Sustainable Management of Biodiversity, South Caucasus

Wildfires in Dedoplistskaro Municipality Shiraki Valley, Georgia

Rationale and Proposal for a Fire Management Concept

Report by the Global Fire Monitoring Center (GFMC)

Working Paper 70/2015

german cooperation
DEUTSCHE ZUSAMMENARBEIT

Implemented by:
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Ministry of Environment and Natural Resources Protection of Georgia

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Concept

1. Background and rationale: Wildfire threats to the natural environment and to society of Georgia

Some recent significant forest fires as well as statistical data and reports of the last decade indicate that fires are a major threat to forests, protected areas, and agriculture and pasture lands of Georgia. The increasing occurrence of extreme dry spells and heat waves currently observed, as well as climate modelling-based predictions, suggest that extreme weather periods favoring the recurrence of more frequent and larger fires and higher associated damages will aggravate in the coming years and decades.

The majority of uncontrolled fires are started by human activities, notably in the context of agricultural and pastoral land use. The trends of socio-economic and land-use changes are influenced by a rural exodus of the young generation in some regions of the country. Abandonment of intensive land cultivation in some places has resulted in an increase of fire risk due to availability of higher amounts of unused and highly combustible vegetation and reduced fragmentation of combustible vegetation cover. In addition a possible future decrease of the young work force available for land cultivation and active fire protection may weaken rapid local response to fires and thus further increase the overall risk of large uncontrolled fires.

Fires if not well managed might pose not only immediate risk to forest and non-forest ecosystems, but also be a threat to biodiversity and the recreational, scenic, environmental and cultural value of forests. Populations of the surrounding areas may become seriously affected by smoke pollution, injuries, death, and losses in properties. Post-fire secondary disasters such as landslides, mudflows or floods are additional threats to human populations, especially in mountain terrain. Fires burning on terrain contaminated by unexploded ordnance and land mines – both remnants of previous conflicts – pose an additional threat to personnel involved in firefighting and civilians.

2. Towards addressing a national, integrated / cross-sectoral approach to fire management: The way ahead to develop a National Fire Management Policy for Georgia

Altogether the problem of fires in Georgia is complex and should not be addressed on a sectoral level. In order to overcome the limited capacity in fire management there is a need to strengthen human and technical resources of agencies and local communities that deal with fire prevention and response. In order to increase the country's fire management capability the process of drafting a national fire management policy has been initiated in 2009. The policy aims at addressing a systematic and realistic approach to overcome shortcomings in fire management.

One of the important preconditions for successful management of fires is a cross-sectoral coordination. Since the Ministry of Environment and Natural Resources Protection cannot cover all the issues related to fire and its environmental, economic and social dimensions, it has been proposed to establish an Interagency Fire Management Commission (or Council) with the function of a central consultative (advisory) and coordination body with a secretariat function under the auspice of the central government. The Commission shall include representatives of all line ministries and other relevant agencies, civil society organizations and academia. The Council

shall work in close relation with the National Crisis Council, Ministry of Internal Affairs, Ministry of Finances, Ministry of Agriculture and other stakeholders.

Between 2009 and July 2014 six National Round Tables of Fire Management were held, which aimed to address the future scope of fire management in Georgia. Key stakeholders of Georgian agencies directly and indirectly responsible in forest and land management, fire protection and emergency response, as well as representatives of academia, local communities and civil society organizations, with support by international experts, were involved and thus constituted a precursor arrangement of the proposed Interagency Fire Management Commission.

The German Agency for International Cooperation (Deutsche Gesellschaft für Internationale Zusammenarbeit – GIZ), through its project *Sustainable Management of Biodiversity, South Caucasus*, cooperates with the Organization for Security and Cooperation in Europe (OSCE) project *"Enhancing National Capacity on Fire Management and Wildfire Disaster Risk Reduction in the South Caucasus"*, conducted by the Global Fire Monitoring Center (GFMC).[1]

Both projects aim to reduce the negative impacts of fires on forests, protected areas and other ecosystems, including arable agricultural lands and pasture lands. To reach this goal private and public land managers are involved in the projects.

3. Use of fire by rural communities: The case of Shiraki Valley

While forest ecosystems and protected areas of Georgia must be completely protected from wildfires (there are no wildfire-adapted ecosystems in Georgia), the owners and managers of agricultural lands (arable lands) and pastures are confronted with a dilemma.

In Georgia, and particularly in Shiraki Valley, fire is used by farmers to clean the arable fields after harvest. One of the main reasons that farmers still use fire to remove post-harvest residuals or, in case of crop failure, burn the non-harvested crops is a general lack of machinery and finances to incorporate the vegetation residuals into the soil. There is also a widespread belief that burning will reduce the infestation of agricultural crops by insects and pathogens.

