Forest Burning as Counterinsurgency in Turkish-Kurdistan: An analysis from space

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Summary

From the early 1990s up to 2006, the Turkish Army was reported to have used the burning of forests, fields and villages in the Kurdish areas as a strategy in the conflict against the insurgent PKK. This article evaluates this claim through the use of satellite images. The processed satellite images revealed significant forest burning. Furthermore, the crossing of the satellite data with geo-referenced eyewitness accounts showed that forest burnings went often accompanied with village destruction. This article concludes that combinations of data from witness reports with satellite images can become a powerful tool for human rights organizations to monitor forest burning in armed conflict.

Counter-Insurgency and Destruction of Resources

Since the early eighties there has been a struggle for control over large areas in East-Turkey, between the Turkish state and the Kurdistan Workers Party. In the early nineties the war between state forces and the PKK began to take many lives, displace people and destroy villages on a wide and systematic scale. International human rights organizations claimed that from 1991 onwards security forces started a full-scale dirty war (Amnesty International 1996:50).

The Kurdistan Workers Party (*Partiya Karkerên Kurdistan* or PKK) had emerged from an urban and leftwing student environment in Turkey (Ankara mainly), but did not remain confined to this social and spatial environment. The party established itself in the countryside in the eastern part of Turkish Kurdistan and developed considerable support from the lower strata, in particular peasants and agricultural workers. Typical for an understanding of the PKK strategy to establish itself also in rural areas is that it did not base its politics on the idea that it could take over 'the state' in a great moment of change (in analogy to the seizure of the tsar's winter palace by the Bolshevik in 1917), but on the idea of developing counter-power and counter-institutions that would replace those of the state. This was best to be organized in areas where the state was absent or weak, e.g. rural areas (Jongerden 2007).

Following the approach developed by Mao, the PKK envisaged a three-stage struggle: from strategic defense (armed propaganda, small scale attacks, mobile warfare), to strategic balance, and then strategic offence (İmset 1995; Kutschera 1999; Özdağ 2003). The three-stage model involved a move from guerrilla to a more conventional form of warfare, with mobile warfare as transitional between the guerrilla strategy (based on the creation of a space to move) and the conventional (based on the creation of a space of control). In mobile warfare, the PKK argued, the rules of regular warfare start to appear, but its guerrilla character remains. Large contingents of guerrillas would advance deep behind enemy lines. The guerilla would not fight pitched battles, but attack and withdraw swiftly (Özdağ 2003). In the final phase of the war, the guerrilla army, supported by a popular uprising in the cities, was supposed to force the Turkish army to leave all of Kurdistan, but this final battle was only to be started when the enemy was swamped, groggy, and demoralized, psychologically prepared for defeat.

By 1990, the PKK had established hegemony in large parts of the Southeast, in particular in Serhat (covering parts of Hakkari, Van and some territories in Iraq and Iran), Garzan (covering parts of Batman, Siirt, Van, Hizan and Gevaş), Botan (covering parts of Şırnak, Hakkari, Van, Siirt, Eruh and parts of Northern Iraq), and Amed (covering parts of Diyarbakır, Bingöl, Genç, and Muş). Although the PKK did not establish permanent control it succeeded in preventing the security forces from entering or remaining within these areas for long periods of time. These areas were considered to be one step away from the establishment of so-called 'red liberated zones' and had the status of 'semi-liberated zones' (marking a transition from the phase of Strategic Defense to Strategic Balance). In many of the smaller settlements in the mountainous areas the PKK lodged guerrillas day and night. At times the PKK became overconfident –sometime during 1992, for example, the guerrilla commander 'Dr. Baran' (Müslüm Durgun) recklessly took his troops down the mountain and into the district town Ovacık in daytime. In this period the PKK also considered and actually tried to seize towns such as Şırnak and Nusaybin, an attempt that failed (Özdağ 2007).

