



# State of Lebanon's wildfires in 2009

“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.

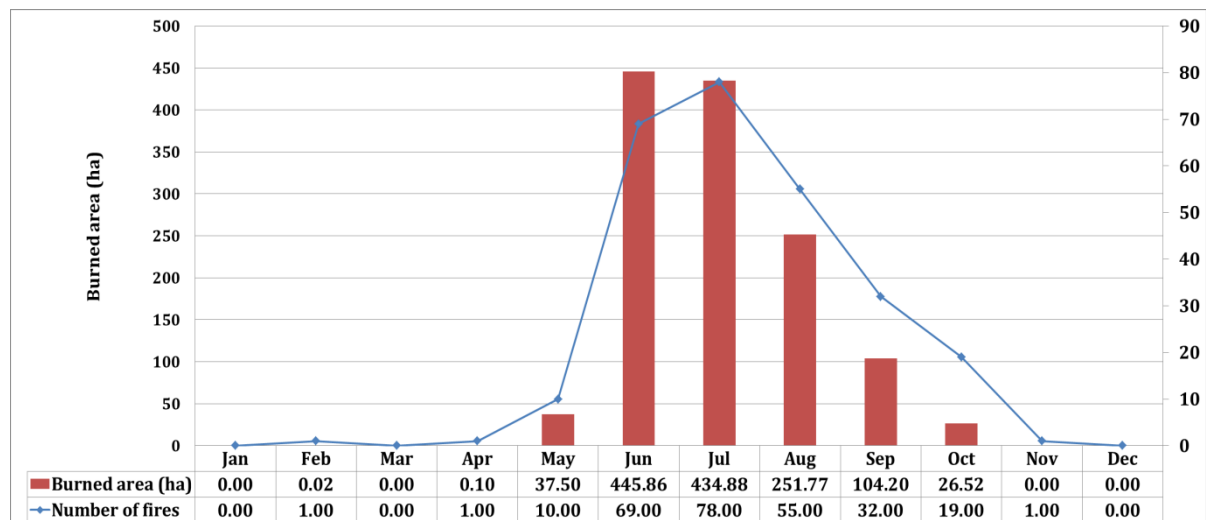
The report comes in line with the highlights of the technical requirements of Lebanon's National Strategy for Forest Fire Management (endorsed by Council of Ministers Decision No. 52 dated 13/5/2009) by working towards the unification of fire information and data as a means to empower efforts in understanding better the problem of wildfires in Lebanon.

## 2. FIRE DANGER IN THE 2009 FIRE SEASON

The calculated start date of the fire danger season for 2009 was 19 May, 2009 and the calculated end date was 18 October, 2009. The peak month was July (a total of 78 fires damaging 435 ha of vegetated land).

## 3. FIRE OCCURRENCE AND AFFECTED AREAS

In 2009, a total of 265 fires were reported (Annexes 1 and 2), affecting a total area of 1300 ha (Figure 1).



**Figure 1: Monthly distribution of fire occurrence and fire affected areas in 2009**

The landuse of fire affected areas (Figure 2) comprised agricultural land (37%), forests/woodlands (31%), and grassland (27%); 50% of fire affected lands were privately owned and 23% were public lands.

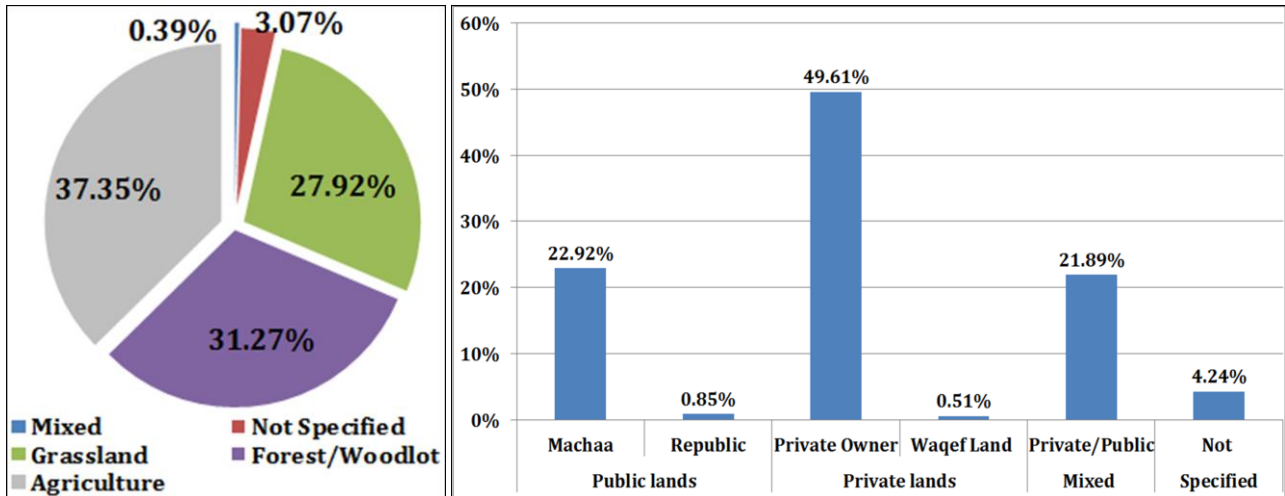


Figure 2. Landuse of fire affected areas (left) and ownership of fire affected areas (right)