During the recent years the farmers in Shiraki Valley experienced the consequences of land degradation and climate change, i.e. longer drought periods, heat waves (with temperatures reaching up to 50°C in 2014), and heavier storms resulting in severe wind erosion. This has led to a reduction of the yield of winter wheat. The former average yield of winter wheat in the Shiraki Valley has significantly decreased from ca. 4-5 tons per ha in the past decades to ca. 1.7 t/ha in 2013 and less than 0.7 t/ha in 2014. Yields

[1] The focus of the project *"Enhancing National Capacity on Fire Management and Wildfire Disaster Risk Reduction in the South Caucasus"* is threefold: Capacity building, policy development and regional and international co-operation. The project is implemented within the framework of the Environment and Security (ENVSEC) Initiative that aims at promoting environmental co-operation for reduction of environment and security risks. ENVSEC Initiative is a partnership of six international organizations – OSCE, United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), United Nations Economic Commission for Europe (UNECE), Regional Environmental Centre for Central and Eastern Europe (REC) and the North Atlantic Treaty Organization (NATO) as an associate partner.

close to 1 t/ha are actually not harvested due to economic reasons, and burned instead. This practice may have increased the overall burning activities in Shiraki Valley.

Fire is also used by shepherds to burn the dry vegetation of the previous year and to stimulate the growth of fresh, palatable grass, and to fight bushes and trees that are encroaching pastures.

According to the currently revised forest legislation agricultural burnings are prohibited in a distance less than 30 m from the forest edge. [2]

Many of the agricultural fires are escaping because they are not properly conducted with regards to the right techniques and the limited willingness to construct firebreaks between the area to be burned and the adjoining lands. Thus, many fires spread to protected areas and forests, including windbreak belts that are embedded in agricultural lands. For instance in Shiraki Valley, the windbreak belts, which in the late 1980s had been functioning in a size (length) totaling 1800 km, contributed significantly to the protection of arable lands against wind erosion. In addition, windbreak systems host important habitats and refugia for floristic and faunistic biodiversity within the extended and largely species-impoverished agro-ecosystems. These windbreak belts were widely cut down in the 1990s for the local supply of fuelwood. It is estimated that tentatively 90% of the windbreaks are degraded or destroyed, i.e. dysfunctional.

The endeavor in rehabilitating windbreaks by GIZ (funded by the Austrian Development Cooperation) is highly endangered by wildfires. Young trees planted on rehabilitated windbreaks are extremely vulnerable to fire. During the summers of 2013 and 2014 many of the recently rehabilitated windbreaks were burned down as a consequence of escaped agricultural burnings.

Within the GIZ project measures were taken to reduce the uncontrolled accidental or negligent burning of windbreaks by informing farmers about the negative consequences of agricultural burning on soil degradation of their own fields, and about the effects of fires spreading uncontrolled into the windbreaks or nearby located forests and protected areas (distribution of leaflets, advisory services by an agricultural expert). Farmers were encouraged to reduce unnecessary burning. A fire warden was employed to convince farmers, travelers and herdsmen to prevent fires and to observe the protection of the windbreak system, especially the windbreaks that are in the early stage of rehabilitation and therefore rather sensitive, even to low-intensity fires (Fig. 1 to 3).

[2] Dzneladze, M. (2010). Report on the existing national legislative, regulatory and institutional framework of the forest and land management in Georgia and how it is addressing issues of reduction and prevention of wildfire hazard (including issues of responsibilities of government agencies, stakeholders of civil society, particularly local communities and individual land users). Analysis commissioned by the OSCE / ENVSEC project *"Enhancing National Capacity on Fire Management and Wildfire Disaster Risk Reduction in the South Caucasus"*.

Figures 1 to 3. Windbreaks in Dedoplistskaro municipality degraded by logging and fire (left, center) and under rehabilitation and protected by a firebreak (right)

Figures 4 to 6. Uncontrolled fires spreading from agricultural lands to surrounding forests and grasslands in Vashlovani Protected Area in 2012. Photos: Courtesy Vashlovani Protected Area administration.

Figures 7 to 9. Fires spreading to Vashlovani Protected Area are controlled by limited technical resources: The Dedoplistskaro fire and rescue unit is highly motivated to engage. However, the number of hand tools and appropriate mechanized equipment available at the Dedoplistskaro fire and rescue unit are insufficient. Photos: Courtesy Vashlovani Protected Area administration.

An assessment based on satellite remote sensing commissioned by GIZ in 2014 revealed the magnitude of agricultural burning in Shiraki Valley.[3] Between 2007 and 2013 the burned area per year ranged between ca. 263 ha (representing ca. 0.6% of the fields used for crop cultivation in 2009), and ca. 12,000 ha (ca. 28%) in 2008. Due to the armed conflict in Georgia in 2008 and the subsequent economic breakdown in 2009, which affected the agricultural sector, both years are not considered as

[3] German Agency for International Cooperation (GIZ). 2014. Report on Fire-monitoring in Shiraki, Dedoplistskaro, Georgia. Remote sensing based assessment of the monthly burned area in Shiraki between 2007 and 2013. Project Sustainable Management of Biodiversity, South Caucasus, Report by Florenz Klein, Tbilisi 09 April 2014, 18 p.

representative. The following Figure 10 and Tables 1 and 2 are taken from the GIZ study.