In spite of numerical superiority—in 1993, a state force of 185,000 (excluding the gendarmerie and village guards) pit against some 15,000–20,000 guerrillas—the performance of the army was bad. Operations were carried out, but units returned to their barracks before dawn. The Turkish military preferred to take up defensive and static positions, especially at night, when soldiers were thought to be safe in their enclosures, which they were not. Many of the garrisons had been built at the slopes of hills or other locations were they could be easily besieged. Moreover, the quality of the construction materials was low, and any shoot out turned the enclosures into a strainer (Kundakçı 2007). Also, the Turkish armed forces had decided to concentrate on the defense of larger

settlements and to refrain from nocturnal operations, which gave the PKK considerable freedom to establish control in the smaller settlements and to move by night. Every now and then, the army would organize large sweeps, sending tens of thousands troops into an area, but these actions were not very effective as the guerrilla escaped into hiding while troops were being concentrated and during the operation, only to return after their retreat and dispersal. In warfare theory, the conclusion of counter-insurgency specialists is that sweeps don't work (Tomes 2004).

American military sources and Turkish specialists ascribed the bad performance of the Turkish army during the 1986–1993 period to the lack of an integrated strategic counter-insurgency doctrine (Özdağ 2003, 2007). Until the dissolution of the Warsaw Pact in 1990, the main mission of the army had been that of a static defense, aimed at countering Soviet and Warsaw Pact forces in the Caucasus and any possible attack on Thrace. The PKK posed a very different threat. Over time, and at some cost, the army learned that a counter-insurgency war could not be fought from a defensive and static position. There were serious deficiencies in the army's ability to respond with speed and flexibility, deficiencies that became even clearer with the spread of guerrilla warfare over the entire region of southeastern Turkey.

The Turkish armed forces thus formulated an integrated doctrine of area control, named the 'field domination doctrine', and aimed at the production of a new (contracted rural and urban) war space. The doctrine had been laid down in 1991, but not put into practice until after the reorganization of the army, initiated in 1992, was completed in 1993. A change was announced from 'search and destroy' sweeps to a 'clear and hold' penetration strategy (Özdag 2003). The 'field domination doctrine' implied, among other things, that the armed forces would abandon the approach of garrison-line-of-defense. 'Garrisons,' wrote General Osman Pamukoğlu, commander of the Hakkari Mountain Warfare and Commando Brigade between 1993 and 1995, 'do not provide protection, but because of their static disposition are targets for the enemy' (Pamukoğlu 2003) Commando brigades and Special Forces became key elements in the war against the PKK. Their soldiers were supposed to stay in the field day and night, searching for PKK units and camps. It is ironic that by 1993 the army had started to apply guerrilla tactics against the PKK at a time that the PKK was preparing for conventional warfare.

The war became not only one of movement—numerical superiority was also considered a key element in the establishment of area control. Between 1993 and 1995, the number of Turkish troops in the region was increased from 185,000 to 360,000 (including as many as 70,000 village guards). The majority of forces continued to perform regular duties. In Hakkari, for example, the land forces comprised fourteen battalions amounting to 56,000 soldiers in 1995, but only five battalions were employed in a war of movement. These five

battalions were organized into special units of 'go-getters' who lived in the mountains for weeks, hunting the guerrilla. The nine other battalions had regular tasks to fulfill, generally involved in patrolling an assigned area. When PKK guerrillas were spotted, their mission was not to engage in contact, but to surround them. Special units were transported to the area by helicopter and took up the pursuit (Özdağ 2003; Pamukoğlu 2003; Jongerden 2007).

Following the new doctrine, the General Staff decided to reorganize the army and shifted from a relatively cumbrous divisional and regimental structure (designed in the period of the Cold War) to a relatively flexible corps and brigades structure (to fight a multi-directional and multi-dimensional internal enemy), which was supposed to contribute to a more rapid response and higher mobility (Ministry of Defense 2000). Prior to the army reorganization, the principal tactical units had consisted of sixteen infantry divisions and one armored division, plus twenty-three independent brigades, of which six were armored and four mechanized. Basically, the Turkish land force was a large but badly equipped infantry force. Under the reorganization, all except three of the seventeen infantry divisions were dismantled. The existing nine corps were retained, with brigades directly responsible to the corps commands.

