



Stakeholder Alliance Facilitates Re-Introduction of Prescribed Fire on the Borana Plateau of Southern Ethiopia

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The implementation of a new prescribed fire program to restore bush-encroached rangelands in southern Ethiopia—and hence increase herbaceous forage supplies for livestock—is given as an example of an integrated action involving multiple institutions to address resource-management problems. The resumption of planned fire—traditionally conducted over hundreds of years by pastoralists until the 1970s—was preceded by key activities including mobilization of the pastoral community, review of government proclamations regarding use of fire, interaction with policy makers, capacity building among pastoralists and agency personnel on how to implement and manage planned fires, development of an overall prescribed burn plan, selection of geo-referenced sites, and then implementing large-scale burns on an annual cycle. The process has required a combination of indigenous knowledge, relaxation of policy constraints, use of modern technology, careful hands-on training, applied research, and building trust to create a truly collaborative approach. The key elements of change have been participatory action research, outreach, and engagement with a wide variety of stakeholders. One springboard for success has been the commitment of the Oromia Agricultural Research Institute (OARI) and the Oromia Pastoral area Development Commission (OPaDC) to support an authentic, demand-driven research agenda with a focus on applied and adaptive work in the pastoral areas.

Background

African rangelands are extensive and support large populations of pastoral people and livestock. The semi-arid Borana Plateau is an especially important rangeland for Ethiopia. It is over 95,000-km² in size and home to about 350,000 people and one million head of cattle, small ruminants, and camels. The grazing systems of the Borana Plateau have become increasingly unsustainable in recent decades, however, because of human population growth, expansion of maize production in dry-season grazing areas, and range degradation in the form of woody encroachment. Heavy grazing by livestock, reduced mobility of pastoralists, and lack of fire have contributed to conversion of open, mixed savanna communities to dense woodlands and bushlands. Herbaceous forage production for cattle and sheep can then be reduced via competition with woody plants for water and light. Residual grass can be subjected to intense grazing pressure, further exacerbating the downward spiral. Prescribed fire is the most cost-effective means of manipulating vegetation in savanna ecosystems of eastern Africa. An apparent blanket national ban on the use of fire compelled the pastoralists to stop this traditional practice in the 1970s (Coppock, 1994). This was intended to protect croplands and other natural resources across the nation from indiscriminate burning, but one unintended consequence of this policy has been a weakening of traditional forms of range management that depended, in part, on the regulated use of fire to control undesirable woody plants, promote herbaceous forage production, and reduce populations

of disease-carrying ticks. Efforts by pastoral communities to revive indigenous range management practices like the use of fire are now gaining the positive attention of policy makers. An alliance among pastoral communities, researchers, policy makers, and development actors has been forged to re-introduce prescribed fire to the Borana Plateau, and achievements made thus far are the focus of this brief.

Progress and Findings

Public Engagement. In mid-January of 2005 a joint workshop involving OARI, OPaDC, and PARIMA was organized that brought together 40 people from pastoral communities, local administration, regional policy makers, government experts, NGOs, and other friends of pastoralists to discuss the national fire ban which had been in place for over 30 years. After a thorough review of government proclamations, this workshop ended by recommending that the use of fire resume in the Borana rangelands, but the participants also underscored the need for capacity building and training in the modern techniques of implementing prescribed fire.

Training on the Use of Prescribed Fire. Training of researchers, development agents, and pastoralists on use of prescribed fire was initiated by PARIMA in February 2005. The course outcomes included: (1) Learning about the role of fire in rangeland ecosystems; (2) learning

how to plan and implement a managed fire; (3) learning how to monitor fire effects to assist management decision-making; (4) making progress towards conceptualizing a community based, fire-management program across the Borana Plateau. On appropriate sites, fire can improve subsequent quality and quantity of herbaceous forage, assist in the reduction of some undesirable plant species, reduce populations of ticks, reduce woody cover to conceal large predators, and strengthen traditional and participatory range-management practices.

