

Learning across borders: community-based fire management – Kalimantan to California

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Abstract

Communities in very different places are initiating participatory fire management planning processes. This paper raises questions about the effectiveness of transferring experiences from one place to another, based on recent examples from northern California, USA, and West Kalimantan, Indonesia. Reforming approaches to fire management is both politically and technically challenging. Vastly different political and administrative systems, and unequal technological capabilities make many apparently sensible approaches unworkable in the foreseeable future. Transferring some practices and assumptions may actually endanger ecosystems and people, demanding that planners “first, do no harm”. Despite demands for caution, in Kalimantan and California there is a growing consensus that participatory and collaborative initiatives offer the most promising approaches to effective fire management.

1. What is at stake?

During the past decade, wildfires, more extensive and intense than any in historical memory, have devastated large areas of both Kalimantan and California. Fire has become one of the foremost concerns of rural communities in both locations, and to people alarmed about the future ecological integrity. Communities initiated new approaches to solving fire problems in Kalimantan and California, in response to their own local concerns, to ensure that their interests would be represented in the face of pressure and neglect from distant governments and commercial interests. Many of these efforts on opposite sides of the globe share common features. Yet, some of their issues also deviate sharply, due to differing causes and contexts of fires. Community-based fire management initiatives have developed local, regional and landscape-scale planning to prevent future wildfire catastrophes, locally appropriate rules for burning practices for “legitimate” purposes, procedures for containing or suppressing fires that are out of control and recommendations for broader policy changes to reflect local interests.

New approaches in fire management are often modelled on systems that appear to work elsewhere. Most people assume that they can learn useful lessons from experiences of communities in places far from our own. Yet, we must be cautious in transferring lessons or approaches from one location to another. Differences in fire ecology, politics and administration, technology, culture and other factors may invalidate our assumptions about fire management for that other place. How can we know which aspects of fire management systems developed elsewhere will work in our own contexts, and which will be ineffective, or even harmful? Few tools help us test the appropriateness of models for locations that they were not designed for.

This paper raises questions about the effectiveness of transferring experiences from one place to another. Recent examples of involving communities in fire management in northern California, USA, and West Kalimantan, Indonesia, provide interesting insights (Figure 1). The work in northern California draws mainly on experiences from Trinity County, associated with the efforts of the Trinity County Fire Safe Council, a consortium of local, state, and federal governmental agencies, and non-governmental citizens bodies. The work in West Kalimantan draws largely on work supported by the U.S. National Science Foundation, and in conjunction with a fire research project by the Center for International Forestry Research (CIFOR), the International Centre for Research on Agroforestry (ICRAF), the United Nations Educational, Scientific, and Cultural

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Organization (UNESCO), the United States Department of Agriculture Forest Service (USFS), the U.S. Agency for International Development, Yayasan Pancur Kasih and Yayasan Dian Tama.

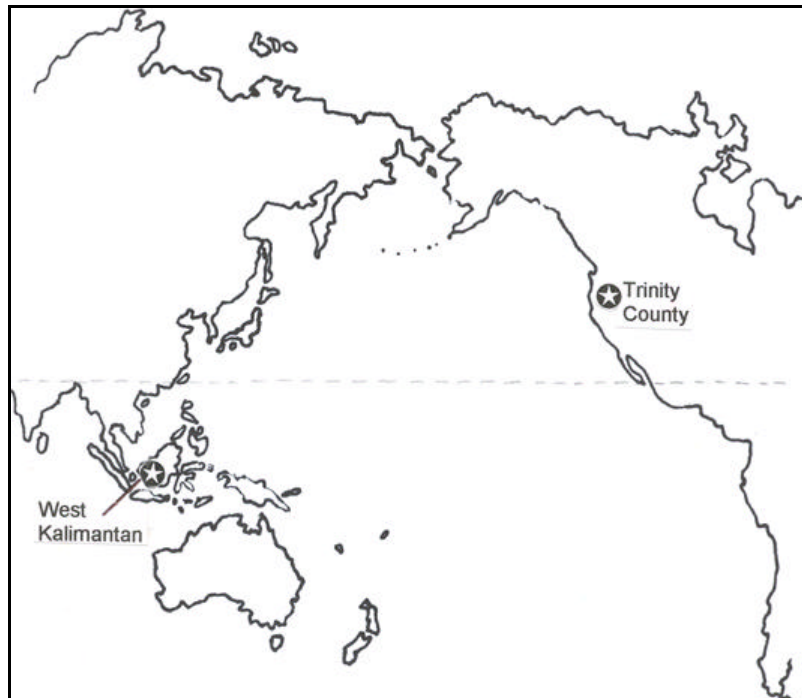


Figure 1: Location of study sites

This paper also highlights the potential of cross-regional lessons, and warns of dangers of transferring models or assumptions, with four areas of concerns:

- ◆ understanding fire causes and transferring fire management technologies from different ecological and social contexts to new locations;
- ◆ developing information for fire management based on local knowledge and appropriate science and technology;
- ◆ understanding and assessing diverse values at risk; and
- ◆ reviewing necessary administrative and political reforms to enable community-based fire management.

In comparing and applying lessons of and approaches to community involvement in fire management, it is necessary to consider:

- ◆ Stakes in fire management vary, depending on one's standpoint.
- ◆ Reforming approaches to fire management is both a political and a technical challenge.
- ◆ Transferring some practices and assumptions may increase damage to land, ecosystems and people.

Combining the four concerns with the three notes of caution generate a matrix that raises warning "flags" to indicate the appropriateness and limitations of transferring knowledge (Table 1).

Table 1: Matrix of warning “flags”

Warnings Concerns	Stakes in fire management vary depending on one's standpoint	Reforming fire management is both a political and technical challenge	Transferring practices and assumptions may increase damages to land, ecosystems and people
<i>Understanding fire causes and transferring fire management technologies from different ecological and social contexts to new locations</i>	Implications of differences in fire ecology, spatial scale, different and changing political and administrative contexts	In some cases, technical issues are more problematic; in others, political conditions are a greater concern	It may be difficult to know how best to apply the precautionary principle across dissimilar situations
<i>Developing information for fire management based on local knowledge and appropriate science and technology</i>	Information and technology readily accessible and well understood in one context may not be well-understood, equitably accessible, locally controlled, or credible in another context.	Government agencies accustomed to technocratic expertise may suspect or devalue local knowledge about fire and fire management	It may be difficult to know when to rely on local knowledge and on science and technical expertise
<i>Understanding and assessing implications diverse values at risk</i>	Members of local communities may have diverse assessments of values at risk, and these may differ from those of local, regional and national fire management officials	Even in collaborative processes, parties with more power often fail to acknowledge the validity of value systems different than their own	Appropriately prioritising values at risk must be based on local contexts, but may also need to consider values not fully represented in a local collaborative process
<i>Reviewing necessary administrative and political reforms necessary to enable community-based fire management</i>	Positions on reform may be related to other political and administrative concerns and positions	It may be difficult to distinguish political or administrative aspects from technical aspects in unfamiliar situations	Misestimating administrative or community capacity, or conflicting assessments of political reform, contribute to ineffective or dangerous decisions

In California, community members, exasperated by lack of attention or misguided approaches to fire management by state and federal government agencies, have initiated fire management planning efforts, and invited state and federal agencies to join them. While these government agencies recognise the value of participating in consultative local “Fire Safe Councils”, the visions of some recent local initiatives go far beyond the degree of collaboration foreseen by the agencies. In California, expenses for community-based processes have been covered by state and federal government funds requested by the consortium of local government and non-governmental parties, under the umbrella of a local collaborative “Fire Safe Council.”

In Kalimantan, indigenous communities have initiated fire management efforts in response to the perceived causes of many fires that adversely affected their community life and agroecosystems during the late 1990s. The efforts initially focused on improving co-operation within and between communities to reduce risks of wildfire from routine burns by smallholders. Together with regional non-governmental organizations (NGOs), they have also addressed fire threats in a broader political-economic context, to ensure that neighbouring plantation and timber concession holders manage their fire risks. In the wake of fires during the 1997/98 El Niño drought, international pressure and assistance have also prompted Indonesian government agencies to co-operate with enterprises and communities in developing new approaches to fire

management. In West Kalimantan, most initiatives have focused on emergency fire suppression, rather than tackling the underlying causes of fires (Dinas Kehutanan, 2000). Provincial plans appear to assume that recent Indonesian forest law reforms have adequately addressed these basic issues. The roles envisioned for local communities in most of West Kalimantan's officially supported initiatives have taken many cues from other countries' traditional firefighting systems, offering Indonesia a combination of technical, financial and institutional assistance.

