# NATIONAL FOREST FIRE PREVENTION AND RESPONSE STRATEGY


**2024**

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## BACKGROUND

Forest fires present a significant threat to Bhutan's forests, particularly during the dry winter months. The country's rugged terrain, combined with substantial ground fuel loads and strong winds, exacerbates the rapid spread of these fires, causing extensive damage to the nation’s pristine forest resources and properties. Between 2020 and 2024, Bhutan recorded 261 forest fire incidents, burning approximately 70,696.19 acres of forested land. These fires resulted in the loss of valuable forest resources, threatened wildlife habitats and biodiversity, and caused significant economic damages. This poses significant challenges to Bhutan’s constitutional mandate of maintaining 60% of its land under forest cover for perpetuity.

Past fire incidents have largely been attributed to factors such as burning of agricultural debris, electrical short circuits, and other human activities, including camp fires, religious activities, construction, etc. However, the causes of maximum fire incidents, remain undetermined or unascertained. This strategy has been developed to guide the efforts of various stakeholders in the prevention and management of forest fires caused by these factors. The strategy is divided into two parts: Part I focuses on preventive measures, while Part II addresses the strengthening of response measures.

## OBJECTIVES

The objectives of the forest fire prevention strategy are as follows:

- Revise and strengthen necessary policy measures and legislations for prevention of forest fires.
- Identify the causes and develop strategies guiding preventive interventions to prevent forest fires.
- Develop clear roles, responsibilities and accountability for concerned institutions and organizations in preventing forest fires.
- Strengthen inter-agency coordination and community participation in preventing forest fires.

# PART I: PREVENTION STRATEGY

## 1. AGRICULTURAL DEBRIS BURNING

Between 2020 and 2024, agricultural debris burning was responsible for 37 forest fires incidents, resulting in the loss of 1643.73 acres of forested land.

### 1.1. Short term strategies:

*Strengthening awareness and community engagement:*

- Establish or strengthen community-based forest fire management group (CFFMG) in identified fire prone communities where forest fire incidents are reported frequently.
- Build the local community capacity by providing training on safe agricultural burning practices, including creating firebreaks and ensuring adequate resources to control and extinguish the fire if needed.

*Strengthening legal and regulatory measures*

- Revise the Forest and Nature Conservation Rules and Regulations (FNCRR), 2023 to include provisions for the approval process of agricultural debris burning. By reinstating the approval process outlined in FNCRR 2017, which requires permits from the Gewog Administration or Thromde, the legislation will ensure appropriate administrative oversight.

### 1.2. Medium term strategies:

*Provision of equipment to identified CFFMGs*

- Ensure that Community Forest Fire Management Groups (CFFMGs) in areas with frequent forest fires are supplied with basic firefighting equipment, including water backpack pumps and fire flappers.
- The Tshogpa (Village Heads) of fire-prone chiwogs are required to lead forest fire prevention initiatives and assume the role of fire watcher during the fire season to ensure prompt response in the event of a fire outbreak.

### 1.3. Terms of Reference and Accountability of Relevant Agencies

| Sl. no | Agency | Key Actions | Accountability Measures | Accountability |
|---|---|---|---|---|
| 1 | Department of Forests and Park Services | Initiate revision of FNCRR 2023, to incorporate the provisions of formal approval process and instituting permit issuance system for agricultural debris burning | 1. Annual Report to Secretary, MoENR<br>2. Revised FNCRR 2023 | HoD, DoFPS |
| | | Lead the implementation of prevention strategy, enforce forest fire rules and regulations, conduct forest fire risk assessment | | |
| 2 | Department of Local Governance and Disaster Management | Support forest fire disaster preparedness and coordinate emergency responses | Post Fire Assessment Reports | HoD, DLGDM |
| | | Support coordination, policy revision, and facilitation | | |
| | | Develop ToR for village Tshogpas to lead forest fire prevention efforts in the community level | Developed ToR for Tshogpa in preventing forest fire | |
| 3 | Department of Agriculture | Support DoFPS and DLGDM in raising advocacy on conducting safe burning of agricultural debris | Participation in the joint awareness programs | HoD, DoA |