Parallel to the sweeping 1992 reorganization of the army, several other significant changes and additions were made to the structure of the Turkish land forces. Most importantly, there was a major strategic shift, with the army instead of the poorly trained gendarme being handed the lead role in the fight against the PKK. Also an upgrading of personnel infrastructure and hardware took place. Another change involved the development of special units. Last but not least, poor performance of state forces was also identified as low levels of information about the enemy, so the Turkish armed forces tried to improve their intelligence. In relation to that, the authorities also started to take an interest in social research, turning the people and the region in objects of study in order to know them better (for an extensive discussion see Jongerden 2007).

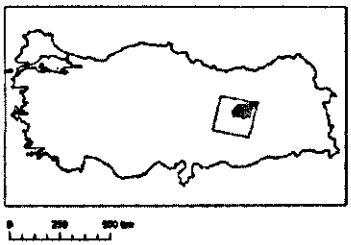
We would like to emphasize that the immediate aim of the new doctrine and strategy was the destruction of the PKK's environment. A constituent element of environment destruction was village evacuation and destruction and the burning of forests. Village evacuation and destruction and forest burning in Eastern Turkey received public attention. Civil society organizations and international and local human rights organizations claimed on basis of witness accounts that the Turkish Army systematically burned and evacuated villages, and destroyed rural livelihoods by burning fields and forests (HRW 1995; SNK 1995; IHD 1996). Yet the scope and impact of human rights violations were difficult to assess because these areas were sealed off by the army, not only for civil society organizations willing to obtain witness accounts, but even for high-

ranking politicians. Evacuated inhabitants of the region were dispersed geographically, hindering comprehensive assessments (noted by SNK 1995).

This paper further examines the scope and impact of the military destruction of the environment in Turkey. It focuses on one area within Eastern Turkey for which information was available: the province of Tunceli. It uses an innovative methodology to establish geographical patterns of environment destruction comparing eyewitness accounts and remote sensing data using spatial analysis.

Tunceli Province

The province of Tunceli is situated in the Eastern Anatolian region of Turkey and covers approximately 760,000 hectares (See Map 1). The area is part of the Munzur catchments, one of the main tributaries of the Euphrates River. The Munzur Mountains are rugged, with deep valleys and high peeks that range in altitude from 950 to 3,463 meters. The area has a continental climate with extreme temperature differences in winter and summer, and precipitation varies per district between 550 and 1100 mm/year. Forests cover 27 percent (207.666 ha) of Tunceli, while 61 percent of this forest has a protected status.[1] Deciduous forests are found mostly in Tunceli, Ovacık, Pülümür, Hozat and Nazimiye. Pine trees are found especially in the North, above 1800 meters.



Map 1. Tunceli Province, Turkey

In 1990, the total population of Tunceli was 133,585, of whom 50,799 lived in urban areas, while the rural population amounted to 82,785. The main agricultural activities in the area are animal husbandry and farming. The province is subdivided in eight districts, a central district dependent on the provincial town (Tunceli), and seven districts dependent district towns (Çemiskezek, Hozat, Mazgırt, Nazimiye, Ovacık, Pertek, Pülümür). There are 416 villages[2] and 804 hamlets[3] in the province of Tunceli. The province has the smallest population of the eastern provinces of Anatolia.

According to witness accounts, the military started a wave of operations in 1994, with forest fires, between July and August, and village evacuations in the autumn of 1994. By 2000, the total population had reduced with 35%. Especially the countryside depopulated heavily, with 75%, while the urban population increased slightly with 7%. In southeast Turkey as a whole most of the evacuation and destruction of villages was said to have taken place between 1990 and 1995, while 1994 reportedly is the year with most evacuations (See Table 1 on next page). This is also the case in Tunceli, where a significant proportion

of the evacuations took place. Table 2 gives a detailed breakdown of reported village and forest destruction for this province (See Table 2). A local politician with close ties to the region claimed that 25% of the forests were destructed in this period (SNK 1995).