2. Understanding fire causes and transferring fire management technologies

Most northern California forest fires are ignited by lightning. A few are bona fide human accidents, and a very small number are ignited by arsonists. Most fires of concern originate as natural consequences of an ecosystem adapted to periodic low-intensity fires that recycle nutrients, germinate seeds and generate ecosystems. Fire extent and intensity have been aggravated by a century of logging and fire suppression, creating volatile "fuel ladders" that turn ground fires into destructive crown fires.

Very few wildfires in northern California originate from deliberate burning. By contrast, virtually all West Kalimantan fires are set by people, and for purposes whose legitimacy is contested. In Kalimantan, burning slash is a defining feature of subsistence shifting cultivation and smallholder agroforestry. Yet, most fires of concern during the 1990s originated from land clearing for extensive government-licensed plantations (CIFOR *et al.*, 2001), although such commercial burning was made illegal in 1995.

The fundamental differences in fire causes and contexts limit the potential of transferring fire management approaches. Improving fire suppression alone will not solve regional fire problems in either Kalimantan or California. However, effective fire management in northern California ultimately depends on improving vegetation management to restore more natural fire regimes and reduce the risks of catastrophic fire. In West Kalimantan, developing consensus about responsible and legitimate uses of fire, and collaborative approaches to controlling wildfires appear to be the best options for improving fire management.

3. Developing appropriate fire management information

In both Kalimantan and California, there is general agreement among the marginalised rural communities involved in forest management that local knowledge provides effective guidance in identifying and communicating their fire concerns, and in planning responses to address these concerns. Useful local knowledge adds to the understanding of specific dynamics of fire within a complex local landscape. It also enhances comprehension of how community members are able and motivated to manage fire for their own, and their neighbours', safety and well-being, for ecological integrity, and in response to broader concerns.

Comparable processes in Kalimantan and California include compiling narratives that explain causes, dynamics and impacts of past fires to local people, scientists, government agency representatives and business people. Community-based planning initiatives in both locations focus on how to reduce fire threats with the help of maps.

3.1. Fire narratives

In both Kalimantan and California, community-based fire management efforts have captured local knowledge by compiling knowledgeable community members' stories of past fire events. These may include details of locations and causes of fires, extent of damages, how fires spread through the landscape, successes and failures to contain or extinguish fires, changes to the local landscape, and impacts on community life. Such narratives indicate a range of local understandings of the ecological and social or institutional causes of fires, and generate discussions about specific measures that could prevent, contain, or suppress future fires.

In West Kalimantan, until recently, oral histories of fires often provide the only accounts of past fires affecting land to which the community has customary rights. In communities where customary rules for burning and sanctions for fire damage still apply, community leaders and customary law functionaries can recall fire events for a generation or more, including locations and seasons of wildfires, areas and directions to which fires spread, property and natural assets burned, who started the fires, local responses, sanctions applied for negligent burning, current uses and conditions of previously burnt lands, and whether fire-use behaviour changed as a result. Villagers can point to consequences of these fires in their community's landscape, and can mark many of these details on maps. In recent cases, some narratives have complemented sparse records kept by plantation and timber companies, and even sparser police reports of suspected arson. Some oral reports have also contradicted company records. The extent to which these records and memories do NOT intersect indicates that communities, companies and government may each see blank spots on their mental "fire maps" of areas beyond their immediate concern.

In California, state and federal government land management agencies and local fire departments have long kept detailed records of fire events. Knowledgeable people's detailed memories of fire events including ignition, movements through the landscape, weather and responses are essential for assessing future fire risks and planning for fire management. Equally important is information on rationales behind past pre-fire planning and landscape/vegetation treatments (e.g. shaded fuel breaks, firebreaks, prescribed burning, backburning, provision of water points, conditions of roads used for emergency access). This is particularly significant as many measures are effective only if they are maintained over long periods, and over extensive areas of the landscape. Many government staff responsible for fire suppression and prevention programmes are transferred to new assignments too frequently. This weakens institutional memory, and makes detailed local knowledge by long-term residents even more important.

