



State of Lebanon's wildfires in 2016

"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 (Formerly Biodiversity Program) at the Institute of the Environment, University of Balamand".

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 2016 FIRE SEASON

The calculated start date of the fire danger season for 2016 was 10 May, 2016 and the calculated end date was 28 November, 2016. The peak month (in number of fires) was June (a total of 56 fires damaging a minimum area of 299.93 ha of vegetated land).

3. FIRE OCCURRENCE AND AFFECTED AREAS

In 2016, a total of 260 fires were reported (Annexes 1 and 2), affecting a total area of 1870.54 ha (Figure 1).

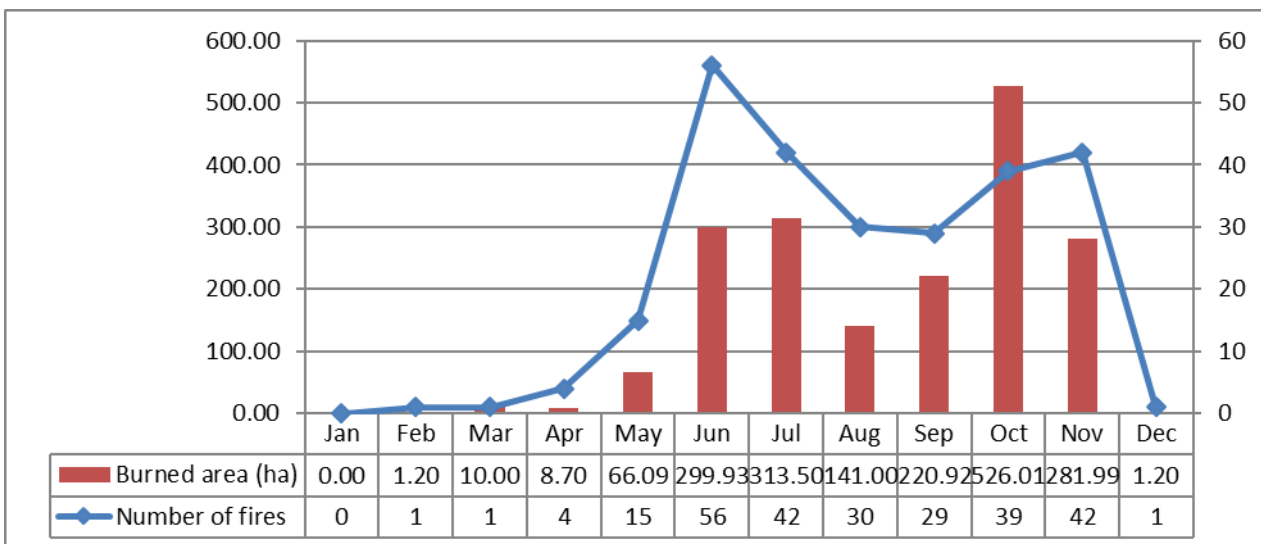


Figure 1. Monthly distribution of fire occurrence and fire affected areas in 2016

The landuse of fire affected areas (Figure 2) comprised forests/woodlands (64%), agricultural land (15.30%), and grassland (12.56%); A total of 24.12% of fire affected lands were privately owned, 18.44% were public lands, and 31.20% comprised mixed private and public ownerships.

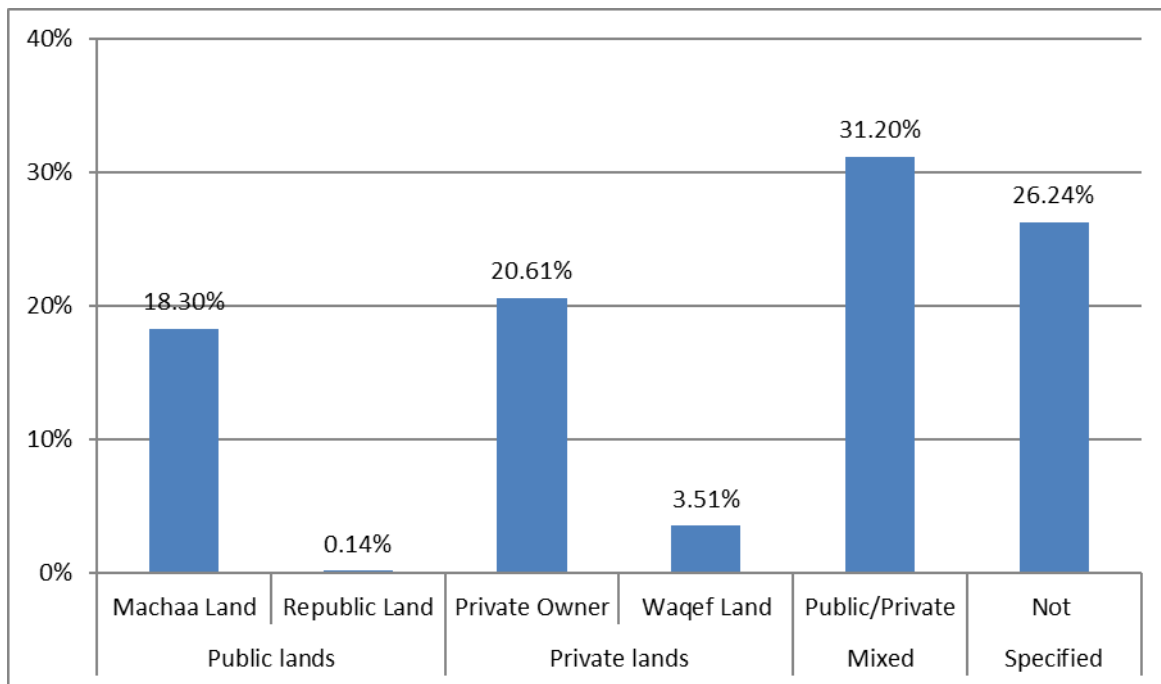
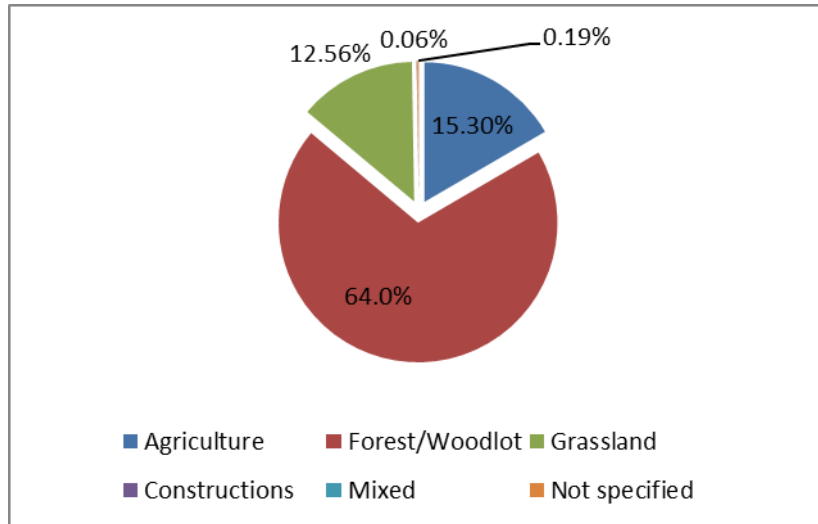


