Republic of Lebanon
Ministry of Environment

State of Lebanon's wildfires in 2018

"This report was produced within a collaborative framework between the Department of Ecosystems at the Ministry of Environment and the Land and Natural Resources Program at the Institute of the Environment, University of Balamand".

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1. SCOPE

In 2013, a collaborative work was initiated between the Ministry of Environment (MOE) and the Institute of the Environment, University of Balamand (IOE-UOB), regarding the execution of the data analysis related to wildfires in Lebanon. The main goal of this collaboration is to produce a yearly report on wildfire occurrence and the extent of burned areas in Lebanon.

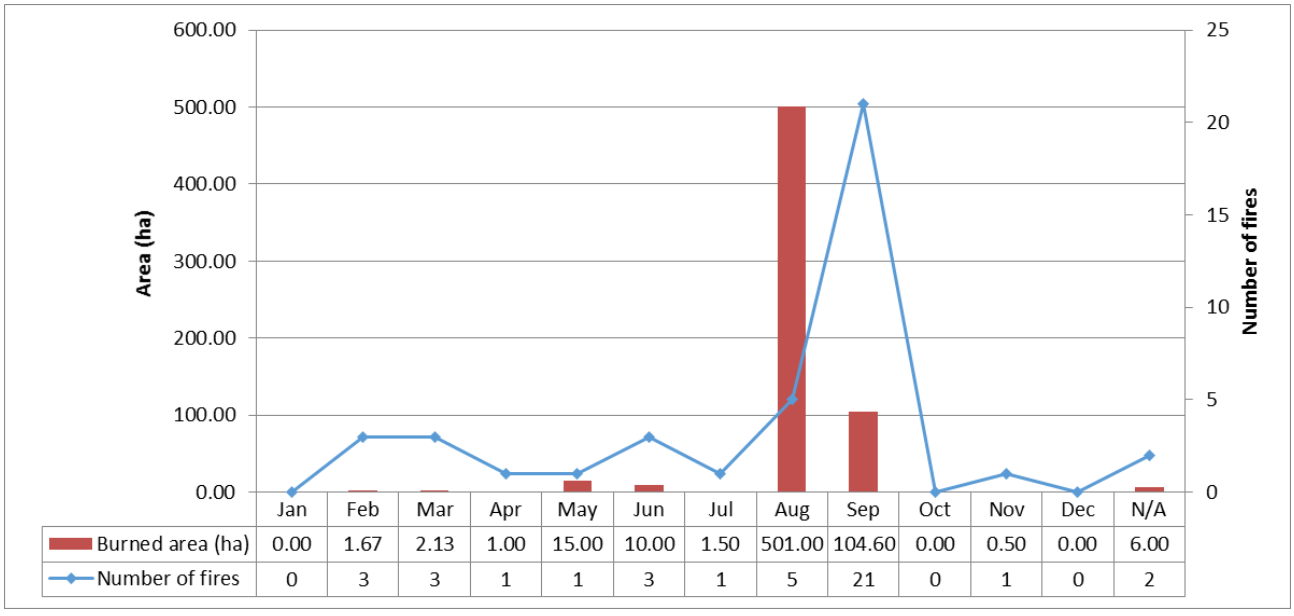
The analysis is done based on the data provided in the fire ID cards filled in by the Internal Security Forces (ISF) and copied to the Ministry of Environment, knowing that the fire ID cards format was issued through the notification of the Presidency of Council of Ministers number 256 dated on 1/3/2008. The report comes in line with the highlights of the technical requirements of Lebanon's National Strategy for Forest Fire Management (endorsed by Council of Ministers Decision No. 52 dated 13/5/2009) by working towards the unification of fire information and data as a means to empower efforts in understanding better the problem of wildfires in Lebanon.

2. FIRE DANGER IN THE 2018 FIRE SEASON

The calculated start date of the fire danger season for 2018 was 5 February, 2018 and the calculated end date was 23 September, 2018. The peak month (in number of fires) was September (a total of 21 fires damaging a minimum area of 104.6 ha of vegetated land).

3. FIRE OCCURRENCE AND AFFECTED AREAS

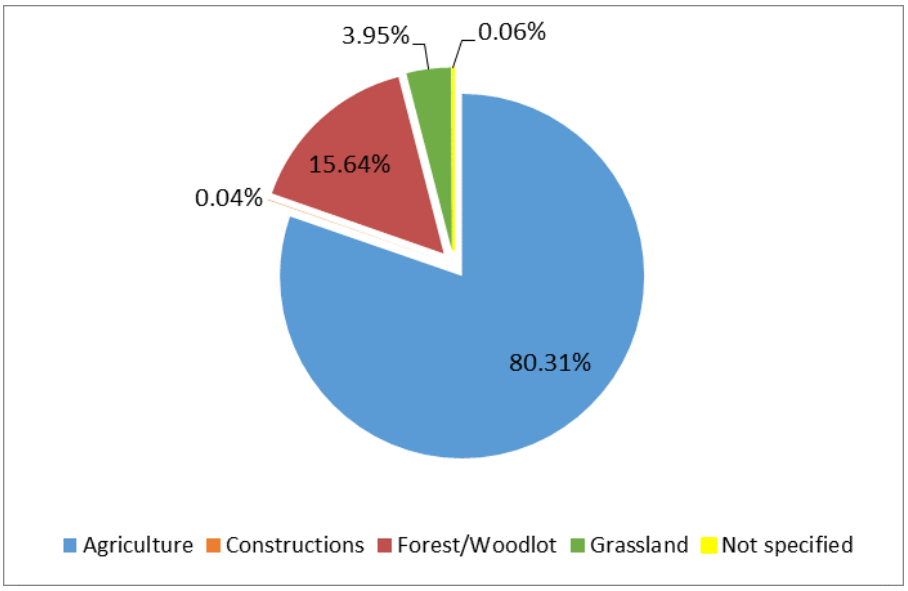
In 2018, a total of 41 fires were reported (Annexes 1 and 2), affecting a total area of 643.4 ha (Figure 1).



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	N/A
Burned area (ha)	0.00	1.67	2.13	1.00	15.00	10.00	1.50	501.00	104.60	0.00	0.50	0.00	6.00
Number of fires	0	3	3	1	1	3	1	5	21	0	1	0	2

Figure 1. Monthly distribution of fire occurrence and fire affected areas in 2018

The landuse of fire affected areas (Figure 2) agricultural land (80.31%), forest/woodlot (15.64%), and grassland (3.95%); A total of 6.49% of fire affected lands were privately owned, 8.78% were public lands, and 6.51% comprised mixed private and public ownerships.