3.2. Mapping

In both Kalimantan and California, one of the most effective tools for extracting and analysing information about fires, fire prevention and responses from personal narratives and official records is to present the information on thematic maps. Many types of information important for identifying and reducing fire risks are indicated on these maps (Table 2). In Kalimantan and California, recent community-based resource mapping, initiated by NGOs rather than state agencies, have helped to empower marginalised communities to improve management of the local natural resources. Community organizers have adopted mapping technologies previously monopolised by powerful central governments and resource corporations, to develop alternative maps that reflect local communities' understandings of their landscapes and resources (Alcorn and Royo, 2000). They have also used maps to have their rights to land and resources recognised.

In Kalimantan, mapping aimed at improving fire management has included information on fire history, community members' assessment of fire risks, priorities for fire protection based on current and projected land and resource uses and values, and proposed priorities for reducing fire hazards. Collaborating with NGOs and researchers in participatory mapping processes has also given communities access to technologies including geographic information systems (GIS) and global positioning system (GPS) to improve map quality and accelerate map production. Communities also benefit from information gathered through remote sensing imagery, including locations of "hot spots", vegetation changes, "burn scars" and other changes in their regional landscape. Community organizers and researchers hope that fire maps developed through participatory processes will help raise community members' awareness of fire hazards, and open up opportunities for constructive dialog and joint planning with government agencies, neighbouring communities, and plantation and timber corporations. If constructive dialog fails, some community advocates hope that their greater access to legal remedies, anticipated with political reform in Indonesia, will help them press suit against companies that have negligently or illegally used fire to clear land, and support communities in their struggle for legal recognition of customary land and resource rights. Maps produced through participatory processes are crucial in supporting both processes.

Table 2: Information for fire management mapped in Trinity County, California and West Kalimantan, Indonesia

California	Kalimantan
<i>Baseline maps used were developed from a combination of information from government agencies and NGO community resource mapping. Topographic, hydrologic, road, administrative boundary and other basic data were available in official maps (mostly in digital form)</i>	<i>Baseline maps used were developed mainly by NGO-assisted community mapping process aimed at documenting and defending customary lands and resources. Community landscape-scale maps showed basic hydrologic data, roads and footpaths, administrative and customary boundaries. Very little usable information in official maps (none in digital form at a usable scale)</i>
<p><i>Information for emergency response (1st set of meetings):</i></p> <p>Roads with limited access for emergency vehicles (too narrow; no exit; bridges cannot bear weight of heavy equipment); how to get keys to locked gates</p> <p>Water sources that could be developed (private and public land)</p> <p>Possible helicopter landing locations</p>	<p><i>Locations of past fires based on oral histories + narratives:</i></p> <p>Extent, sequence of events, causes, damages associated with all fires remembered by participants, or noted in oral histories from past generations</p> <p>Responses to fires (including sanctions applied, if any)</p> <p>Comparisons of narratives with remote sensing data (in a few cases, including hotspots and burn scars)</p>
<p><i>Participants' identification and ranking of values at risk from fire (2nd set of meetings):</i></p> <p>Housing/buildings; recreation and resort sites</p> <p>Telecommunications towers</p> <p>Old-growth forest and specific groves</p> <p>Habitat for species of special concern</p>	<p><i>Participants' assessments of areas with high risk of future fires, based on landscape conditions, land uses, and resource tenure or conflicts</i></p> <p>Fire-prone vegetation</p> <p>Activities with high risk of uncontrolled fires</p> <p>Locations of potential conflicts</p> <p>Comparing assessments from villagers, companies and officials</p>
<p><i>Locations of current and potential fuel management zones (3rd set of meetings):</i></p> <p>Ridgelines; roads (especially within 1.5 miles of communities)</p> <p>Public/private land interface</p> <p>Community drinking water supplies</p>	<p><i>Assessment of gaps between current capacities for fire management and perceived needs</i></p> <p>Community-based process focus on community needs</p> <p>Basis for formalising fire control rules and negotiating joint responsibilities</p>

Mapping has also played an important role in California's community-based fire management efforts. As in Kalimantan, mapping for fire management draws on an infrastructure of community-based mapping and technology developed for broader resource management purposes. The community-based fire management efforts in Trinity County were spearheaded by NGOs, but brought under the umbrella of a new committee of the local county government.² The committee tries to bring together community organizations, volunteer fire departments and private landowners with county agencies, and fire management staff of state and federal land management agencies. Organizers designed mapping efforts to incorporate spatial data generated by all participating groups.

