Republic of Lebanon
Ministry of Environment

UNIVERSITY OF BALAMAND

State of Lebanon's wildfires in 2010

"This report was produced within a collaborative framework between the Department of Ecosystems at the Ministry of Environment and the Biodiversity 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.

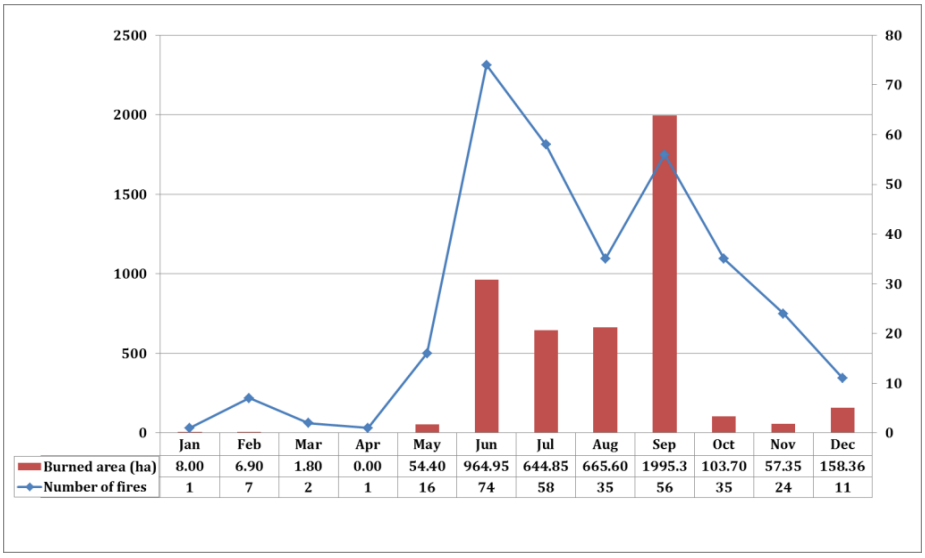
The analysis is done based on the data provided in the fire ID cards filled in by the Internal Security Forces (ISF) and copied to the Ministry of Environment, knowing that the fire ID cards format was issued through the notification of the Presidency of Council of Ministers number 256 dated on 1/3/2008. 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 2010 FIRE SEASON

The calculated start date of the fire danger season for 2010 was 5 May, 2010 and the calculated end date was 2 December, 2010. The peak month was June (a total of 74 fires damaging 965 ha of vegetated land). The fires during the months of January, February and March were not taken into consideration to calculate the fire season due to the exceptional peak in fire occurrence in February 2010.

3. FIRE OCCURRENCE AND AFFECTED AREAS

In 2010, a total of 320 fires were reported (Annexes 1 and 2), affecting a total area of 4661.26 ha (Figure 1).



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Burned area (ha)	8.00	6.90	1.80	0.00	54.40	964.95	644.85	665.60	1995.3	103.70	57.35	158.36
Number of fires	1	7	2	1	16	74	58	35	56	35	24	11

Figure 1: Monthly distribution of fire occurrence and fire affected areas in 2010*

* When the number of fires is different from zero and the corresponding burned area is equal to zero in the graph, it indicates that the data about the burned area is not available (N/A).

The landuse of fire affected areas (Figure 2) comprised forests/woodlands (65.61%), mixed land (22.54%), , and agricultural land (5.88%); 49.33% of fire affected lands had mixed private and public ownerships, 10.87% were privately owned and 25.77% were public lands.

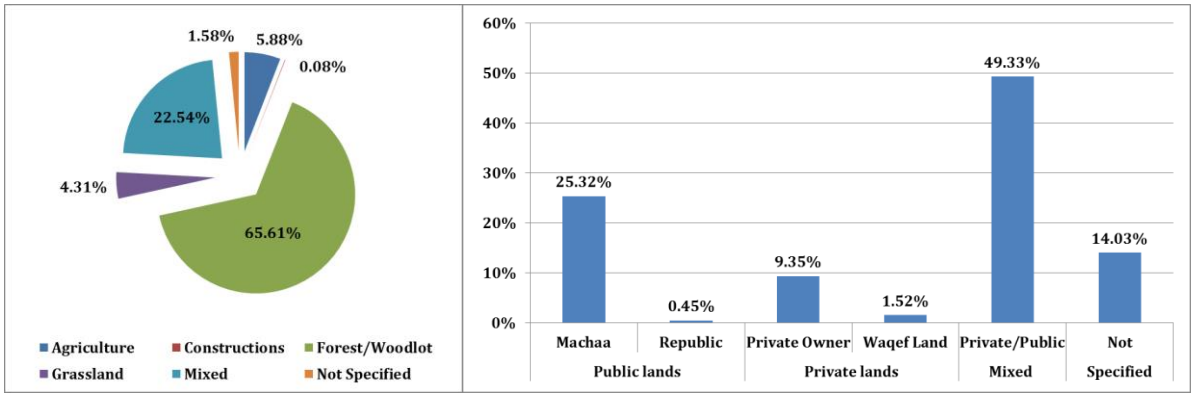


Figure 2. Landuse of fire affected areas (left) and ownership of fire affected areas (right)

Wildfires occurred in 22 out of 26 Kadaa. More specifically, the Kadaa of Chouf, , Sour, Marjeoune, Aakkar and Aley were affected by 40, 33, 29, 28 and 27 fires, respectively; while the Kadaa of Chouf, Becharre and Aakkar were affected by 2093.76 ha, 500.5 ha, and 456 ha of burned areas respectively (Figure 3).