| | | | | |
|---|---|---|---|---|
| | | Promote alternative measures to dispose of agricultural debris (composting) | | |
| 4 | Gewog/ Thromde/ Dzongkhag Administration | Integrate forest fire prevention activities into Gewog/Thromde/ Dzongkhag Annual Plans | 1. Annual Plans<br>2. Reports on issuance of burn permits to Dzongdag/ Secretary MoHA<br>3. Monitoring reports to Dzongdag/ Secretary MoHA<br>4. Advocacy report to Secretary, MoHA | Gups, Thrompons, Dzongdags |
| | | Review and issue agricultural debris burning permits and regulate debris burning | | |
| | | Conduct monitoring of agricultural debris burning and reporting | | |
| | | Promote forest fire prevention actions through advocacy and awareness campaigns | | |

## 2. ELECTRIC SHORT CIRCUIT

Electrical short circuits have been alleged as one of the main causes of forest fires in the country: between 2020 and 2024, electric short circuits caused 29 forest fire incidents, burning 6530.63 acres of forested land.

### 2.1. Short term strategies:

*Strengthening power infrastructure maintenance and safety standards*

- Regular inspection and maintenance of transmission lines, poles, and transformers before the onset of dry season to identify and facilitate the maintenance or replacement of aging or faulty electrical components, ensuring optimal operational integrity.
- The Annual Preventive Maintenance (AMP) of all power infrastructures is being carried out annually after conducting comprehensive inspection of infrastructure which facilitates to identify all the components, sections, areas etc. requiring attention. Accordingly, the maintenance plans are scheduled for rectifications depending on the severity of the risk. The execution of the AMP is monitored and the Action Taken Reports (ATR) for the same is reviewed and recorded. In addition to AMP; continuous regular monitoring, inspections and maintenances are carried out to ensure optimal operational integrity.
- Total of Nu. 80.63 million has been budgeted for carrying out the APM for 2025.

*Forest fire risk mapping and assessment*

- BPC and DoFPS to collaborate and conduct forest fire risk mapping around power infrastructures to inform mitigation measures and resource allocation.
- The forest fire risk mapping of power infrastructures shall be conducted in collaboration with DoFPS which would enable BPC and DoFPS to strategies and allocate the resources. In order to quantify and estimate the resources required and to strategize the implementation schedule for power infrastructures falling in high, medium and low risk areas; the risk mapping of power infrastructures has to be conducted immediately. BPC would like to propose the risk mapping to be completed by March 2025 so that BPC has ample time to procure and complete the works before onset of dry season-2025 for those mitigation measures identified as short-term falling in high-risk areas.

*Preemptive power supply interruption*

- During extreme wind conditions, implement a protocol to interrupt power supply to reduce the risk of downed power lines or equipment failures to ignite fires.
- The SoP/guideline for preemptive power supply shutdown shall be developed by first quarter of 2025 and accordingly implemented during extreme weather conditions.

*Right-of-Way (RoW) Clearing*

- The RoW clearing is carried out annually/bi-annually as part of AMP which is completed before onset of every winter months. Total of Nu. 44.86 million has been budgeted for carrying out the RoW clearing for 2025. The Right-of-Way (RoW) clearing beyond the current RoW for power infrastructure falling in fire-prone landscapes shall be immediately carried out after the approval is accorded and budget is sanctioned. Additional budget would be required for extended RoW clearing beyond the current RoW as it is not provisioned/budgeted.

*Perimeter Concrete Construction (PCC) for substations*

- BPC has already initiated the Perimeter Concrete Construction (PCC) provision in Thimphu and Paro. Total of 38 in Thimphu and 11 in Paro has been already completed. After the completion of risk mapping of power infrastructures; the PCC for high-risk areas shall be initiated immediately and completed before onset of 2025 winter months.

*Conversion of bare conductors*

- The conversion of bare conductors to insulated conductors in the high-risk forest fire zones shall be implemented immediately (shall be completed before onset of winter months) after carrying out the joint assessment (BPC & DoFPS) on the forest fire risk and mapping of power infrastructures.