Figure 2. Landuse of fire affected areas (upper) and ownership of fire affected areas (lower)

Wildfires occurred in 21 out of 26 Caza (i.e., Kadaa). More specifically, the Caza of Sour was affected by 41 fires, followed by Aakar and Marjeoune with a total of 24 fires each. The Caza of Sour, Aakar and Marjeoune were affected by 448.096 ha, 327.063 ha and 143.729 ha of burned areas, respectively (Figure 3).

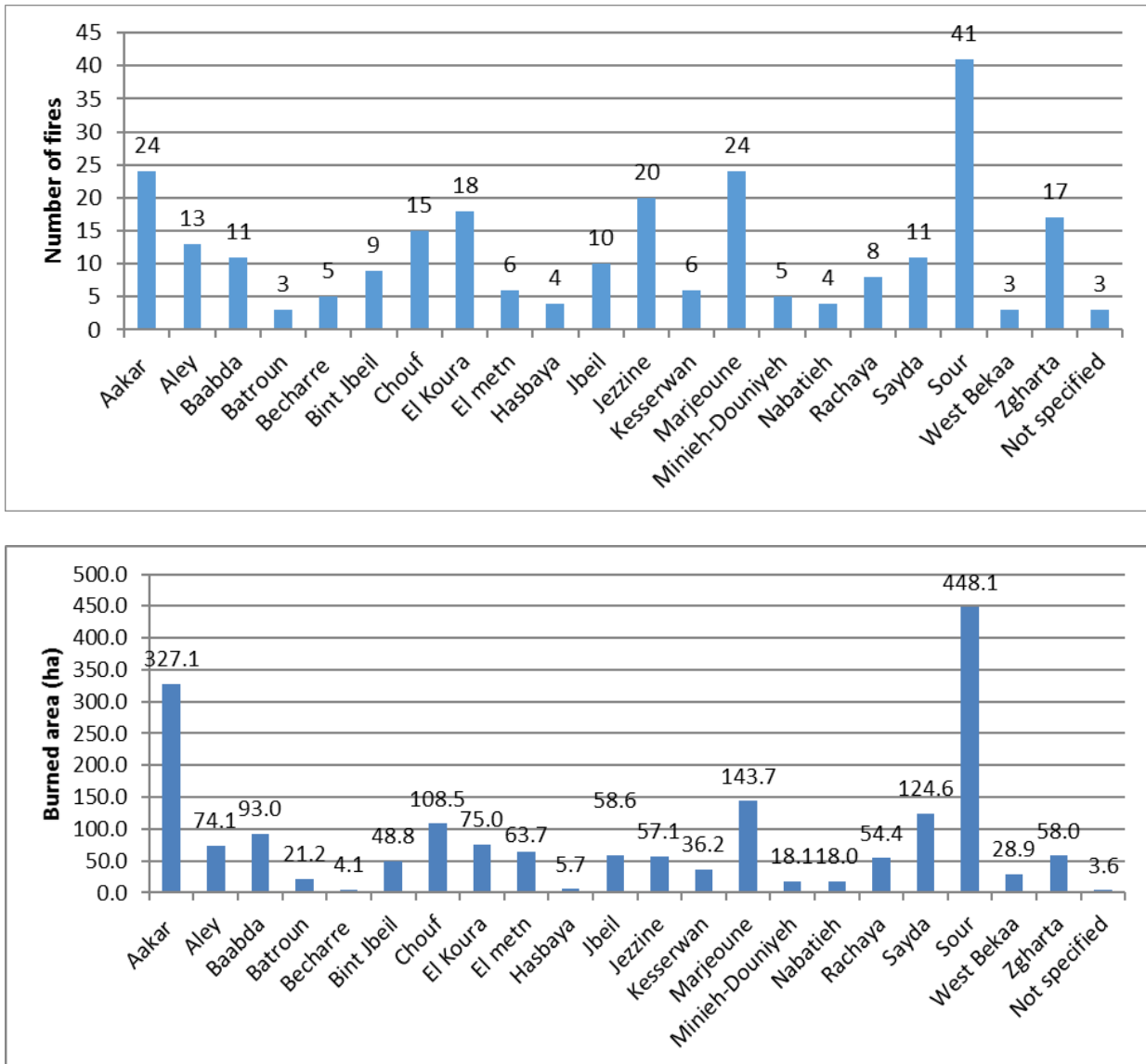


Figure 3. Distribution by Caza of fire occurrence (upper), and burned areas (lower)

Mountainous areas were affected by the largest number of fires (66.15%), followed by valleys (21.15%) and plains (10.00%) consecutively. Mountains were also affected by the largest extent of burned areas (75.29%), followed by valleys (20.9%) and plain areas (2.94%) consecutively (Figure 4).

