APPROACHES TO REDUCE WILDFIRE DANGER IN UKRAINE

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Global warming and increasing aridity of the climate lead to an increase in the frequency and density of wildfires. This increases the likelihood of large uncontrolled wildfires. A prerequisite for effective fire protection of forests is to take into account all the risks and threats that lead to their occurrence. Among which are:

– increase in duration and early onset of the fire season;
– increase the probability of large uncontrolled fires occurrence;
– uncontrolled spread of fires into forests from agricultural lands;
– transboundary fires;
– permanently high risk of fire occurrence in the East of Ukraine (in the zone of armed conflict);
– increase of fire hazard in the forests affected by beetles and diseases (fast accumulation of dead fuel).

According to the official data of the State Forestry Agency of Ukraine, the total area of dying plantings in 2018 is about 440 thousand hectares, of which pine forests (Pinus sylvestris L.) occupy about 243 thousand hectares (the most fire-hazardous species in Ukraine), spruce (Picea abies L.) 26 thousand hectares, common oak (Quercus robur L) 107 thousand hectares and other plantations 64 thousand hectares. The sharp deterioration of the sanitary condition and dieback of coniferous forests over large areas require the immediate implementation of a set of organizational and practical treatments for fire prevention (limiting the spread of fires in such areas).

Burning of dry grass in the spring and fall (agricultural burnings) causes wildfires to spread across forests and agro-landscapes. For this reason, it is advisable to introduce the terminology of landscape fires, natural fires, agricultural fires, etc. at the level of legislative and regulatory support for the «Fire Safety Rules in the Forests of Ukraine». Because these types of fires often spread to forested areas from other types of landscapes and vice versa, the problem must be addressed in a comprehensive manner.

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Among the factors that characterize the causes of forest fires in Ukraine, the human factor dominates (from 85-95% of cases). It should be noted that the existing mechanisms of fire propaganda are not effective enough, so it is necessary to introduce means of influence in two vectors: general and targeted [1]. It is promising to create strategies for influencing specific social groups and for raising awareness of fire hazards for the most burning forests and landscape types, both in space (specific regions) and in time (taking into account the phenological phases of the predominant vegetation that forms the fire hazard locally).

It is also advisable to disseminate fire safety information more actively through social networks. Try to introduce changes in the format of «explanatory conversations» in schools towards more informal reporting of information, such as the fire festivals in the USA. Also the information impact should be also regulated by timeframes and based on data obtained from the research of local fire regimes and fire history for each specific region (at the micro level – the most burning type of landscape).

Effective fire prevention of transboundary wildfires is one of the greatest fire safety challenges [4], which should be achieved through effective engagement of firefighters on both sides of the border, timely exchange of information and joint coordination of actions.

Considering that Ukraine has a land border with Belarus, Russia, Moldova, Poland, Romania, Hungary and Slovakia, the priority is to harmonize fire terminology with neighboring and EU countries as a whole. Alternatively, the terminology proposed by the Global Fire Monitoring Center (GFMC) or FAO may be adopted. In this case, providing fire monitoring together with the relevant services of neighboring countries would be most appropriate.

Effective transboundary interaction should include:

1) Joint fire monitoring of border areas.

2) The use of harmonized techniques for assessing fire risk by weather conditions (the most appropriate way is the use of FWI (fire weather index), which is being implemented for use at the pan-European level).

3) Harmonization of instructions for monitoring and accounting of wildfires with at least neighboring countries, optimally at the pan-European level (criteria for division of fires by characteristics: type, area classification, etc.).

4) Conducting fire risk assessment of territories for a whole country and on both sides of the border, which should be based on the use of the same conventional methods and criteria. Territorial zoning information should be made available to relevant services on both sides of the border. European criteria may be adopted as a basis for the classification of territories (landscapes).

5) Ability to share fire means and resources simultaneously on both sides of the border.

It is also worthwhile to note the possibility of introducing a system of prescribed fires, but with the exception of radiation contaminated landscapes. Such a system is widely used in the world for the purpose of vegetation fuel managing and reducing fire risks for the most hazardous forested areas.

In the most vulnerable to fires forest areas where the introduction of deciduous impurity is inappropriate / impossible (poor dry sandy soils), it is worthwhile to use a system of forestry treatments oriented for forming relatively sparse pine stands formed from fire-resistant pine trees [3]. The most vulnerable to forest fires sites are usually located in close proximity to settlements and infrastructures objects.

Silvopastoral systems for wildfire prevention are also promising in areas vulnerable to landscape fires, where grasslands fires often spread and cause forest fires. According to [5] using such approaches, managers were able to reduce the underestimation of biomass by 80% in critical areas and reduce its fire hazard.

It is worth paying attention to the US experience, especially for applications such as «FireWise Community», where protection and prevention belongs to everyone in the social community. Main goals of the Community due to this program are: to improve safety in the Wildland-Urban Interface by learning to share responsibility; to create and nurture local partnerships for improved decision making in communities; and to promote the integration of FireWise concepts into community and disaster alleviation planning [2].

Homeowners located close to the forest (up to 500 m) should ensure that buffer zones are formed around the house with the removal or reduction of fuel in them, which will provide both shelter from wildfires and protection of forest from fire that can occur and spread from private property. Standard methods for the reduction of vegetation fuel and a comprehensive approach using fire-resistant landscaping can be used to achieve these goals. Its purpose is to form a type of landscape that uses fire-resistant plants (plants with high-moisture content) that are strategically planted to resist the spread of fire to landowner property and in the same time decorates the owners' yard.

Therefore, conducting research on the feasibility of using the proposed approaches for Ukrainian conditions and testing them should precede changes and improvements to existing legislation in the field of forest and natural landscapes protection against fires. Taken together, it will provide reduce level of fire danger for the forest industry and society to the new challenges posed by global warming.

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