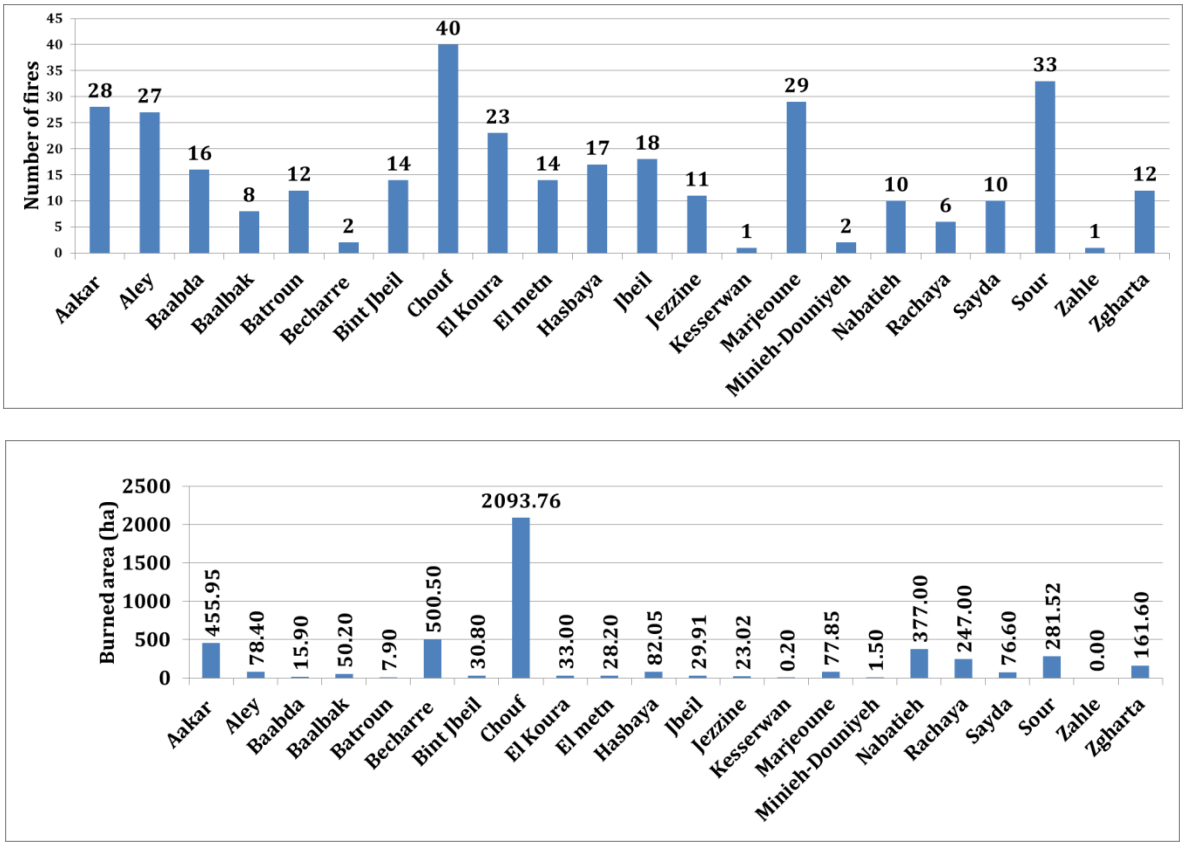


Figure 3. Distribution by Kadaa of fire occurrence (upper), and burned areas (lower)

Mountainous areas were affected by the largest number of fires and the largest extent of burned areas, followed by valleys and plains consecutively (Figure 4).

