

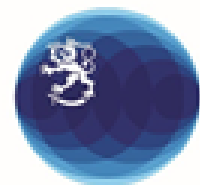


PARTICIPATORY PLANTATION FORESTRY PROGRAMME

Integrated Forest Fire Management Instruction Booklet for Commercial Plantation Forestry



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



Embassy of Finland
Dar es Salaam



Participatory Plantation Forestry Programme (PFP 2)

Integrated Forest Fire Management Instruction Booklet for Commercial Plantation Forestry

February 2023, Iringa, Tanzania

Report version: February 2023



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Recommended citation:

Participatory Plantation Forestry Programme – PFP 2. (2023). Integrated Forest Fire Management Instruction Booklet for Commercial Plantation Forestry. Iringa, Tanzania.

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ABBREVIATIONS

DFFC	District Forest Fire Coordinator
FDI	Fire Danger Index
IFM	Integrated Fire Management
LGA	Local Government Authority
MNRT	Ministry of Natural Resources and Tourism
PFP 2	Participatory Plantation Forestry Programme
PO-RALG	Presidents Office Regional Administration and Local Government
RFFC	Regional Forest Fire Coordinator
TFS	Tanzania Forest Service Agency
VFC	Village Fire Crew
VFF	Village Fire Fund
VFMC	Village Fire Management Committee
VFMP	Village Fire Management Plan

PREAMBLE

This **Integrated Forest Fire Management Instruction Booklet for Commercial Plantation Forestry** should be considered together with two accompanying documents. These are **1) Bylaws for Fire Prevention and Management of Village Councils**, and **2) Kidete Village Fire Management Plan**.

Together these documents provide instructions for implementation of integrated fire management (IFM), the legal framework for IFM, and a worked example of a village fire management plan (VFMP) that will act as a reference for preparing village FMPs for all villages participating in IFM.

National, regional and district governments of Tanzania have committed to reducing the losses suffered from forest fires and have, for that reason, made the implementation of Integrated Fire Management (IFM) one of their priorities (Macric, and Lyimo, 2019).

The national level “Integrated Fire Management – Guidelines for Commercial Forestry” was prepared based on forest fire trends, and existing national policies including the recently reviewed forest policy, Food and Agriculture Organisation (FAO) recommendations, and the increasing investments in small, medium, and large-scale commercial forestry in the country (Macric, and Lyimo, 2019).

Sokoine University of Agriculture, working with Tanzania Forest Service in Wino and surrounding villages, piloted the introduction of IFM and paved the way for planning broad national level uptake. In addition, some private companies have been working with their neighbouring communities to adapt elements of IFM, but not in a holistic and standardised manner. Regional and local government have increasingly been providing leadership and coordination in reducing fire damage.

IFM can be defined as an approach to addressing the problems and issues posed by both damaging and beneficial fires within the context of the natural environments and socio-economic systems in which they occur, by evaluating and balancing the relative risks posed by fire with the beneficial or necessary ecological and economic roles that it may play in each conservation area, landscape, or region (Myers, 2006). ITTO (n.d), adds that Integrated Fire Management (IFM) comprises a systematic approach to forest fire management. It encompasses both the traditional efforts of fire prevention and fire suppression as well as the use of prescribed fire as a tool, community involvement, and forest law enforcement.

The concept of IFM has evolved over the last ± two decades and is often interpreted slightly differently by individuals from alternative land use disciplines. The differences in the interpretation are usually linked to different land use practices such as commercial forestry, agriculture, and conservation.

IFM can be summarised as a systematic, holistic approach to managing wildfires. Literature generally defines IFM in terms of five strategic elements. These strategies have various subthemes and activities (implementing tactics) considering environmental, social-economic, and political-administrative aspects. Strategic elements of the IFM system include:

- Protection/Preparedness (readiness to face fires),
- Prevention (risk reduction/preventing fires from igniting),
- Suppression (response to a fire/strategies and tactics to suppress a fire),
- Restoration (rehabilitation of areas damaged by fires), and
- Research (data collection and analysis, applied and academic research).

Refer to Figure 0.1 on the summary of the IFM system.

