



Short report
on the workshop on
Fires in Angola: dynamics, impacts and management
that took place at the
Instituto Superior Politécnico de Tundavala (ISPT)
in Humpata (Huila Province) from
1st to 2nd of June 2023



Prescribed fire in Bicular National Park (Huila province) in June 2016. Image: Paulina Meller

Organizers:

Provincial Government of Huila, Provincial Office of the Environment

SASSCAL Angola

Instituto Superior Politécnico Tundavala

University of the Witwatersrand, RSA

University of Hamburg, Germany



Workshop Rationale: I

Southern Africa's humid savannas are the biome with the highest fire frequency worldwide. Angola is a typical case in this regard: extremely high fire incidences occur in the savannas and woodlands of central Angola and in the tropical rainforests of northern Angola.

Wildfires in savanna ecosystems are generally considered a natural phenomenon as extensive burning has occurred for many millions of years. Current analyses show that the overwhelming majority of fires in Angola are ignited by people, and it is difficult to know how different these fires are from fires ignited through lightning and other sources. In densely populated areas, moreover, particulate emissions from fires could be damaging to human health. Forest and woodland fires, in particular, damage trees and hinder tree regeneration after charcoal production or in agricultural fallows, thus reducing forest productivity and future income opportunities for smallholders. Peatland fires have a particularly high carbon and biodiversity footprint while grassland fires, on the other hand, are important for carbon storage and biodiversity conservation.

For rural people, fire is an important tool to facilitate their labour. Fire is used to burn pastures for hunting or to stimulate grass regrowth for livestock, to clear new fields for agriculture in forests and woodlands, to burn the outskirts of villages for pest control, to produce honey, and to make charcoal. All these activities are aligned in the agricultural calendar of rural smallholder farmers and have the potential to cause wildfires, with specific seasonal patterns according to the fire's objectives. However, to date, the effects of fire seasonality on fauna and vegetation, fire intensities and fire dynamics are not well understood, nor are there instruments in place for community-based fire management.

Therefore, bringing strategic actors and interested stakeholders together is crucial for a broad discussion on fire issues in Angola. We hope that a broad participation will contribute to a better understanding of fire dynamics and impact, and to draft outlines for ecologically sound fire management guidelines.

Target group / audience:

Public and private sector entities, forest owners, non-governmental organisations, international cooperation partners, universities and community representatives.

Goals:

- to bring together people interested in the environmental effects of fire and sustainable fire management,
- to compile the existing knowledge on wildfires and fire management in Angola,
- to identify research gaps on fire dynamics, use and management,
- to outline ideas for establishing sustainable fire management strategies in Angola.



Short summary of the workshop

Results & lessons learned:

1) Fire patterns:

The presentations given during the workshop showed clearly, that **Angola is a global hotspot in terms of number of fires and of area burned** because of its large expanses of natural vegetation. **However, there is no evidence that Angola is a hotspot in terms of fire intensity.** Most fires in Angola are savanna fires. They seem to be fires of low and medium intensity which do not cause lasting damage to people or environment. Some woodland fires, however, damage the economic potential of wood resource use by local communities.

Many **open grassy ecosystems**, e.g. the woodland savannas in the south and east of Angola, the flooded grasslands of Moxico and the geoxyle grasslands on the Angolan Plateau ('Anharas de Ongote', 'Chanas de borracha') are biodiverse ecosystems that depend on periodic fires for their existence. **Fires are beneficial and indispensable for these ecosystems**, frequency and seasonal timing of fire matter, though.

Intact Angolan **miombo woodlands are relatively fire resistant**. The increasing and rapidly expanding charcoal production in dense miombo ecosystems, however, opens the way for grassy and highly flammable regeneration stages which in many cases have very short fire return intervals (fire every year or every second year) which keep the resprouting trees in a so called 'fire trap'. The recurrent fires prevent the resprouting trees from closing the canopy again and from growing into larger diameter classes. Thus, the woodland ecosystems appear to be relatively fire resilient in terms of species diversity, **but their growth potential** (and thus their wood productivity and the related economic potential for the local community) **is strongly diminished** by uncontrolled post-harvest fires. A post-harvest fire exclusion strategy would be a meaningful approach to move towards a economically more profitable and environmentally more sustainable charcoal production and would strongly benefit local communities. The ways to reach this goal depend on steps toward a community based fire management / local fire stewardship.

Only a subset of fires that occur in other ecosystems of Angola, **particularly fires in humid rainforests and in peatlands, are cause for serious concern**. These particular fires cause permanent and irrecoverable damage to biodiversity and environmental functions like water provision and storage, flood control, and carbon storage. Active fire control and fire prevention measures should focus on these fire sensitive ecosystems and the provinces where they occur.