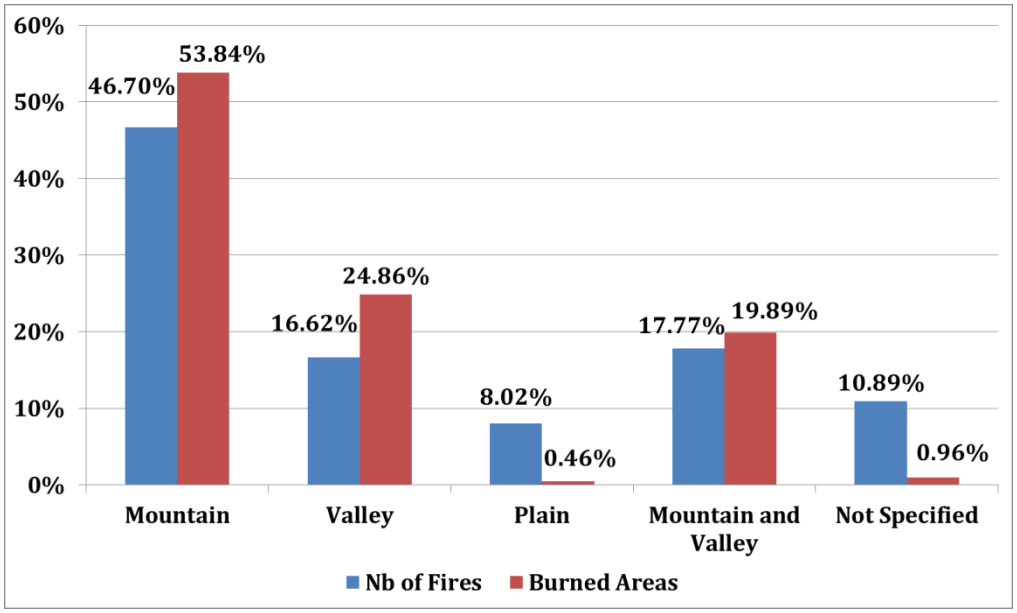


Figure 4. Land type affected by fires

Twenty one per cent of affected fuel type (Figure 5) was mixed agriculture/forest followed by mixed forest (18.6%), and broadleaves forest (5.7%).

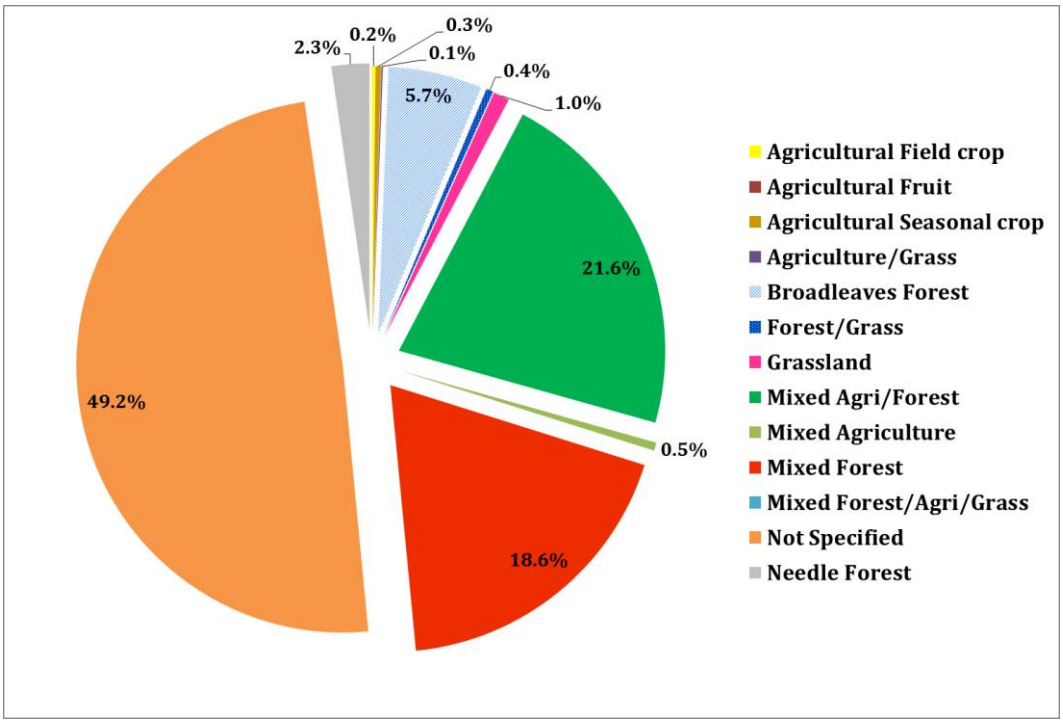


Figure 5. Distribution of fuel type affected by fire

4. CAUSES OF FIRES

The main fire causes were unknown (68%). Negligence was reported as the main cause of fires for 18% of the reported fire events; 10% of causes involved human activities on natural lands. Arson fires and agriculture practices represented only 2% and 1% respectively of the total causes (Figure 6).