The maps indicate locations of past fire and fuel breaks of various types and degree of maintenance, detailed information about emergency vehicle and helicopter access and water sources for firefighting, a wide variety of ecological and property assets at risk, as well as

² The Trinity County Fire Safe Council was established with strong support of the county's official Natural Resource Advisory Council.

jurisdictional and administrative boundaries. Maps also show participants' recommendations of priority projects and activities for fire prevention (especially vegetation treatments).

There are many significant differences in the ways that local knowledge is generated and used in fire management (Box 1). In California, many long-term residents of fire-prone rural regions have professional experience and training in fire management techniques, and are familiar with the way government agencies work to suppress and prevent fires, as staff or contractors for land management agencies, commercial loggers, landowners and members of local volunteer fire departments. Counting on this knowledge, participants in the Trinity County community-based fire planning process hope that by collaborating with state and federal agencies to develop coherent plans for fire management, these agencies that normally respond to fire emergencies would uphold local priorities even in emergency situations (TCRCD and WRTC, 2000).

Box 1: Questions to help define significant differences for information based on local knowledge

- ◆ What is considered to be legitimate "local knowledge"?
- ◆ Who has obtained it? How?
- ◆ Who initiates efforts to gather or generate information useful for fire management?
- ◆ Who controls this information, and how does this affect its use?
- ◆ Who uses it?
- ◆ For what specific purposes? For what purposes is it not used?
- ◆ Who respects it? Who disparages it?
- ◆ Who "owns" technology or records used to compile and interpret local knowledge?
- ◆ Who communicates information to whom? Through what means? When?
- ◆ Who "owns" the right to communicate information?
- ◆ Who decides which information will be communicated? Which will be withheld?

In contrast to California, few local community members in West Kalimantan are familiar with, and trusted by, government agencies or companies involved in fire management. Many government-supported fire management efforts tend to disparage indigenous experiences and knowledge of controlled burning for shifting cultivation under customary rules, and responses to escaped fire using simple local technologies. Even government-sponsored efforts to involve communities in fire management continue to portray long-standing indigenous communities and their agricultural practices either as fire risk factors (swidden fires, or arson against company assets), or as free or cheap labour to fight fires (Dinas Kehutanan, 2000). In some cases, officially supported participatory measures also see community monitoring as a source of reports of companies' illegal burning. However, less attention is paid to threats to community assets posed by corporate activities than threats to company assets or protected areas by smallholders.

Experienced staff, equipment, trained community members and local familiarity with uses of community-generated maps and plans formed a basis for fire mapping and planning efforts. In California, fire mapping could start with accurate, high-resolution topographic maps produced by the federal government. In West Kalimantan, on the other hand, government topographic maps of areas where NGO-assisted fire management mapping efforts focus are unreliable. Both topographic and land-use maps available to the public (as opposed to military maps) are at a scale too coarse to be useful. Base maps used in fire mapping had been produced by villagers with NGO help, and had been intended largely to defend customary lands and resource rights against expropriation for exploitation by government-licensed concession holders.

In both places, the processes of identifying significant past fire events, locating them on base maps, and linking them with as much data as could be collected about each fire were analogous. They both grew out of previous involvement with community-based resource mapping, and mistrust that distant and plodding official fire planning processes would accurately reflect community priorities and values. Yet, differences in their level of detail and variety of data on baseline maps were enormous. The sources of data were also dissimilar. Whereas government baseline maps and fire data were readily provided to the California process (much of it in digital form), in West Kalimantan regional government and forestry agencies both lacked useful data, and were suspicious of NGO-assisted community mapping.

4. Understanding and assessing diverse values at risk from fire

Community-based fire management processes consider threats to direct resource values, less tangible cultural values, commercial assets, various types of private and common property and numerous ecological functions. The California state government's approach is generally to identify these assets, acknowledge disagreements about the ranking of values among participants in the planning processes, and eventually address protection of a very wide range of values, from employment in logging and real estate to wildlife habitat, with priorities for specific projects and programmes. This statewide process had not yet been applied to Trinity County (CalCBF *et al.*, 1996) before the locally based participatory process began. The Trinity process was in part designed as a local alternative to the statewide "top-down" asset assessment approach. Local people were concerned that it would undervalue the remote forest region's fire protection needs, compared to those of more urban areas.