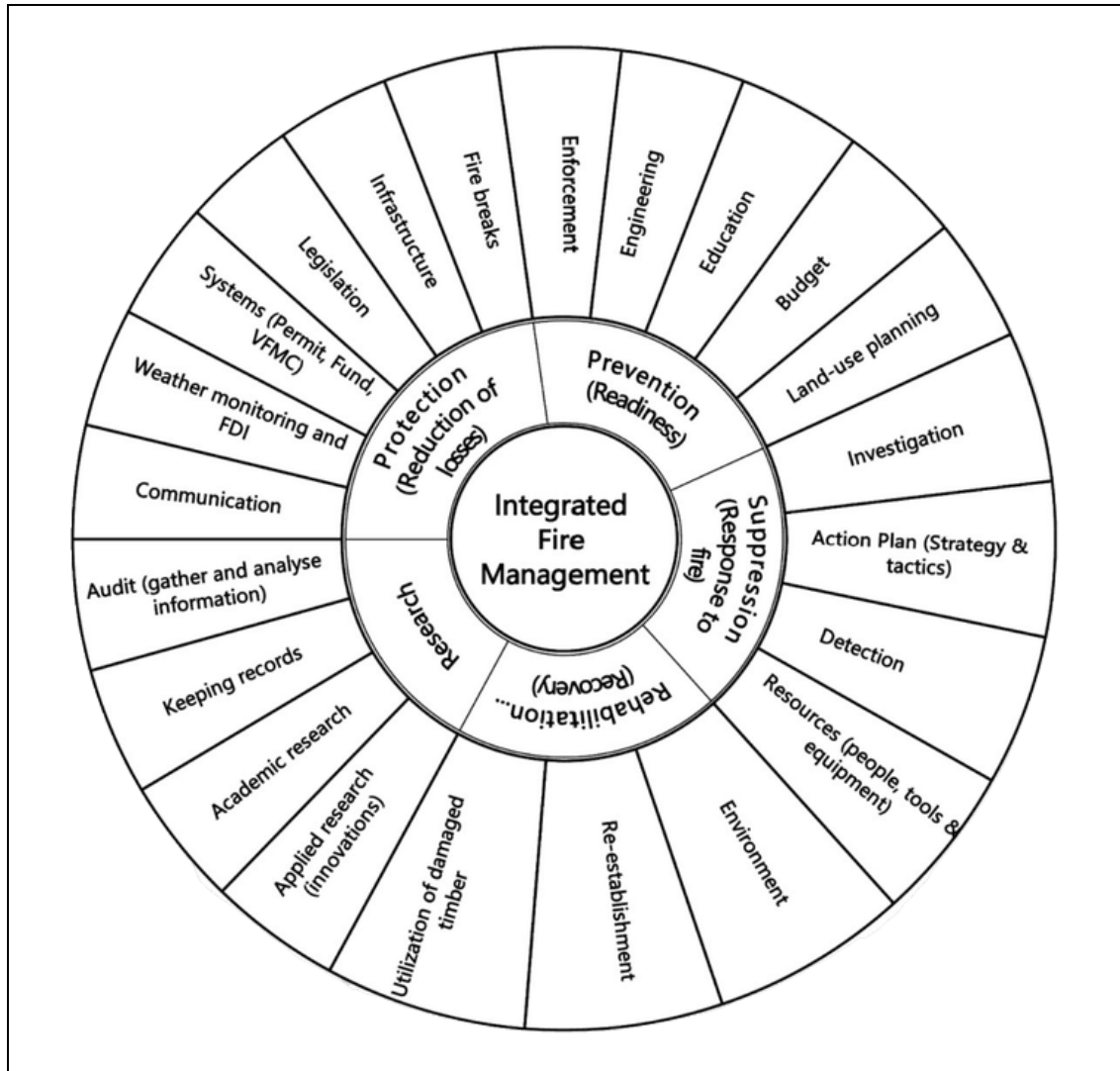
IFM should be supported within all spheres of state – national, regional and district (local). If the political will and support in any of these spheres are absent or weak, the potential of the IFM system will be limited.

Other limiting factors within the IFM system include a breakdown in communication among role players, a failure to optimize the use of all available resources (including human resources within

the community), and a failure to collaborate across boundaries. IFM implementation success thus depends on close collaboration and capacity building among multiple stakeholders.