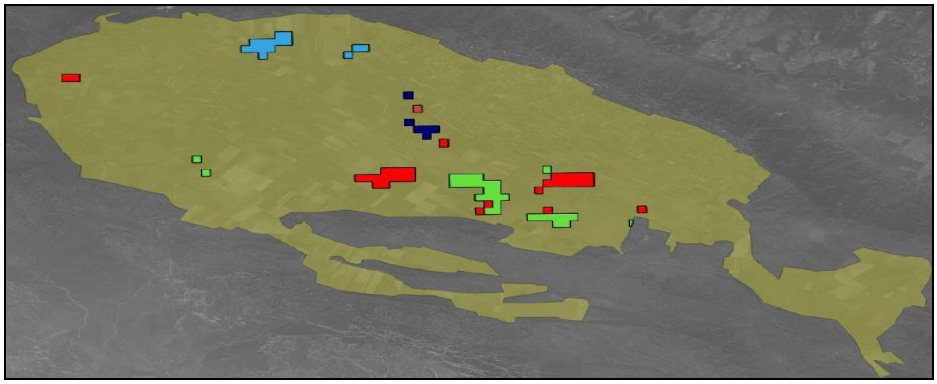


Figure 10. Example of monthly mapping of burned areas in Shiraki Valley in 2013 based on archived satellite remote sensing data. Source: GIZ (2014)

The burned area derived from historic satellite remote sensing products for the years 2007-2014 are given in Tables 1 and 2 (GIZ 2014).

Table 1. Monthly burned area of agricultural fields in Shiraki Valley (2007-2013)

Monthly burned area in ha							
	2007	2008	2009	2010	2011	2012	2013
January	0	0	0	0	0	0	0
February	0	0	0	0	0	0	17,93
March	0	0	0	0	0	0	0
April	0	0	0	0	0	0	0
May	0	0	0	0	0	0	0
June	0	0	0	17,58	0	0	0
July	231,37	0	35,49	3288,73	215,15	0	268,77
August	6008,3	11739,08	0	5400,43	609,77	2813,69	574,14
September	503,84	247,41	0	178,83	0	645,7	543,89
October	0	17,95	227,65	0	54,56	394,64	107,6
November	0	0	0	0	0	0	0
December	0	0	0	0	0	0	...

Table 2. Annually burned area of agricultural fields in Shiraki Valley (2007-2013)

Annually burned area in ha and in percent							
	2007	2008	2009	2010	2011	2012	2013
Annually burned area in ha	6743,54	12004,44	263,14	8885,57	879,48	3854,03	1512,33
Annually burned area in %	15,57	27,72	0,6	20,52	2,03	8,89	3,49

To assess the impact of the project activities in reducing agricultural burning, the remote sensing study selected the year 2007 as reference year. In 2007 about 6744 ha (ca. 16 % of the area cultivated by crops) were burned. Within the project phase the highest amount of burned area has been recorded for 2010 when ca. 8886 ha (21%) was affected by fire. This year was followed by a low burning rate of 879 ha (2%) in 2011. In 2012 the area of approximately 3854 ha (ca. 9%), and in 2013 ca. 1512 ha (ca. 3.5%) of agricultural lands were burned. In comparison to the reference year 2007 the yearly burned area has decreased since the beginning of the project implementation, except the burnings in 2010. In 2011 the burned area decreased by ca 87%, in 2012 by ca. 57% and in 2013 by ca. 78% compared to fire-affected area of 2007.

However, despite of the initial progress to reduce agricultural burning in Shiraki Valley, with focus on Dedoplistskaro municipality, the extent of fires getting out of control and damaging windbreak systems in 2014 was still at a significant and intolerable level.

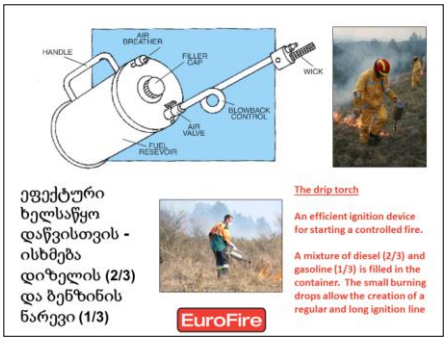
4. A first approach towards addressing the fire problem in Dedoplistskaro municipality

Technical steps

In July 2014 two fire management missions conducted by the GIZ project, in cooperation with the OSCE-ENVSEC project, organized a first local round table on fire management and two fire management training sessions for local stakeholders (local authorities and farmers) in Dedoplistskaro municipality. In addition first discussions were held with sheep owners concerning the use and consequences of pasture burning in Eastern Georgia.

The missions were preceded by the 6th National Round Table on Fire Management held on 8 July 2014 under the auspice and participation of the Minister for Environment. The participating representatives of the agencies and civil society organizations of Georgia unanimously underscored the significance of agricultural burnings as a cause of wildfires affecting other fire-sensitive ecosystems as well as health and security.

The on-site field verification missions, the round tables and the local training sessions included interviews, group discussions and collection of statements and recommendations of local actors (representatives of the administration of the municipality, the municipal fire service, agricultural extension service, the local forest administration, local National Park management, and farmers).



Figures 11 and 12. The EuroFire Competency Standards and training materials in Georgian language were used to train farmers, shepherds and firefighters in classroom sessions and in the field. Source: GFMC.

Figures 13 to 16. Demonstration of light hand tools and a rapid-attack unit for prescribed burning and control of wildfire. EuroFire-based safe prescribed burning methods were exercised on agricultural fields. Photos: GFMC.