*Spacers for the Conductors*

- The lines with longer spans shall be provided with spacers to prevent any two phases from coming in contact and creating short circuits between the phases during extreme weather conditions especially during strong winds and heavy snow loading. The line spacers shall be installed immediately wherever required and shall be implemented under regular O&M activities.

## 2.2. Medium term strategies:

*Enhanced electrical infrastructure resilience*

- Replace bare conductors into/with insulated conductors in high-risk areas focusing on the vulnerable distribution lines. The power infrastructures which fall in medium and low risk fire zone areas; the conversion works shall be planned and implemented as medium-term. It is estimated to cost Nu. 6,129.11 million for converting 5,107.59 km of bare conductors to covered conductors nationwide.
- The Perimeter Concrete Construction (PCC) for those substations falling in medium and low risk areas shall be implemented in the following years. It is estimated to cost Nu. 134.58 million to provide PCC for 3,845.00 DT.
- Install silicone rubber sleeves to enhance insulation and prevent electrical faults. The 3km of silicon rubber sleeves (SRS) worth of Nu. 3.033 million were procured and implemented as pilot project for 8 Dzongkhags and the feedbacks received from the field offices were encouraging. Therefore, the installation of SRS shall be continued and roll out to rest of the ESDs. Total of 11,745.00 m shall be procured and installed in high-risk areas which is estimated to cost Nu. 11.87 million.
- Employ thermal imaging and AI-based fault detection systems using drones or thermal cameras to identify overheating power lines before power failures occur. The Partial Discharge Testing which is equivalent/similar technology has been already adopted by BPC for detecting hot spot and partial discharges. The inspection and rectification work for 11 Dzongkhags were completed in 2024 and remaining 9 Dzongkhags is scheduled to be completed in 2025. This practice shall be continued and implemented annually hereafter. BPC shall procure 81 nos. of such portable handset in 2025 for carrying out the partial discharge testing which is estimated to cost Nu. 6.08 million.

*Strengthening policy and regulatory measures*

- In addition to existing RoW regulations, allow removal of vegetation outside of the ROW if it poses an ignition risk.
- Establish penalties for negligence in maintaining power lines, ensuring legal accountability for failures that result in forest fire incidents.

**2.3. Terms of Reference and Accountability of Relevant Agencies**

| Sl. no | Agency | Key Actions | Accountability Measures | Accountability |
|---|---|---|---|---|
| 1 | Bhutan Power Corporation | Conduct joint forest fire risk assessment along power infrastructures in collaboration with DoFPS | 1. Maintenance Reports<br>2. SOP for preemptive power supply shutdown developed and implemented | CEO, BPC |
| | | Preemptive power supply interruption during adverse windy conditions | | |
| | | Conduct infrastructure maintenance and strengthen safety standards | | |
| | | Enhanced electrical infrastructure resilience | | |
| 2 | Department of Forests and Park Services | Assist BPC to conduct forest fire risk assessment and mapping along power infrastructures (transmission lines & transformers) | Assessment Report sharing to BPC for implementation of maintenance | HoD, DoFPS |
| 3 | Local Government | Assist BPC and DoFPS to conduct forest fire risk assessment and mapping along power infrastructures (transmission lines & transformers) | Assessment report | Gups to ensure LG members are involved (Mangmi or Tsogpa) |
| 4 | Electricity Regulatory Authority | Strengthening policy and regulatory measures | Assessment report | CEO, ERA |
| | | Monitor the safety standards of the electrical infrastructures | | |

## 3. CHILDREN/JUVENILE FIRE SETTING

In the period 2020-2024, children were responsible for 6 forest fire incidents, causing the loss of 323.22 acres of forest.

### 3.1. Short term strategies:

*Strengthen education and awareness campaigns*

- Conduct fire safety programs in schools, colleges, and institutes to educate children the negative impacts of forest fires utilizing videos, presentations, awareness and seminars.

### 3.2. Medium term strategies:

*Strategic placement of fire prevention signages in high-risk areas*

- Install signages and posters with prevention messages in strategic locations to draw attention and reinforce the fire prevention messages.

*Integration of fire awareness education in school curriculum*

- Incorporate fire awareness education into school curricula, teaching students the risks and preventive measures of forest fires.