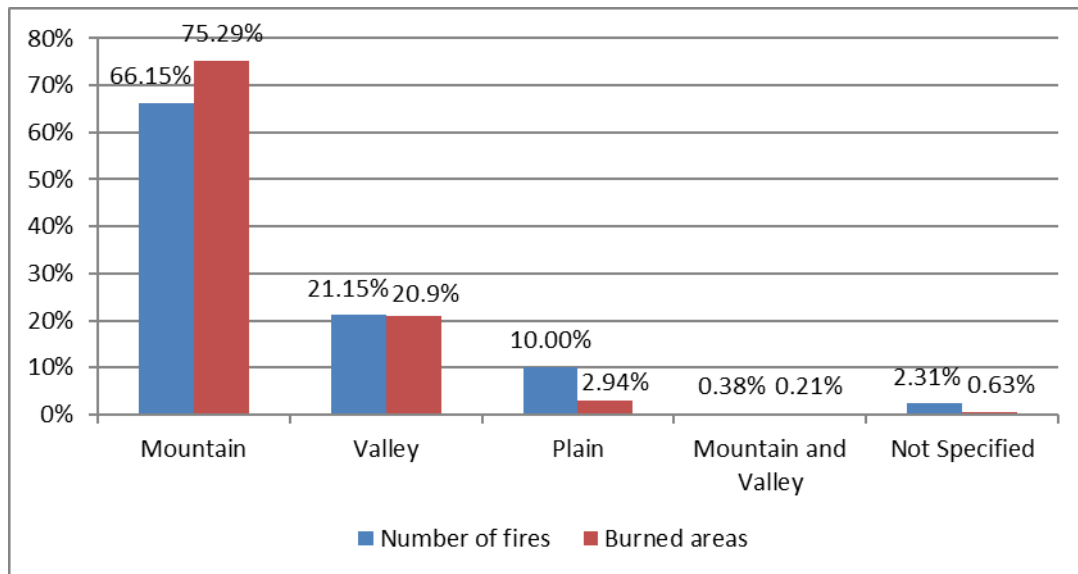


Figure 4. Land type affected by fires

A total of 36.54% of affected fuel types (Figure 5) was mixed agriculture and forests, followed by mixed forests (18.81%) and grassland (14.32%).

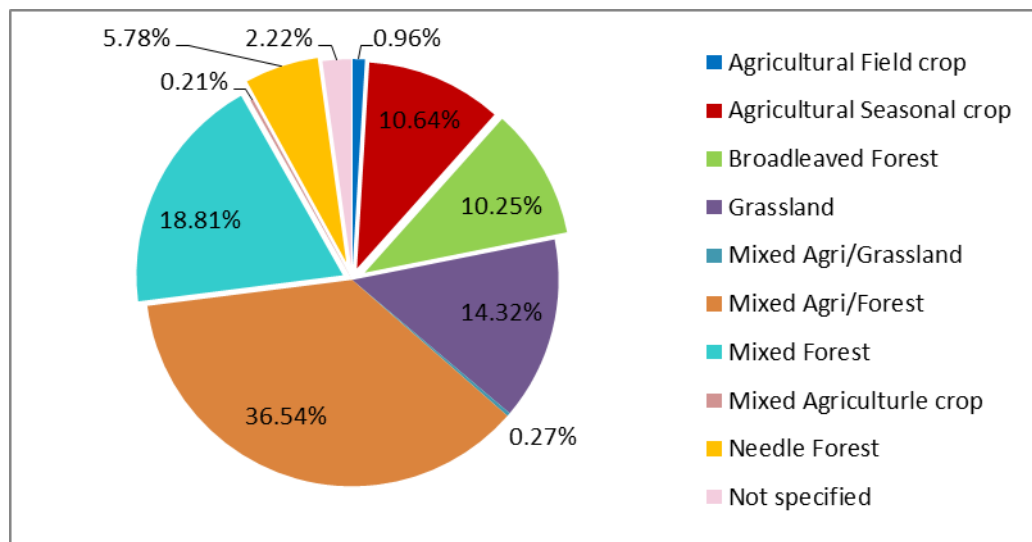


Figure 5. Distribution of fuel type affected by burned areas

4. CAUSES OF FIRES

The main fire causes were unknown (61%). Negligence was reported as the main cause of fires for 16.61% of the reported fire events. Furthermore, 11.99% of causes were attributed to Arson. Human Activities in nature, and landfills represented 4.31% and 3.78% respectively of the total fire causes (Figure 6).

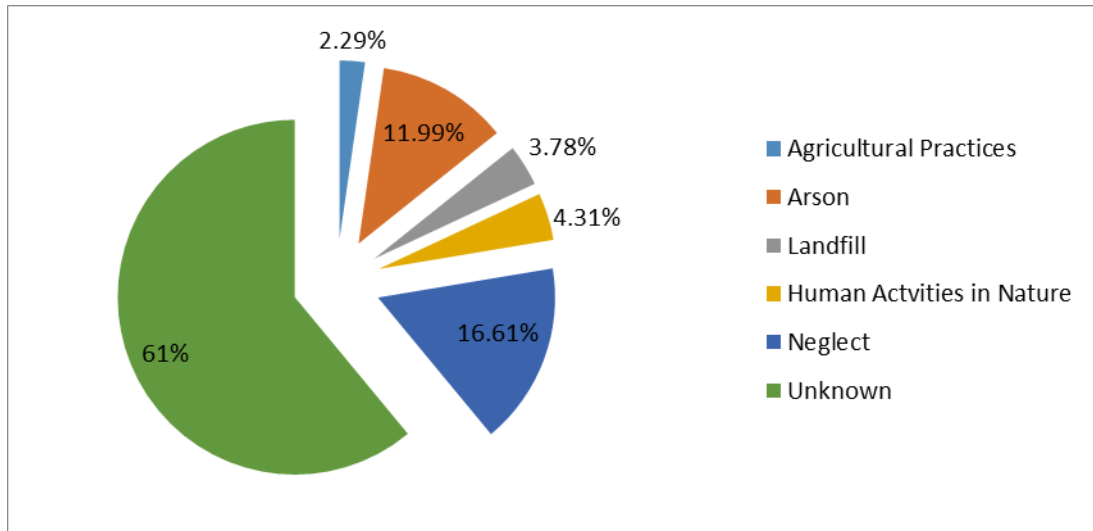


Figure 6. Distribution of main fire causes

5. FIRE FIGHTING MEANS

Reporting

Local residents reported 49.62% of fire incidents, while 36.92% of fire incidents were reported by Internal Security patrols, 5% by others, and 3.46% by farmers. However, 5% of fire incident reporting individuals or agencies were not specified (Figure 7).

