe TC	Ng'elamo	x	x	x	x	x	x			x
80	Nyasa	Kigongo	x		x					x	
81	Nyasa	Lipingo	x	x	x			x		x	
82	Nyasa	Litindo Asili	x	x	x					x	
83	Nyasa	Liuli	x	x	x			x		x	
84	Nyasa	Lundo							x		
85	Nyasa	Lwekei							x		
86	Nyasa	Mango						x		x	
87	Nyasa	Mapato	x	x	x					x	
88	Nyasa	Mbanga	x	x	x					x	
89	Nyasa	Mkali A	x	x	x			x		x	
90	Nyasa	Nkalachi						x		x	
91	Nyasa	Upolo	x	x	x					x	
Total count			65	60	65	17	47	59	11	66	17



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