Figures 17 and 18. Two local round tables on fire management were held in Dedoplistskaro Municipality involving all stakeholders and resulting in consent-based recommendations for further action. After the consultations and training basic hand tools (fire swatters, drip torches) were handed over to the municipal fire and forest service and Vashlovani Protected Area. Photos: GIZ / GFMC.

Key findings

During the three Missions to the Dedoplistskaro district the following key findings were identified. They include key issues related to the problem of agricultural burnings in Shiraki Valley that were identified by the participants of the round tables and training sessions and the roles of the involved organizations and actors in fire management:

General problems of drought and disposal of wheat residuals (straw)

- Three consecutive years of drought since 2012
- Wheat harvest in mid-2014 was expected to be less than 2 t/ha (it turned out to be less than 0.7 t/ha).
- Many farmers are aware of the problem with fires getting out of control and often know how to properly set a fire and the means how to control it. However, they often do not follow them, because the proposed means are too costly for them.

Farmers cannot even afford to plough a mineral stripe around their field. In addition, it is cheaper for them to burn the straw than to rent a tractor with a disc-harrow to incorporate the straw into the soil again.

- In some agricultural properties disk harrows have been introduced (replacing traditional ploughs), which reduce the need to burn the straw.
- The use of fire is discussed controversially. It is widely believed (not proven) that
  - Straw residuals reduce soil moisture
  - Straw residuals favour infestation by insects and diseases
  - Non-burned stubble strips have less yields

Pastures, agricultural land and Protected Areas impacted by overgrazing and fires set by shepherds

- Protected Areas are surrounded by arable lands, grazing lands (winter pastures for ca.60,000 sheep (according to a NACRES Field Officer).
- Many areas are not accessible by fire vehicles.
- 20 shepherds live near or in the Protected Areas, but they change every year.
- Before leaving the camps of the winter pastures and moving to summer pastures they ignite the pastures because they think that the pastures will be more productive upon return in fall, brush encroachment reduced and make them unattractive for other shepherds to use for grazing during their absence. The shepherds also burn pastures, fields or windbreaks in order to have fresh grass in the following days or after their return in the fall. The burning is carried out negligently with no precaution and thus the fires often get out of control and spread to adjacent property.
- According to one sheep owner out of 100 grass species only 10 species are considered fire adapted, which at the same have a very low calorific value and are thus not appropriate for animal grazing.
- Some shepherds, however, do not believe in pasture improvement by fire and rather observe degradation caused by fire and overgrazing on their pasture lands that are swept by uncontrolled fires set by neighbours.
- While the sheep are grazing in the mountains during summer, they come down to Shiraki Valley in the winter season and then enter fields and windbreaks. The exact number of sheep and cattle grazing in Dedoplistskaro is not clear and the estimations vary greatly, from 15,300 cattle and 44,000 sheep (UNDP, 2014)[4] and 25,000-30,000 cattle and 120,000 sheep (deputy of local Information and Consultation Service Center) and min. 30,000 cattle and 200,000 sheep (Head of Sheep Breeders Association of Georgia). The grazing area also varies considerably, from 22,000 ha (UNDP, 2014) to 130,000 ha (deputy of local Information and Consultation Service Center) and 150.000 ha (Head of Sheep Breeders Association of Georgia).
- Because there is not enough pasture land for the amount of sheep, the shepherds pursue a number of techniques to find grazing opportunities for their herds. These measures include prolonging the transhumance movement of the herds from the summer to the winter pastures and entering arable land of other farmers on the way, leading the herds on agricultural lands and windbreaks in the Shiraki Valley.
- Because they fear punishment from the owners of the lands and the police, the shepherds often let their herds graze on other land or in the windbreaks.
-

[4] UNDP report on Climate Change and Agriculture in Kakheti Region, 2014

Role of the municipal fire and rescue service

- In case of fire the Fire and Rescue Service of Dedoplistskaro municipality often is called directly (personally) and thus arrives faster than being activated through the official 112 emergency number.
- The municipality Fire and Rescue Service is on standby for fast-response readiness between 12 June and 30 August. During the extremely hot and dry summer of 2014 a total of 62 wildfires were attended by the Service.
- There are insufficient equipment and resources at the municipal Fire and Rescue Service to control wildfires in remote terrain, especially under off-road conditions. The GIZ project handed over a set of hand tools (fire swatters, drip torches) to the Fire and Rescue Service in order to improve their capacities to fight agricultural fires.
- Due to re-organization of municipal fire services in Georgia, which will migrate under the auspice of the Ministry of Internal Affairs, Emergency Management Department, the future of the fire service in Dedoplistskaro is uncertain; a governmental report is due before 15 January 2015. From this change the Fire and Rescue Service hopes to receive better equipment and more trainings in firefighting. In addition, the fire fighters hope to receive more rights and responsibilities regarding the investigation of arson, and the right to fine arsonists. Currently, they are sometimes not even allowed to access fires.
- Based on the training sessions in Dedoplistskaro and the participation of a member of the Fire and Rescue Service in the Regional Fire Management Training Course in Antalya (Turkey, October 2014)[5] the EuroFire Competency Standards and Training Materials, which are available in Georgian language,[6] are utilized by the Service.