### 3.3. Terms of Reference and Accountability of Relevant Agencies

| Sl. no | Agency | Key Actions | Accountability measures | Accountability |
|---|---|---|---|---|
| 1 | Ministry of Education and Skills Development | Strengthen education and awareness campaigns on forest fire prevention in collaboration with DoFPS and DLGDM | 1. Awareness reports<br>2. Curriculum | Secretary, MoESD |
| | | Integration of fire awareness education in school curriculum | | |

| | | | | |
|---|---|---|---|---|
| 2 | DoFPS & DLGDM | Facilitate awareness and educative campaigns in schools, colleges, and institutes | Awareness campaign reports | HoD, DoFPS & HoD, DLGDM |
| | | Placing signages and informational posters in and around high-risk forest fire zones in collaboration with LGs/Thromdes/ Dzongkhags | Pictorial evidence of signages | |

# 4. OTHER CAUSES

**Construction/Labour camps/Road related activity/Camp fires/Religious purposes/ (Sangs) Cattle herders/Cigarette disposal**

Between 2020 and 2024, forest fires caused by activities such as construction, labor camps, roadwork, campfires, religious events, cattle herders, and cigarette disposal led to 20 incidents burning 439.80 acres of forested land.

## 4.1. Short term Strategies

*Strengthening targeted awareness program*

- Implement educational campaigns targeting local communities, labour camps, road workers, cattle herders, and religious groups about the dangers of forest fires.

*Regulating bon fires, open burning, religious (sang) and cigarette disposal*

- Enforce strict regulations on bonfires in construction and labor camps, prohibit waste burning during dry season, and ensure proper disposal of cigarettes.
- Develop a protocol for informing relevant authorities when fires are lit for religious purposes to ensure proper management.

## 4.2. Terms of Reference and Accountability of Relevant Agencies

| Sl. no | Agency | Key Actions | Accountability measures | Accountability |
|---|---|---|---|---|
| 1 | Thromde/ Gewog Administration | Monitor and regulate bon fires, open burning, religious (sang) and cigarette disposal, construction sites and conduct advocacy programs during forest fire season | Monthly monitoring reports | Thrompon /Gup |

| | | | | |
|---|---|---|---|---|
| 2 | Department of Surface Transport (DoST) | Collaborate with DoFPS to create advocacy on forest fire prevention and safety (cigarette disposal/bon fire/ burning waste) along the road side | 1. Advocacy reports<br>2. Monthly monitoring reports | HoD, DoST |
| 3 | DoFPS | Initiate revision of FNCRR 2023, to incorporate the provisions of formal approval process and instituting permit issuance system for *sang* | 1. Revised FNCRR 2025 | HoD, DoFPS |

# 5. UNESTABLISHED CAUSES

Over the five-year period from 2020 to 2024, a total of 169 forest fire incidents with unidentified causes were recorded, resulting in the loss of 61,326.97 acres of forested land. It was found that 65% of these incidents had no ascertainable cause, with 86% of the total area burned attributed to unknown causes. This lack of identifiable causes presents a huge challenge for effective fire prevention and management strategies, since understanding the underlying reasons for these incidents is crucial for developing strategic targeted interventions.

## 5.1. Short term strategies

*Strengthening forest fire prevention through enhanced capacity building, policy shift and improved collaboration.*

- Train DoFPS and RBP personnel in investigative techniques to determine the causes of forest fires. Such training will enhance the ability to accurately detect the offence, thereby discouraging individuals from setting or causing forest fires.
- Incentivize the public to report fire-related offenses, helping with early detection and prevention efforts. Formulate clear guidelines for reporting and ensure anonymity of the reporters.
- The National Center for Hydrology and Meteorology to share weather forecasts, particularly on windstorms, early on with DoFPS and BPC to enhance decision-making for forest fire preparedness.

## 5.2. Medium term strategies

*Enhancing forest fire resilience through immediate fuel management.*

- Implement scientific thinning operations to reduce the density of forests thereby decreasing the amount of fuel load available with focus in wildland urban interface (WUI).
- Implement prescribed burning as a proactive approach to reducing fuel accumulation particularly, the understory vegetation in wildland urban interface.