In California, identifying priority fire management programmes and projects early ensures that legally required environmental impact assessments and administrative approvals are completed in time, so that projects can proceed with a local workforce without delay as soon as funds become available. Yet, some critics insist that most purported fire management treatments, including thinning for fuel reduction, and "salvage logging" in previously burned or pest infested areas, are just excuses to continue logging where logging would otherwise be prohibited for environmental reasons.

Collaborative community-based resource planning in northern California emerged in the mid-1990s in the wake of the "timber wars", which had pitted environmentalists against loggers in a battle over values that would form the region's future landscape. A remarkable feature of the fire planning priority process developed in Trinity County is its incorporation of a wide range of values. Overcoming polarisation involves developing a consensual sense of a "community of place"³ where economic prosperity and community welfare can be based on protecting and restoring "forest health". Vegetation treatment for fire management and ecosystem restoration may create jobs that are needed because of the declining logging industry.

In West Kalimantan, community efforts also try to balance conflicting values, although compared to California, indigenous communities embarking on fire management appear to be less polarised in terms of values, especially concerning their own interests relative to government policies on land rights, agroforestry practices and fire uses. The most serious rifts appear to be between indigenous communities and commercial plantations, logging and mining companies, and new settlements on customary lands. As communities organize themselves to reduce fire risks through consensual processes and mutual assistance, many village residents are annoyed that blame for the late 1990s fires is still so easily cast at shifting cultivators, despite evidence that the most serious of the West Kalimantan wildfires were associated with commercial land clearing (CIFOR *et al.*, 2001). Numerous villages have codified and reinforced customary sanctions aimed at reducing wildfire risks since the 1990s fires, with relatively little government support. Many

³ "Community of place" and "forest health" are terms often used in describing motivations underlying recent movements for increased community control of local natural resources in the United States, corresponding to widespread developments in "civic environmentalism".

call for the government to act decisively and stop illegal burning for plantation expansion rather than threaten to prohibit burning by indigenous shifting cultivators using traditional safeguards.

A conflict of values is also expressed in the implicit devaluation of the relatively fire-resistant landscapes that indigenous agroforestry is forming in the long term. Government-licensed plantations continue to expropriate customary village lands. Local governments have largely failed to enforce prohibitions imposed by executive order in 1995 against land clearing by commercial burning. As smallholders plant more perennial tree crops, land is withdrawn from shifting cultivation cycles, which reduces the need for burning. Through much of West Kalimantan today, smallholders have integrated indigenous shifting cultivation with relatively high-value agroforestry production. Both recently planted and generations-old forest gardens are the focus of many community efforts to protect customary territory from wildfire. Many villagers contributing to fire management initiatives believe that to protect their area from fire they have to defend their customary land rights and village customary territory against encroachment by commercial plantations! For the regional NGOs assisting villages in fire management, expanding from land rights advocacy to fire management is a strategic move.

When plantation and timber companies began working with the regional government to develop new systems and procedures to mobilise their capacities for firefighting, local communities were seen either as sources of fire risk or cheap labour for the companies' firefighting crews. Although the regional government and several aid projects have included villagers in firefighting training, and provincial fire suppression plans intend to provide training for farmers' groups, no provincial plans have provided for local communities' input to formulating fire policies. New provincial fire suppression institutions follow an extremely hierarchical model (Dinas Kehutanan, 2000). Whether such a model to mobilise firefighting capacity in a regional emergency is compatible with consensual village-level fire management initiatives has yet to be tested.

5. Reviewing necessary reforms to enable community-based fire management

Administrative and more fundamental political reforms would contribute to the potential success of emerging community-based fire management. Movements to gain political support for forest and watershed management regimes that are more responsive to local needs are taking place in Kalimantan and California.

Recognising that it is more cost-effective to prevent than to fight unwanted fires, it makes sense for governments to assist community-based fire management. Demonstrating the value of local knowledge for fire management provides a strong argument for governments to provide financial and technical resources, in a credible "political space" to support collaborative fire management. Successful community-based fire management calls for government recognition of local planning and values to guide emergency fire responses. Unfortunately, such government support is still rare in California and Kalimantan. Community-based initiatives occupy only a tenuous place in broader forest management, and are not yet integrated with government firefighting institutions and procedures.