Wildfires occurred in 23 out of 26 Kadaa. More specifically, the Kadaa of Sour, Marjeoune, Chouf, El Koura and Bint Jbeil were affected by 38, 30, 27, 26 and 25 fires, respectively; while the Kadaa of Marjeoune, Bint Jbeil, and Hasbaya were affected by 464 ha, 152 ha, and 100 ha of burned areas respectively (Figure 3).

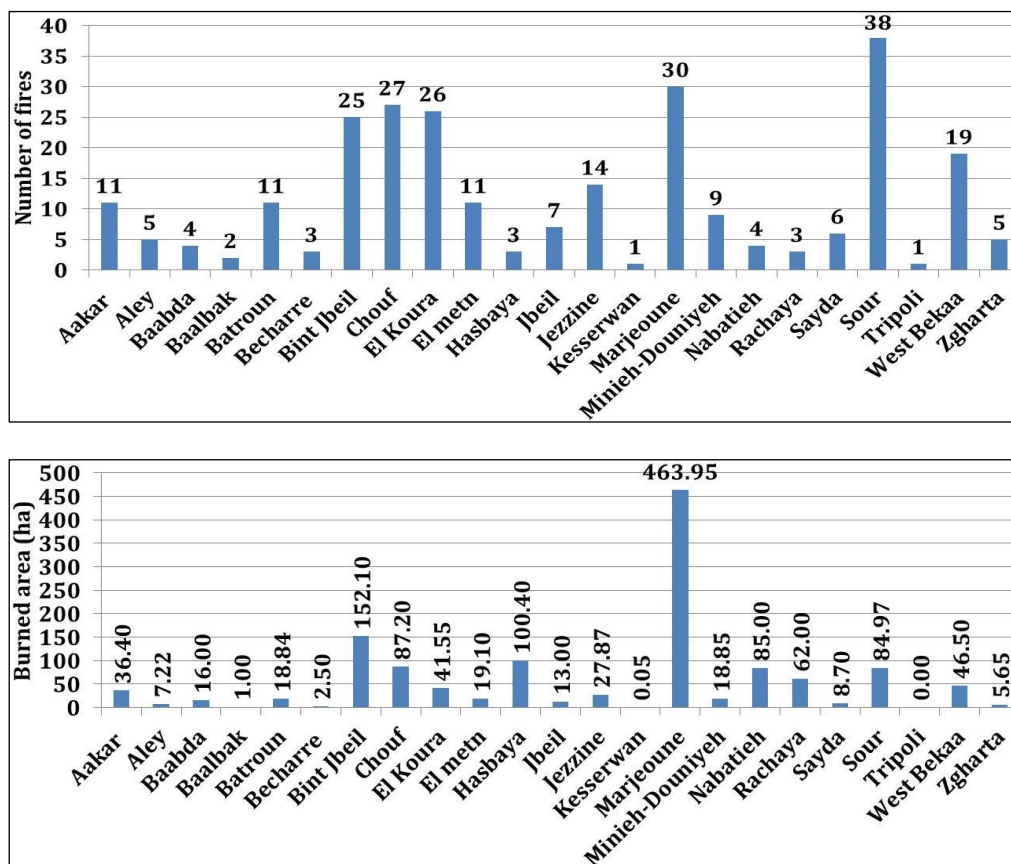


Figure 3. Distribution by Kadaa of fire occurrence (upper), and burned areas (lower)

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).