### 5.3. Long- term strategies

*Enhancing forest fire resilience through advanced detection and landscape restoration.*

- Establish fire watch towers equipped with AI-powered surveillance cameras and sensor networks for continuous monitoring and automated detection capabilities.
- Enhance reforestation efforts with focus on planting fire-resistant tree species and establishing greenbelts in WUIs and burnt areas to ensure long-term resilience.

### 5.4. Terms of Reference and Accountability of Relevant Agencies

| Sl. no | Agency | Key Actions | Accountability measures | Accountability |
|---|---|---|---|---|
| 1 | DoFPS | Capacity building to improve investigative skills of foresters and RBP personnel (ToT) | Training completion report | HoD, DoFPS |
| | | Reinstating the reward mechanism for reporting fire-related offences | Revised FNCRR 2025 | |
| | | Forest fire risk mapping for targeted intervention | Forest fire risk map produced | |
| | | Collaborate with Inter agency forest fire coordinating group (IFFCG) to execute prescribed burning in fire prone areas with focus in wildland urban interface | To have reduced fuel load in identified WUIs | |
| 2 | DoFPS & NRDCL | Conduct Scientific thinning operation in fire prone areas in collaboration with Nature Resources Development Corporation Limited (NRDCL) | To have thinned forested areas in identified WUIs | HoD, DoFPS & CEO NRDCL |
| 3 | DoFPS & GBCL | Conduct plantation of fire-resistant species in burnt areas and in WUI in | To have planted fire-resistant species in WUIs | HoD, DoFPS and CEO GBCL |

| | | | | |
|---|---|---|---|---|
| | | collaboration with Green Bhutan Corporation Limited (GBCL) | and fire burnt areas | |
| 4 | DoFPS & DLGDM | Collaborate with DLGDM to establish fire watch towers equipped with AI based surveillance cameras | To have fully established the infrastructures. | HoD, DoFPS & HoD DLGDM |
| 5 | NCHM | Collaborate with National Center for Hydrology and Meteorology to share weather forecast data | Provide weather data to DoFPS on timely basis | HoD, NCHM |