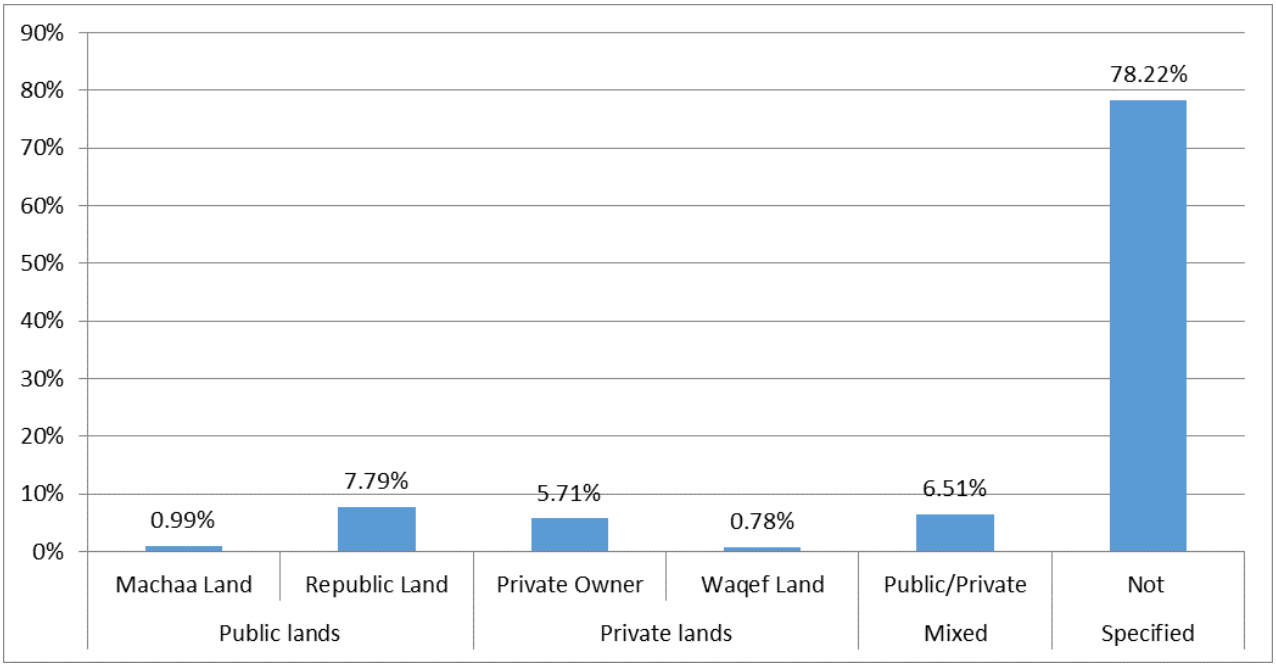


Figure 2. Landuse of fire affected areas (upper) and ownership of fire affected areas (lower)

Wildfires occurred in 17 out of 26 Caza (i.e., Kadaa). More specifically, the Caza of Jezzine was the most affected by number of fires (6 fires), followed by Chouf with a total of 5 fires. The Cazas of Akkar, Sour, Chouf and Jezzine were affected by 500 ha, 50 ha, 31 ha and 31 ha of burned areas, respectively (Figure 3).

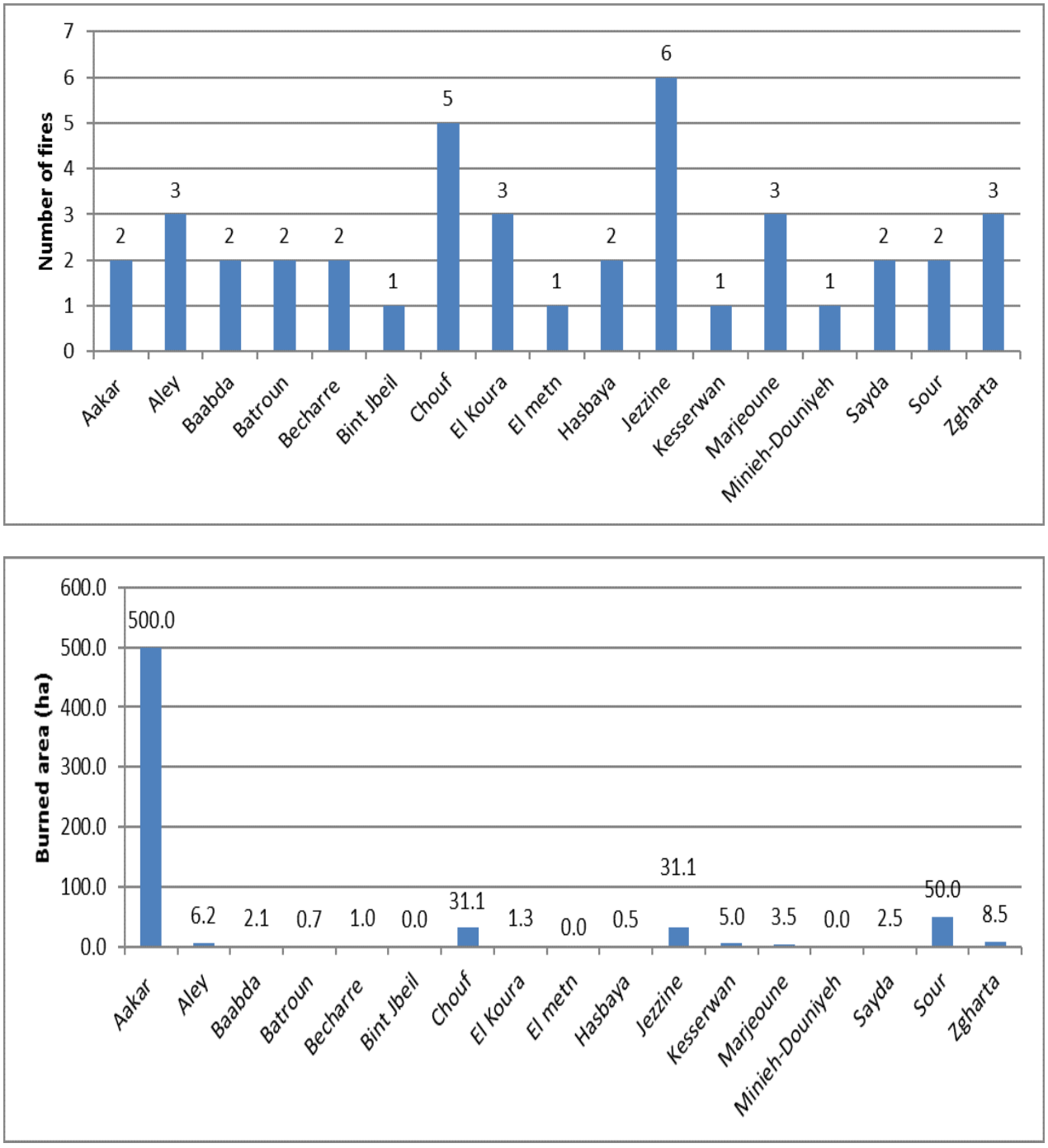


Figure 3. Distribution by Caza of fire occurrence (upper), and burned areas (lower)

Mountainous areas were affected by the largest extent of burned areas (93.57%), followed by valleys (2.4%) and plains (0.19%) consecutively. Mountains were also affected by the largest number of fires (58.54%), followed by valleys (29.27%) and plain areas (7.32%) consecutively (Figure 4).