Role of the municipality administration (Gamgeoba) of Dedoplistskaro District

- Even though the municipality administration of Dedoplistskaro District is not in itself responsible for combating fires, the municipal fire and rescue service currently still belongs to the local administration. The municipality administration has the right to set up regulations and fines regarding agricultural and wildfires in the district. It currently considers forbidding agricultural fires and punishing it as arson.
- Within the framework of the forthcoming law on windbreaks, it is envisaged to put the windbreaks under the responsibility of the farmers adjacent to the windbreaks. Thus, it is planned to privatize them.

Role of the municipal forest service unit

- The forest service unit (under the National Forest Agency) is responsible for the protection of the windbreaks but does not feel responsible as they perceived the GIZ paid fire warden to be responsible for their protection. The GIZ project supported measures of prevention of fires affecting windbreaks.
- The forest service unit has only 4 forest rangers for the whole Dedoplistskaro Municipality with a total forest area of 19,107 ha. In addition to lacking human capacities, the forest administration also lacks equipment and even a functioning building.

[5] http://www.fire.uni-freiburg.de/GlobalNetworks/SEEurope/Antalya-2014.html
[6] http://www.euro-fire.eu/ - Georgian version: http://www.fire.uni-freiburg.de/eurofire/ef_geo.html

Role of the municipal agricultural extension service (Information and Consultation Service Centers – ICC)

- The ICC (under the Ministry for Agriculture) is not involved in fire prevention and control activities.
- The ICC was only recently (in 2013) reestablished under the Ministry of Agriculture and thus still lacks capacities in advisory services.

Role of the Vashlovani Protected Area administration

- As the Vashlovani PA is often affected by wild fires starting outside of the PA borders, the administration of the Park is very interested in solving the fire problem. Because the shepherds living near the PA often change, the PA rangers go yearly to the shepherds and try to inform them about the fire problem. However, this measured is not perceived as very effective.
- The PA rangers received training in fire management by the consultant of GFMC and a set of firefighting equipment (fire swatters and fire torch) to improve their capacities in fighting fires.

Role of the GIZ fire warden

- The GIZ project paid the salary of two fire wardens in 2010-2014 for better protection of the windbreaks in the Shiraki Valley. Currently, the GIZ warden does not have a big effect on the prevention of fires because he can only call the police or the Fire Rescue Service and cannot do anything himself against the fire. Thus, he is not taken seriously by shepherds or farmers who burn their fields or pastures. If a fire warden is institutionalized, then the person has to receive a set of rights and responsibilities regarding fires.

Role of farmers associations and cooperatives

- The “Agrarian Environment Association”, a private association, which does not receive government subsidies but had been supported by advisory services of the GIZ project, considers the rehabilitation and protection of windbreaks as essential for securing the productivity of arable lands. Association members are interested in introducing technologies to reduce the necessity of burning straw residuals. They welcome the training in safe burning techniques and receipt of appropriate hand tools for situations that may require the use of prescribed fire.
- Farmer cooperatives, which are supported by government subsidies, currently do not have an agenda on the avoidance of unnecessary burnings or safe prescribed burning methods.

5. Local, national and international considerations for the development of an agricultural burning policy

In evaluation of the current state of developing a national fire management policy on the one side, and the consultations and first training sessions on the use of prescribed fire in Dedoplistskaro municipality in July 2014 on the other side, the situation is summarized as follows:

The envisaged national fire management policy

- The role of agricultural and pasture fires as the most important cause of wildfires affecting forests, protected areas and other fire-sensitive lands in Georgia has been recognized.

- The negative impacts of agricultural fires on arable and pasture lands, on human health and security, and on the regional and global environment requires a reduction of unnecessary burning. The fires have a strong negative effect not only on the local environment and air quality. The black particles (also called "black carbon") are transported over hundreds of kilometers and even to the Arctic environment, where they cover the snow, resulting in the change of albedo, increase the absorption of solar energy and thus contributes to the melting of the snow and ice cover.

Need of the development of a regulatory policy for agricultural burning

- Under the current legislation the use of fire on arable and pasture lands is permitted.
- In the European Union and other countries, e.g. in Armenia, agricultural fires are banned by law due to their adverse impacts on ecosystems, biodiversity and air quality as well as the regional and global atmosphere.
- The 1979 Geneva Convention on Long-range Transboundary Air Pollution has been ratified by Georgia in 1999. However, the „Gothenburg Protocol" to the convention, which addresses black carbon emissions, including those from agricultural burnings, has not been signed by Georgia.
- Georgia is challenged to comply with European standards aimed at reducing air pollution.[7]

Integration of top-down and bottom-up approaches

- Institutional and legal reforms of Georgia justify a careful but rather slow progress in the development of the national fire management policy.
- Along with national reforms there is an overwhelming engagement of civil society, supported by international organizations / donors, to take responsibility in environmental protection and securing sustainable development.
- This development is prompting and encouraging efforts developing simultaneous, parallel and mutually influencing approaches at all levels of society.