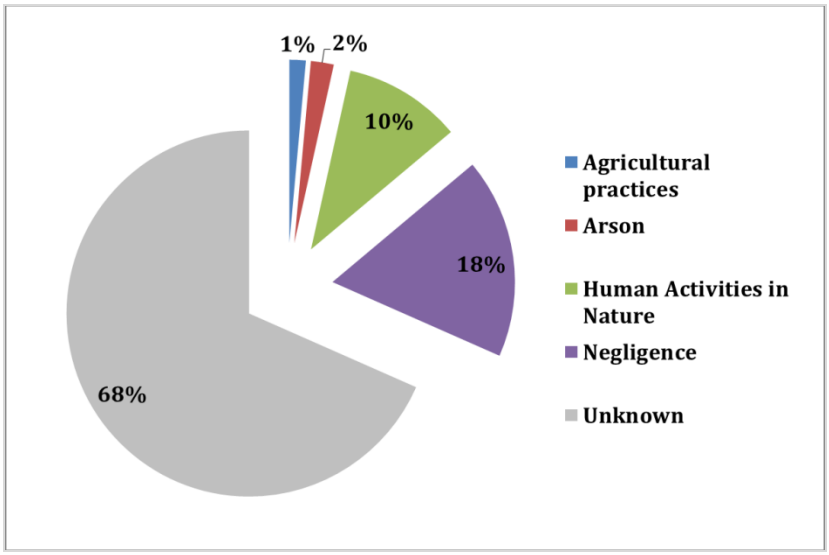


Figure 6. Distribution of main fire causes

5. FIRE FIGHTING MEANS

Reporting

Local residents reported 39.5% of fire incidents, while 37.2% of fire incidents were reported by internal security patrols, 23.1% by others, and 0.3% by farmers (Figure 7).

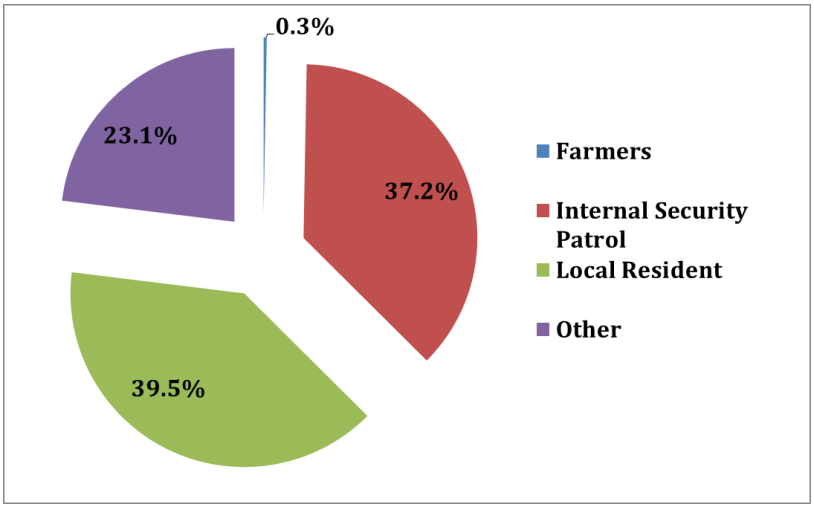


Figure 7. Fire reporting individuals/agencies

Fire starting time

Most of the fires started between noon and 4 pm (34%), and 24 % of fires started between 8 am and noon. In addition, 14% of fires started between 4 pm and 8 pm (Figure 8).

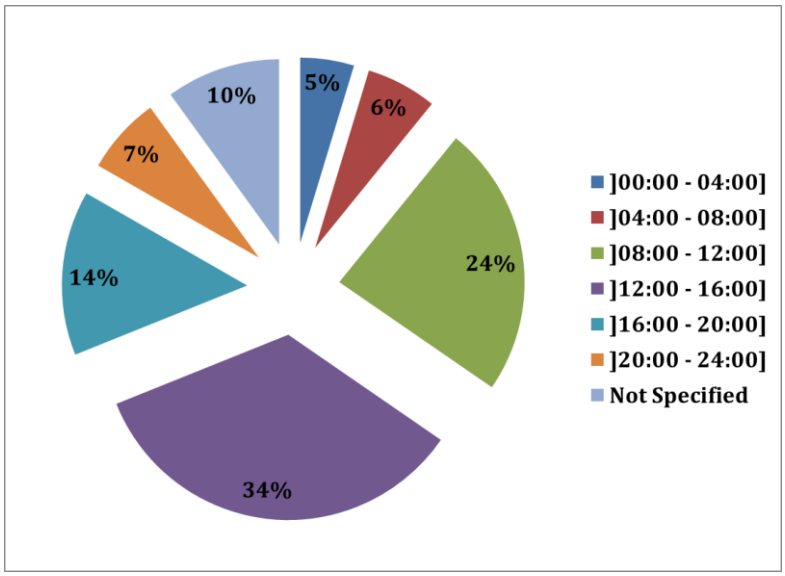


Figure 8. Distribution of temporal fire occurrence

Intervention time

It was observed that 51% of first interventions in fire suppressions occurred within the first 20 minutes after the reporting time, while 23.5% of interventions happened after 20 minutes and before 1 hour from reporting time. Only 2.6% of interventions in fire suppression happened after one hour and a half from the reporting time (Figure 9).