1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
109	295	874	1,531	243	68	23	30	30	0	3

Table 1. Number of evacuated and burned villages 1991-2001, calculated on the basis of human rights reports Source: Jongerden (2007:82)

Access to Geo-Data

At the time of study (2000) it was still difficult to obtain topographical maps from the area. However, researchers from our research project were able to get access to a detailed Russian 1:100.000 topographical map, scale 1:100.000 (1970-1994). [4]

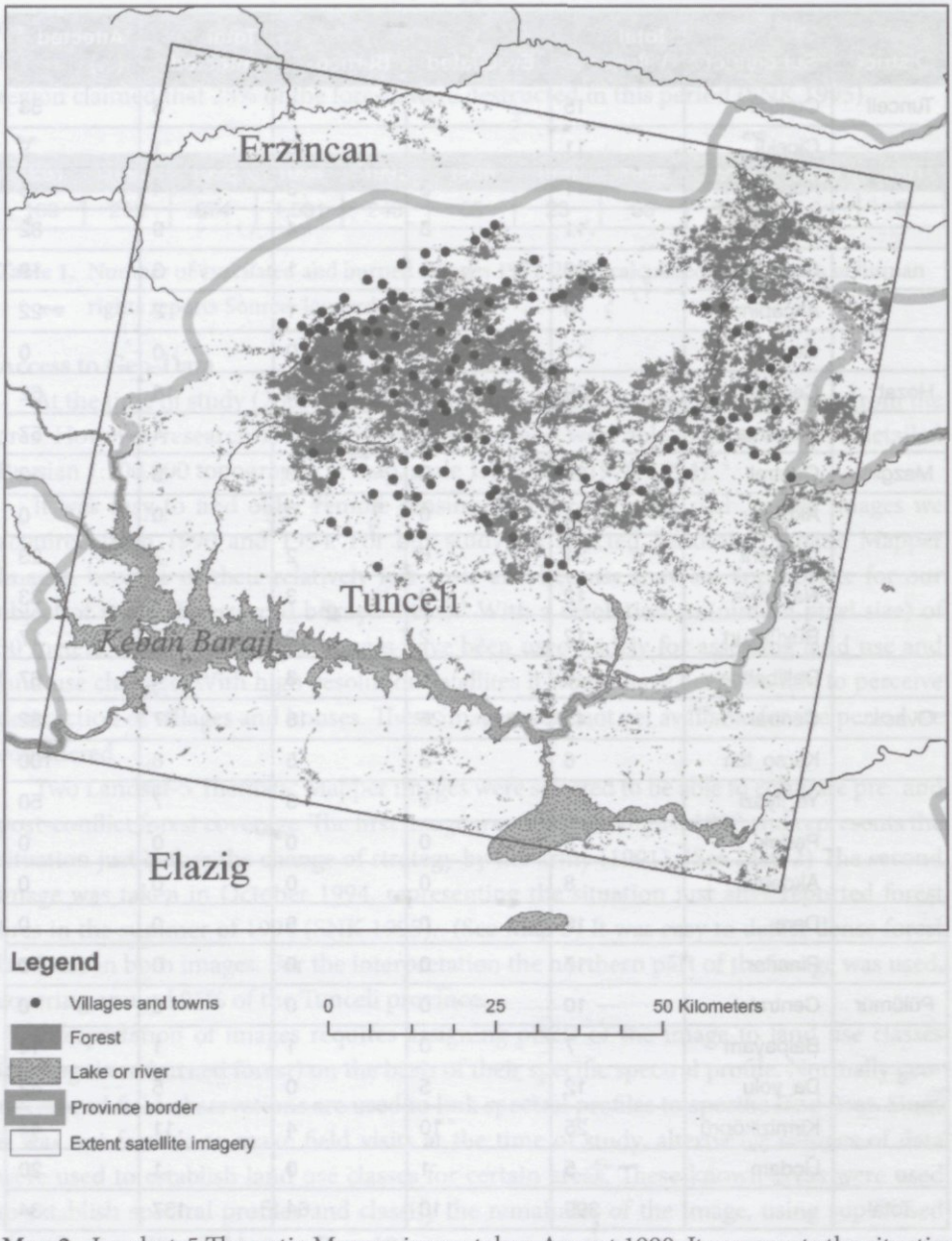
It was easy to find older remote sensing data for the area, such as two images we acquired from 1990 and 1994. For our study we selected Landsat Thematic Mapper images, because of their relatively low costs and because they are appropriate for our object of study (forests and burned areas).[5] With a resolution (minimum pixel size) of 30 meters, Thematic Mapper images have been used widely for assessing land use and land use changes. With high-resolution satellites it would have been feasible to perceive destruction of villages and houses. These images were not yet available for the period we considered.