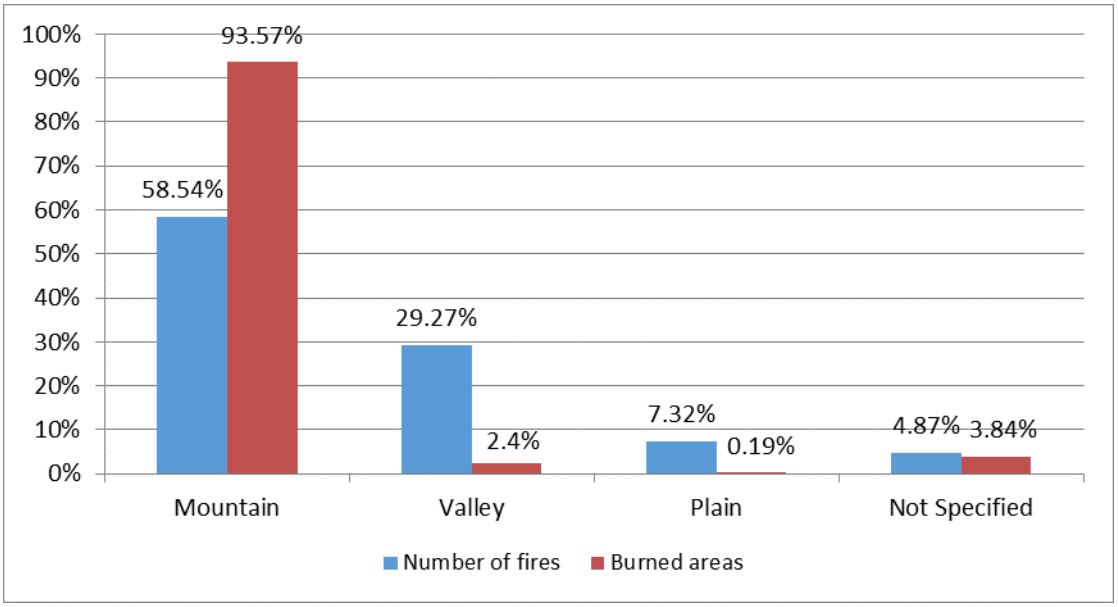


Figure 4. Land type affected by fires

A total of 81.20% of affected fuel types (Figure 5) was mixed forests, followed by Brodleave forest (13.27%) and grassland (3.46%).

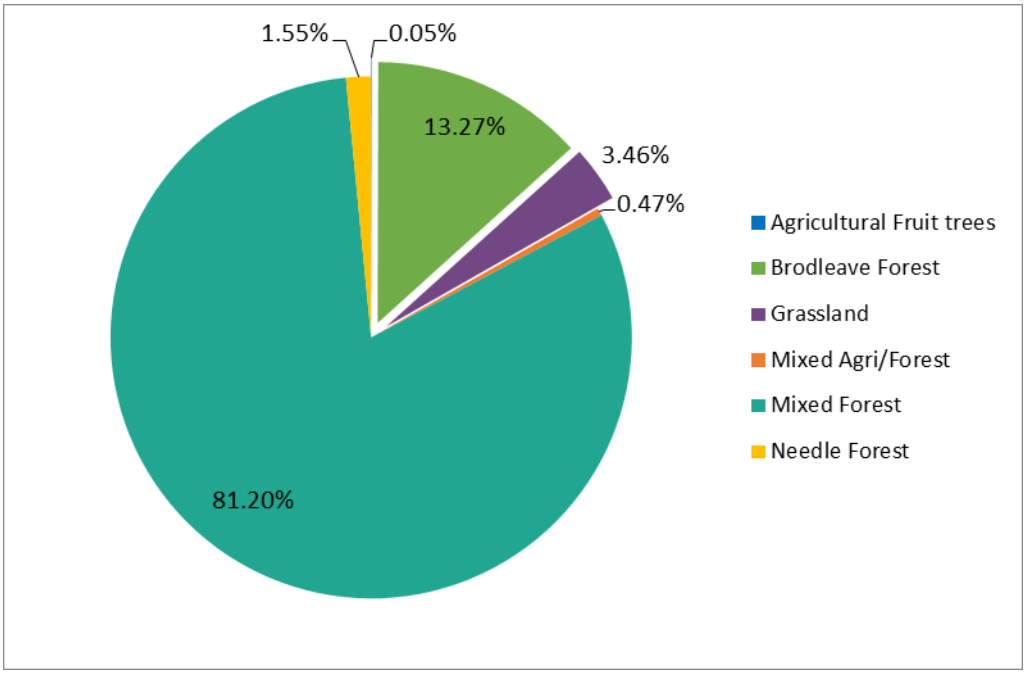


Figure 5. Distribution of fuel type affected by fires

4. CAUSES OF FIRES

Arson was reported as the main cause of fires for 78.49 % of the reported fire events. Furthermore, 12% of causes were due to neglect, while 9% had unknown causes (Figure 6).

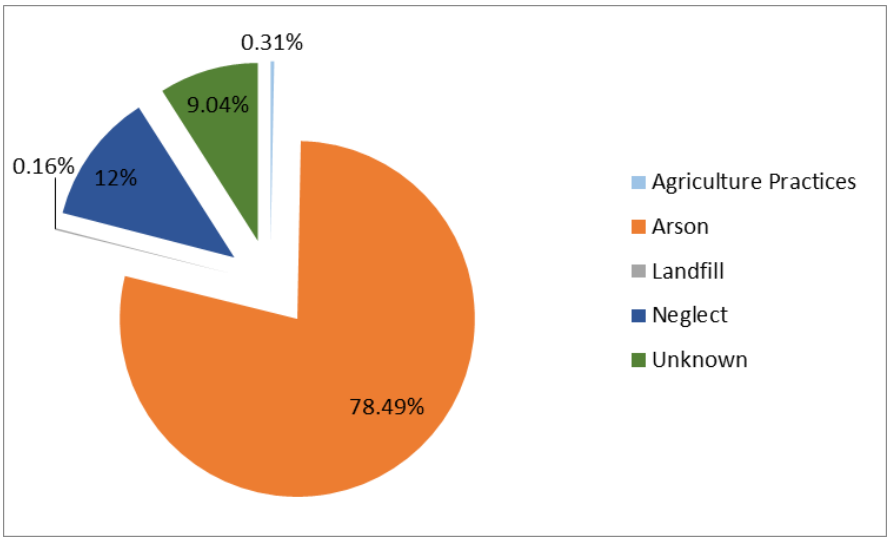


Figure 6. Distribution of main fire causes

5. FIRE FIGHTING MEANS

Reporting

Local residents reported 51.22% of fire incidents, while 19.51% of fire incidents were reported by Internal Security patrols, 9.76% by farmers, and 7.31% by other. However, 12.20% of fire incident reporting individuals or agencies were not specified (Figure 7).

