



Forestry Department

Food and Agriculture Organization of the United Nations

Fire Management Working Papers

Community Based Fire Management (CBFiM) training workshop (Northeast Asian Region)

*Workshop Summary
Xishuangbanna, China
March 9th-14th 2009*



by
D. Johnson & A.P. Vuorinen
2009

Disclaimer

The Fire Management Working Papers report on issues addressed in the work programme of FAO. These working papers do not reflect any official position of FAO. Please refer to the FAO website (www.fao.org/forestry) for official information.

The purpose of these papers is to provide early information on on-going activities and programmes, and to stimulate discussion.

Comments and feedback are welcome.

For further information please contact:

Mr. Petteri Vuorinen, Forestry Officer (Fire Management)
Mr. Jim Carle, Chief
Forest Resources Development Service
Forest Management Division, Forestry Department
FAO
Viale delle Terme di Caracalla
I-00153 Rome, Italy
e-mail: petteri.vuorinen@fao.org
jim.carle@fao.org

or: FAO Publications and Information Coordinator:
andrea.perlis@fao.org

For quotation:

FAO (2009). Community Based Fire Management (CBFiM) Training Workshop (Northeast Asian Region). Fire Management Working Paper 24. www.fao.org/forestry/firemanagement/en/

FOREWORD

Fires impact upon livelihoods, ecosystems and landscapes. Despite incomplete and inconsistent data, it is estimated that 350 million hectares burn each year; however, the nature of fires determines whether their social, cultural, environmental and economic impacts are negative or positive. Up to 90 percent of wildland fires are caused by human activities primarily through uncontrolled use of fire for clearing forest and woodland for agriculture, maintaining grasslands for livestock management, extraction of non-wood forest products, industrial development, resettlement, hunting and arson - thus any proactive fire management needs to adopt integrated, inter-sectoral, multi-stakeholder and holistic approaches.

This Working Paper reports on the Community Based Fire Management (CBFiM) training workshop organized in Xishuangbanna, China, 9-14th March 2009 by the FAO, the China State Forestry Administration and The Nature Conservancy's (TNC) Global Fire Initiative and China country program. The training workshop included 32 participants representing 4 countries: China, Vietnam, Mongolia and South Korea and eight instructors from six countries (See Appendix 5. List of participants).

The aim of this training course was to collate information about community based fire management (CBFiM) in North East Asian Region, analyse the experiences gained, and increase the capacity of participants to create proactive fire management approaches and national strategies in the appropriate use of fire as a management tool.

Table of Content:

| | |
|---|-----------|
| Background | 1 |
| Rationale | 2 |
| Objectives | 3 |
| Course Synopsis | 3 |
| Course Evaluation | 3 |
| Opening | 4 |
| Day 1 | 6 |
| Global Perspective of TNC | 6 |
| Fire People and Ecosystems..... | 6 |
| Regional Perspective: Asia | 7 |
| China Case Study | 8 |
| Mongolia Case Study | 9 |
| Philippines Case Study | 10 |
| Korea Case Study | 10 |
| Vietnam Case Study..... | 11 |
| Day 2 | 13 |
| China's forest certification and relations with IFM and Climate Change | 13 |
| REDD Technical Elements..... | 14 |
| Summary of Chinese Fire Management Policy and legislation | 15 |
| Strategies to strengthen legislation pertaining to fire – a natural reserve perspective | 16 |
| Fire Management - Voluntary Fire Guidelines..... | 17 |
| ITTO Fire Guidelines | 18 |
| Characterizing Fire Management..... | 18 |
| PRA Tools | 18 |
| Day 3 | 19 |
| Field Trip to Xishuangbanna Nature Reserve | 19 |
| Day 4 | 19 |
| Field Trip Summaries | 19 |
| Day 5 | 21 |
| Application of prescribed burning in Xishuangbanna Nature Reserve | 21 |
| Fire will contribute to the conservation of the tiger and elephant in..... | 23 |
| Xishuangbanna | 23 |
| ITTO Project in China..... | 23 |
| Ecology of Fire in West Africa, Ghana | 24 |
| Human Behaviour vs. Fire Use, NEA Russian Handbook..... | 24 |
| Prescribed Fire Techniques | 24 |
| Fire Management in Yunnan Province | 26 |
| Community Based Fire Management (CBFiM) in Wenyime Village, | 27 |
| Chuxiong Yi Autonomous Prefecture | 27 |
| The Two Faces of Fire | 29 |
| Next Steps | 30 |
| Vietnam: | 30 |
| China: | 30 |
| Mongolia:..... | 30 |
| Appendix 1. Program | 33 |
| Appendix 2. Evaluation Summary | 37 |
| Appendix 3 Fire Impact Table | 39 |
| Appendix 4. CBFiM Analytical Table | 40 |
| Appendix 5. List of participants | 41 |
| Working papers series on fire management | 43 |

Background

Over the past thirty years, the frequency and intensity of fires in Asia has increased. Additionally, haze from forest fires often results in significant increases in respiratory conditions, lung function complaints and other related impacts. Whenever adverse fire weather conditions persist, it is almost a foregone conclusion that severe air pollution and haze events, induced by fire-associated smoke, will ensue in Asia and elsewhere.