As a result of the devastating 2021 fire season, major actors came together in 2022 to study the baseline forest fire situation and to establish the prerequisites for IFM in Commercial Plantation Forestry. This document provides instructions for the operationalization of IFM in Commercial Plantation Forestry.

Figure 0.1 Summary of the IFM system



1. INTRODUCTION

1.1 Background

Forestry has become one of the major economic drivers in the Southern Highlands of Tanzania. Available statistics indicate that up to 70% of this fast-growing industry belongs to small and medium tree growers (SMTGs) intermingled with external investors, with Tanzania Forest Service Agency and large companies making up the balance. Together they contribute most of the local government income.

Implementing an IFM system in the forestry regions of Tanzania is a challenging task. Postponing its implementation is however not an option. The destructive effects of wildfires on the economy of the area, the social well-being of its people and the degeneration of the natural environment are evident and if not checked will continue to limit the development and prosperity of the area.

Across the globe more days with dangerous fire weather are experienced with an increase in the number of destructive fires. In addition, the average size of areas destroyed by unwanted fires has increased in recent years.

Small-scale local tree growers plant trees in plantations and woodlots with an average size of below one hectare. External investors are also actively establishing plantations in these areas. These plantations and woodlots occur both in large contiguous plantation blocks and as scattered small woodlots in agricultural landscapes.

Unfortunately, wildfires have become a major threat to this valuable resource. Plantations worth billions of TZS were destroyed by fire in 2021.

Villagers use fire to prepare their farms for planting. In addition, fire is also used to prepare charcoal, make bricks, hunt, gather honey, reduce fuel loads, and to promote grazing. When fire is used responsibly it is an appropriate tool for farmers, but when it is used at the wrong time or without adequate safeguards, it can quickly spread to cause significant damage.

The destruction of afforested areas by fire has been exacerbated by several issues including, inadequate regulation of burning, changes in the general climate, lack of resources, excessive fuel loads due to poor forest management practices (such as, thinning, pruning, weeding, fire breaks, processing sector, etc), and the difficulty for communities to adapt to the changed fire landscape.

It is not only the enormity of the task that is challenging but also the lack of capacity amongst stakeholders. The successful implementation of IFM, therefore, will require careful planning, sourcing of additional funding to support the effort, and capacity building. In addition, the success of IFM will depend on long term endorsement by the central and local government.

IFM should be implemented by identifying critical factors for success and focusing management efforts and maintaining focus on these factors.

It should be noted that Tanzania, despite having a backdrop with many challenges, has a legacy of achievement. The development of the economy, education system and infrastructure of the country over recent decades is testimony to the nation's strong leadership, positive attitude, and innovation.

Furthermore, there are many competent people with a sound knowledge platform who – if they put their minds to the task, will without doubt, be able to curb the destructive effects of unwanted fires.

1.2 Critical IFM Factors in Commercial Plantation Forestry

The following actions and activities have been identified as critical short-term success factors and should be addressed as a matter of priority. Ensuring that Tanzania has the capacity to address these issues is key to making a difference on the ground.

1.2.1 Protection/Preparedness

Fire protection can be defined as the introduction of infrastructure, tools/equipment, legislation, communication, systems, fire bylaws, and other measures needed to protect human life, property, and the environment from the negative impact of wildfires.

Activities aimed at the implementation of systems and the establishment of infrastructure will lead to a reduction in the spread of wildfires and of losses and include:

A Fire Danger Index (FDI) warning system.

The FDI system is the collection of weather observations and the analysis of this data to give a real time assessment and forecast of fire danger. These assessment and forecast must be in line with on-the-spot assessments by experienced fire managers. Although this method has flaws and is $\pm 70\%$ accurate, it serves as a guideline that can be used by fire managers to determine fire behaviour. Planned burning activities are informed by the FDI and will guide the use of fire on any day.

The village executive officer and other authorised officers will consider the FDI when issuing permits to use fire. The FDI should be calculated daily but can also serve as an early warning system if the weather conditions predicted for following days are known. This will make planning of burning operations easier and guide the issuing of permits to use fire.

Effective communication system between villages and districts, neighbouring villages, and other role players.