A modern prescribed-fire plan is comprehensive and follows U.S. federal guidelines (LaMalfa and Coppock, 2005). It includes spatial mapping information, pre-treatment digital photos, site vegetation characterizations, treatment justification and objectives, and hazard preparations. Fuel load and weather information is also collected as prescribed burns are best conducted under optimal conditions of air temperature, relative humidity, days since the last rainfall, wind direction, and wind speed. Other components related to burn management include firebreak preparations and a post-fire site rehabilitation plan.

Selection of sites to be burned has been jointly conducted by pastoralists and agency personnel. Criteria include fuel load availability, site suitability, potential of sites to be used as fodder reserves (*kalo*), and the relative ease of managing the site after the fire has been conducted. Actual implementation of fires has involved full participation of pastoralists and agency personnel.

Ecological Effects of Fire and Manual Thinning of Bush. Frequency data for vegetation and bare soil occurrence has been collected on paired sites on the north-central Borana Plateau before and after a treatment that included manual thinning of *Acacia drepanolobium* stands followed by fire. Fires on the Borana Plateau are best conducted during January or February, the peak of the long dry-season. The post-fire assessment is best conducted following the long

wet season that occurs during March to May. In addition, a paired, adjacent unburned site is assessed for comparison with each burned site.

An example data set from a pair of pilot sites burned in 2005 is shown in Table 1. These sites are about 20 hectares in size. Results suggest that changes in the herbaceous composition and exposure of bare ground have occurred as a result of fire. The overall forage species composition has improved in the fire site and the amount of bare ground has decreased. The striking change has been the doubling of cover for the highly valued *Themeda* forage grass. It increased from 18% of cover to 40% in this case. The amount of exposed bare ground

was reduced by treatment from 7% (control site) to 3% (thinned and burned site). This suggests that the herbaceous plants emerging after fire and precipitation have been more vigorous, and by reducing exposed bare ground risks of topsoil erosion have been lessened. One rule of thumb from the range literature has been that range sites can be burned no more often than once every five years for optimal effects.

The ecological data have been supplemented with qualitative impressions from local pastoralists via use of focus groups. In these discussions the Boran noted that fire resulted in: (1) An improved condition of the herbaceous layer; (2) a good kill of noxious bush species; (3) increased site visitation

by wild grazing animals; (4) increased availability of key grasses used for housing thatch and other building materials; (5) less tick burdens on livestock; (6) fewer instances of predatory animals; and (7) less teat damage on cow udders as related to cuts from *Acacia drepanolobium* thorns.

Scaling-Up the Activity. Overall, given a total of three sites burned in a pilot program, the outcomes have been positive. In view of this and the enthusiasm generated, new partnerships have been recently formed to scale-up the approach. This came at an opportune time when the USAID Pastoral Livelihood Initiative (PLI) was launched through the CARE and Save the Children/USA consortia. The PLI effort allowed the fire initiative to be expanded in terms of active members to include more NGOs. The technical

*Table 1. Frequency of occurrence (percent) of herbaceous plants on a pair of treated and untreated rangeland sites on the north-central Borana Plateau following the long rainy season of 2005. Entries represent data collected for 300 points per site selected on a restricted random basis. The treatment consisted of manual thinning of *Acacia drepanolobium* stands followed by prescribed fire. Exposed bare ground changed from 3% (treated) to 7% (control).*

CATEGORY	TREATMENT	
	Thinned and Burned	Control
<i>Achyranthus</i> sp.	1	0
<i>Cenchrus ciliaris</i>	7	0
<i>Chloris gayana</i>	1	0
<i>Chloris roxburghiana</i>	2	19
<i>Chrysopogon plumulosus</i>	33	35
<i>Eleusine indica</i>	1	4
<i>Heteropogon</i> sp.	1	0
<i>Lintonia nutans</i>	3	12
<i>Solanum</i> sp.	1	0
<i>Sporobolus pyramidalis</i>	7	4
<i>Themeda triandra</i>	41	18

Mr. Askebir Tesfaye, development agent from Arero Rural and Pastoral Development Office, uses a drip torch as prescribed in U.S. Forest protocols. During the 2005 PARIMA course on fire management, three sites (Alona, Dembi, and Dikale) were burned for demonstration purposes. The course set a framework for future collaboration and resulted in a task force to make recommendations for fire management policy.