The problematic fires in Angola seem to be symptoms of unsustainable land use practices that damage the fire resilience of the respective ecosystems: Uncontrolled timber exploitation in the rainforests of the northern provinces, drainage of peatland for agricultural purposes on the Angolan Plateau, and charcoal production without post-harvest fire prevention in the miombo woodlands and dry tropical forests of central Angola and the Angolan escarpment. The fire is not the cause of the problem, we need to manage fire AND work to manage the causes of degradation together!

The Afromontane and escarpment forests are of particular concern, as they are refuges of many endemic forest species (e.g., birds, herpetofauna) with very restricted areas of occurrence.



The fire trends in Angola are still not conclusive: the number of fires in grasslands seems to decrease and woodland fires appear to increase. These patterns may be related to grassland transformation to agricultural use and woodland exploitation for charcoal, but these trends need further research. Different fire hotspots are caused by different driving processes. Dr. Mendelsohn and Dr Maiato made a convincing point for the need of more field based case study.

The size of fires in Angola has a clear pattern. Fires on the Angolan Plateau are smaller than fires in the southern savannas. This could either depend on the landscape structure with many streams acting as natural fire breaks or be an indicator that local communities on the Angolan plateau manage and supervise fire more closely. This pattern merits further investigation.

By far most fires occur in the dry season from May to October. Most fires occur during the day, only few at night.

Protected areas generally burn far more extensively than inhabited areas, and have different fire patterns. As would be expected, the protected areas in grassy ecosystems, e.g. Cameia NP, Luando Special Reserve and the protected areas in Cuando Cubango, have the highest burned areas.

The role of fire in seasonally inundated habitats merits further research, as the presented case study from Brazil by Dr. Damasceno showed.

So far there is no evidence of problematic effects of climate change enhancing the fire risk for Angolan ecosystems. For most of Angola this seems not to be the case, quite contrary to the rising global evidence from Mediterranean and temperate ecosystems. This is because high temperatures are not the major driver of fire in tropical grassy systems as they are in systems that burn with canopy fires: studies show that the amount of rainfall, and the extent of the dry season are the most important climate drivers. It is important therefore to pursue more studies which focus on the important climate variables. If climate change will modify the rainfall patterns and eventually prolong the short dry spells in the rainforest regions of northern Angola this would enhance the fire risk in the rainforest tracts of Angola strongly.

2) People and fire:

Fire is a powerful and cheap tool for smallholder land management (agricultural, pastoral, hunting) and traditional land management systems. Fire has many uses for rural communities, e.g., renewal of pastures, pest control on pastures and around villages, preparation of new fields ('slash & burn'), honey harvesting, hunting. Fire banning is no solution, experience from all over the world shows that it does not work, but makes fires more intensive and dangerous.

The relation between fire and charcoal is indirect! Charcoal exploitation (and abandonment of fields) are followed by succession stages loaded with highly inflammable grassy fuel. The fire follows these land use decisions. The development of feasible post-harvest fire control strategies needs more research and field experiments!



The Angolan legal framework regarding fire is flexible. Fire is mainly regulated in the 'Lei de bases de florestas e fauna selvagem', Artigo 33. In general, controlled uses of fire are allowed and tolerated in Angola, in consultation with the local and traditional authorities. Uncontrolled application is considered to be a criminal offense. Setting fire in protected areas is forbidden and a criminal offense, but fire is accepted and used as a management tool in protected areas.

3) Management needs

Rural communities are handling and managing 'queimadas' according to their needs. The knowledge and technical skills of rural communities with regard to fire handling should be acknowledged and appreciated. They represent an important resource for sustainable fire management. Education and outreach programs to harmonize traditional fire handling with modern day environmental knowledge and conservation needs should be developed and implemented. Mechanisms to ensure that communities are enabled to make decisions around fire together would be desirable.

Traditional knowledge and skills should be incorporated in the fire management training of the staff of protected areas. Communities should be trained with formal scientific-technical knowledge on fire. Local communities and their fire handling present an important fire management resource, not a problem! As stated above, we need to think land use management and fire management together. The national institutions and agencies should focus on moderating the cooperation of institutional actors and rural communities and stakeholders, bringing in NGOs where appropriate.

Fire management approaches in conservation areas can be different, and focussed on specific management goals. It is important that each conservation area have a fire management plan, that is specific to their particular requirements, and that the resources to enable them to implement this plan are available. Moreover, it would be helpful to regularly assess and update these fire management plans and enable idea transfer between managers of parks in Angola, and in other countries on the sub-continent. For example, the challenge of protecting Afromontane forest patches from fires is shared between Madagascar, Malawi, South Africa, and Zimbabwe: tools and understanding regarding successful approaches could also be shared.

Provincial fire intervention teams with heavy equipment seem to be necessary only in the northern provinces and around the larger urban agglomeration. In the rest of the country, it would be more promising to develop fire risk information services which deliver meteorological risk assessments and adequate time frames for fire application to local communities. Adequately accessible communication channels for rural communities need to be chosen for such services.