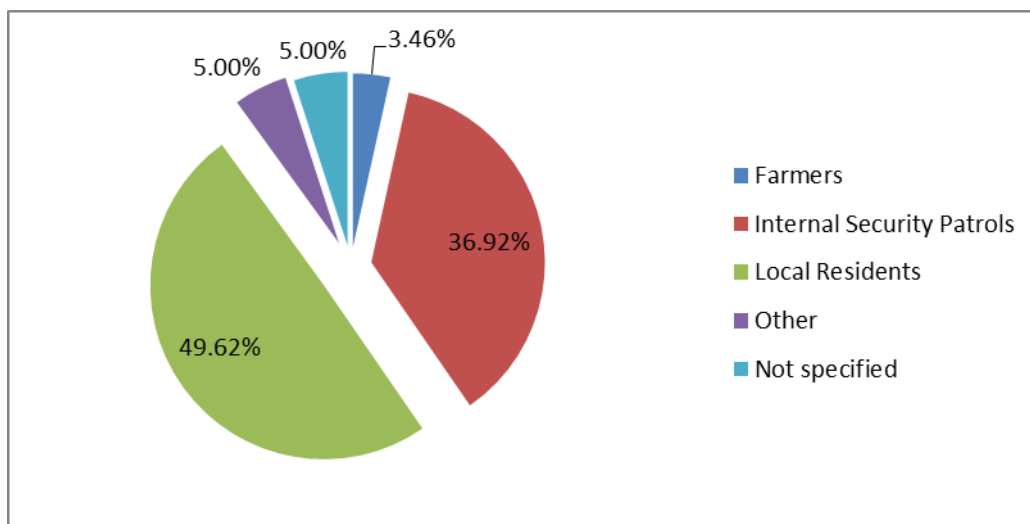


Figure 7. Fire reporting individuals/agencies

Fire starting time

Most of the fires started between noon and 4 pm (45%), and 23.08 % of fires started between 8 am and noon. In addition, 21.2 % of fires started between 4 pm and 8 pm and 5% of fires started between 8 pm and midnight. The fire starting times for around 2.31% of fires were not specified (Figure 8).

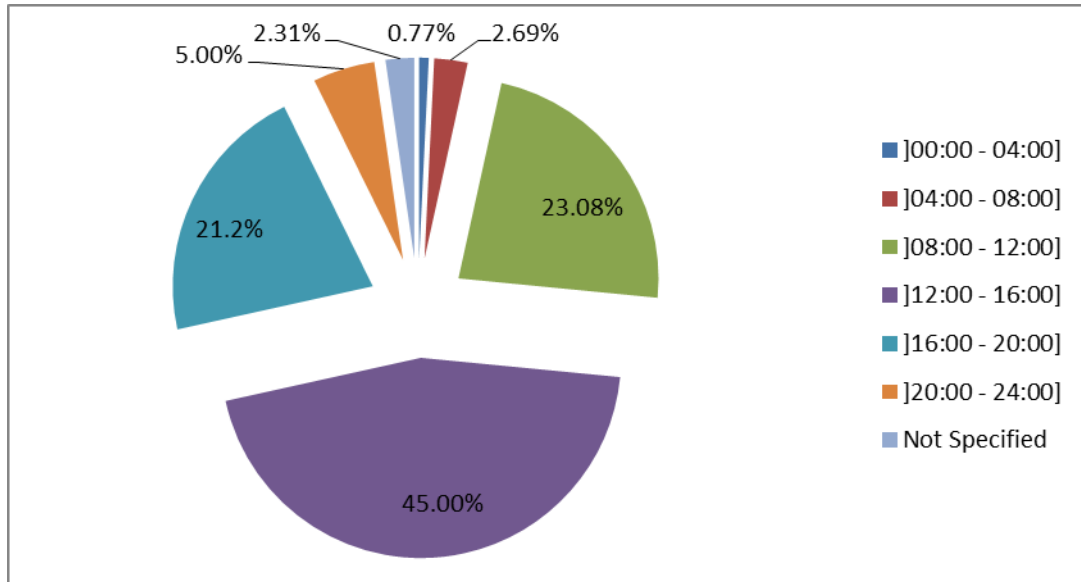


Figure 8. Distribution of temporal fire occurrence

Intervention time

It was observed that 64.23% of first interventions in fire suppressions occurred within the first 20 minutes after the reporting time, while 20.38% of interventions happened after 20 minutes and before 1 hour from the reporting time. Only 0.77% of interventions in fire suppression happened after one hour and a half from the reporting time (Figure 9).

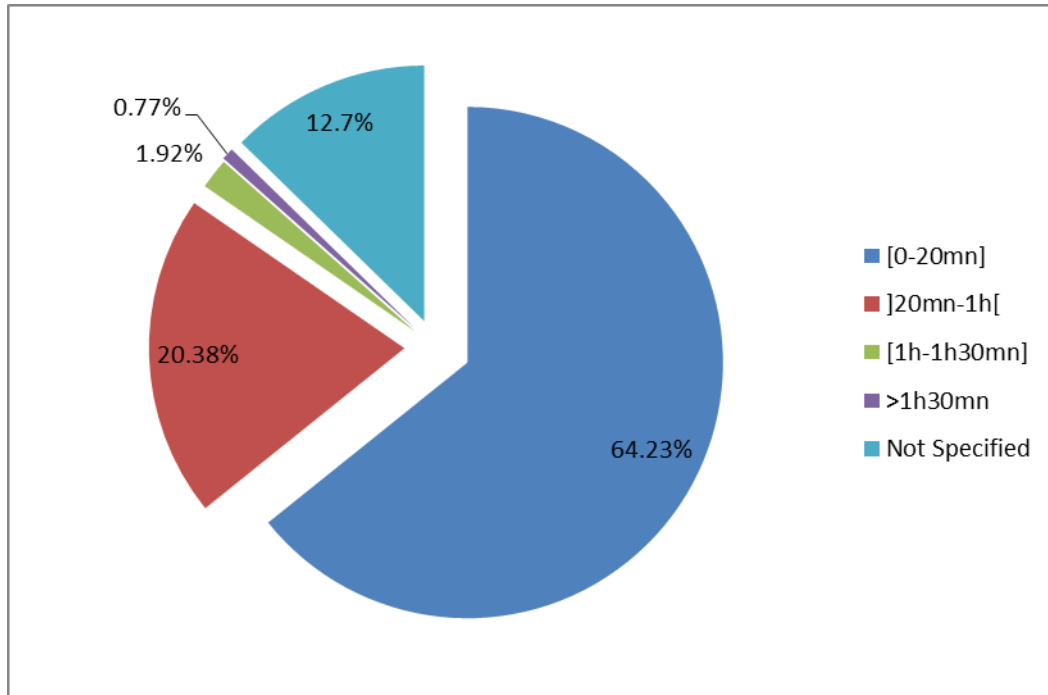


Figure 9. Times for intervention after reporting fires

Fire duration

The largest number of fires lasted between 1 and 2 hours (42.3%). A total of 30.77% of fires lasted between 2 and 5 hours, and 11.92% of fires lasted between 5 and 12 hours. It was also observed that 7.69% of fires lasted between 12 and 24 hours. However, 3.85% of fires lasted more than 24 hours. 3.46% of fires lasted more than 24 hours (Figure 10).