General considerations concerning rural fire management in Georgia

- There is a consent that an informed and coordinated approach needs to be taken to address agricultural burning practices in Georgia
- One alternative is to completely prohibit the use of fire in agricultural and pasture lands. This approach would simplify the sometimes unclear distinction between agricultural and wildfires and – theoretically – could assist in an improvement of protection of the windbreaks. Such legal ban, however, bears the risk of willfully set but unattended and uncontrolled fires.
- Alternatively, the development of a fire management "information system" or a "fire-use permit system" may be considered appropriate. Such a system shall be compatible with national legislation and responsibilities and
  - Introduce voluntary arrangements where legal obligations cannot be imposed (e.g., obligation to take precautionary measures such as construction of firebreaks and application of safe and fully attended burning techniques
  - Serve as a first-hand experience for possible wider application in Georgia
- This development would support and strengthen

[7] (a) 2008 ambient air quality directive (2008/50/EC; known as the Clean Air for Europe [CAFÉ] Directive), and (b) the Fourth Air Quality Daughter Directive (2004/107/EC). These directives are of general importance although not addressing agricultural burning explicitly.

  - The role and responsibility of farmers operating individually, in state-supported cooperatives or otherwise organized associations
  - The performance of shepherds to comply with environmentally compatible pasture management practices
  - The responsibility of the local (municipal) government / administration in safeguarding sustainable land management
  - The institutional capacities of the National Forest Agency (responsible for the management / protection of windbreak systems), the Agency for Protected Areas (primarily affected by uncontrolled agricultural burnings), and the Agricultural Extension Service (that should have prime responsibility for agricultural fire management)
- At local level the institution of a fire warden with a set of rights and responsibilities similar to the Fire and Rescue Service may be envisaged to facilitate this development.
- At national level the exchange between the different actors who have been trained / capacitated in fire management shall ensure that investments by national and international bodies will be efficient and effective.
- The upcoming development of a Regional Fire Danger Rating System for the South Caucasus, underway through the OSCE-ENVSEC project in 2014-15, will provide an opportunity to develop a pilot for community-based approach in wildfire early warning and preparedness.
- The acceptance and results of the first fire management training sessions for local authorities and farmers in July 2014 are promising and pointing to the right direction with regards to acceptance and the willingness to share experience.
- The involvement of the Fire and Rescue Service of Dedoplistskaro Municipality in the regional fire management training in Antalya, Turkey, 15-17 October 2014, organized and conducted by the OSCE-ENVSEC project, has contributed to the awareness that the municipal approach is in harmony and consent with the national and regional perspective in cooperation and harmonization of approaches in fire management.

6. Draft recommendations for a fire management concept for Dedoplistskaro municipality

The following considerations for developing a fire management concept reflect the final consultations and the last local trainings held in Dedoplistskaro on 4 to 6 November 2014. Main discussions and exchange of views were held at the second Local Round Table on Fire Management on 4 November 2014. The recommendations in the following were enriched by the discussions during the training of farmers and shepherds on 5 November 2014 and at the occasion of the handing-over of hand tools for prescribed burning and fire suppression to the key stakeholders on 6 November 2014.[8]

(I) Legal sanctions

[8] On 6 November 2014 a total of 26 fire swatters and 3 drip torches were handed over from the GIZ project *Sustainable Management of Biodiversity, South Caucasus* to the Fire and Rescue Service, the Agrarian Environment Association and the Vashlovani Protected Area Administration.

While the burning of agricultural residues in principle is currently limited by the law only in areas closer than 30 m to the edge of a forest and inside windbreaks, there are currently no clear rules for legal sanctions for agricultural and pasture burnings that are getting out of control. It is therefore suggested that clear legal regulations shall be developed, which would tentatively provide the following rules:

- **Permission of the use of fire by the land owner**: For the management of agricultural fields the land owners (and authorized land managers / land users) are entitled to use fire. However, the land owners are fully responsible for the safety of fire application, i.e. they must ensure that fires do not escape to the adjacent territory belonging to other owners or the public.
- **Legal sanctions**: The person who is responsible for a fire spreading to any property and land not belonging to him will be made responsible for all damages caused by the fire and subjected to a penalty. This includes transient land users such as shepherds and travelers.

These rules would imply that for instance shepherds may be permitted to set fires for pasture management if the land owner will authorize the use of fire.

The prerequisites for implementation and enforcement of rules will include:

- **Public information and awareness raising**: Only a fully informed rural society will recognize the significance / importance of rules aiming at regulating the use of fire (cf. items 2 and 3)
- **Mandated authority to ensure observation / enforcement of rules**: The current administrative settings do not allow appropriate enforcement of rules. However, with the upcoming re-organization of rural fire services, i.e. the incorporation of the municipal fire and rescue services into the Emergency Department (Ministry for Interior) will provide an opportunity to define the mandates and authority of the re-organized fire and rescue units in the arena of vegetation fires. The rural fire units should be authorized to investigate fire causes as a prerequisite of forensic procedures.
- **Provision of appropriate competency**: Appropriate qualification of fire service personnel must be ensured to take over the responsibilities of a rural fire management authority, including forensic wildfire investigation.
- **Provision of appropriate technical means**: Appropriate technical equipment for fire management must be provided to enable the rural fire and rescue services as well as the local authorities of the National Forest Agency and the Agency for Protected Areas.