Steps to follow-up

- To distribute a workshop report.
- The scientists and institutions interested in fire are still too disconnected. It would be necessary to connect interested workshop participants in national and regional (contact: Sally Archibald) networks.
- Research should focus on the above mentioned research needs and on collaboration between science, institutions and local communities. Case studies, long term fire experiments, and action research with communities are important elements of a future fire research strategy.
- Fire management plans should be a part of all management plans of the protected areas. The fire objectives in these plans should be revisited regularly and adapted to the newest scientific knowledge.
- To connect the interested scientific and institutional community with the planned FAO project on fire in Angola (contact: Liudmila Sayovo).
- To build capacity within existing research centres in Angola to monitor and evaluate fire patterns and provide real-time weather and fire risk information
- To develop a fire management curriculum for ranger of INBAC and other interested institutions or NGO's. ISPT might be interested in offering such a curriculum.
- INBAC is open to future cooperation and joint fire research in protected areas, similar to the current scientific fire research project in Bicular NP.
- To plan a follow up workshop for 2025.

June 2023,

M.Finckh, S., Archibald, F.Lages



Workshop program:

Time slot	Thursday 01.06.2023
8.00 – 8.30	Registration and reception of participants
8:30 - 9.15	<p style="text-align: center;">Welcome notes</p> <p>Dr. Margarida Ventura, ISPT Dr. Gabriel Miguel, SASSCAL Dr. Chipilica Barbosa, SASSCAL Dr. Manfred Finckh, University of Hamburg, Germany Dr. Sally Archibald, University of the Witwatersrand, RSA Dr. Dirk Schories, Federal Ministry of Education and Research (BMBF), Germany</p>
9:15 – 9.30	<p style="text-align: center;">Opening statement</p> <p>Ing. Tânia Santos, Provincial Government of Huila, Provincial Office of the Environment</p>
9.30 – 10.00	<p>Opening conference: Fire in Southern Africa. Patterns, dynamics and impacts by Dr. Sally Archibald, University of the Witwatersrand, RSA</p>
10.00 – 10.15	Discussion moderated by Dr. Fernanda Lages
10.15 – 10.30	Coffee Break
10.30 – 10.45	Session 1 Fiery puzzles and hot challenges by Dr. John Mendelsohn, RAISON, Namíbia
10.45 – 11.00	Spatial and temporal trends of burnt area in Angola by Dr. José Miguel Cardoso Pereira
11.00 – 11.15	Monitorização de Incêndios Florestais nos Parques Nacionais de Angola no Período 2010-2023 by Dr. Isaú Quissindo, Universidade José Eduardo dos Santos, Huambo, Angola
11.15 – 11.30	Uso do fogo pelas comunidades by Dr. Simeone Chiculo, Associação para o Desenvolvimento Rural de Angola (ADRA)
11.30 – 11.45	Discussion moderated by Ing. Tânia Santos, Provincial Office of the Environment
12.00 – 13.45	Lunch time
13.45 – 14.30	Session 2 Fogo no Pantanal: Problemas e Gestão by Dr. Geraldo Alves Damasceno Junior, Universidade Federal de Mato Grosso do Sul, Brasil
14.30 – 14.45	Fogo e Poluição Atmosférica. Project ModelArA - Eng. Evanilton Pires, Instituto Superior Politécnico Tundavala
14.45 – 15.00	Necessidades de investigação sobre o fogo by Dr. Francisco Maiato, Universidade Mandume ya Ndemofayo
15.00 – 15.15-	Impacto das queimadas sobre o meio ambiente by Marta Zumbo, INBAC, Angola
15.15 – 16.00	Discussion moderated by Chipilica Barbosa, SASSCAL Angola



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SEXTA-FEIRA 02.06.2023	
Session 3	
8.30 – 9.15	Quadro Legal sobre Fogos Florestais by Ing. Abel Zamba Representante do Ministério da Agricultura
9.15 – 9.30	Controlo das Queimadas em Angola by Alberto Cambumbe, Bombeiros, Defesa Territorial
9.30 – 10.00	Presentation of the project 'Gestão Sustentável do Fogo' by Ing. Liudmila Sayovo, FAO, Angola
10.00 – 10.30	Good or bad? Forest, grassland and peatland fires by Dr. Manfred Finckh, University of Hamburg, Germany
10:30 – 11:00	Launch of a fire awareness film by Dr. Paulina Meller, University of Hamburg, Germany Discussion moderated by Marta Zumbo, INBAC Angola
11.00 – 11.30	Coffee Break
Round table discussion	
11.30 – 12.30	Fire management in Angola: the way forward (research needs, legal frameworks, fire management capacities at provincial or municipal level)
12:30 – 13:30	Discussion moderated by Ing. Tânia Santos, Provincial Office of the Environment
13.30 – 15.00	Lunch time
15.00 – 16.00	Final remarks & discussion given and moderated by Dr. Fernanda Lages
16.30 – 18.00	Visit of the Cristo rei do Lubango