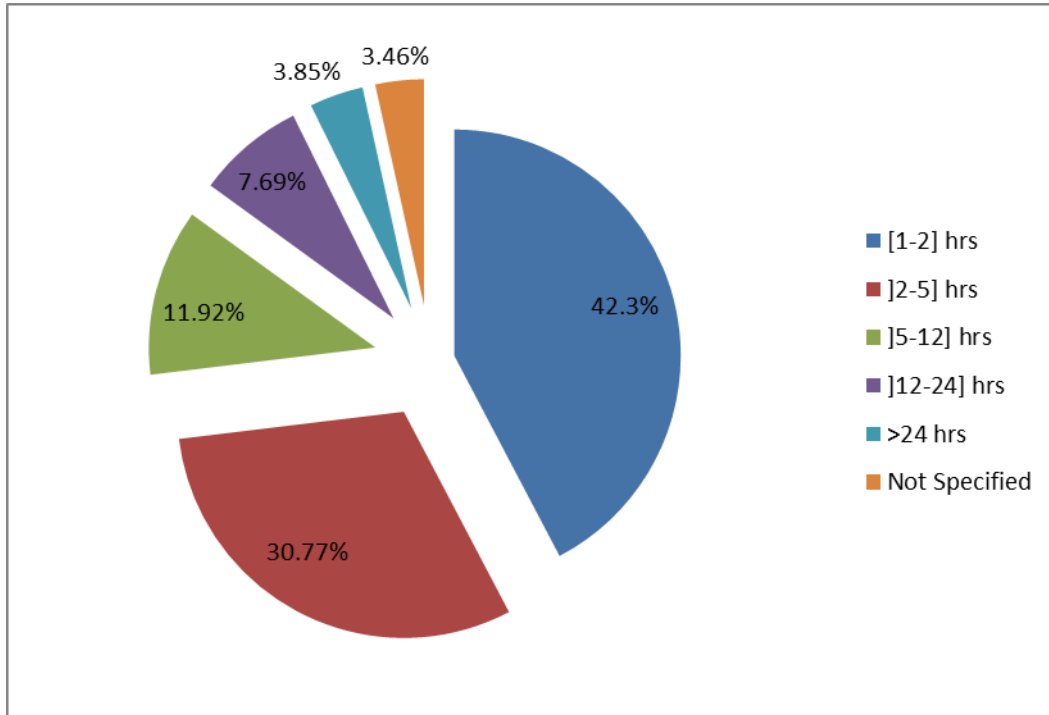


Figure 10. Fire duration

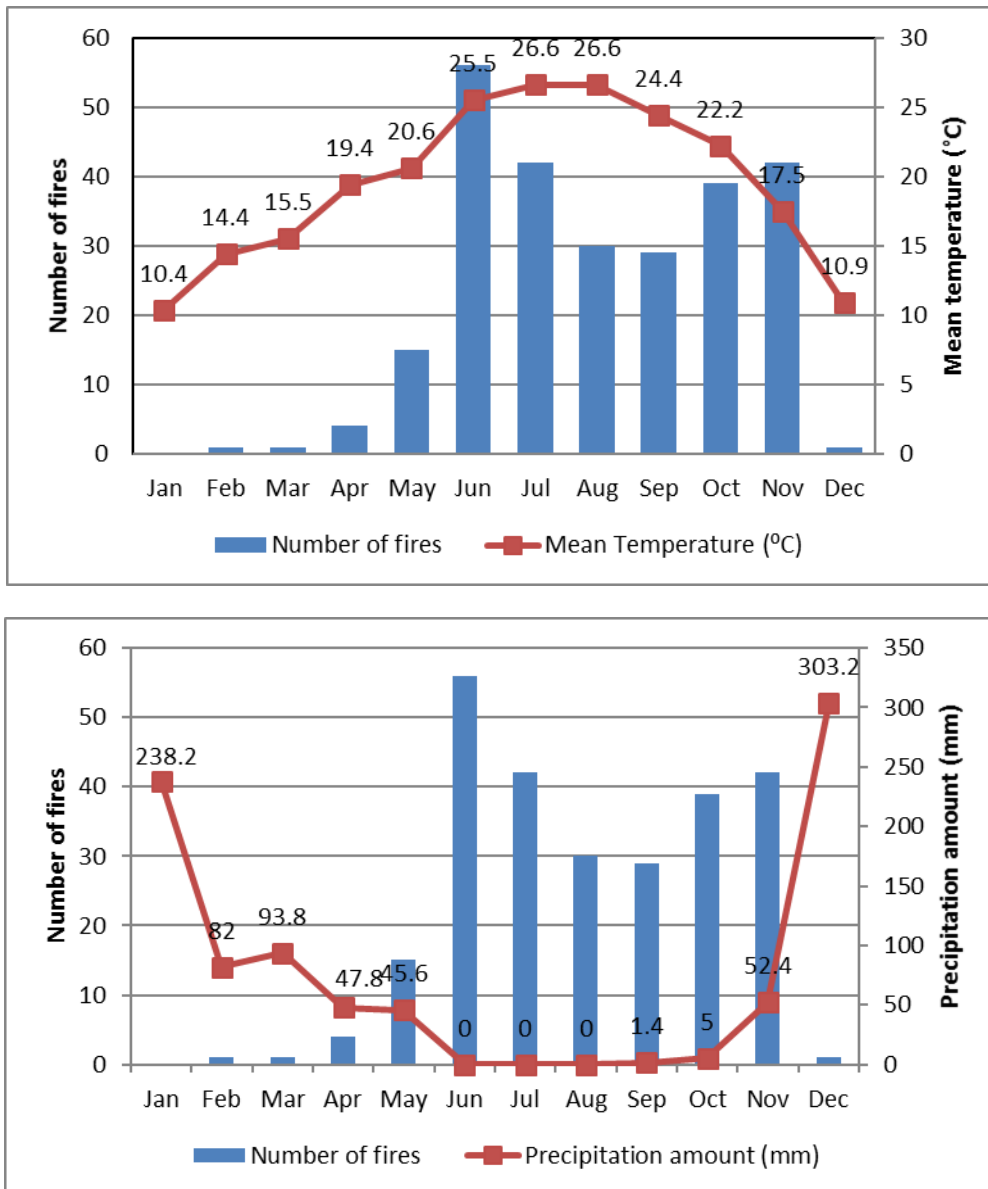
Resources employed in fire suppression

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
Civil Defense	159	486	31	1180	
Army	87	9	27	929	89 interventions
Internal Security	172	7	7	578	
Ministry of Agriculture	7	0	0	8	
NGO	28	43	0	283	
Local Resident	0	0	0	1042	
Total	453	545	65	4020	