Two Landsat-5 Thematic Mapper images were selected to be able to compare pre- and post-conflict forest coverage. The first image was taken in August 1990 and represents the situation just before the change of strategy by the army (1991). (See Map 2) The second image was taken in October 1994, representing the situation just after reported forest fires in the summer of 1994 (SNK 1995). (See Map 3) It was easy to detect dense forest land-use in both images. For the interpretation the northern part of the image was used, covering around 95% of the Tunceli province.

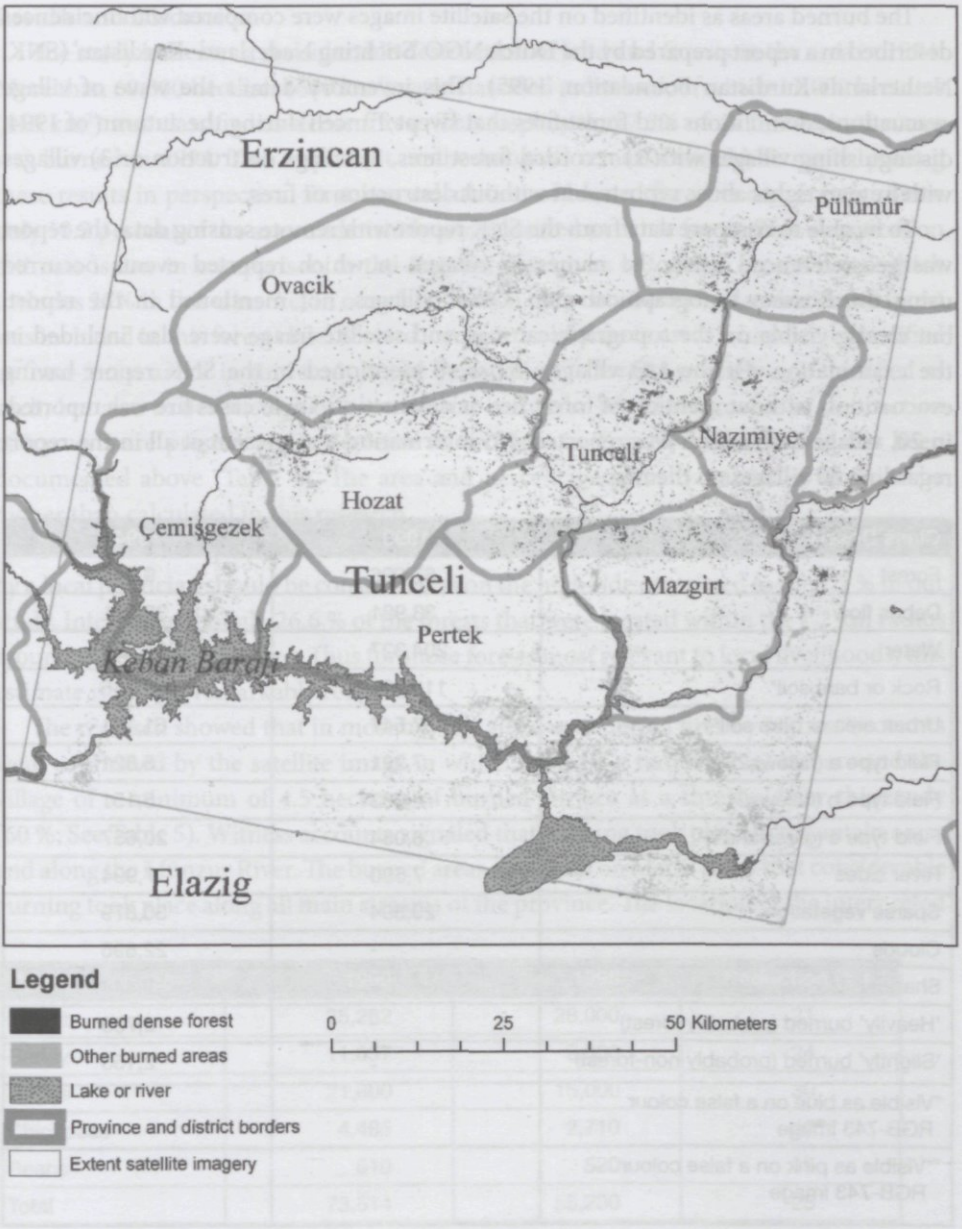
Interpretation of images requires assigning pixels of the image to land use classes (among them burned forest) on the basis of their specific spectral profile. Normally geo-referenced field observations are used to link spectral profiles to specific land uses. Since it was not feasible to make field visits at the time of study, alternative sources of data were used to establish land use classes for certain areas. These known areas were used to establish spectral profiles and classify the remainder of the image, using supervised classification. (See Table 3 on Page 10)