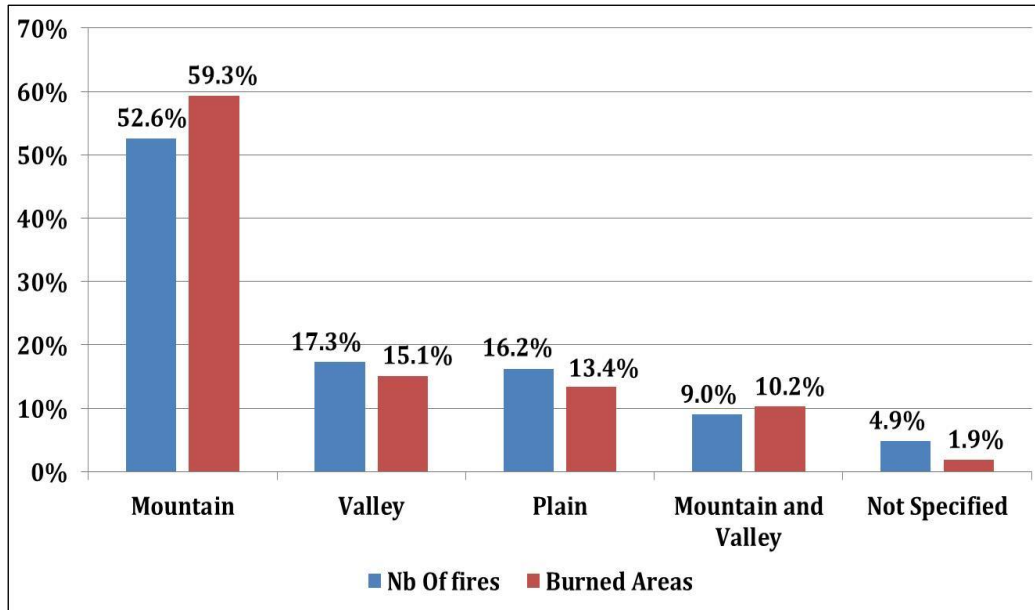


Figure 4. Land type affected by fires

Thirty four per cent of affected fuel type (Figure 5) was mixed agriculture/grassland followed by grassland (18%), mixed forest/agricultural land (13%), mixed agriculture (8%) and mixed forest (7%).

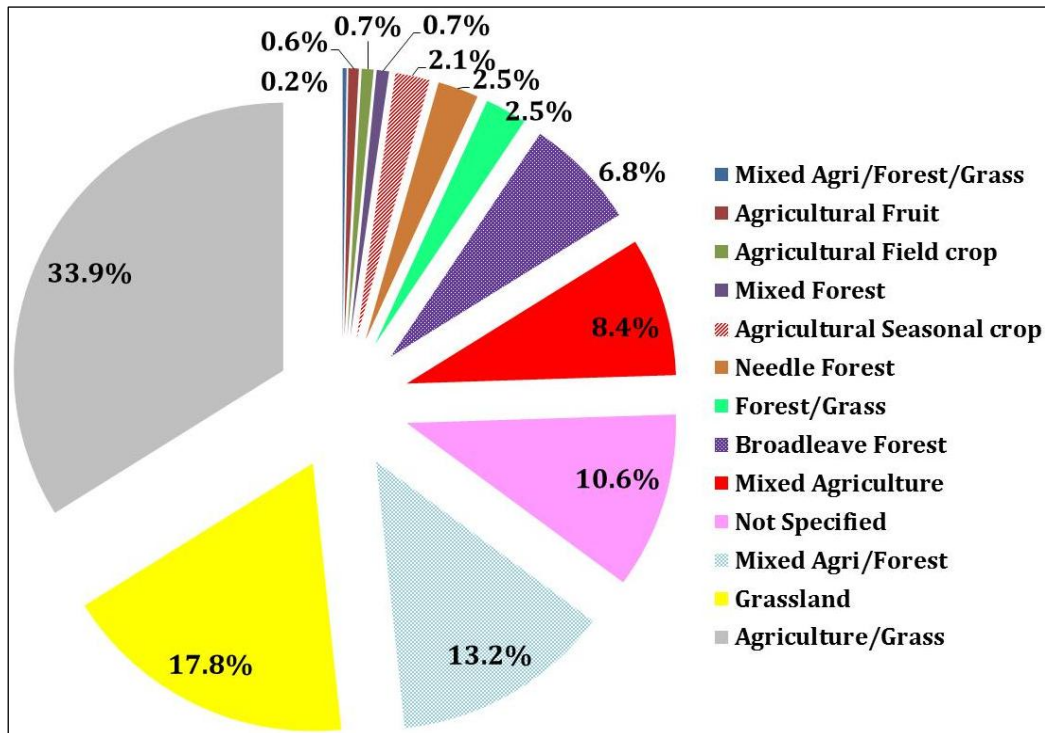


Figure 5. Distribution of fuel type affected by fire

#### 4. CAUSES OF FIRES

The main fire causes were unknown (61%). Negligence was reported as the main cause of fires for 19% of the reported fire events; 13% of causes involved human activities on natural lands. Arson fires and agriculture practices represented only 2.7% each of the total causes (Figure 6).