## 6. DETAILED ACTION PLAN FOR THIMPHU DZONGKHAG

Total Estimated Cost: **18.608 million.**

### A/ Short-term Strategies for Thimphu Dzongkhag

| Sl. no | Causes | Strategies | Timeline | Unit | Rate | Qty | Amount in Millions | Implementation modality | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Agriculture debris burning | Establish/Strengthen Community-based Forest Fire Management Group (CFFMG) in identified fire prone communities where forest fire incidences are reported frequently | March - May 2025 | No. | 100000 | 4 | 0.4 | DoFPS in collaboration with DLGDM & LGs | Four CFFMGs will be formed in these four gewogs (Kawang, Chang, Mewang & Geney) involving the LGs and communities. Management plan will be developed with validity of 10 years |
| | | Enhance capacity building and awareness on safe agriculture debris burning practices | March - May 2025 | No. | 100000 | 4 | 0.4 | DoFPS in collaboration with DLGDM, LGs, DoA and Desuung | This training will be conducted after the formulation of CFFMGs. Apple orchards owners shall also be targeted for awareness |
| | | Revision of FNCRR 2023 (Instituting the formal approval process for agriculture burning permit and fines and penalties) | March - May 2025 | - | - | - | - | DoFPS & MoENR | Reinstate the provisions of approval process in FNCRR 2017 |
| 2 | Children/Juvenile setting fire | Conduct fire safety programs in schools, colleges, and institutions to educate children the negative impact of forest fires (create awareness) | March - May 2025 | No. | - | - | 0.1 | DoFPS in collaboration with DLGDM and MoESD | The DoFPS will prepare a material/key prevention messages and then formally sent to MoESD to convey/relay this message to the schools. Printing cost of materials |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 3 | Other causes Construction/ Labour camps/Road related activity/Camp fires/Religious purposes/ (Sangs) /Cigarette disposal | Enhance and intensify educational campaigns targeting communities, construction/labour camps, road workers, cattle herders, and religious groups | March - May 2025 | No. | 250,000 | 2 | 0.5 | DoFPS in collaboration with Thromde/Gewog administration, DoST, Desuung | Conduct door to door campaign, along the highway for road user (before and in middle of dry season), personal contact, placing posters at public places, meetings |
| | | Revise the existing FNCRR 2023 and institute approval process for fires lit for religious purposes (Sangs) | March - May 2025 | - | - | - | - | DoFPS in collaboration with MoENR | Propose the reinstatement of provisions of FNCRR, 2017 |
| | | Place signages at designated places, disposal containers for discarded cigarette butts in high-risk areas | March - May 2025 | No. | 15000 | 10 | 0.15 | DoFPS | Wildland urban interface (WUI), along high-risk highway |
| 4 | Unestablished Causes | Conduct capacity building on improving the investigative skills of the foresters and RBP personnels (ToT) | March - May 2025 | No. | - | 30 | 1.5 | DoFPS in collaboration with DLGDM and RBP | This training will be provided as a Training of Trainees (ToT) for 30 foresters and will be conducted in SRPF Tashigatshel, Chukha in collaboration with RBP |
| | | Conduct Forest fire risk mapping to direct the targeted intervention | March - May 2025 | - | - | - | - | DoFPS | The DoFPS will conduct forest fire risk mapping to finalize on fire prone areas in the country |
| | | Collaborate with National Center for Hydrology and Meteorology to share weather forecast data to enhance preparedness | March - May 2025 | - | - | - | - | DoFPS in collaboration with NCHM and MoENR | The DoFPS will collaborate with NCHM and with support from Ministry will institute data sharing mechanism on the daily weather updates and in particular |
| | | Creation and maintenance of fire lines around important monuments to prevent fire spread/stop from one area into another area | March - May 2025 | No. | 100000 | 5 | 0.5 | DoFPS in collaboration with DoC, DLGDM and Desuung | Construct fire lines around this five important Lhakhangs (Tharana, Tandin Ney, Choekhortse, DoChorten & Wangditse) on immediate basis in collaboration with Dessups |
| | | Reinstating the reward mechanism for reporting of fire related offences | March - May 2025 | - | - | | - | DoFPS in collaboration with MoENR | Propose the reinstatement of provisions of FNCRR 2017 |
| | | | **Total Estimated cost (Nu.)** | | | | **3.55** | | |

**B/ Medium-term Strategies for Thimphu Dzongkhag**

| Sl. no | Causes | Strategies | Timeline | Unit | Rate | Qty | Amount in Millions | Implementation modality | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Agriculture debris burning | Supply of forest firefighting equipment (water backpack pump, fire rake, flappers) to CFFMG | July - December 2025 | No. | 537000 | 4 | 2.15 | DoFPS in collaboration with DLGDM, LGs | 20 water backpack pumps, 20 rakes and 20 flappers will be supplied to each CFFMG |
| | | Improve surveillance and early detection in high-risk regions by leading the preventive efforts by Tshogpas in chiwog level | June - December 2025 | - | - | - | - | DoFPS in collaboration with DLGDM, LGs. | DLGDM to develop ToR for Tshogpas to lead prevention efforts in chiwog level and to act as fire watchers for early detection |
| 2 | Children/Juvenile setting fire | Install signages and posters with prevention messages in strategic locations to draw attention and reinforce the fire prevention message | June - December 2025 | No. | 13000 | 20 | 0.26 | DoFPS in collaboration with DLGDM and MoESD | Establish 20 signages in strategic location (Schools with adjoining forested areas) |
| | | Integration of fire awareness education in school curriculum | June - December 2025 | - | - | - | - | MoESD in collaboration with DoFPS | Discuss and finalize on how to integrate the fire education in school curriculum |
| 3 | Unestablished Causes | Creation and maintenance of fire lines around important monuments to prevent fire spread/stop from one area into another area | 2+A7:A11 | - | 100000 | 10 | 1 | DoFPS in collaboration with DoC and DLGDM | The DoFPS will collaborate with Department of Culture and DLGDM to finalize the list of monuments in Thimphu dzongkhag and accordingly implement this intervention before the onset of next forest fire season (expected: 10 Lhakhangs) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Conduct scientific thinning operations around the identified fire prone WUIs (Hazard reduction) | June - December 2025 | - | - | - | 0.15 | DoFPS in collaboration with NRDCL and MoENR | Removal of diseased, dead or dried trees from the identified WUI in Thimphu Thromde area (the site will be chosen after forest risk mapping and field inspection); Conduct consultative meeting with NRDCL |
| | | Conduct Prescribed burning in an around the identified fire prone WUIs | June - December 2025 | Acres | 100,000 | 5 | 0.5 | DoFPS in collaboration with IFFCG | Burning the understory fuel of within a 20-meter perimeter of forested area situated adjacent to infrastructures in Thimphu Thromde area (the site will be chosen after forest risk mapping and field inspection) |
| | | | **Total Estimated cost (Nu.)** | | | | **4.058** | | |