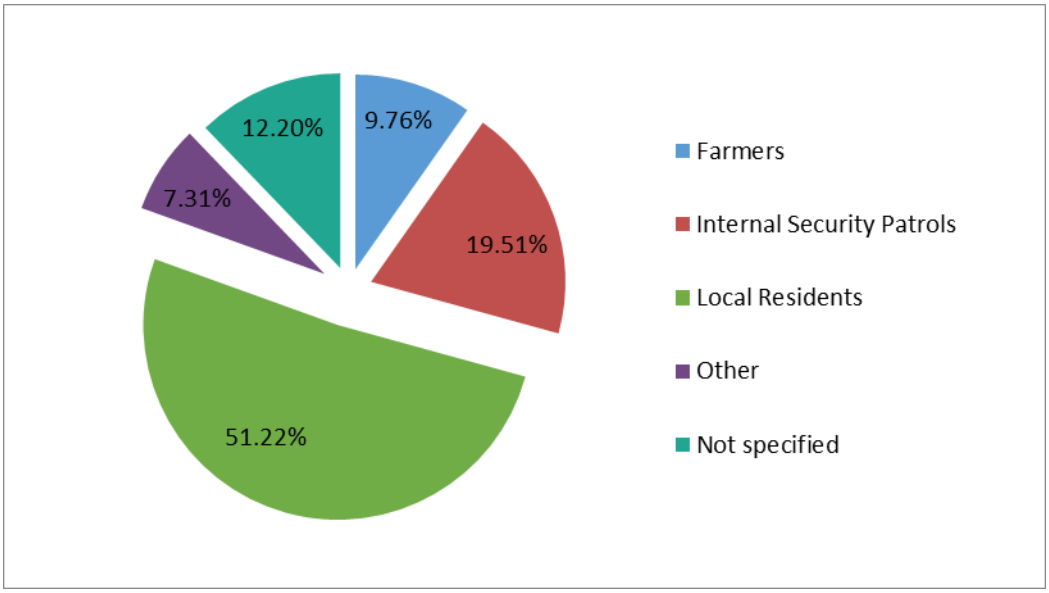


Figure 7. Fire reporting individuals/agencies

Fire starting time

Most of the fires started between noon and 4 pm (56.1%), and 26.83 % of fires started between 8 am and noon. In addition, 9.75 % of fires started between 4 pm and 8 pm and 4.88% of fires started between 8 pm and midnight (Figure 8).

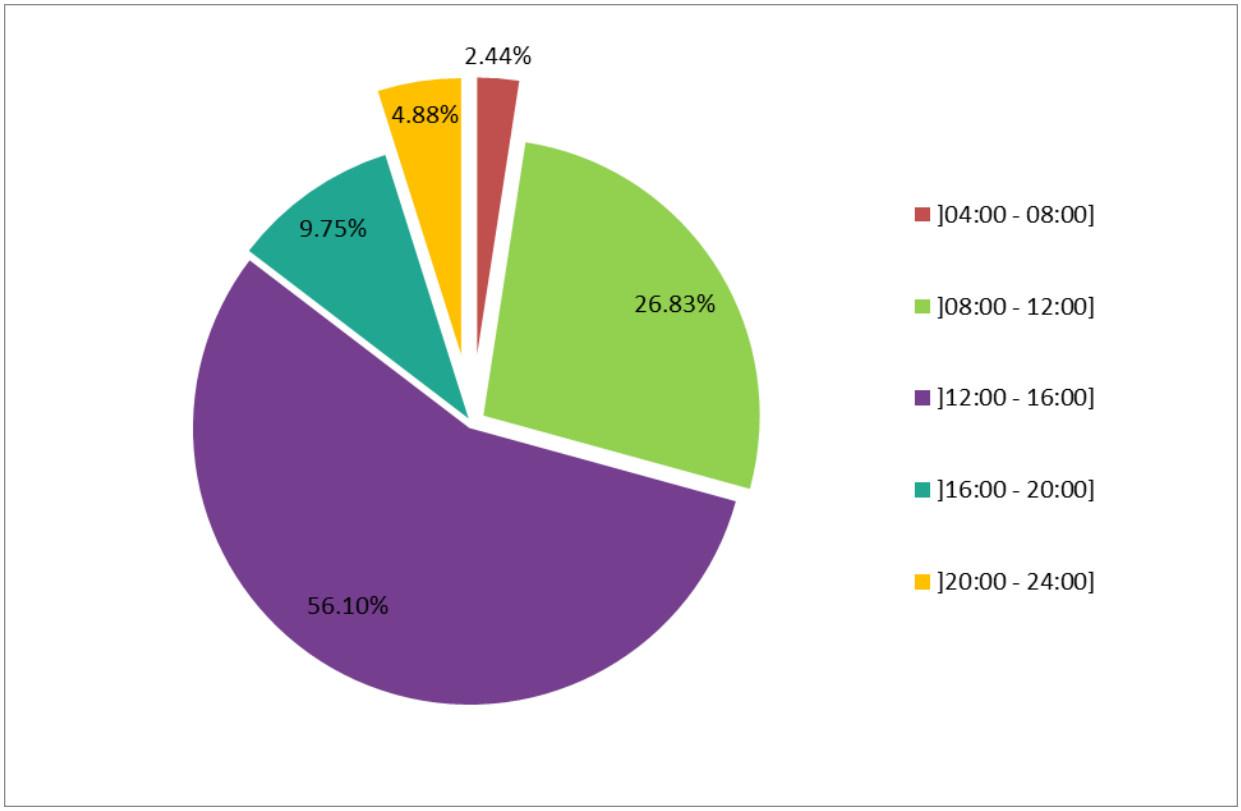


Figure 8. Temporal distribution of fire occurrence

Intervention time

It was observed that 46.3% of first interventions in fire suppressions occurred within the first 20 minutes after the reporting time, while 24.4% of interventions happened after 20 minutes and before 1 hour from the reporting time (Figure 9).

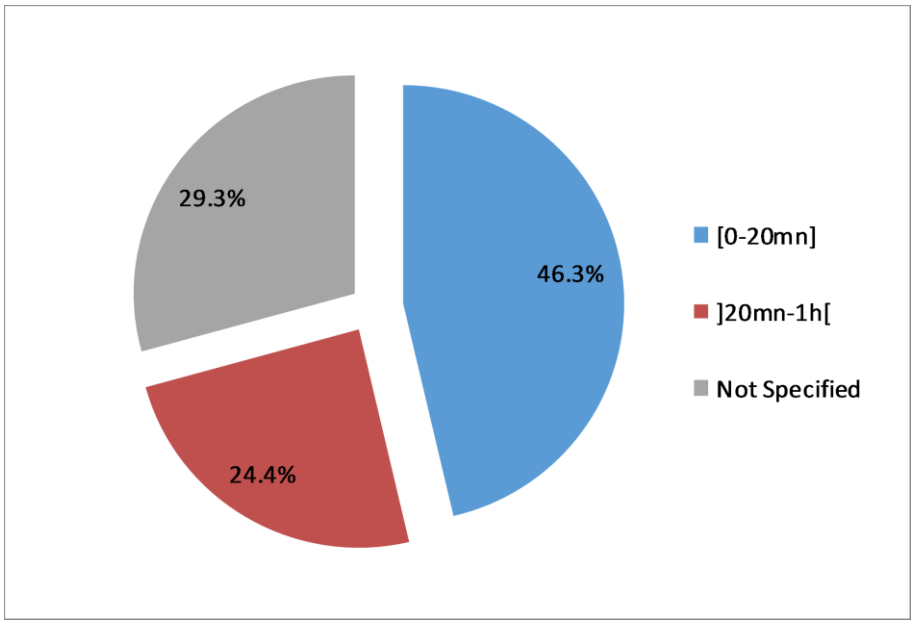


Figure 9. Times for intervention after reporting fires

Fire duration

The largest number of fires lasted between 1 and 2 hours (48.78%). A total of 24.39% of fires lasted between 2 and 5 hours, and 17.07% of fires lasted between 5 and 12 hours. It was also observed that 2.44% of fires lasted between 12 and 24 hours. However, 4.88% of fires lasted more than 24 hours (Figure 10).