Exchanging Information, giving instructions and filing reports are very important communication activities needed for effective IFM. Communication methods used to transfer information should therefore be simple but effective. Communication can be done through meetings, cell phone communication, an alarm system, personal communication to landowners, as well as signboards.

The VFMC must have monthly meetings during the fire season to discuss and report back on all fire management issues in the village. A joint meeting between the VFMC, leaders of neighbouring villages/landowners must be held in the beginning of the fire season to discuss mutual fire interests and preparation of boundary firebreaks.

There must be monthly communication between the VFMC and the district fire coordinator to report on IFM activities.

The VFMC chairperson and another VFMC member should be empowered to obtain the daily and future local FDI and distribute it to villagers.

An FDI signboard displaying the daily FDI rating should be erected in the centre of the village and must be updated with the daily FDI reading.

Establishment of village fire management committees (VFMCs)

Village VFMCs are an essential component of IFM. The village council will select the Village Fire Management Committee members, which will need to be approved by the village assembly. Members should be drawn from the village's various hamlets. Members of the VFMC are experienced farmers who understand wildfires. The committee consists of 25 members who oversee and managing all aspects of the IFM. Members are responsible for developing and implementing a village fire management plan (VFMP) that must be approved by the Village Assembly (refer to section 3). The VFMP guides members in carrying out their responsibilities effectively.

Create a VFMP

A VFMP is a document that provides tactical guidelines to the VFMC to enable them to meet the outcomes of IFM over a five-year period. All IFM activities (and accompanying responsibilities), are spelled out in the VFMP. The VFMP provides five-year budgets for implementation of the plan along with financing proposals. The “**Kidete Village Fire Management Plan**” provides an example of a VFMP that could be used as platform to develop VFMPs for all villages.

Establishment of village fire crews (VFCs)

A VFC is a team of at least 15 physical fit people who are trained to suppress fires safely and efficiently. A crew leader with leadership skills, knowledge, and experience oversees the team and takes charge of team activities. Depending on its size, a village may have more than one fire crew. The VFMC will be responsible for overseeing the logistics needed for the VFC and directing their activities.

VFCs are expected to be on standby whenever there is extreme fire weather or high FDI ratings (above 55 FDI). If a VFMC deems it appropriate, the crew's services can be made available to assist landowners with their planned burning activities. Personal protective equipment, tools, and equipment should be provided to VFCs as displayed in Table 1.1.

Table 1.1 Basic equipment recommended for Village Fire Crew

Items/Tools	Quantity	Approximate Unit Cost (TZS)	Approximate Total Cost (TZS)	Approximate Cost (Euro)
Cotton overalls	15	150,000	2,250,000	878
Leather boots	15	100,000	1,500,000	585
Cotton hats	15	60,000	900,000	351
Leather gloves	15	11,500	172,500	67
Safety goggles	15	20,000	300,000	117
Fire beaters	12	28,000	336,000	131
Firefighting knapsacks	4	278,000	1,112,000	434
Rake hoes	4	30,000	120,000	47
Machete (Panga)	2	20,000	40,000	16
Drip torch	1	120,000	120,000	47
Drag forks	6	15,500	93,000	36
Fire stick	4	3,000	12,000	5
First aid kit (with provision for treating burns)	1	200,000	200,000	78
Total Cost (TZS)			7,155,500	2,792

Establishment of village fire funds (VFFs)

The Village Fire Fund (VFF) exists to fund the implementation of the village FMP. The VFMC is in charge of implementing the VFMP and managing the VFF. The fund will be primarily sourced from investor fees. In addition, it will be supplemented by donations, and any other means of funding.

Funds will be used in accordance with the VFMP. Typically, funds will be used for village firebreak preparation, and to purchase tools for fire suppression, emergency rations during fire suppression, provide Personal Protective Equipment (PPE), transport costs (Meetings, training, and fire suppression), and fire lookout guards.

Management of the fund should be transparent and delegated to a specific person(s) who will be held accountable for any income or expenditures. Ideally, the VFF should have its own bank account in accordance with the government system, and the VFMC should choose a treasurer among its members to be responsible for managing financial transactions in accordance with the VFMP.