### C/ Long-term Strategies for Thimphu Dzongkhag

| Sl. no | Causes | Strategies | Timeline | Unit | Rate | Qty | Amount in Millions | Implementation modality | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Unestablished causes | Reforestation/Plantation of fire-resistant species in wildland urban interface and ensuring maintenance of the plantation | January 2026 - | Acres | 200,000 | 5 | 1 | DoFPS in collaboration with GBCL | Nu. 200,000 for 1 acre plantation establishment and maintenance for 5 years (Green belt) |
| | | Installment of AI powered surveillance cameras with automated detection and reporting in strategic locations | January 2026 - | No. | 2500000 | 4 | 10 | DoFPS in collaboration with DLGDM and RBP | Install fours no. s of AI powered surveillance cameras in an around Thimphu (Wangditse, Kuenselphodrang, Talakha and Tharana). Besides this, constructing poles and the full system development is necessity for its full operational establishment |
| | | | **Total Estimated cost (Nu.)** | | | | **11 m** | | |

## D. MITIGATING ELECTRIC SHORT CIRCUIT IN THIMPHU DZONGKHAG

### Overall Cost Abstract for Thimphu Dzongkhag

| Sl No. | Work Details | Unit | Qty | Estimated Cost (Nu.) Millions | Remarks |
|---|---|---|---|---|---|
| 1 | Conversion from bare to MVCC | Km | 328.17 | 391.05 | |
| 2 | Perimeter Concrete Construction (PCC) for substations | No. | 402.00 | 14.07 | |
| 3 | Silicon rubber sleeves (SRS) | M | 600.00 | 0.61 | |
| 4 | Providing conductor spacer for longer spans | No. | - | - | No cost implication as it will be implemented under regular O&M |
| | **Total Estimated cost (Nu.)** | | | **405.73** | |

### Short-term strategies for Thimphu Dzongkhag

| Sl No. | Work Details | Unit | Qty | Estimated Cost (Nu.) Millions | Remarks |
|---|---|---|---|---|---|
| 1 | Conversion from bare to MVCC | Km | 131.27 | 156.42 | 40% of the quantity was considered to arrive the cost under short-term |
| 2 | Perimeter Concrete Construction (PCC) for substations | No. | 160.80 | 5.63 | |
| 3 | Silicon rubber sleeves (SRS) | M | 240.00 | 0.24 | |
| 4 | Providing conductor spacer for longer spans | No. | - | - | No cost implication as it will be implemented under regular O&M |
| | **Total Estimated cost (Nu.)** | | | **162.29** | |

### Medium-term strategies for Thimphu Dzongkhag

| Sl No. | Work Details | Unit | Qty | Estimated Cost (Nu.) Millions | Remarks |
|---|---|---|---|---|---|
| 1 | Conversion from bare to MVCC | Km | 196.90 | 234.63 | 60% of the quantity was considered to arrive the cost under medium-term |
| 2 | Perimeter Concrete Construction (PCC) for substations | No. | 241.20 | 8.44 | |
| 3 | Silicon rubber sleeves (SRS) | M | 360.00 | 0.37 | |
| | **Total Estimated cost (Nu.)** | | | **243.44** | |

## PART II: STRENGTHENING OF RESPONSE MEASURES

### 1. Replication of Inter-agency Forest Fire Coordination Group (IFFCG) in all the Dzongkhags.

The Inter-agency Forest Fire Coordination Group (IFFCG) was first piloted in Thimphu dzongkhag in 2017 and has been replicated to 13 fire prone districts across the country. It has been proven very useful in providing effective forest fighting efforts and has improved the response, thereby minimizing the damage incurred. Given this, it is imperative for it to be replicated in all the Dzongkhags across the country.