Specifically in China the major portion of forest fire occurrence is concentrated in a small number of regions. The highest number and largest forest fires occur in the five provinces: Heilongjiang, Inner Mongolia, Yunnan, Guangxi and Guizhou. These regions tend to have the majority of forest cover, are exposed to more climatic extremes, including extreme wind events, and are remote with limited access and fire management (prevention and control) facilities.

Over one third of terrestrial habitats in China are considered fire-dependent, but they largely suffer from too much fire as a result of the combination of complexity of fire origins, the high combustibility of forests, and the difficulty to control wildfires. Specific fire-related threats include lightning and uncontrolled accidental fires in forests, savannahs and grasslands. These sources of fire regime alteration also accelerate climate change by contributing to deforestation and greenhouse gas emissions. The need to address the causes of fire regime alteration is urgent; experts estimate that a large percentage of fire regimes in the region are considered degraded or very degraded when compared to ecologically-acceptable conditions.

With the exception of the North-eastern forest regions in China where many fires are the result of lightning strikes, 95% of all fires in China and other countries in the region are caused by human activities. It is therefore necessary to address the reasons for these fires rather than only trying to increase fire suppression capacity or by tightening fire legislation. Proactive fire management approaches are needed to establish data on the underlying causes of these fires; only then is it possible to develop national strategies in the appropriate use of fire as a management tool.

Fortunately, however, long-term fire management programmes can achieve a substantial decrease in the numbers and extent of unnecessary burning. This has been achieved in many parts of the world by raising the awareness of local people and providing training to multiple level stakeholders in the proper use of fire as a management tool in rural livelihood activities. By managing fires at a local level, resources, including forestry, can be managed sustainably.

Rationale

Several reasons supported the idea for this Workshop. The majority of wildfires in China and its surrounding countries are human caused and are often associated with changes in land use patterns and practices. Many communities in countries located within Asia are quite familiar with fire in terms of its use for traditional livelihood activities such as clearing vegetation for agriculture, hunting and stimulating the growth of Non-Timber Forest Products (NTFPs). As such these communities historically have played a significant role in the management of fire in many areas of the region. However, changes in land use patterns, and top down fire related policy and legislation often conflict with traditional fire use practices. In terms of effective fire management, suppression, prevention and enforcement are only part of the answer; there is also a need to recognize the role of fire in fire-dependant ecosystems and the beneficial uses of fire by rural communities.

Fire is not always used in appropriate ways. For example, excessive or inappropriate burning can lead to damaged ecosystems and altered fire regimes. The top causes of altered fire regimes globally include urban development; livestock farming; ranching and agriculture; fire and fire suppression; resource extraction (including energy production, mining and logging); and climate change. More specifically, in Asia, agriculture and logging have been identified by experts and managers as being two of the greatest threats to biodiversity. Further, inappropriate land development policies have led to extensive deforestation and ecologically inappropriate fire use in many countries. This situation is exacerbated when local peoples' uses and needs are not considered in the development of legal and regulatory systems. The resulting social conflict often becomes an indirect cause of fires in the region. Lastly a lack of recognition of local people's rights can lead to land tenure conflicts, where stakeholders may resort to the use of fire as a weapon to claim lands.

Fire and forestry professionals need to be looking for solutions to these problems beyond conventional fire management approaches. National and community-based solutions need to be sought; solutions that engage local communities and NGOs and other stakeholders who are critical to success. There is a need to apply an ecosystem approach wherein all fires; regardless of its purpose (agriculture, land clearing) are managed in an integrated manner that takes into consideration the needs of nature and people.

The Food and Agriculture Organization of the United Nations (FAO), The Nature Conservancy (TNC) and the China State Forestry Administration (SFA) involved forest/fire scientists, managers, policy makers and NGOs from the Northeast Asian region in this workshop. The aim was to develop viable fire management options for the present socio-cultural conditions in China and elsewhere within the region.