The fund's status will be determined by an annual IFM audit, which will include the fund's management. The fund's annual financial report will be presented to the Village Council and Village Assembly (refer to the Kidete Village Fire Management Plan). Investors that are up to date with paying their fees will be provided with an annual financial VFF statements and IFM audit report.

Planning and maintaining a firebreak system.

It is important to plan and delineate firebreaks that will protect village assets from fires. These breaks will also prevent fires that started within a village from spreading to neighbouring villages. Firebreaks must be prepared on time and to the correct specifications to be effective.

As preparation of fire breaks may continue into the dry season, it will be necessary to prioritise breaks that need to be prepared first. These breaks should provide the most protection to high-risk areas.

Between the beginning of the dry season and the peak fire season, all firebreaks should be prepared. Some moist areas and valleys that will only become flammable later will be exempt from this rule. No burning should be permitted from October until the first rain, and a burning ban should be in effect.

The “**Kidete Village Fire Management Plan**” provides an example of an VFMP with fire break specifications.

Establishment of strategic infrastructure

Roads, water points, fire management facilities, and firebreaks are expensive, but they are required to improve IFM within villages. These expenses will however be one-time only and will not be repeated annually. A concerted effort should be made to finance this.

Issue permits to use fire and enforce safe burning criteria

Landowners, honey collectors, hunters, brick makers, charcoal operations, Ding-Dong sawmillers, and anyone else who will be using open fires within the village boundaries must obtain permits from the village executive officer (VEO) in accordance with the village fire bylaws. This permit's purpose is to legalize and regulate the use of fire.

The VEO must record all permits issued in a fire permit register. The district forest fire coordinator (DFFC) should receive a monthly report on permits issued. Refer to accompanying “**Bylaws for Fire Prevention and Management of Village Councils**” on issuing permits to use fire.

Customise and implement Fire bylaws.

In Tanzania, bylaws are made under section 8 of the Local Government Act of 1982. This act allows districts, towns, municipalities, city councils and villages to pass bylaws to ensure the smooth running of different socio-economic and environmental activities.

Building on existing bylaws, PFP 2 combined efforts with District and Regional government solicitors and fire experts to prepare a template “Bylaws for Fire Prevention and Management of Village councils VC”. Refer to the Bylaws for Fire Prevention and Management of Village Councils template.

If the village bylaws are enacted as presented in the template, they will provide a comprehensive legal basis for prerequisites of IFM such as VFMC, VFC, VFMP, VFF, FDI, and issuing of permit to burn. Furthermore, they will define fire offences and associated penalties.

The bylaw template should be customised by VCs and assemblies to meet their specific needs whilst also conforming with the prerequisites of IFM.

Implement reporting systems

Keeping records (such as fire investigation reports, permits, levying of fines, and work progress) is a very effective way to measure the success of fire management activities. This will keep the VFMC informed about progress with fire management activities such as fire break preparation, fire incidents and progress with land preparation. All the reports should be filed with the DFFC who should compile periodic consolidated reports to inform the District Commissioner /District Executive Director and RFFC about progress with IFM.

1.2.2 Prevention

Prevention is defined as identifying fire causes and implementing measures to eliminate or reduce them.

Because available resources are primarily used for fire protection and suppression, prevention has been identified as the most underutilized fire management strategy. However, if this strategy is successfully implemented, it has the potential to have the greatest impact in preventing

wildfire losses. Prevention can be divided into three categories: training and awareness, engineering, and law enforcement underpinned by land-use planning and capacity building.

A fire risk analysis is the starting point for a prevention programme. A risk analysis should reveal the causes of fires as well as the most vulnerable areas.

