* **Forest conservation methods: Forest Fires**

**Forest fire: It is a fire that spreads freely and burns weeds, herbs, shrubs, and stacks of dried algae**

Forest fire consider one of the biggest dangers threatening and defining forests in different region around the world and may start anywhere. The degree of risk is controlled principally by climate factor. Generally, the lower humidity and the higher temperature of the air the greater risk. All those responsible for firefighting should be especially alert during hot, dry periods with strong winds.

* **The major causes of forest fire: -**

1. Carelessness.
2. Incendiary.
3. Factorises and rail way.
4. Hunting.
5. Lighting.
6. Micellanious or Unknown causes.

**Types of Fire**

Fire can be divided into three major types:

1. **Ground fires:** largely flameless fire that burn slowly through thick surface accumulation of organic matter (stocked dried algae).
2. **Surface fires:** rapidly burning fire that sweep quickly over an area consuming litter and the above ground portions of herbs and shrubs.
3. **Crown fire:** fires that burn through the crown of woody vegetation, frequently leaving most of the stem and forest floor relatively untouched.

(It occurs as a result of the burning of Twigs, Resin, or Lichens, and the middle layer of the forest, and the help of gases coming out from the combustion of the volatile oils in the needle leaves, one of the characteristics of crown fire is that it burns forest crowns and vegetation and leads to forest degradation).

* The three types of fire can occur in any combination. Sometimes a crown fire will be accompanied by both surface and ground fires, resulting in the total consumption of all organic matter above the mineral soil. Even roots deep in the mineral soil may be burned.
* Alternatively, crown fires driven by strong winds may race through the tree crown consuming foliage and twigs only, leaving stem and the forest floor virtually intact. Such fires leave most of the biomass and almost all of the minor vegetation intact. They have high intensity but low severity. Some trees are killed by having their crowns burned, but others, such as redwoods (*Sequoia spp*.) are able to regenerate branches and foliage.
* Various technical terms are applied to fire including severity, intensity and rate of spread.
* Severity refers to the degree of impact of fire on organic matter.
* Intensity refers to the rate of energy released by the fire and is usually expresses as frontal fire (Canada) or fireline (United states) intensity (kw/m).
* Rate of spread refers to the speed with which the leading edge of the fire travels downwind.
* Surface fire generally burn off just the litter layer and the aboveground parts of herbs and shrubs. These are often able to re sprout from below ground penetrating organs, depending on the depth of heat penetration into the soil and the depth of the lowest penetrating organ of the plant. Tree may or may not be killed, depending on their bark thickness.
* Ground fire tends to be more destructive, because they kill and consume all the roots in the forest floor, which generally prevents re sprouting from underground organs. ground fire can kill large tree by this mean while the steam and crowns remain untouched.

Consumption of forest floor may eliminate most of the dormant seeds on the site, slowing revegetation of the area. however, viable seeds are sometimes found buried in the mineral soil, where they may escape destruction by ground fires and contribute to regenerative.

**Forest fire behaviour**

**The element of fire behaviour**

* Fire needs fuel, heat and oxygen to sustain the process of combustion.

**Fuel Heat**

**Oxygen**

**The combustion fire triangle**

* The combustion process requires each leg of the triangle, and all fire suppression efforts are an attempt to remove one of legs of the triangle. fire lines remove fuel, water and aerial fire retardants remove heat and oxygen.
* The combustion process varies tremendously, both in the terms of its rates of spread across the landscape and in terms of the rates at which energy is released.

These characteristics of fire are known as fire behaviour, and they are a function of the side of the fire behaviour triangle: weather, fuel and topography. If sufficient information is available for each of the sides, the behaviour of the fire can be predicted.

* Forest fire may distribute slowly or quickly per hour in exceptional case.
* The understanding of forest fire behaviour is the basic factor which lead to put the basic of principles of fire resisting and controlling.

**Forest fire behaviour depended on several factors:**

1. **Weather:**
2. **Wind:** type of wind, direction and speed of wind
3. **Temperature:** high temperature increases the distribution of fire.
4. **Topography**:

Topography has both direct and indirect effect on fire behaviour. Its direct effects are primarily caused by slope gradients and channelling of winds.

indirect effects include the influence of aspect, elevation and orographic effects on precipitation that result in different vegetation type and fuel conditions.

Slope is a direct input into fire behaviour models. As slope gradient increase, upslope fuel particles are closer to the flames, the source of radiant heat, and the fuel particles preheat more rapidly. As slope steepness, fires more rapidly upslope because of the increased radiation effect.

1. **Time:**

The fire distribution also depends on day time. At night its more difficult to control fire.

1. **Fuel:**

Type, amount and moisture of fuel affect the speed of fire distribution. The dried fuel more quickly catches the fire. The moisture content in fuel and the humidity in the night caused low intensity in forest fire than day because of interfering high temperature.

The study of these above factors makes the fire fighter to be prepared and provide the requisites to control the fire in the best way