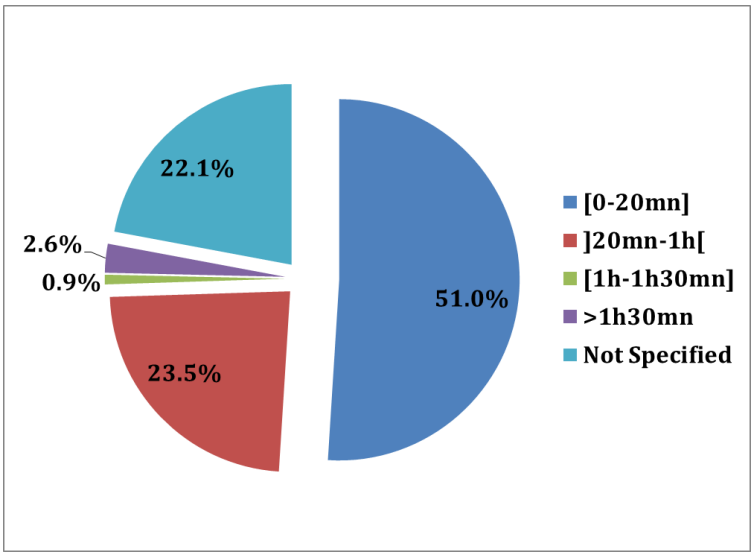


Figure 9. Times for intervention after reporting fires

Fire duration

The largest number of fires lasted between 1 to 2 hours (40%); 22% of fires lasted between 2 and 5 hours and 13% of fires lasted between 5 and 12 hours. Only 7% of fires lasted between 12 and 24 hours (Figure 10).

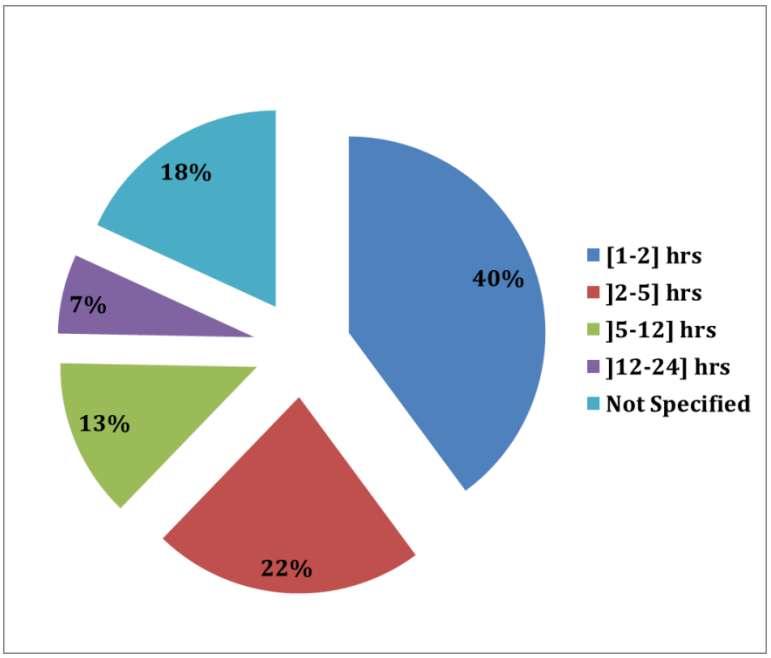


Figure 10. Fire duration

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	260	678	46	1381	
Army	304	50	56	1450	60 Interventions
Internal Security	271	31	70	806	
NGO	6	0	7	43	
Local Resident	0	0	0	1230	
Total	841	759	179	4910	

Table 1. Human and technical resources

6. FIRE SEASON OVERVIEW

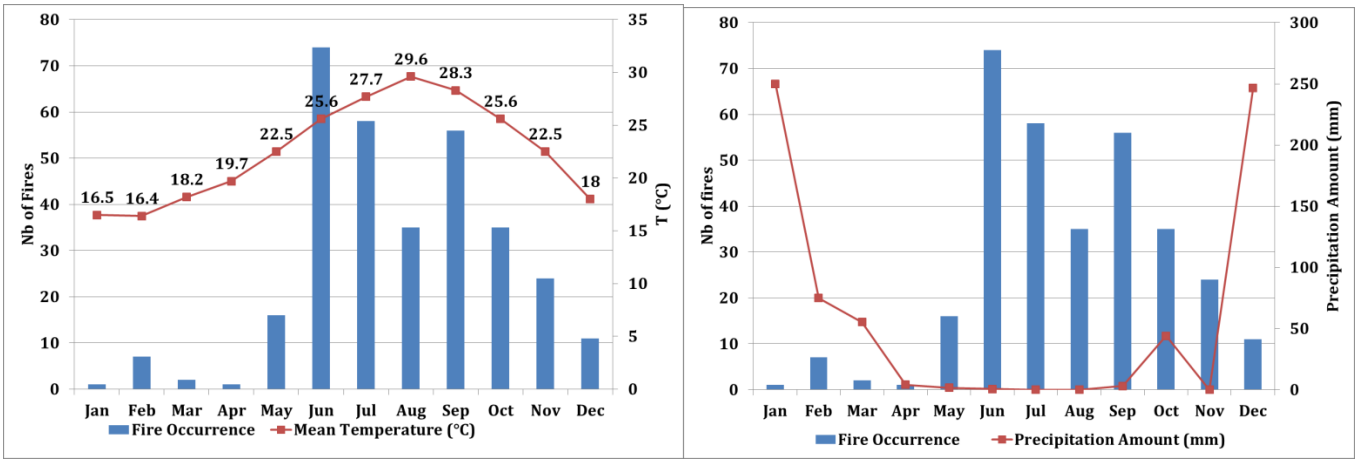


Figure 11. Fire occurrence in function of monthly mean temperature (left) and monthly precipitation in 2010 (right)