District	Subdistrict	Total Villages	Evacuated	Burned	Total Affected	Affected (%)
Tunceli	Central	15	7	3	8	53
	Çicekli	11	1	0	1	9
	Kocakoç	11	3	3	4	36
	Sütlücü	11	8	4	9	82
	Çemi_gezek	16	2	1	3	19
	Akçapinar	9	1	1	2	22
	Gedikler	14	0	0	0	0
Hozat	Central	29	15	10	18	62
	Ça_larca	7	4	1	4	57
Mazgirt	Central	26	3	0	3	12
	Akpazar	21	0	0	0	0
	Darikent	31	6	2	7	23
	Nazimiye	12	8	3	4	33
	Büyükyurt	12	2	2	2	17
	Dallibahçe	6	4	3	4	67
Ovacık	Central	45	26	18	37	82
	Karao_lan	6	3	5	6	100
	Ye_ilyazi	14	5	3	7	50
	Pertek	9	0	0	0	0
	Akdemir	8	0	0	0	0
	Dere	10	0	0	0	0
	Pinarlar	17	0	0	0	0
Pülümür	Central	10	0	0	0	0
	Balpayam	7	0	1	1	14
	Da_yolu	12	5	0	5	42
	Kirmiziköprü	25	10	4	11	44
	Ûçdam	5	1	0	1	20
Total		399	110	64	137	34

Table 2. Numbers of villages evacuated and burned during the autumn 1994 army operations in Tunceli province Source: Stichting Nederland-Koerdistan



Map 2. Landsat-5 Thematic Mapper image taken August 1990. It represents the situation just before the change of strategy the army in 1991.



Map 3. Landsat-5 Thematic Mapper image taken October 1994. It represents the situation just after reported forest fires in the summer of 1994.

The burned areas as identified on the satellite images were compared with incidences described in a report prepared by the Dutch NGO 'Stichting Nederland- Kurdistan' (SNK, Netherlands-Kurdistan Foundation, 1995). This inventory details the wave of village evacuations, demolitions and forest fires that swept Tunceli during the autumn of 1994, distinguishing villages with 1) recorded forest fires, 2) village destruction or 3) villages with human rights abuse reports, but without destruction or fires.