Yet the differences in political and administrative contexts in California and Kalimantan make it problematic to compare political and administrative reforms much further. Since most of the land in California is managed by the national Forest Service, administrative reform to support community-based fire management would include taking ongoing collaborative processes more seriously, and prioritising resultant projects and programmes for government financial support. It would also mean eliminating the bias toward huge projects to enable small-scale local contractors to compete. Emergency fire crews mobilised by the USFS (to fight fires on federal land) and the California Department of Forestry and Fire Protection (to fight fires on private and state land) should become accustomed to consultative operations. Some of this change requires financial assistance; much of it calls for a change in attitudes.

In Kalimantan, a more open attitude from the government toward the capacities of local communities, recognition of indigenous land-use and forest management systems, and of local

decision-making institutions are priorities. It is just as important to incorporate local communities' fire management capacities into the newly implemented fire suppression action plans. Recent reforms of the Indonesian forestry law, which strengthen community positions relative to corporations and the state, would help support community-based fire and forest management. Other Indonesian reforms focusing on devolution of authority and revenue collection from the central to the provincial governments may facilitate broad-based fire management. However, devolution may also provide irresistible incentives for regional politicians to exploit every possible source of revenue for the short-term, rather than conserving natural resources for the long term. Funds for investment in a decentralised fire management system, calling for substantial early investment for benefits in an uncertain future, would be scarce in this case.

6. Problems in comparing and transferring practices

Community-based fire management initiatives in northern California and West Kalimantan share several similarities. Yet, the many differences seriously limit opportunities to transfer approaches directly without any adaptations. It is particularly important to increase our understanding of how various actors' stakes in fire management are likely to differ across contexts – not only between vastly different locations, but also across different spatial scales and institutional levels.

In assessing where and when approaches can be successfully transferred from one place to another, the following act as a guide:

- ◆ *Reforming approaches to fire management is both politically and technically challenging. Vastly different political and administrative systems, and unequal technological capabilities may make many apparently sensible approaches unworkable in the foreseeable future.*

In California and West Kalimantan, the similarities in approach to planning, using narratives, mapping and prioritising systems appear to be remarkable. However, the levels of technology and uses to which maps or other tools can be applied are limited by very different characteristics in the two locations. Although the processes may be congruent in some ways, it is misleading to assume that they will lead to the same kind of planning and implementation opportunities.

- ◆ *Transferring some practices and assumptions may endanger the land, ecosystems and people. In attempting to “transfer” practices from one place to another, how can the precautionary principle, “First, do no harm,” be applied?*

There has been some controversy over whether it is more important to know the history of underlying causes of fires, or whether it may be enough to understand the more immediate causes of fires. If one assumes that a build-up of fuel loads will eventually result in a fire, then it is not particularly important to understand causes and contexts for specific ignition events. This rationale may make sense in California, where fire is a natural part of an ecological cycle, and fuel build-up through fire suppression set the scene for the almost inevitable fire. However, it would be dangerous to apply the same rationale to Kalimantan. Where fires are largely anthropogenic, understanding the circumstances of specific fire events is crucial, since if no fire is lit, no fire will burn. By overlooking fire origins in Kalimantan, opportunities to prevent fires by addressing the intentions of people starting fires will be lost. Asking “What do we gain by making a particular set of assumptions?” and “What do we lose by not making other assumptions?” may allow us to translate assumptions and approaches more carefully.

Processes of community-based fire management can create opportunities for improving understanding among local communities, land and resource management agencies and commercial enterprises. Successful community-based approaches are in the best interest of everyone hoping to eliminate unwanted fire. In both Kalimantan and California, there is a growing consensus, among people who believe that both people and valuable ecosystems are at risk from present courses of action, that the most promising approaches to sustainable forest and natural resource management lie in such joint management initiatives.

Acknowledgements

The research on which this paper is based was undertaken with financial support of the U.S. National Science Foundation, in conjunction with Virginia Polytechnic Institute and State University. Additional institutional support has been provided by the Center for International Forestry Research, with sponsorship from the Indonesian Institute of Sciences (LIPI). Collaborative work was undertaken in California with the Watershed Research and Training Center (with thanks to Yvonne Everett), Trinity County Resource Conservation District, and the Trinity County Fire Safe Council. In West Kalimantan, collaborative partners included Yayasan Pancur Kasih, Yayasan Dian Tama, and participants in community-based fire management initiatives in Sanggau and Ketapang. This research is greatly indebted to all participants in community-based fire management processes in West Kalimantan, and in Trinity County, California.

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