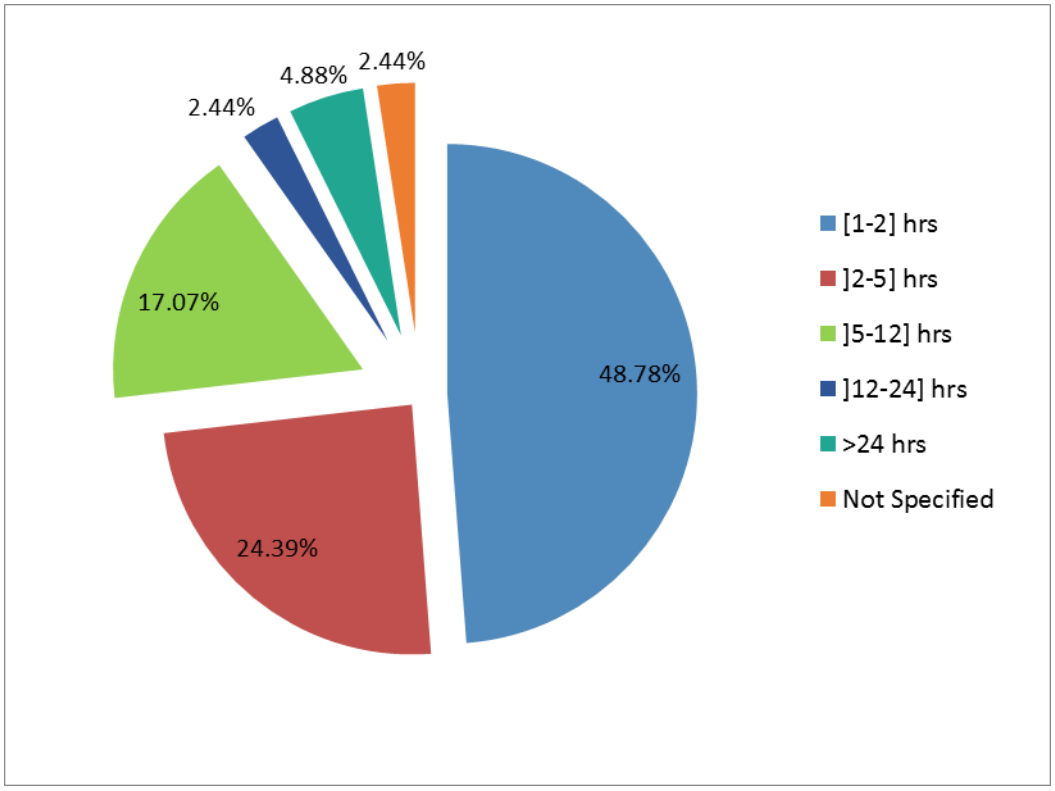


Figure 10. Fire duration

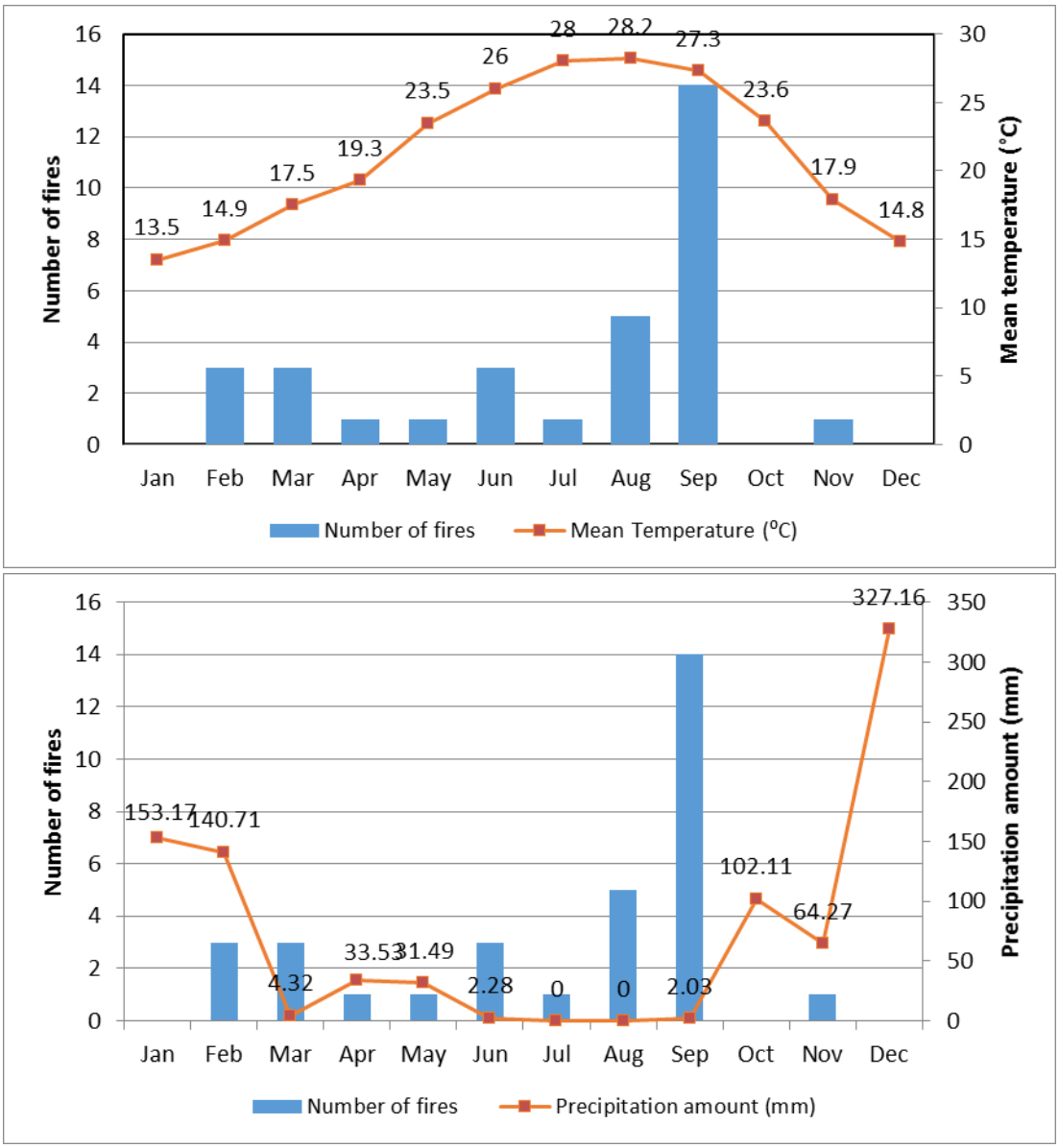
Resources employed in fire suppression

The following human and technical resources were involved in fire suppression:

	Nb. of Small Cars	Nb. of Water Tanks	Nb. of Other Cars	Nb. of Human Resources	Lebanese Army Helicopters used
Civil Defense	19	71	1	110	
Army	13	1	0	85	15
Internal Security	14	2	2	105	
Ministry of Agriculture	0	0	0	0	
NGO	1	0	0	5	
Local Resident	0	0	0	133	
Total	47	74	3	438	15

Table 1. Human and technical resources

6. FIRE SEASON OVERVIEW



Observations data are reported by the weather station 401030 (OLBA) – Latitude: 34.45 and Longitude: 35.8 at an altitude of 5 m above sea level. These observations are presented for display purposes only and not for use in correlation analysis. en.tutiempo.net/climate/ws-401030.html

Figure 11. Fire occurrence in function of monthly mean temperature (upper) and monthly precipitation in 2018 (lower)

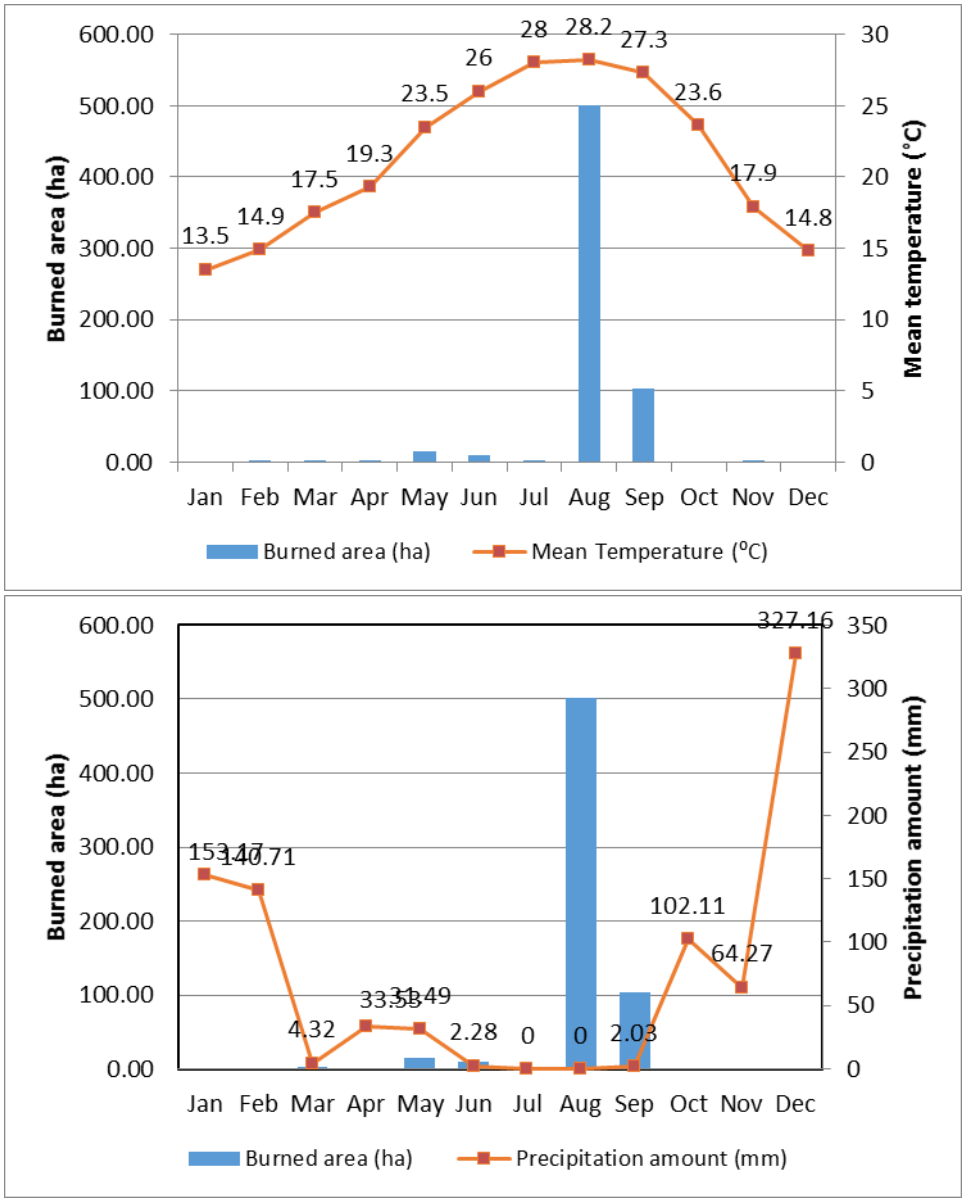


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Figure 12. Burned areas in function of monthly mean temperature (upper) and monthly precipitation in 2018 (lower)

7. WILDFIRE PATTERN IN LEBANON

In 2018, the recorded fire season (230 days) was 21 days shorter than the 2017 fire season. September was the peak for the year 2018 (Figure 13).