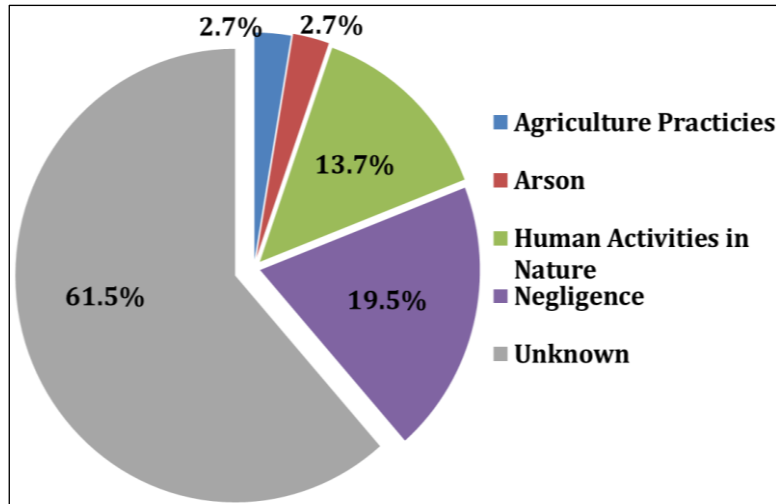


Figure 6. Distribution of main fire causes

#### 5. FIRE FIGHTING MEANS

##### Reporting

Local residents reported 43% of fire incidents, while 31% of fire incidents were reported by internal security patrols, 19% by others, and 5% by farmers. Forest guards reported only 1.5% of fires (Figure 7).

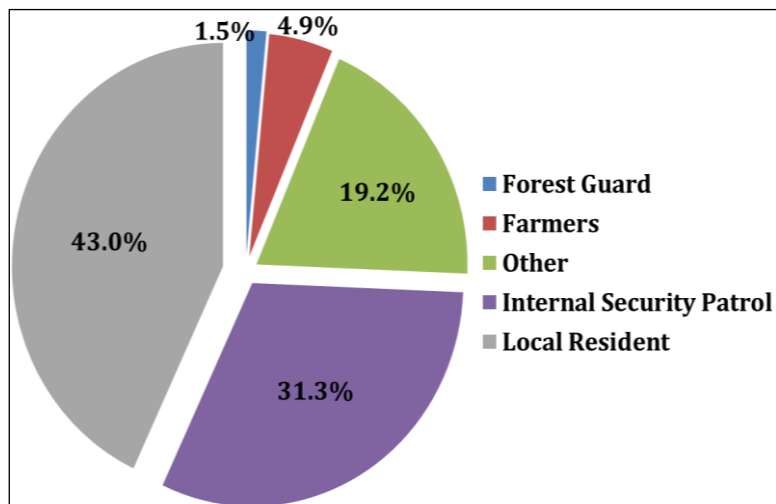
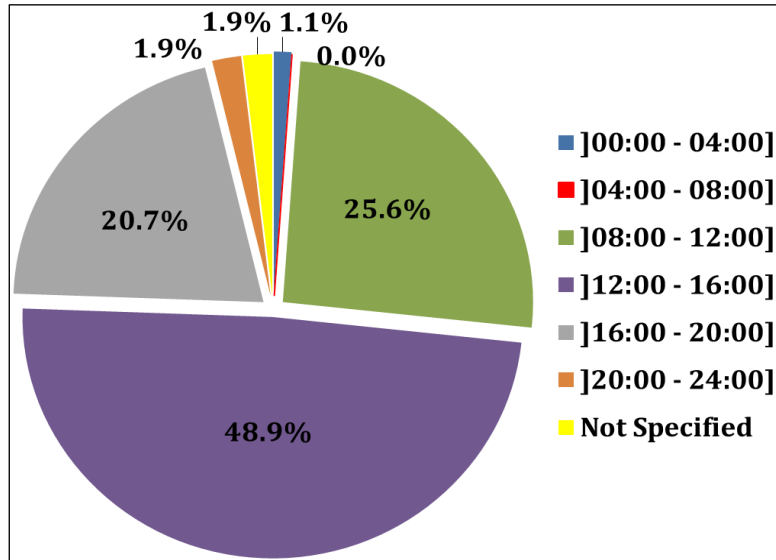


Figure 7. Fire reporting individuals/agencies

*Fire starting time*

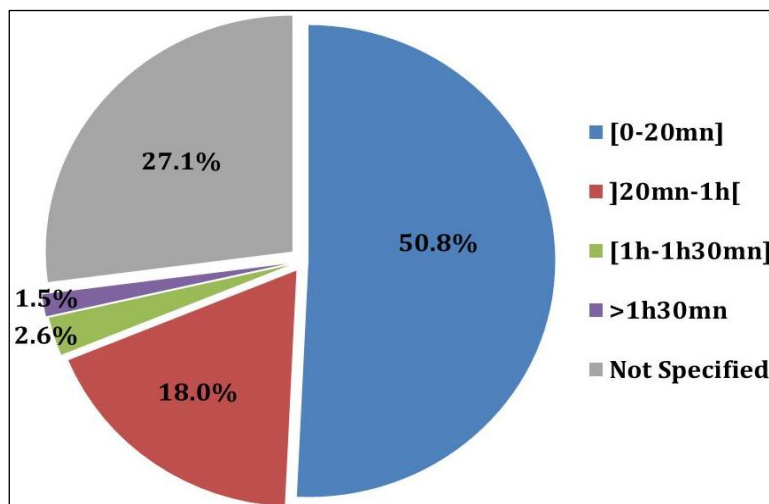
Most of the fires started between noon and 4 pm (49%), and 25 % of fires started between 8 am and noon. In addition, 21% of fires started between 4 pm and 8 pm (Figure 8).