The Round Table participants underscored the likely advantages of the transition of the Municipal Fire and Rescue Services to the Ministry of Interior:

- In future the staff of the local Fire and Rescue Services would have ranks and wear uniforms, visibly authorizing the Service to be a governmental authority mandated to enforce laws and rules and to conduct forensic wildfire investigations.
- Compared to the current situation this would enhance the authority of the Service to be in control of fire management.

Based on the experience of the GIZ-supported fire patrol unit, which was operational from 2010 to 2014, it was recommended to finance an official position of a Fire Warden

at municipal level, to be financed by the municipality and eventually supported by interested stakeholders. This Fire Warden should be legally and visibly (by wearing a uniform) mandated to act on behalf of the municipality, thus increasing his authority to enforce sanctions against those using or causing fire outside of their property.

Furthermore, agreements should be made with land owners who do not have grazing lands but who are renting out places for shepherds. Such situations regularly result in high grazing pressure on surrounding lands belonging to other land owners.

Apart of such agreements it was strongly suggested that shepherds be registered in order control the migration of flocks of sheep between winter and summer pastures. Registration should go along with intensive information and education of shepherds concerning the adverse effects of uncontrolled pasture fires.

Another option, which was considered by the GIZ project was the development of alternative migration routes to avoid conflicts with windbreaks, which are grazed on the way. These incentives include watering places, veterinary checkpoints or shearing points and may be introduced in cooperation with other international organizations (e.g. CDA – Czech Development Agency).

(II) Information and education of farmers and public

Consent was expressed by the representatives of the local authorities and civil stakeholders that there is a need to increase the awareness of farmers, shepherds and the general public in a rural area such as Shiraki Valley concerning the need of environmental protection and sustainable land management in general and with regards to the role of fire.

It was agreed unanimously that public information and education about

- Damages and threats caused by inappropriate fire use on agricultural and pasture lands
- Importance of intact windbreaks for the protection of soil and thus farming and pasture grounds
- Impacts of wildfires that escape from agricultural and pasture burning on the environment, including forests and protected areas
- Alternatives to the use of fire in agriculture and pastoralism
- Need of civil society to reduce the use of fire and prevent wildfires in their own interest

will be prerequisite for a acceptance of a coordinated approach in fire management based on participation of the rural communities.

(III) Promotion of taking collective / cooperative responsibility to make burning safer

Taking into account that the practice of burning agricultural residuals will continue for the time being as a consequence of limited access to knowledge, affordable equipment and practical application of advanced management of wheat fields, e.g. by using disk

harrows that will contribute to reduce exposure of soil to wind erosion and desiccation and to incorporate organic matter into the soil, it is recommended to promote safe burning techniques and procedures.

The local consultations and training sessions in Dedoplistskaro municipality provided insight in safe burning techniques and procedures. Many farmers could prove during the sessions that they have a quite solid understanding of fire behaviour and long-standing experience in burning of agricultural residuals. However, during the round table a farmer, who had burned his field in summer 2014, admitted that his fire ran away and spread to adjacent land. Experience of the last years shows that such incidents occur frequently and constitute the major cause of wildfires affecting windbreaks and protected areas.

The trainings conducted in the field, as described in Section 4 (including Figures 11 to 18) created the awareness that strict observation of burning techniques and safety standards will contribute to better controlling land-use fires.

Cooperative burnings, i.e. the cooperation between farmers and shepherds to safeguard prescribed burning through mutual assistance, will definitely increase the safety and control of agricultural burnings.

Collective action would also facilitate ruling voluntary procedures and the development of agreements to apply fire only if weather conditions will be suitable and sufficient experienced personnel be available secure that prescribed fires will not escape to neighbouring territories.

Voluntary agreements could be implemented by:

- Neighbouring farmers and shepherds assisting each other when burning agricultural fields
- Farmers, shepherds and the municipal fire and rescue service informing each other about planned burning activities on the one side, and burning restrictions due to weather conditions (e.g., extreme heat, drought and wind)
- Municipal fire and rescue service offering support to advise and support farmers and shepherds in safe prescribed burning

During the Round Table discussions it became clear however, that voluntary agreements can only work if all actors are involved. In this regard different participants expressed their doubts about the possibility to involve shepherds in any voluntary agreements.

(IV) Ownership of use and responsibility to protect windbreaks

Participants of the local consultations argued that the aforementioned options would have limited effects, e.g.:

- It will be difficult to enforce sanctions under the current legal and administrative setting as well as due to limited finances (Option 1);
- It will take too long time until public information and education would result in efficient and effective change of attitudes of the rural society with regards to avoidance of fire use or observation of rules of safe burning methods (Option 2);

- The application of wildfire prevention measures (e.g., construction of firebreaks through a ploughed line) and safe burning practices involving higher number of involved persons and equipment would involve costs that cannot be borne by most of the farmers (Option 3).