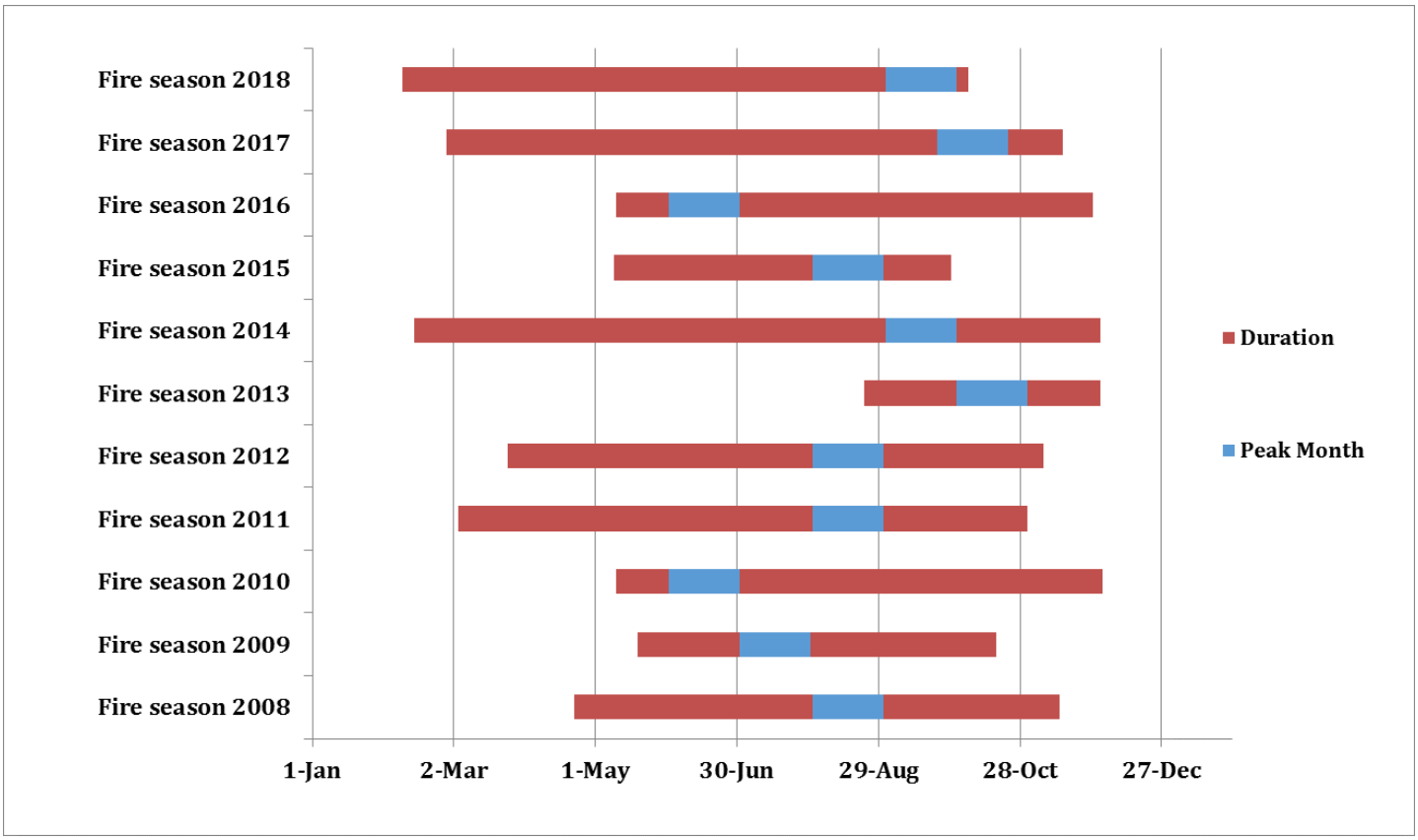


Figure 13. Comparison in fire inter-annual seasonality

A comparison of monthly fire occurrence and burned areas from 2008 to 2018 showed the following figures (Figure 14).