- **Training and Awareness:** - Groups who need to be sensitised and educated about wildfires include, leadership, youth, general public and the media. In addition, VFCs should receive annual training in basic firefighting techniques, and VFMC should be empowered with knowledge of fires and equipped with administrative skills to provide IFM leadership within villages. Village based extension officers should facilitate training and awareness through FDI display boards, school activities, meetings, media platforms, and official training.
- **Engineering (such as fire breaks, roads, water points, etc.):** - After identifying high-risk areas within a village using a risk analysis (vulnerability of the area and number of ignitions in the area), interventions must be implemented to prevent fires from starting in these areas. This could include building firebreaks, upgrading infrastructure such as roads and water points, or simply reconsidering the operating practices of those who start unwanted fires. (Isolating dangerous activities such as charcoal production, cooking fires, and fires to prepare land for plantation). Mobile sawmillers must be held accountable for dispersing sawmilling waste to break up high concentrations of flammable materials such as sawdust and off-cuts.
- **Enforcement:** - Individuals or groups of individuals who transgress or omit their responsibilities, need to be held accountable. The fire bylaws are promulgated to protect the people of Tanzania and their interests against unwanted fires. Village fire bylaws are generated and agreed upon by villagers, and there are penalties for those who fail to adhere to these laws. Some of the challenges preventing the effective application of these bylaws are ignorance from some villagers and the capacity and political will to uphold the law is often lacking. The concept of accountability must be established through the enforcement of bylaws.

For example, the decision of where people should be allowed to build houses and live, or where fire breaks must be constructed (once agreed upon) should be dictated by authorities.
- **Land-use planning:** - Good land-use planning will ensure that infrastructure is constructed where it will have the least impact in the environment, provide the maximum benefit to land users and ensure the safety of villagers. Examples of infrastructure that will influence fire safety includes: - placement of fire breaks, establishment of water points, construction of roads, building of houses schools and other buildings as well as manufacturing sites (charcoal and brick making). Land-use planning must take place through the district land use management teams and should be with consultation with fire experts.
- **Budgeting:** - All aspects of IFM require financial input. The management of a village fire fund therefore becomes very important because it will be the only source of funding. It is therefore important to make sure that investors pay their fees, and that money in the fund is managed well. A separate bank account must be opened for the fire management fund. All planned activities must be budgeted for each year.

1.2.3 Suppression

Suppression can be defined as all preparations made, actions taken, and resources applied to get a fire under control, mopped up, guarded, and investigated. This implies that there is preparation to be done that will ensure an effective response to a fire, actions during the fire event that will determine the outcome of the suppression effort, and activities after the fire has been controlled, that will contribute towards increased affectivity of fire suppression and prevention of fire re-occurrence.

One of the key elements of effective fire suppression is a fast response time to the fire. Effective response to a fire includes a set of coordinated actions to bring the correct resources with accurate information to an unwanted fire without delay.

To be able to respond to a fire, the position of the fire must be known as soon as possible. Once the location of a fire is known, the resources needed to control the fire must be at hand. (People and tools). It is therefore necessary to organise and manage the availability of resources. The implication of this is that there must be a dedicated team of firefighters on standby during high FDI conditions (FDI over 55) and in case of a fire, they must have the means to arrive at the fire scene in the shortest possible time.

All suppression actions must be based on the fire danger of the day. If the weather is warm, dry, and windy (FDI over 55), the village firefighting crew must be on high alert and their reaction time to a fire must be very fast.

A village action plan will dictate to every member of the village how to react under different FDI conditions. Fire action plans are imbedded in the VFMP. It outlines instructions to specific people responsible for fire protection, prevention, and suppression activities. Action plans usually focus on fire suppression activities and are linked to FDI ratings. Action plans will streamline activities such as fire suppression and facilitate the timely execution of duties such as the annual preparation of fire belts (Table 1.2).

Under high FDI conditions smouldering material within areas where fires occurred, can easily flare up. Therefore, burnt areas must be patrolled and guarded until the areas is safe.

Finally, a fire investigation must be conducted to determine what caused the fire as well as to evaluate the effectiveness of fire suppression activities and compliance with best plantation management procedures (such as plantation thinning, pruning and firebreak construction) as defined by MNRT technical order number 1 of 2021. The findings of fire investigations should lead to the implementation of preventative measures and the prosecution of the party responsible for the fire.