Therefore another option was suggested:

Farmers should become motivated or prompted to actively protect windbreaks by granting them the rights to cultivate and use windbreaks for their own benefit. With such user rights the farmers, particularly those owning agricultural lands adjoining windbreaks, would be highly interested to protect the windbreaks, not only from wildfires that escape from their own fields, or otherwise willfully set fires, but also from illegal cutting and grazing. Public support of farmers to rehabilitate degraded windbreaks, e.g. by provision of plant materials by government authorities, could further stimulate the endeavour to generate more active interest in sustainable windbreak management. Some farmers mentioned an interest to cultivate fruit / nut trees on windbreaks.

The application of this principle of community participation could benefit from experiences in community-based forest management and community-based fire management in other regions of the world, where both benefits and responsibilities for sustainable management have been put in the hands of individual smallholders or local communities successfully.[9]

The currently ongoing consultations for the development of a legal instrument at national level to enforce the protection of windbreaks could consider the option of participatory management / ownership of windbreaks. The possible use of mechanical clearing to reduce grass cover and thus grazing pressure and wildfire hazard (by fuel reduction) in windbreaks could also be considered.

7. Conclusions and recommendations for the SMB Programme

The three periods of outreach work in fire management in Dedoplistskaro municipality between July and November 2014 included several round tables, personal interviews and demonstration & training sessions with municipal authorities, land owners and land users.

On the one side it is clear that the problems of excessive use of fire, as well as the direct and collateral damages of fire use cannot be solved by the municipality alone. The development of a National Fire Management Policy, which aims at addressing fire by a holistic, landscape-level approach, underway since 2009 but somewhat hampered by the long-lasting process of legal and administrative reforms of the country, constitutes an essential **top-down approach** which will determine the role and authority of local (municipal) actors.

[9] See e.g. reports of the GIZ-supported project reports from Nepal:
Community Level Fire Management Planning (2007): http://www.fire.uni-freiburg.de/GlobalNetworks/South_Asia/Community-Level-Fire-Management-Planning.pdf
Community-Based Fire Management Training: An approach towards participatory planning (2007): http://www.fire.uni-freiburg.de/GlobalNetworks/South_Asia/Community-Based-Fire-Management-Training.pdf

On the other side the local consultations revealed that responsible actors at municipality level are eager to revise habits and "traditions" in land use, including fire use. Local actors in the municipality have expressed their intent to take measures necessary to cope with land degradation as a result of multiple stress factors, including climate change and socio-economic changes.

Public information and education as well as capacity building of land-users are critical to reduce the unnecessary use of fire and the damages caused by land-use fires getting out of control.

It is rather important to continue the outreach work at the level of a municipality, which could serve as a pilot for the country. This work could be considered as a **bottom-up approach** by those who have recognized that their livelihood is endangered by the many factors that are causative for land degradation and who want to contribute to act today rather than wait for an uncertain tomorrow. This "community" deserves advisory and technical support to define their own interests and their demands opposite a national fire management policy.

Recommendations for the GIZ Programme Sustainable Management of Biodiversity, South Caucasus

What are the implications for Dedoplistskaro municipality and the supporting agenda of the GIZ programme *Sustainable Management of Biodiversity, South Caucasus*?

The report reveals that the project has successfully tied up with the national agenda of development of a National Fire Management Policy by supporting this development at local / municipal level.

Awareness building and pragmatic outreach work at local level may require, similarly to the national "top-down" approach, a longer lasting commitment. The GIZ project very much promotes the building of a **culture of sustainable land management and protection of natural resources, including biodiversity and other conservation values**.

The approach to address fire within Shiraki Valley / Dedoplistskaro municipality should accompany and support the municipality during the coming years to realize the proposals made at the consultations in 2014.

The short-term recommendations for the project include

- Acquisition of further firefighting equipment for the local actors, e.g. backpack sprayers
- Support the Fire Rescue Service in Dedoplistskaro in the acquisition of a small firefighting pickup with 500 L water capacity for fighting agricultural fires (as in Borjomi-Kharagauli NP), in case the organisational restructuring does not improve the equipment
- Further dialogues and trainings with shepherds in the spring fire season

The project should continue to cooperate with the OSCE/GFMC-led ENSEC project *"Enhancing National Capacity on Fire Management and Wildfire Disaster Risk*

Reduction in the South Caucasus", with the following options (to be confirmed by the OSCE):

- Participation in the implementation of the "Regional Fire Danger Rating System" at local level: Here Dedoplistskaro municipality could serve as a local pilot for the active use of the fire danger rating system by the local authorities (Fire and Rescue Service, NFA, APA) and stakeholders (farmers, shepherds)
- Exploring the use of automated fire alerts based on satellite remote sensing system that are in place and need to be adapted for local use
- Consider financing the participation of a delegate (or a delegation) of the GIZ programme and / or local representatives to attend end eventually contribute to the 6th International Wildland Fire Conference (12-16 October 2015, Pyeongchang, Gangwon, Republic of Korea)[10]
- Consider the adaptation of the Guidelines „Defence of Villages, Farms and Other Rural Assets against Wildfires: Guidelines for Rural Populations, Local Communities and Municipality Leaders in the Balkan Region" to the conditions and for the use in Georgia and translate the modified guidelines to Georgian.[11]

Tbilisi, Georgia / GFMC, Freiburg, Germany, 30 November 2014

[10] http://en.wildfire2015.kr/
[11] http://www.fire.uni-freiburg.de/Manag/CBFiM_11.htm

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