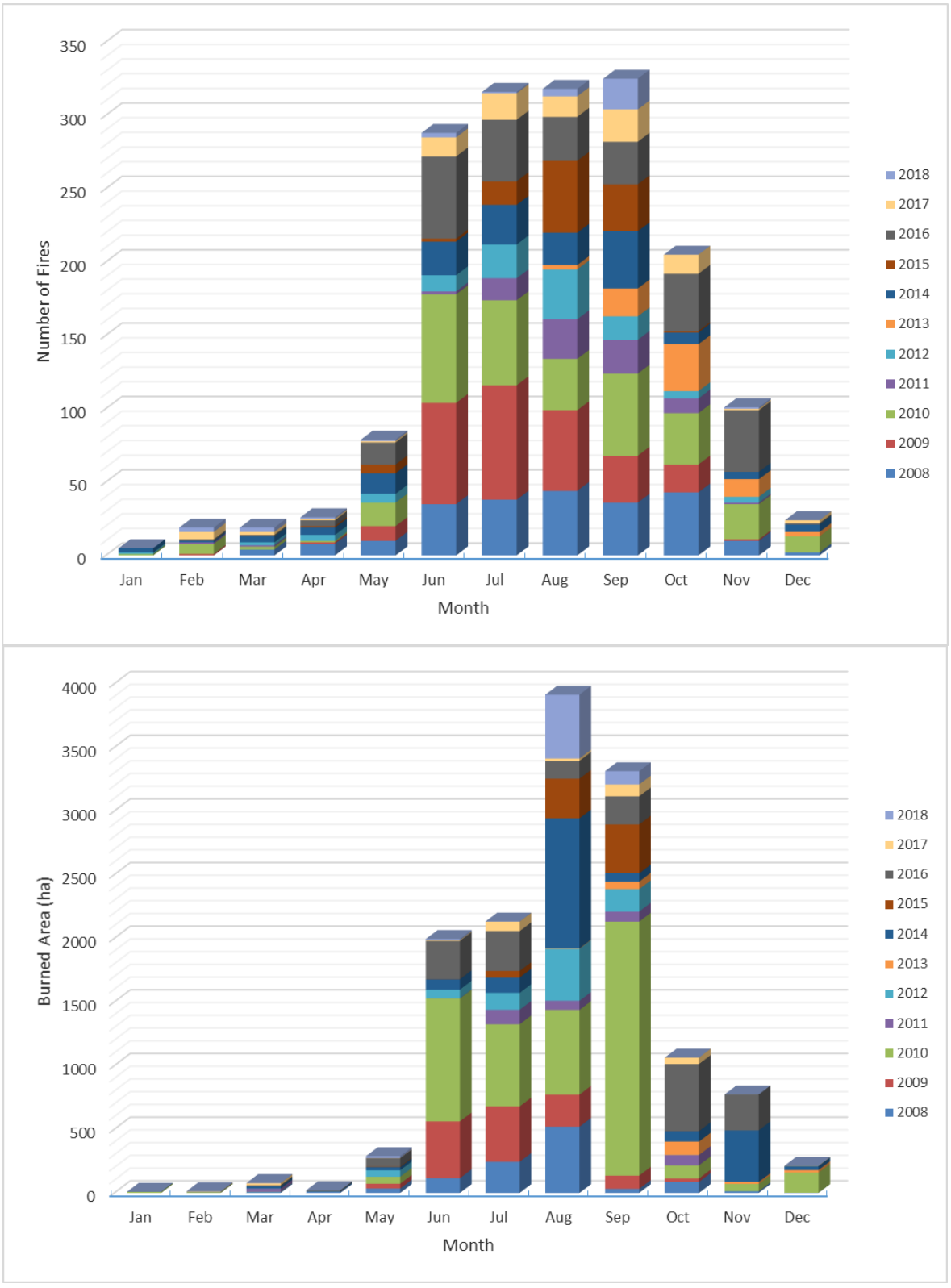
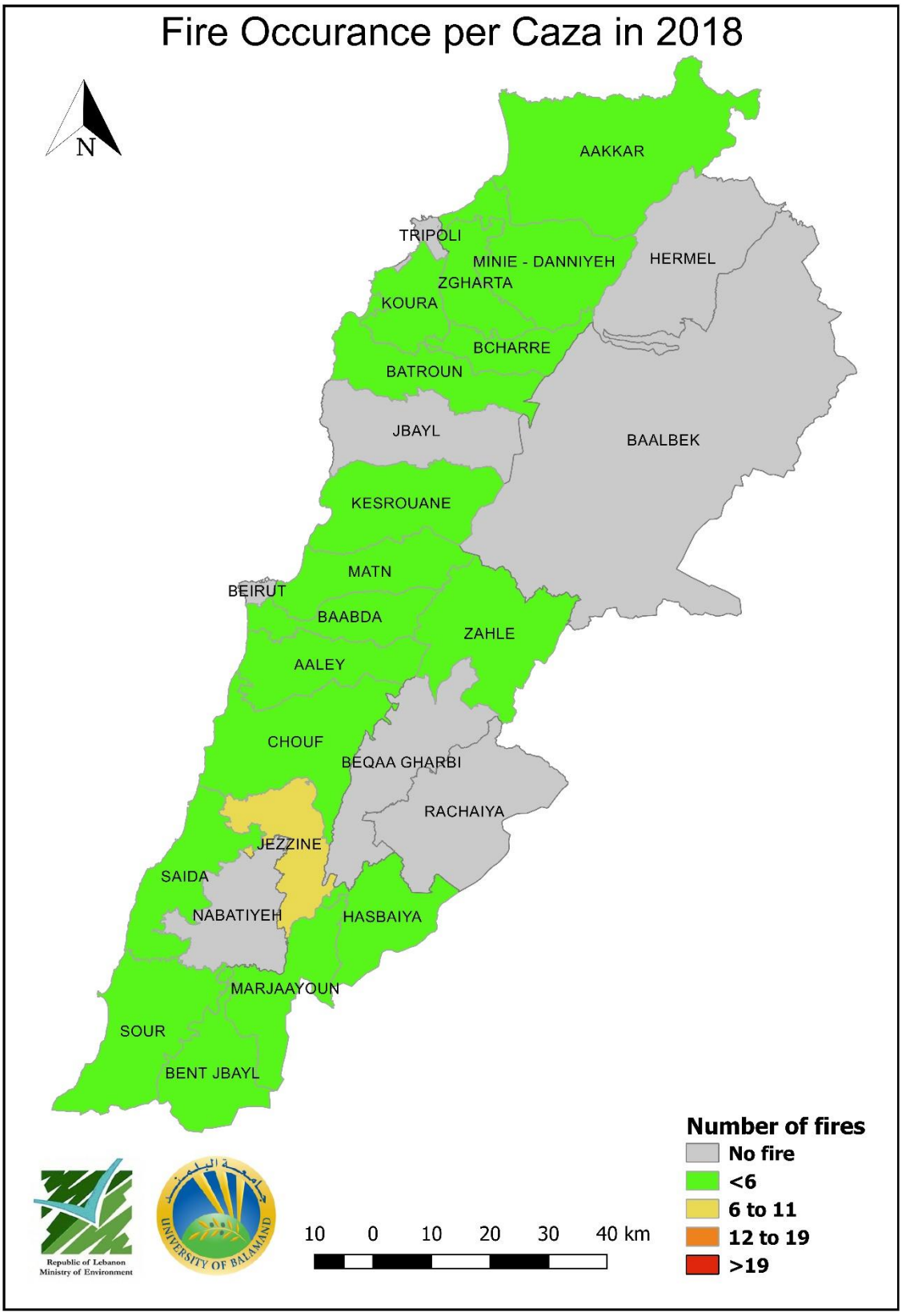
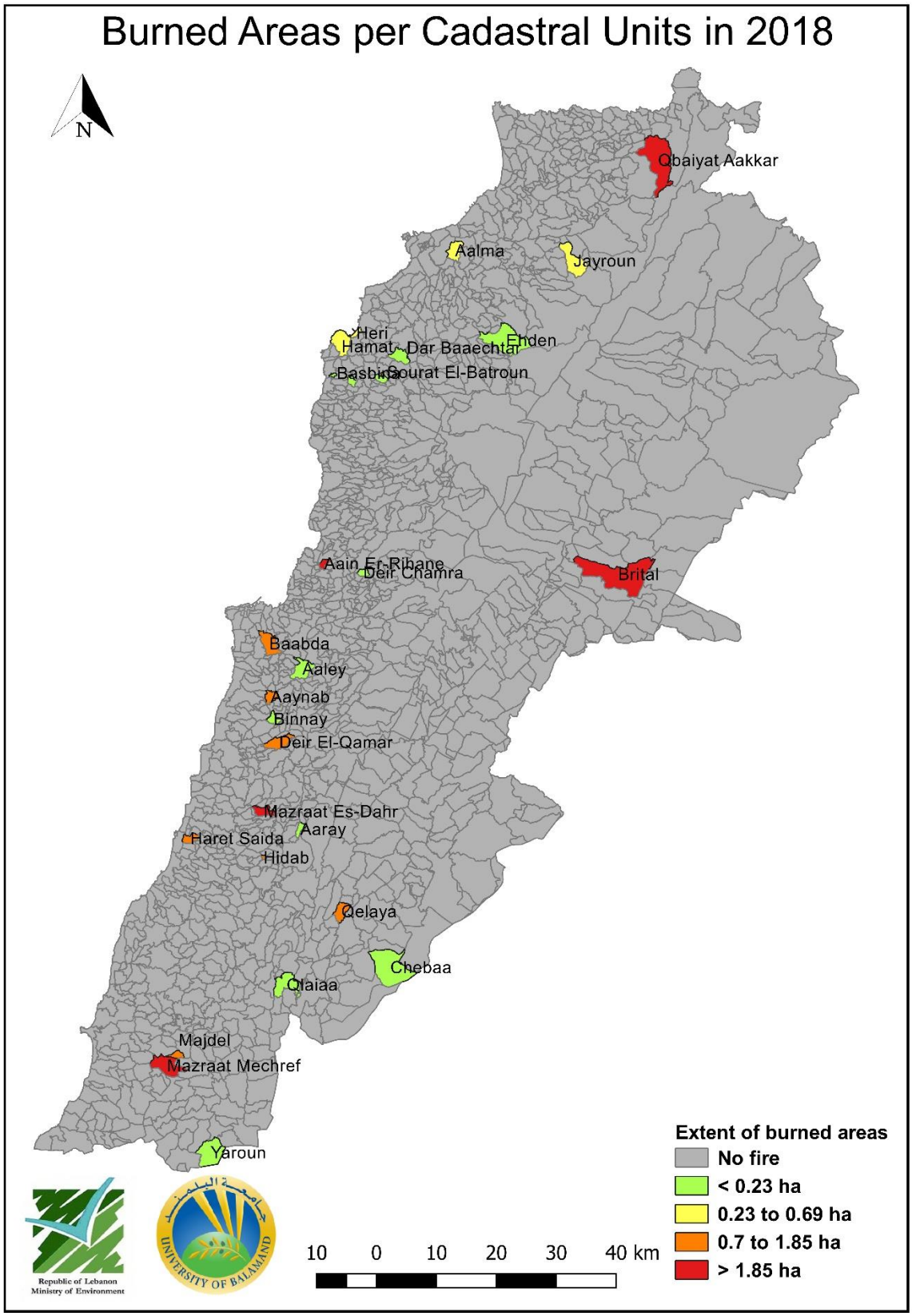


Figure 14. Comparison of fire occurrence (upper) and burned areas (lower) in the period between 2008 and 2018

Annex 1: Fire occurrence per Caza in 2018



Annex 2: Extent of burned areas per cadastral units in 2018



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