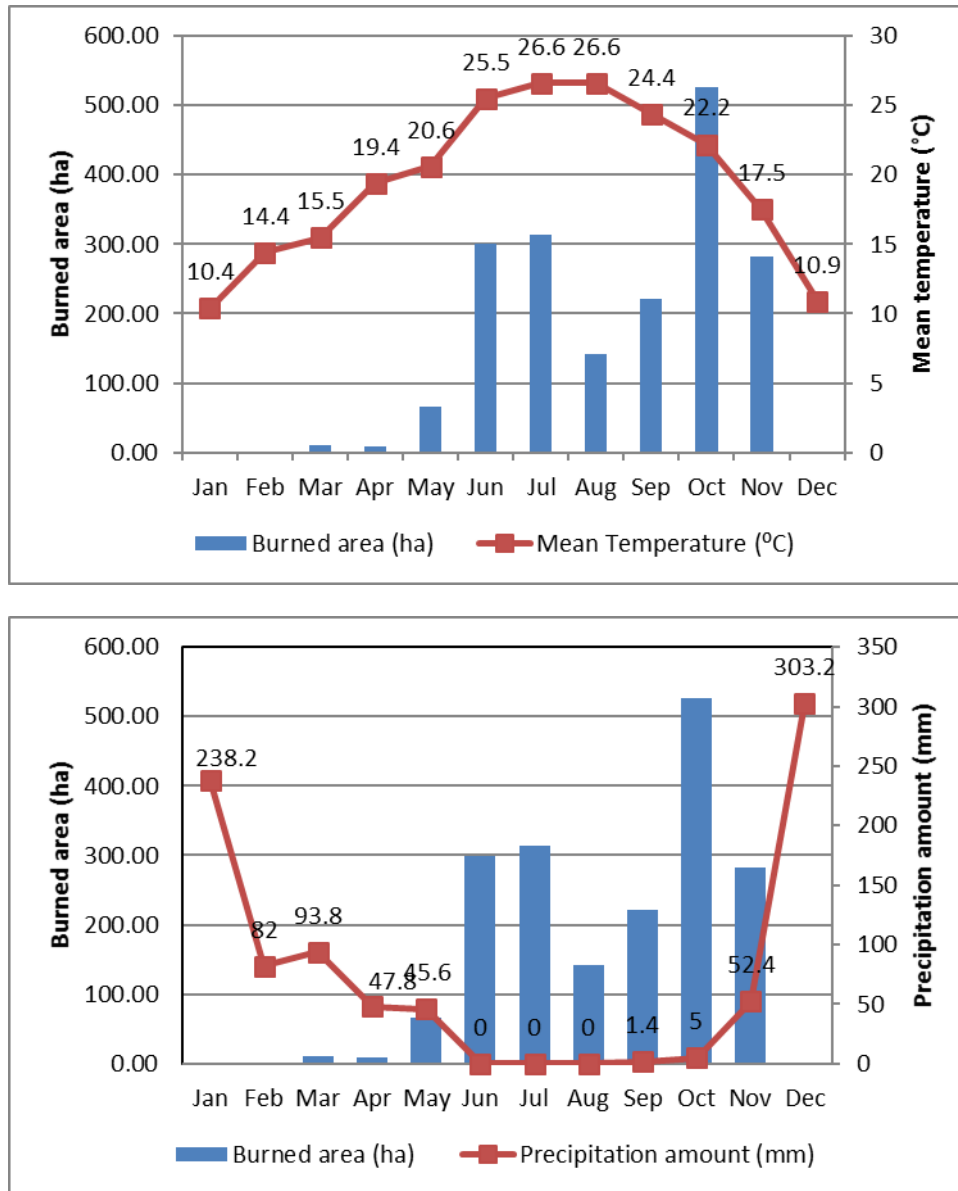
Table 1. Human and technical resources

6. FIRE SEASON OVERVIEW



Weather observations are provided by the Automated Weather Station of the Institute of the Environment; University of Balamand (IOE-UOB) mounted at an elevation of 310 m above sea level in Kaftoun, El Koura, North Lebanon. These observations are presented for display purposes only and not for use in correlation analysis.

Figure 11. Fire occurrence in function of monthly mean temperature (upper) and monthly precipitation in 2016 (lower)



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Figure 12. Burned areas in function of monthly mean temperature (upper) and monthly precipitation in 2016 (lower)

7. WILDFIRE PATTERN IN LEBANON

In 2016, the recorded fire season (202 days) was 59 days longer than 2015 and 89 days shorter than the fire season in 2014. While August was the peak month (in number of fires) for 2015, June was the peak for 2016, similarly to the year 2010 (Figure 13).