### *2.* Train first responders of RBP, RBA, Desuung, Forester and Community

Provide standardized training and refresher courses for first responders (RBP & RBA personnel, Dessups, and members of local communities) on fire behavior, safety, equipment handling, and fire suppression techniques. Scenario-based drills and communication exercises will also be conducted regularly for the first responders.

### 3. Firefighting tools and equipment for forest fires

The current firefighting capacity is severely limited due to outdated and insufficient equipment. Therefore, a set of new essential firefighting equipment, including chainsaws, grass cutting machines, fire flappers, and water backpacks will be procured and distributed to the fire prone Dzongkhags. In order to ensure better coordination and safety during the fire incidents, Personnel Protective Equipment (PPE) and communication sets will also be procured and pre-positioned with the first responders.

### 4. Coordination and communication of IFFCG

Strengthen communication and coordination within the IFFCG for effective and timely forest fire responses. This includes reviewing and updating existing strategies and SOPs, holding regular meetings, and conducting simulation exercises.

**Annexure I: Capacity building for effective response**

| Sl.no | Activity | Numbers | Days | Cost | Total cost | Remark |
|---|---|---|---|---|---|---|
| 1 | Training on fire behavior, safety, equipment handling, and fire suppression techniques | 1500 | 3 | 1000 | 4500000 | RBP (50), RBA (100), Dessup (500), Forester (50), Community (800) |
| 2 | Refresher course | 1500 | 1 | 1000 | 1500000 | |
| 3. | Training on handling of surveillance equipment and refresher course (Drone and Camera) | 10 | 2 | 1000 | 20000 | 2 people from each agency |
| | | | | | 60,20,000 | |

**Annexure II: Firefighting equipment for forest fires**

| SI. No | Tools & Equipment | Proposed no. s | Unit/ Cost | Total cost |
|---|---|---|---|---|
| 1 | Power chainsaw | 10 | 25000 | 250000 |
| 2 | Grass cutting machine | 10 | 20000 | 200000 |
| 3 | Communication set | 20 | 38000 | 760000 |
| 4 | Water backpack pump | 500 | 26000 | 13000000 |
| 5 | Spade | 500 | 250 | 125000 |
| 6 | Rakes | 500 | 350 | 175000 |
| 7 | Fire Flapper | 500 | 500 | 250000 |
| 8 | Bowser (tanker) | 1 | 4250000 | 4250000 |
| 9 | Loud speaker | 6 | 6000 | 36000 |
| **Personnel Protective Equipment (PPE)** | | | | |
| 1 | Helmet | 1000 | 500 | 500000 |
| 2 | Mask | 1000 | 200 | 200000 |
| 3 | Gloves | 1000 | 250 | 250000 |
| 4 | Water bottle | 1000 | 1000 | 1000000 |
| 5 | Goggles | 1000 | 3000 | 3000000 |
| **Surveillance equipment** | | | | |
| 1 | PTZ camera | 1 | 1200000 | 1200000 |
| 2 | Drone | 3 | 700000 | 2100000 |
| | **Grand Total** | | | **27296000** |

Note: These Activities are tentatively proposed for Thimphu only

## CONCLUSION

The National Forest Fire Prevention & Response Strategy aims to address the multifaceted causes of forest fires in Bhutan and provides a comprehensive approach for both prevention and response. By focusing on policy revisions, community engagement, infrastructure improvement, and enhanced collaboration and coordination among stakeholders, Bhutan can strengthen its capacity to protect its invaluable forest resources. The implementation of short-term, medium -term and long-term strategies will ensure a proactive and resilient approach to managing forest fires, safeguarding the nation's forests, wildlife, and biodiversity for the present and future generations.