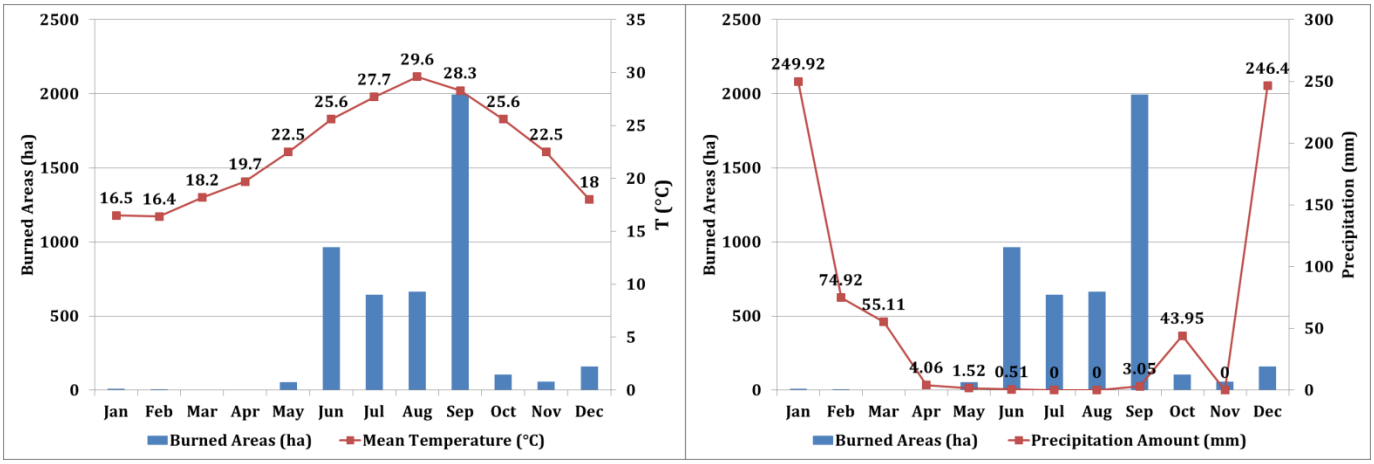


Figure 12. Burned areas in function of monthly mean temperature (left) and monthly precipitation in 2010 (right)

7. WILDFIRE PATTERN IN LEBANON

In 2010 the fire season was 54 days longer than in 2009 and equal to the duration in 2008 (206 Days). June was the peak month for 2010, July was the peak month for 2009 and August was the peak month for 2008 (Figure 13).

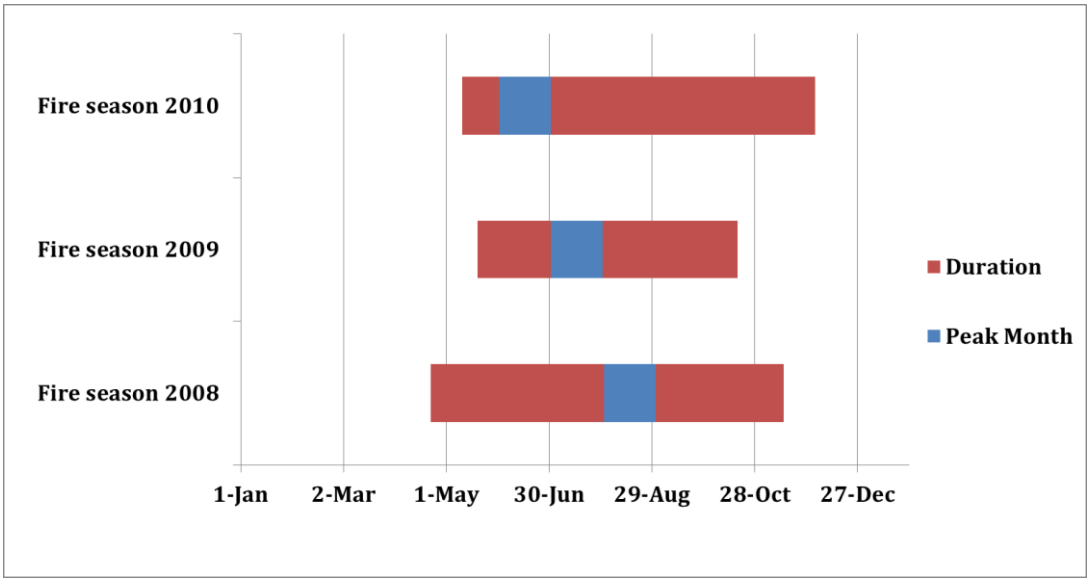


Figure 13. Comparison in fire inter-annual seasonality

A comparison between 2008, 2009 and 2010 showed the following statistics (Figure 14).