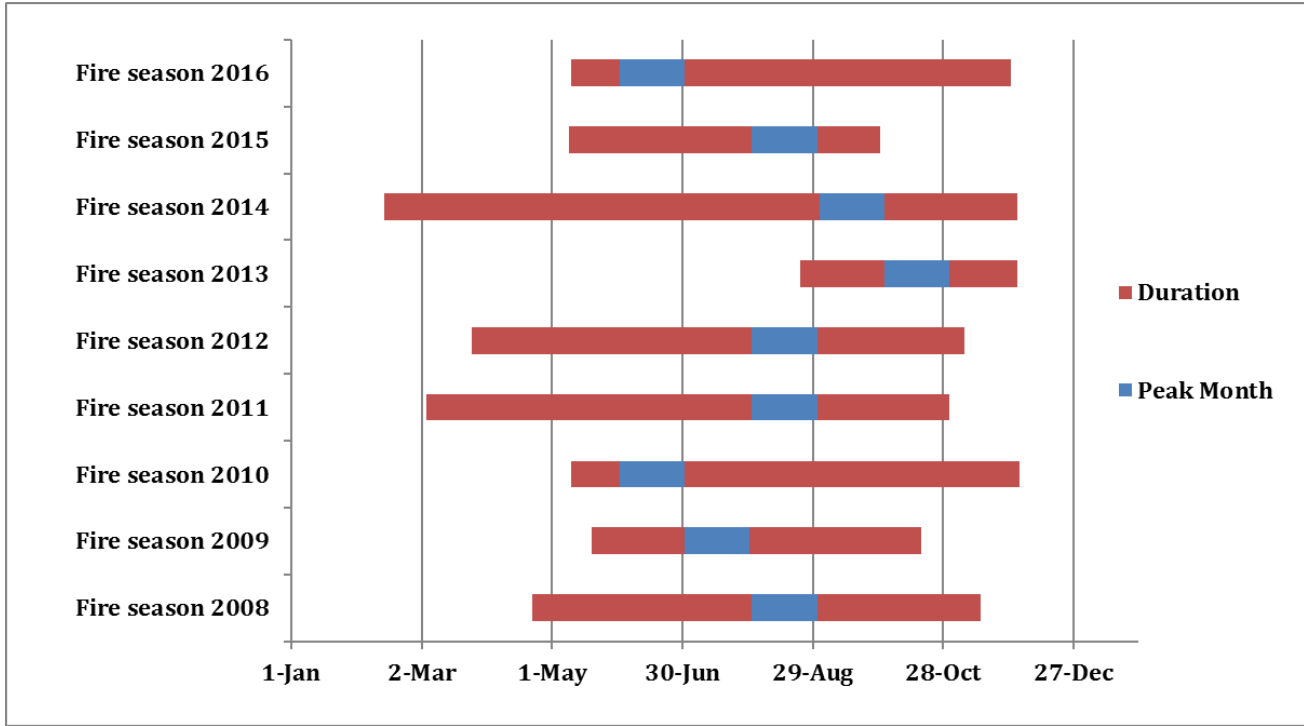


Figure 13. Comparison in fire inter-annual seasonality

A comparison of monthly fire occurrence and burned areas from 2008 to 2016 showed the following figures (Figure 14).