To be able to compare data from the SNK report with remote sensing data, the report was geo-referenced using the names of villages in which reported events occurred using the Russian topographical map. Other villages, not mentioned in the report, but clearly visible on the topographical map and satellite image were also included in the examination. Of the 143 villages, 53 were mentioned in the SNK report having evacuations, without mention of forest fire or destruction, in 40 cases fire was reported, in 20, village destruction was reported. No information was present at all in the report regarding 30 villages on the map.

Class Description	1990	1994
Forest	67,096	9,616
Debris flow	33,921	33,921
Water	204,327	204,327
Rock or bare soil*	115,925	54,136
Urban area or bare soil**	437,547	61,141
Field type a (fallows?)	7,221	5,821
Field type b (fallows?)	2,083	5,151
Field type c (grassland?)	8,034	20,657
River sides	7,590	7,994
Sparse vegetation	29,394	30,879
Clouds	-	22,896
Shadows	-	9,444
'Heavily' burned (probably forest)	-	2,739
'Slightly' burned (probably non-forest)	-	2,153
*Visible as blue on a false colour RGB-743 image		
**Visible as pink on a false colour RGB-743 image		

Table 3. Training area classes and their size (number of pixels)
Source (Van Hoeve & A. Klaasse 2001)

Results and Discussion

The study indicates a considerable destruction of land and forests in the area in 1994. More than 60,000 hectares (600 km^2) were classified as burned, of which 11,000 hectares (110 km^2) was classified as dense forest. This implies that 7.5% of all forests in the area was burned in 1994. Two important methodological remarks should be made, putting these results in perspective. First, our calculation of burned forest is conservative since only 10.3 percent of the area under study was classified as dense forest. This classification estimate is low in comparison to the forested area given by official census data, which includes 27% in this class. Yet in our classification only continuous, relatively dense forest was included in this forest class. Second, occurrence of fires in areas which were classified as 'non-forest areas' in this study could be ascribed to forests wrongly not classified as such, but also to destruction of harvests and orchards. Witness accounts of destruction of harvests are present and a decrease in orchards in Tunceli in this period has been documented above (Table 4). The area and percentage actually burned is likely to be higher than calculated in this research.

In spite of these qualifications, the estimate that 25% of the forests were burned made by a local politician should be considered as on the high side compared to the 7.5 % in our study. Interesting though, 26.6 % of the forests that were located within the 1.2 km radius around villages were burned. Thus for those forests most relevant to local livelihoods, this estimate is indeed remarkably realistic.

The research showed that in most but not all cases reported fires by witness accounts were confirmed by the satellite image in which we used a radius of 1.2 km around the village of a minimum of 4.5 hectares of burned surface as a threshold for this study (60 %; See Table 5). Witness accounts signaled that burning took place in mountain areas and along the Munzur River. The burned areas displayed on Map 3 show that considerable burning took place along all main streams of the province. The location of the interpreted

Crops	1990	1995	Reduction (%)
Wheat	35,282	28,000	21
Barley	11,837	9,000	24
Lentils	21,300	15,000	30
Chickpeas	4,485	2,710	40
Beans	610	520	15
Total	73,514	55,230	25

Table 4. Reduction in area grown with annual crops (ha), 1990-1995
Source: Tunceli Sendikalar Platformu (1996)

forest-fires confirms witness reports that especially Ovacik, Hozat and the northern parts of Tunceli were affected, even though these were not the only areas.

On the other hand, 40% of the reported forest fires could not be confirmed with the method used to determine presence or absence per village. These unconfirmed eyewitness reports might refer to forests outside a 1.2 km radius around the village or to forest fires affecting less than 4.5 ha. Also, the location of fires may be inaccurate when they are based on smoke observed from a distance. Villages in which no destruction occurred according to eyewitnesses or those for which no information was available showed relatively less burned forest areas.