Table 1.2 Village action plan

Fire Danger Rating	Blue	Green	Yellow	Orange	Red
FDI	0 – 20	21 – 45	46 – 60	61 - 75	75 – 100
Fire Behaviour	SAFE	MODERATE	DANGEROUS	VERY DANGEROUS	EXTREMELY DANGEROUS
Flame Length	0 - 1m	1 – 1.2m	1.2 – 1.8m	1.8 – 2.4m	2.4m or more
Fire Committee	No action required	No action required	Communicate FDI to villagers. Activate lookout guard if FDI exceeds 55.	Issue fire ban on all open fires. Alert Fire crew, villagers, and schools	Issue fire ban on all open fires. Activate fire crew. Alert villagers and schools
Fire Crew	No action required	No action required	Crew Leader must be in contact with crew members to make sure they are all available in case of a fire	Crew must be ready (fully dressed and fire tools at hand) to fight fires and must report to the crew leader 10 minutes	Crew must be on standby at the assembly point (fully dressed and fire tools at hand) and be ready to react immediately if a fire is reported
Lookout Fire Guards	No action required	No action required	If the FDI reached 55 guard must resume lookout duties	Guard must resume lookout duties	Guard must resume lookout duties. Duties can be extended to 24 hours under extreme conditions.
Villagers	Resume normal activities	Resume normal activities	If the FDI reached 55 no open fires are allowed	No open fires are allowed unless protected	No open fires or dangerous activities that can start fire allowed.

1.2.4 Rehabilitation

The aftermath of a wildfire requires rehabilitation of the burnt area. Immediate dangers include soil erosion. In burnt out woodlots, re-establishment should be done. Before re-planting can take place, the area must be prepared. A very important activity includes fuel load management such as dispersing or removing flammable materials.

Failing to manage these sites will not only create a fire hazard, but also reduce the available area to grow trees (Because sawdust and off-cut heaps are not plantable).

1.2.5 Research

Innovations and new technology applicable to Tanzanian fire management practices, should be transferred to landowners. Extension officers must therefore be kept up to date and invest their efforts in training and education of villagers.

In addition, scholars doing research on fire related issues should be encouraged to research fire challenges in the area to provide possible solutions.

Record keeping of the fire management activities creates a data basis that will provide information that fire managers can use to make better decisions. Registers that should be kept include: - FDI readings, permit issue register, fire incident register, fire fines received, investor contribution register, tool register, firebreak register, etc.

Annual fire management audits will provide feedback to VFMCs regarding the gaps that exist in their management strategies and therefore create opportunities to improve.

2. RISK ANALYSIS

The goal of a fire risk analysis is to identify areas that will be severely impacted by unwanted fires. As a result, a high-risk area justifies more intensive IFM interventions.

The success of IFM is dependent on risk assessments within the area affected by unwanted fires and identifying high risk priority focus areas. A risk analysis should be conducted at village level, and in addition a risk analysis is also required at district level. The identification of high value crops such as woodlots, and a record of fire occurrences in the vicinity of these high value crops will be the starting points for establishing high risk areas.

The findings of a risk analysis will help authorities prioritize high-risk areas where IFM interventions can make the most of a difference.

3. RESPONSIBILITIES OF GOVERNMENT DUTY BEARERS

The responsibility of government leadership towards the successful implementation of the IFM system includes capacity building for strategic leadership, empowerment, and provision of the means for tactical implementation. In this regard there are several duties, that should be fulfilled within the different spheres of government.

3.1 National government

- Endorsement of the IFM system within the high-risk regions of the country.
- Coordination and regulatory support.
- Financial and human resource support including capacity building
- Training institutions to develop capacity on IFM
- National broadcasting should include IFM awareness and FDI warnings
- Research institutions such as Tanzania Forest Research Institution (TAFORI), Tanzania Agriculture Research Institution (TARI) and academic institutions to engage with IFM
- Develop and maintain links with international fire academics
- Collection and analysis of remote sense meteorological data, and the communication of local FDI information to villages
- IFM to be a permanent agenda at Ministry of Natural Resources and Tourism (MNRT) Ministry of Agriculture (MoA), Vice President's Office, (Union Affairs and Environment) and Ministry of President's Office Regional Administration and Local Government (PORALG)

3.2 Regional government

- To communicate high priority IFM issues (such as recruitment and capacity building of extension staff, fire bylaws, acquiring and communicating local FDI data to villages)
- To communicate the urgent need to prioritise forestry as a key economic sector for development and prioritise commensurate reinvestment.
- Appoint regional fire coordinator to monitor and report progress on IFM.
- To strengthen commercial forest management capacity at regional, district, and village levels.
- Promote the standardisation of key elements of IFM between districts and throughout all IFM villages.
- IFM to be a permanent agenda at all regional meetings.