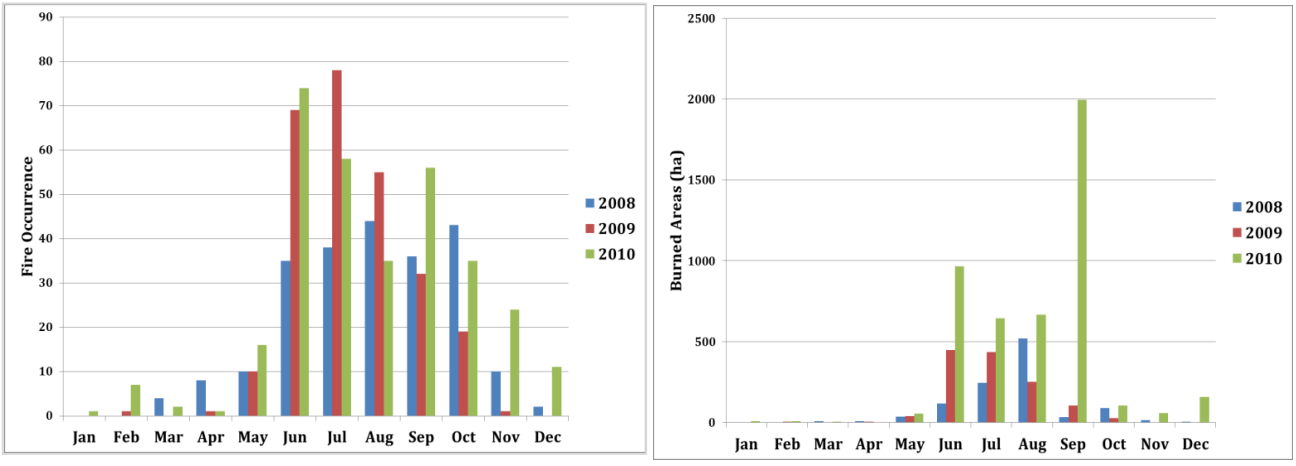
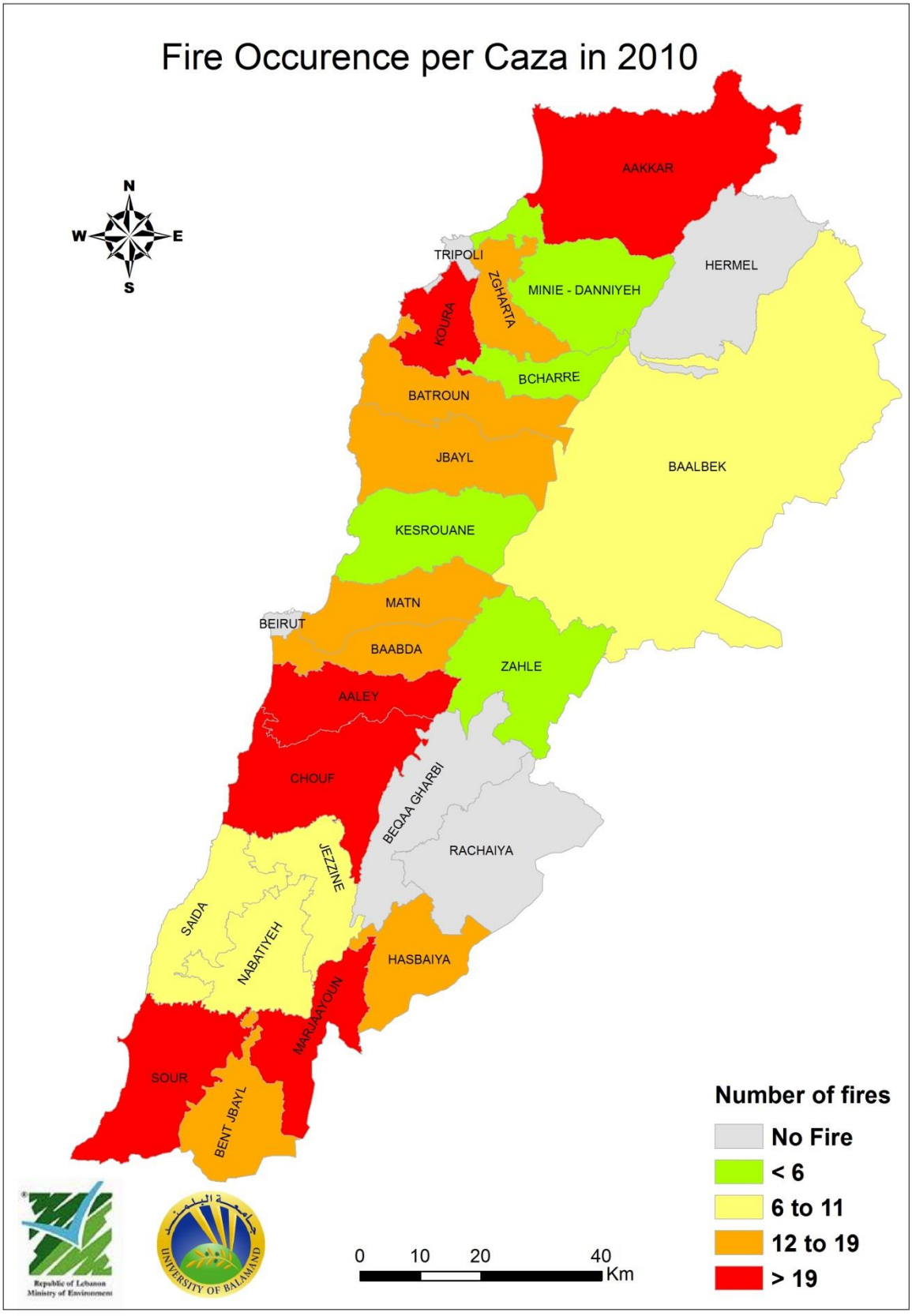
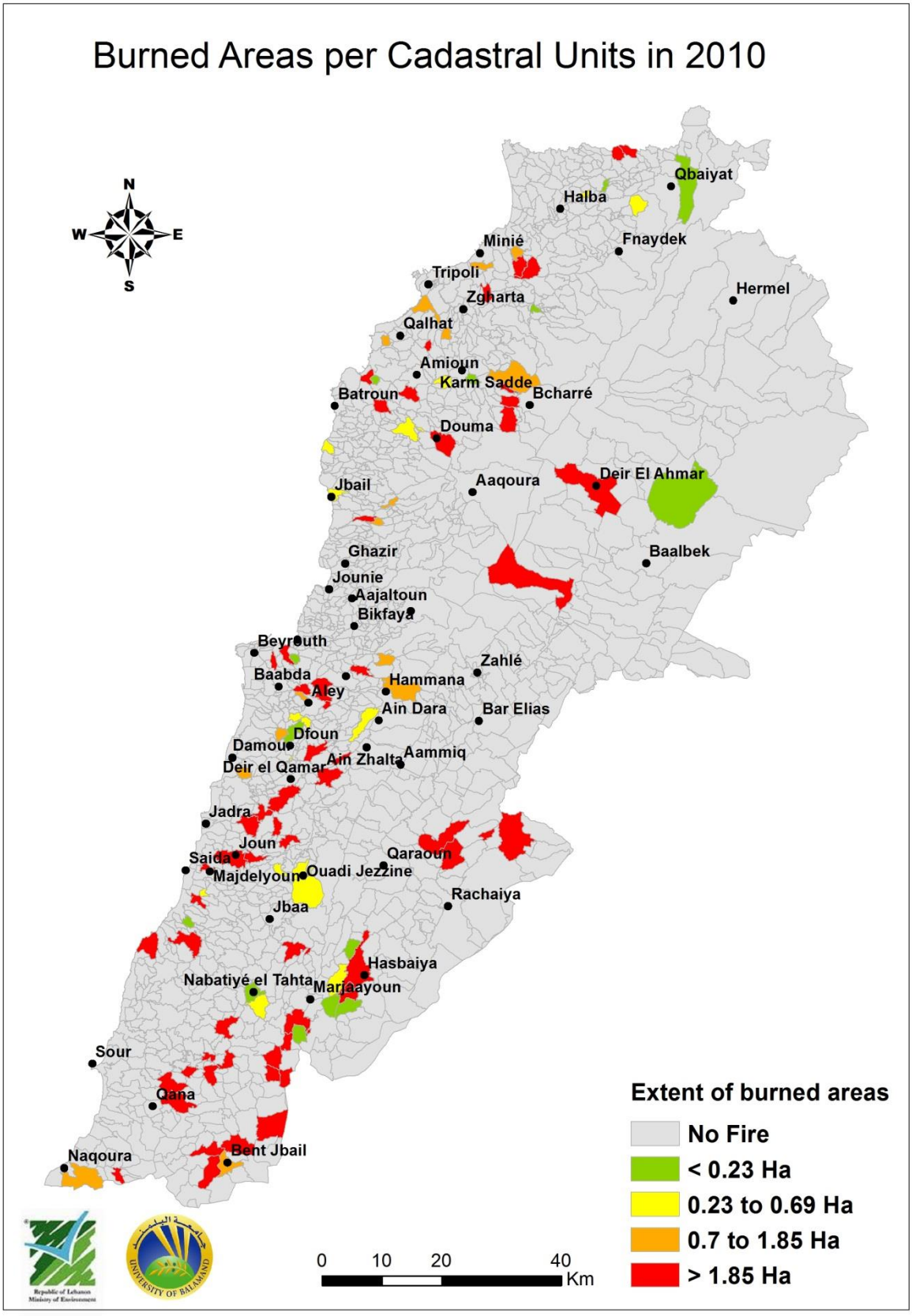


Figure 14. Comparison of fire occurrence (left) and burned areas (right) between 2008, 2009 and 2010

Annex 1: Fire occurrence per Kadaa (Caza) in 2010



Annex 2: Extent of burned areas per cadastral units in 2010



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