Land cover	1,000 ha	%
Forest in both 1990 and 1994	141	10.3
Forest in 1990, heavily burned in 1994	11	0.8
Other landuse in 1990, slightly or heavily burned in 1994	52	3.8
Clouds and shadows in 1994	77	5.6
Other	1087	79.4

Table 5. Land cover classification results

The high frequency of fires in case of village destruction (85%) draws the attention, because this suggests that village destruction almost always went hand in hand with burning of forests, orchards and fields around it, even if these fires were not reported. Burnings were present even in cases no specific mention was made of forest fire around these villages by the eyewitnesses. This may indicate that destruction was not observed by villagers because it occurred after the evacuation was completed, thus revealing the limitations of the data based on eyewitness accounts and the complementary value of remote sensing data. Also, that village evacuation proved to be a better predictor of remotely sensed burned areas than direct witness accounts of burnings indicates that the quality of the village evacuation data may be higher than the fire reports. Possible causes of the incompleteness and imprecision of fire reports have been mentioned above. Village evacuations, in contrast with fires, are easier to characterize spatially (it concerns the village centre, a well geo-referenced point) and involves the entire population of the village, creating a considerable pool of informants for each village.

It may be concluded that even though details in the accounts taken from witnesses were not precise or complete, these limitations could be explained from the ways these data were generated. The overall geographical pattern of resource destruction implied in the eyewitness accounts is confirmed by the satellite image derived data, which gave valuable additional information about the scope and pattern of the use of fire by Turkish military during the studied period.

Conclusions

On the basis of the processed satellite images it was calculated that in 1994 7.5% of the forest in the Tunceli and 26.6% of the forest near villages was burned. This constitutes massive resource destruction on behalf of the Turkish Armed Forces. The more severe burning around destroyed and evacuated villages is important evidence for the intentionality behind the use of fire against civilian populations and underscores the claim of human rights abuse.

We have shown that even with limited resources it is possible to combine remote sensing with local data if the exact dimensions of time and place are known for the latter. Without recurring to prohibitively expensive and often inaccessible high- resolution images we were able to analyze the spatial pattern of resource destruction through a triangulation of various types of more readily available information. Our method of combining NGO reports with satellite images was only possible because of the availability of spatially explicit information on the occurrence of destruction and burning in the form of witness accounts. In the future it will be important to anticipate this possibility in the information collection protocols used by human rights organizations.[6]

It is clear that there are good opportunities to turn the combination of data from witness reports with satellite images into a powerful tool for human rights organizations to monitor forest burning (and village destruction) in armed conflict. The two main advantages of satellite images over eyewitness accounts are that (1) they deliver objective data over larger areas and (2) view ground realities without the need of being physically present in conflict situations. In the presented case, the remote sensing methodology did not allow for the observation of the direct causes for perceived events and land use changes. However, it has become clear that even when satellite images are not sufficiently detailed and frequent to reveal the direct causes of fires, in combination with witness reports satellite images can strengthen the overall case and add to the insight in the scope and pattern of violence and destruction.

ENDNOTES

1. Official figures from the provincial administration *(http://www.tunceli.gov.tr/ilhak.htm)*

2. A village has between 250 and 2,000 inhabitants.

3. A hamlet has more than 50 and less than 250 inhabitants.

4. Joint Stock Company SK-IMPEX Moscow, Russia Glavnoe Upralenie Geodezii i Kartografii pri Sovete Ministrov SSSR, 1:100,000. 1970–1994.

5. Due to limited budget a selection was made from a special discount database. At the time of the research, the total costs amounted to around 2000 Euros. The cost aspect may be interesting to human rights organizations considering using satellite imagery to corroborate eyewitness accounts (see also de Vos, Jongerden & van Etten; forthcoming).

6. Eyewitness accounts should contain references to location and time that are as precise and unambiguous as possible. Also, protocols should furnish information about the observed and unobserved domains (regarding time, place, type of violation), to distinguish (a) areas with no recorded violations but with violations from (b) areas with no recorded observations but with possible violations.

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