3.3 District government

- Appoint dedicated district fire coordinator (with relevant key performance indicators) to monitor and report progress on IFM to the relevant authorities (such as the regional forest fire coordinator). In addition, to act as the contact person to resolve IFM related issues from villages.
- Support the establishment and operation of a dedicated VFF in accordance with fire bylaws.
- Develop focussed extension and training services on forestry and fire activities in villages including the formulation of VFMPs, training of VFCs Crews and VFMCs.
- Do an annual district forest fire risk assessment.
- Develop district firefighting capacity to respond to disastrous wildfires.
- Regulate all fire activities in villages through assessments/audits and follow up on irregularities in fire management/use in villages.

- Assist in establishing fire infrastructure in villages (water points, roads, and other fire infrastructure).
- Support villages in accessing local FDI data daily during the fire season.
- IFM to be a permanent agenda to all District Council Meetings

3.4 Ward government

- Resolve conflict between villages and villagers.
- Coordinate VFMC meetings between villages.
- Communicate real time information on wildfires between villages.
- General support for IFM.
- Ward agriculture and forestry extension officers to build capacity in IFM and mentor VFMC and VFC. Refer bylaws for fire
- IFM to be permanent agenda to all ward council meetings.

3.5 Village government

- Create and maintain a village fire management plan (VFMP) – including a village action plan.
- Use the VFMP as guideline to implement IFM within the village.
- Develop and enforce forest fire bylaws.
- Escalate special cases to the ward for legal action.
- Mobilise landowners to prepare firebreaks in accordance with the VFMP.
- Facilitate fire training and awareness events within the village.
- Perform duties outlined in the VFMP (Manage fire fund, issue burning permits, apply FDI criteria, gather contributions from investors, regulate the use of fire amongst honey hunters, charcoal & brick manufacturers and ding-dong sawmillers, manage the VFFC, investigate fires and reporting to the DFFC).
- Purchase/manufacture and maintain fire management tools.
- To monitor and report on fire related issues to the DFFC.
- To support villagers in applying best practices for plantation management including thinning, pruning and firebreaks for general fuel load reduction.
- IFM to be a permanent agenda to all village council meetings.

4. END NOTE

In Tanzania's Southern Highlands, the forestry industry is the largest source of tax revenue. It is reasonable to argue that the forestry industry is also the most important socioeconomic driver in the region, as it generates many business ventures and jobs, and it also generates a positive trade balance because many forest products are exported. The greater the success of the industry, the greater the growth in the region. As a result, the government has an incentive to protect and develop the forestry sector.

The "Integrated Fire Management - Guidelines for Commercial Forestry" document, published in 2019, demonstrates the National Government's foresight in recognizing this. This document's content is based on forest fire trends, existing national policies, including the recently revised forest policy, Food and Agriculture Organization (FAO) recommendations, and the country's increasing investments in small, medium, and large-scale commercial forestry (Macric, and Lyimo, 2019).

Investment in the IFM system is the ideal vehicle for pushing the agenda for Tanzania's forestry sector development. IFM is a tried-and-true international system that has made a significant contribution to people's well-being, environmental health, and the prevention of wildfire losses where it has been successfully implemented. Although the system's implementation necessitates strong leadership and financial support, the system's results yield benefits in a variety of areas.

Preventing destructive wildfires not only increases timber yields for villagers, but also stimulates regional development through increased tax revenues. Externalities such as village safety, stimulation of external investment in villages, job creation, a sustainable growing forestry industry, improved education and training, innovation, timber product exports, and a healthier environment are just a few examples of the value that can be added on the ground level.

The implementation of IFM will take time because many villages are vulnerable to the devastating effects of wildfire. Although efforts to implement IFM and educate and train villagers, extension officers, trainers, and other officials about IFM have begun, these efforts are only scratching the surface. To maintain momentum in the establishment of IFM, the government must make a concerted effort. If the IFM drive fails, all efforts made to implement the system will be rendered ineffective.

IFM is a system that requires a comprehensive approach because the principles embedded in it span regional boundaries and all levels of government (National, Regional District and village).

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