Photo by Eric LaMalfa.



backstopping has been further enhanced via USAID support for a team from the U.S. Forest Service (USFS) to engage in capacity building and further blending the integration of modern and indigenous knowledge on fire application. The focus of the USFS team has been to build capacity of partners to carry out much larger burns. Other institutions that have joined in the broadened partnership have been SOS Sahel, the Gayo Pastoral Development Initiative, the Ethiopian Forestry Research Center, and the Oromia Water Design and Supervision Enterprise. A steering committee at the regional level, and fire teams at the district levels have been formed. The steering committee takes the lead in reviewing and approving action plans. The role of the local teams is to prepare the detailed action plans, mobilize the pastoral communities, collect data, and report back to the steering committee. Based on the detailed plans made, and with technical back stopping from the USFS team, several large-scale prescribed fires were conducted, and covered a total of 900 hectares in 2007. These locations are currently being monitored by OARI. Plans are now underway to carry out more large-scale burns in February of 2008 with assistance from the USFS.

Practical Implications

An alliance has been forged among pastoral communities, researchers, policy makers, and development actors to re-introduce prescribed fire to the Borana Plateau. The process has required a combination of indigenous knowledge, relaxation of policy constraints, use of modern technology, careful hands-on training, applied research, and building trust to create a truly collaborative approach. The key elements of change have been participatory action research, outreach, and engagement with a wide variety of stakeholders. One springboard for success has been the commitment of the Oromia Agricultural Research Institute (OARI) and the Oromia Pastoral area Development Commission (OPaDC)—as the major regional agencies—to support an authentic, demand-driven research agenda with

a focus on applied and adaptive work in the pastoral areas. This intervention model could be adopted for use in other pastoral or rural areas of Ethiopia. Furthermore, the focus need not be restricted to use of fire. It can be expanded to other issues. The bottom line is that a large alliance is needed to effectively confront large problems. No one partner, or subset of partners, is effective enough to do it alone. Partnerships also create space for innovation and generation of knowledge.

Pastoral communities on the Borana Plateau have historically used fire as a tool to manage natural resources. Any attempt to institute managed fires within a community needs to be broad-based and address the reasons why people use fire, the benefits to be gained through its use, and the contemporary consequences of use. In short, a strategy for prescribed burning had to be developed within a broader land-use and resource-management program.

Prescribed burning requires decisions on where, when, and how to burn, what preparations are needed to control the fire, and coordinated actions to control the spread of the fire. To ensure success of controlled burning, community members must be party to decisions on the need for burning and its control. They must be responsible for determining which areas can be burned, when, how, and by whom. They must also be able to delegate these responsibilities. The essential role of technical assistance is to facilitate decision-making by the community, not to dictate the decisions.

A wise and sustainable strategy should therefore involve the pastoral community in the planning and implementation of the intervention. Sustaining the positive impacts of the rangeland restoration effort will require buy-in from pastoralists in terms of improved grazing management. The ability to manage grazing is related, in part, to the ability to sell livestock at certain times for fair prices. Livestock marketing is thus also linked to the success of a fire program in the bigger picture.

Further Reading

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The GL-CRSP Pastoral Risk Management Project (PARIMA) was established in 1997 and conducts research, training, and outreach in an effort to improve the welfare of pastoral and agro-pastoral people with a focus on northern Kenya and southern Ethiopia. The project is led by Dr. D. Layne Coppock, Utah State University. Email: lcoppock@cc.usu.edu.



The Global Livestock CRSP is comprised of multidisciplinary, collaborative projects focused on human nutrition, economic growth, environment and policy related to animal agriculture and linked by a global theme of risk in a changing environment. The program is active in East Africa, Central Asia and Latin America.

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