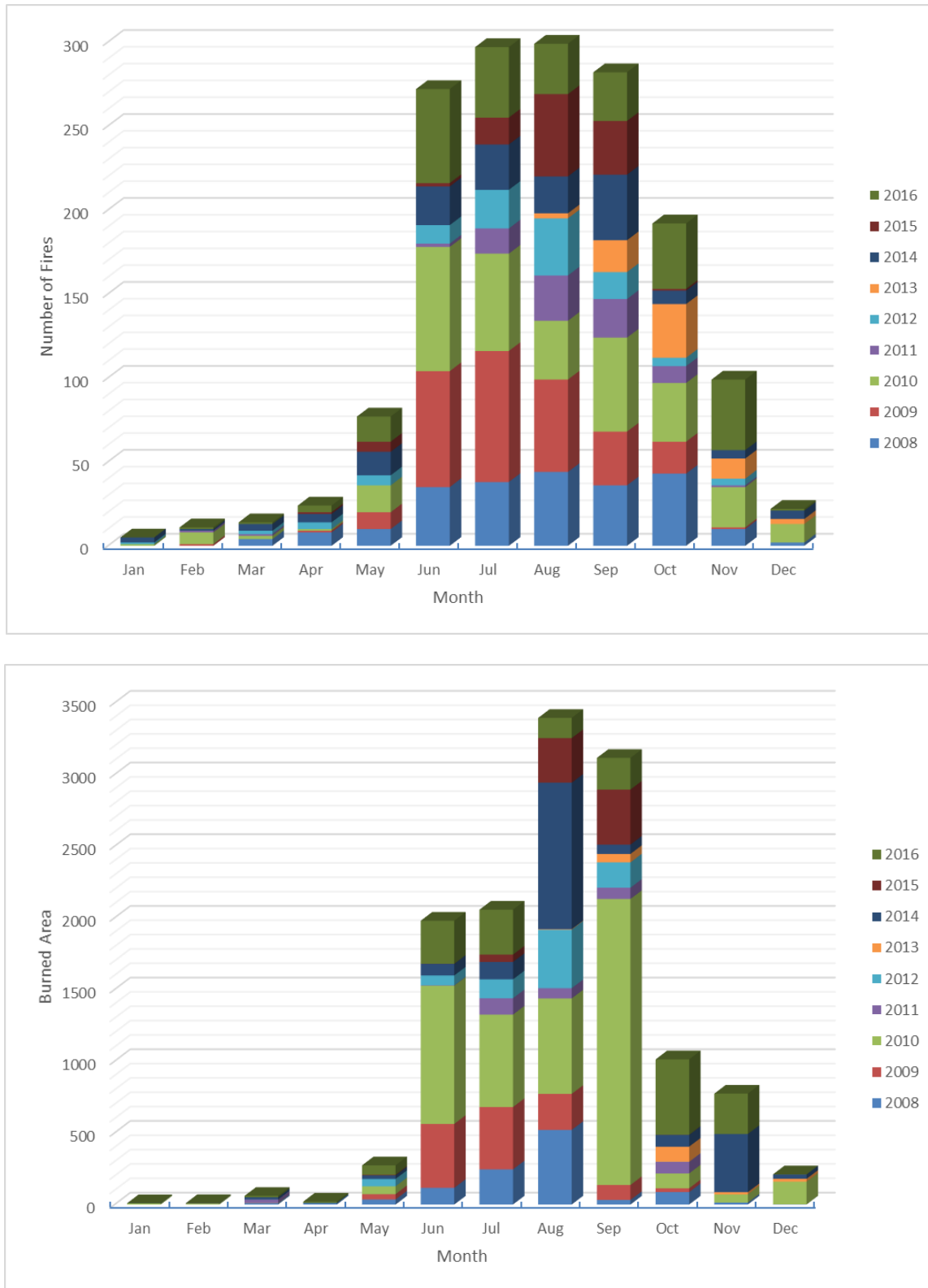
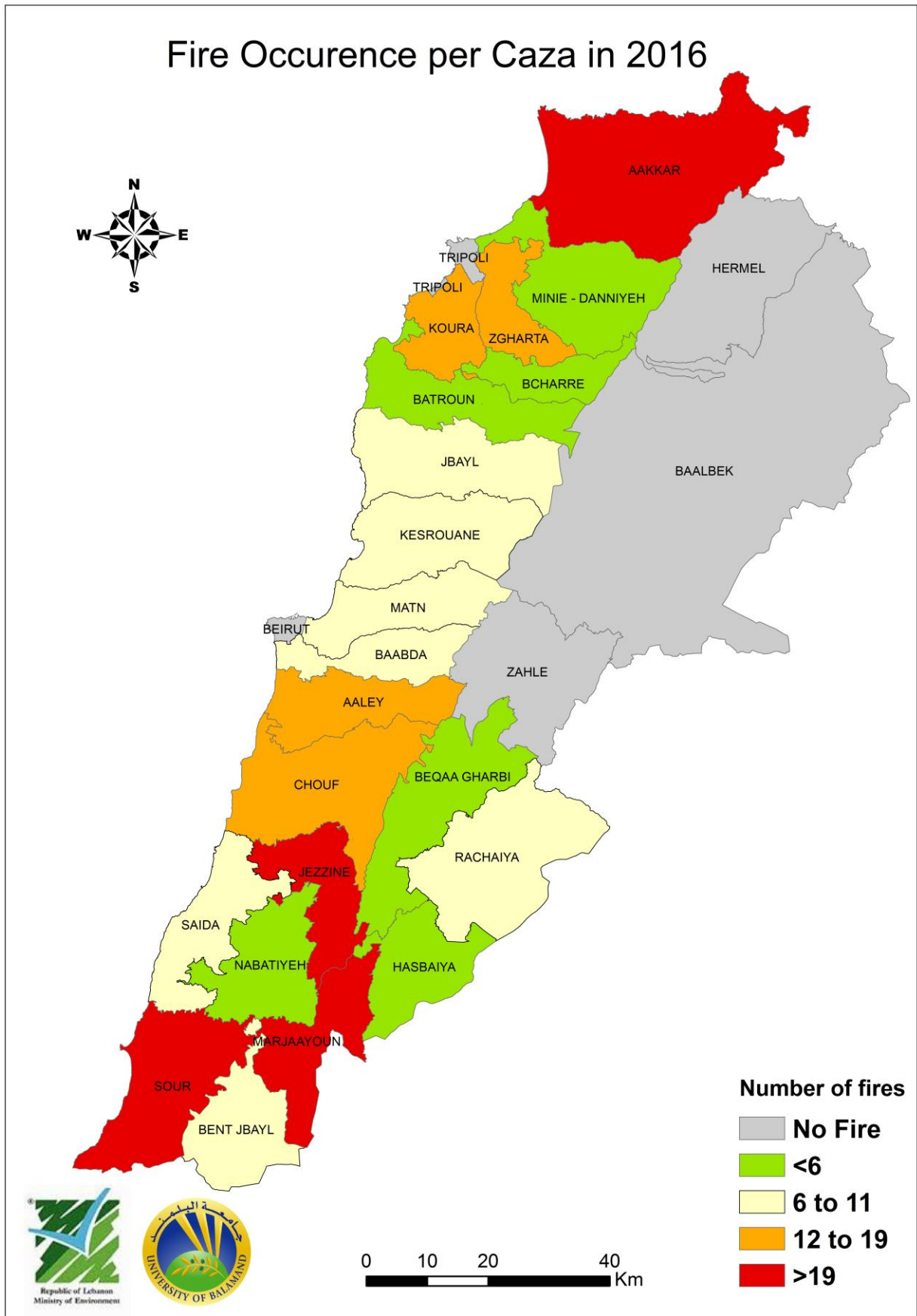
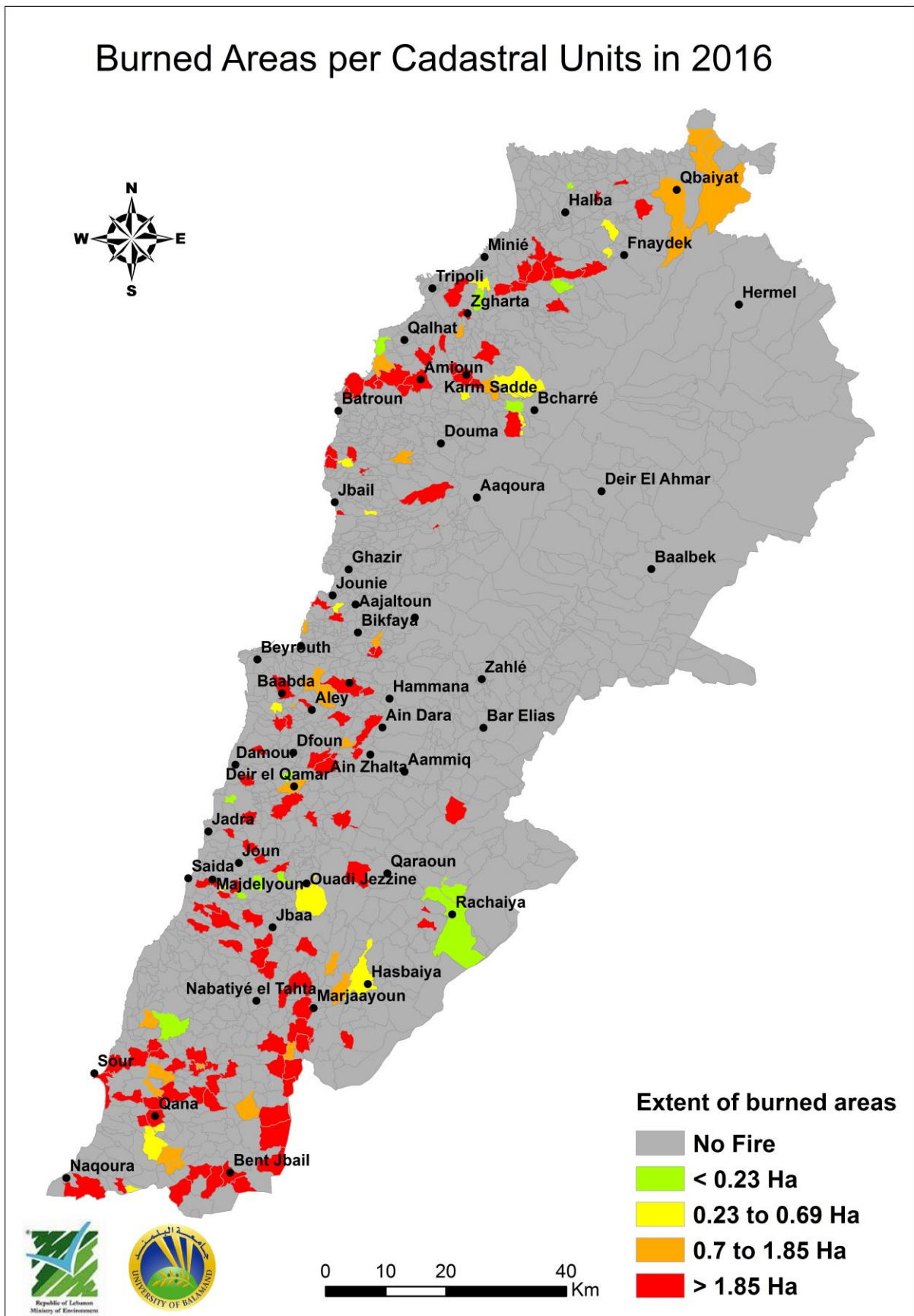


Figure 14. Comparison of fire occurrence (upper) and burned areas (lower) in the period between 2008 and 2016

Annex 1: Fire occurrence per Caza in 2016



Annex 2: Extent of burned areas per cadastral units in 2016



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