**Figure 8. Distribution of temporal fire occurrence**

*Intervention time*

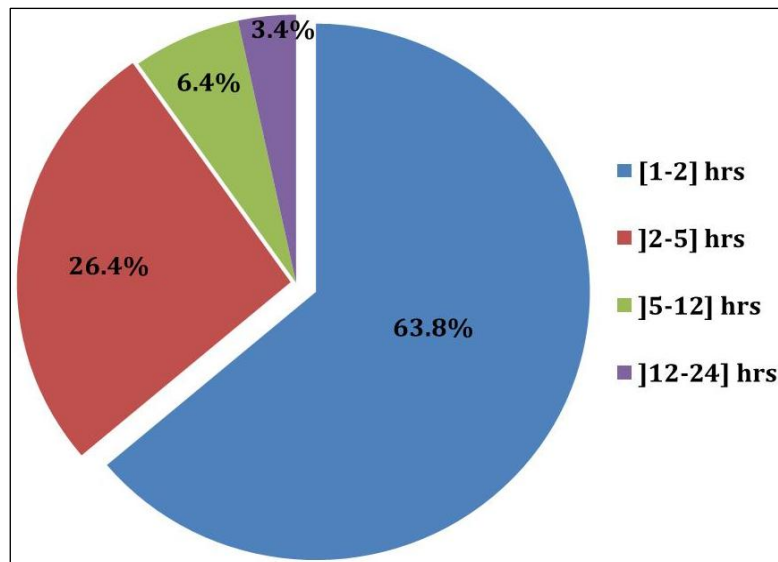
It was observed that 51% of first interventions in fire suppressions occurred within the first 20 minutes after the reporting time, while 18% of interventions happened after 20 minutes and before 1 hour from reporting time. Only 1.5% of interventions in fire suppression happened after one hour and a 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 (64%); 26% of fires lasted between 3 and 5 hours and 6 % of fires lasted between 6 and 12 hours. Only 3 % of fires lasted between 12 and 24 hours and no fires were 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
<b>Civil Defense</b>	91	359	37	970	
<b>Army</b>	98	12	17	895	17 interventions
<b>Internal Security</b>	147	15	27	561	
<b>NGO</b>	4	1	14	17	
<b>Local Resident</b>	0	0	0	669	
<b>Total</b>	<b>340</b>	<b>387</b>	<b>95</b>	<b>3112</b>	

**Table 1. Human and technical resources**

## 6. FIRE SEASON OVERVIEW

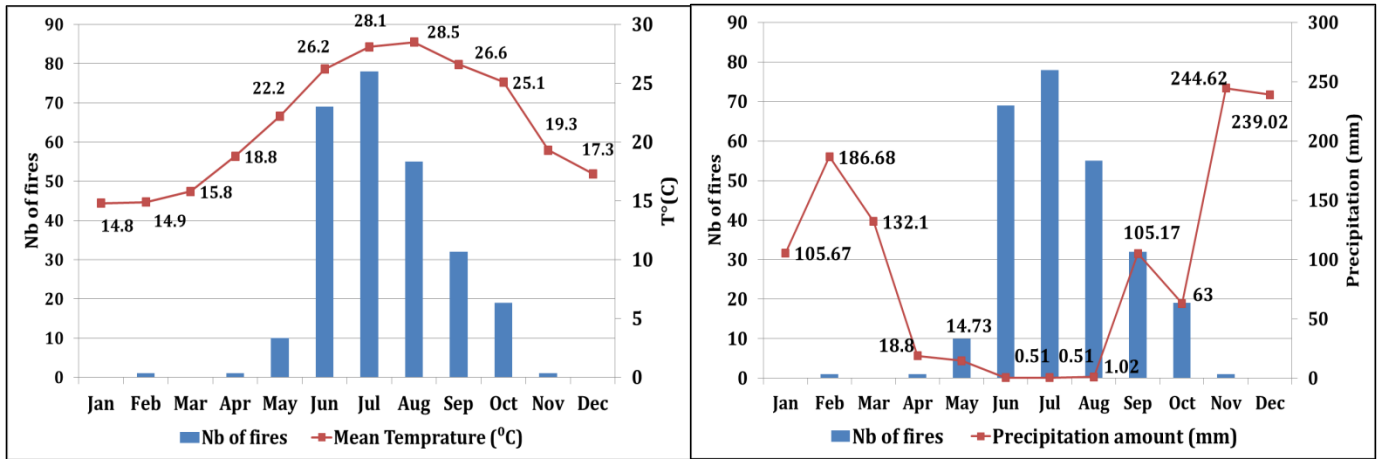


Figure 11. Fire occurrence in function of monthly mean temperature (left) and monthly mean precipitation in 2009 (right)

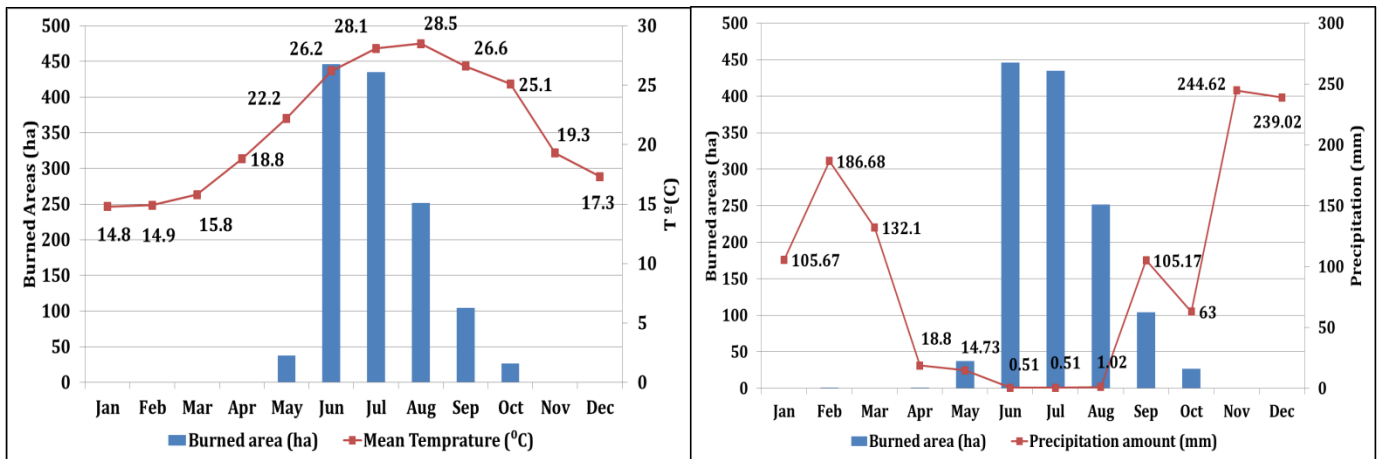


Figure 12. Burned areas in function of monthly mean temperature (left) and monthly mean precipitation in 2009 (right)

## 7. WILDFIRE PATTERN IN LEBANON

In 2009 the fire season was 54 days shorter than in 2008. July was the peak month for 2009 and August was the peak month for 2008 (Figure 13).

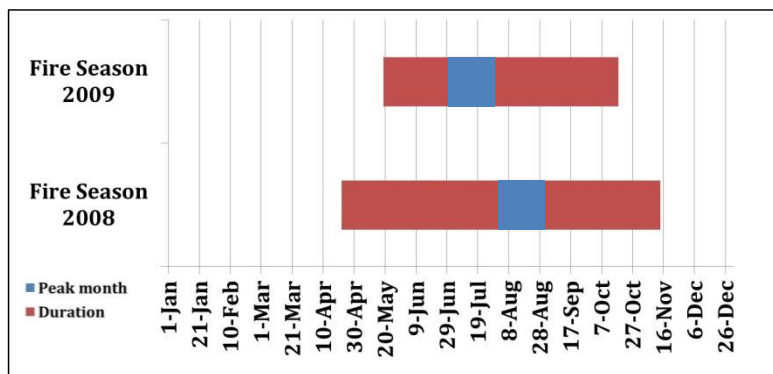


Figure 13. Comparison in fire inter-annual seasonality



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

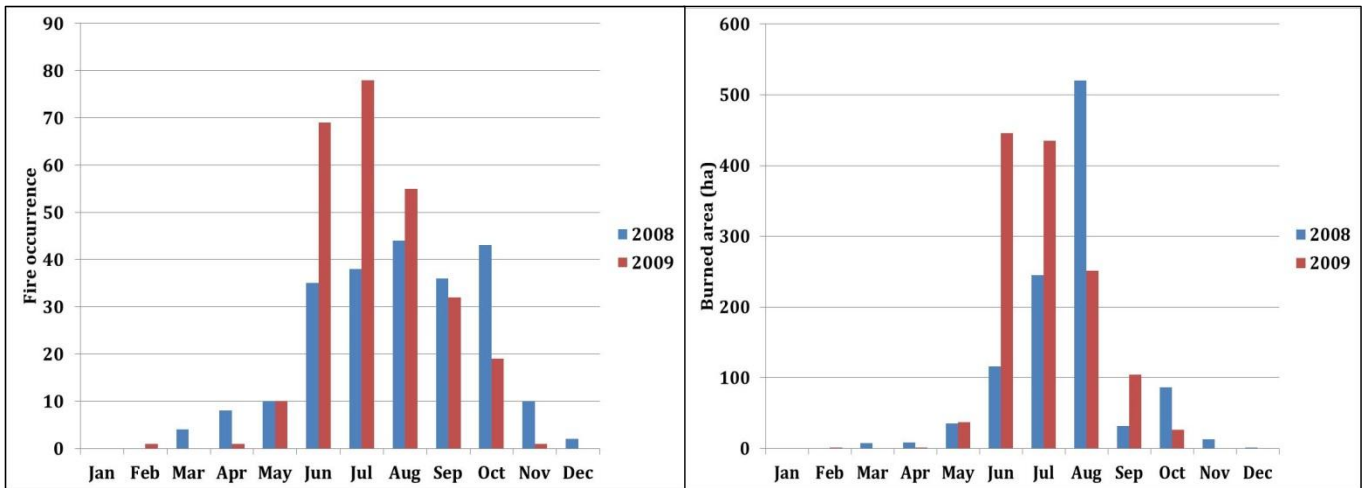
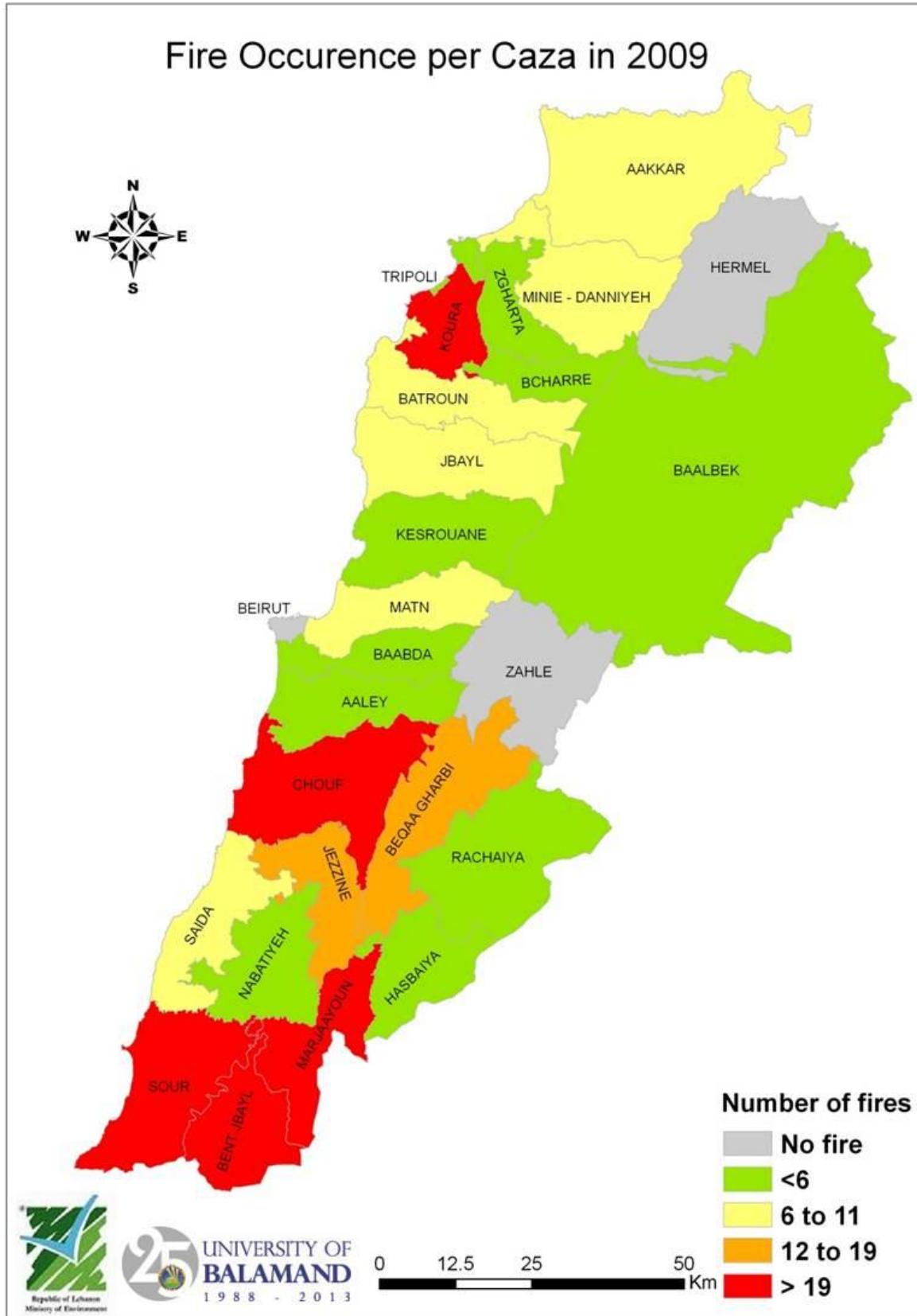
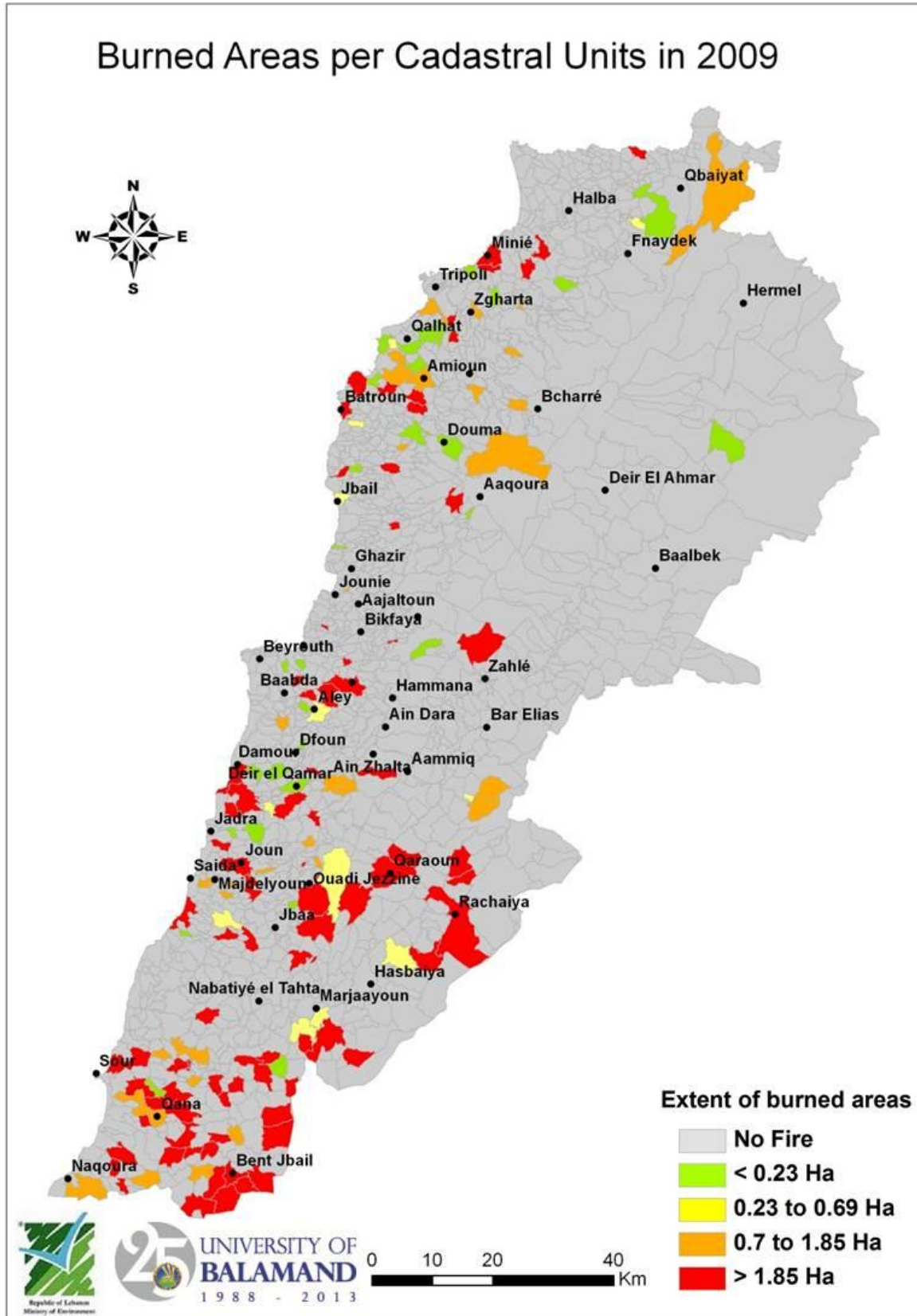


Figure 14. Comparison of fire occurrence (left) and burned areas (right) between 2008 and 2009

Annex 1: Fire occurrence per Kadaa (Caza) in 2009



**Annex2:** Extent of burned areas per cadastral units in 2009



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