Objectives

The overall objectives of the Workshop were to provide:

- (a) A forum on CBFiM in China and the North East Asian Region,
- (b) Prepare mechanisms for information and resource exchange in forest management, wildland fire management and other types of resource management within China and the region, including the establishment of partnerships for joint activities in fire research, training, outreach and policy development, and
- (c) Enable preparation of proposals to governments and international organizations of the region to establish mechanisms for sharing resources in fire management and in large fire emergencies in accordance with existing international procedures.

Course Synopsis

The training course included five days of classroom instruction which took place at the King Land Hotel in Jinghong, Xishuangbanna, Yunnan, China. Participants received intensive training in the concepts of CBFiM and were invited to increase their understanding of the underlying causes of ecologically-inappropriate fires, policy and legislative frameworks related to fire management, and to consider proactive fire management approaches and national strategies in the appropriate use of fire as a management tool. The workshop equipped attendees with the information and tools needed to develop successful approaches to work collaboratively with communities, government agencies and the private sector to reduce fire-related threats to both people and nature. Case studies from China, Vietnam, Mongolia, South Korea and the Philippines were given in order to present an overview of community-based fire management in the region.

An additional day was spent on a field trip to the Xishuangbanna National Nature Reserve a 243,000 ha reserve located in Xishuangbanna Prefecture and managed by the provincial government. Students were introduced to the fire management program of the reserve and met with locals from the village of Mangun, one of the communities located adjacent to the nature reserve that use fire as a tool.

At the conclusion of the training workshop participants developed and shared strategies for organizing their own training sessions and implementing CBFiM concepts in their home countries. (For the full workshop agenda see Appendix 1.)

Course Evaluation

Course evaluation average 4.58 of 5.00

Workshop met objectives 4.8

Presentations 4.4

Conference facilities 4.5

Meals 4.4

Field trip 4.8

(See Appendix 2. for details)

Opening

Ms. Li Censheng (Vice Director Fire Prevention Office of Yunnan Forestry Department) opened the workshop by noting the importance of fire in forestry and forest development. She explained that that workshop is planned to be a sharing of experience in fire management. Ms. Censheng conveyed that there is recognition that fire plays an important role in forest management. Further that there is an increasing and deeper recognition at the higher levels of Chinese government of the importance of fire management to forestry. Ms. Censheng closed her remarks by extending a warm welcome to each of the representative countries (Mongolia, South Korea, Vietnam, Philippines, Australia, USA and Italy).

Mr. Su Ming (Director General International Forestry Cooperation Center, SFA) welcomed the workshop participants and distinguished guests. He explained that in 1992 the UN established forestry as a priority for discussion. In recent years the Chinese government has developed forestry initiatives and forest fire management as a priority in natural resource management. There is recognition of a change in land use in China being driven primarily by climate change and access to resources (including water and forestry). Some of the impacts are negative and all realise that fire, land use changes and the degradation of native species are some of the issues that should be addressed.

Mr. Su Ming recognised the recent devastating fire in Australia killing 200 people, 4000 homeless and millions of dollars in expense. He also explained that the FAO voluntary guidelines on fire management and this workshop is a key delivery of those guidelines.

According to Mr. Ming China has a reduced area of forest and desires to achieve sustainability of the forest that remains. Further, China has been working to understand fire for more than 10 years and is now becoming more effective in fire management. Additionally China would like to learn from others and also share its fire management experiences in order to further develop their understanding and capabilities in this area.

In closing he thanked FAO and TNC for their support of this workshop in forest and fire management and wished good luck and success to the workshop and hoped that participants would have an enjoyable stay in Xishuangbanna.

Mr. Vuorinen (Forestry Officer – FAO) welcomed the workshop participants and distinguished guests. He then went on to discuss FAO's role in fire management globally, specifically addressing the question of why FAO is active in organizing workshops in fire management.

There is a forestry department within FAO which is working on fire management issues globally. FAO acts in the areas of international policy and agreement and invites countries and organisation to discuss forestry and fire problems. FAO offers technical assistance to member countries, develops cooperative projects with national governments and acts as a global point of information collection and dissemination.

Mr. Vuorinen discussed one of FAO's initiatives, The Global Assessment (2006) which was 2 years in development with various authors, including fire prevention/suppression experts, international organizations and institutions. The findings from this assessment include: Fire is not a high priority on policy agendas in most countries and therefore we have limited data on impacts, causes and costs of wildfires. What we know is that 350 million hectares of land area is affected by fire each year and 90% of all fires are caused by humans. Fire is no longer the responsibility of the forestry sector alone and as such has also been given to emergency and rescue agencies and services. People most familiar with the forests are no longer in charge of fire management.

Recommendations that resulted from the assessment included:

- Expensive equipment alone is inadequate - awareness raising and education is critical
- Need to understand the role of fire in ecosystem maintenance
- Need for better internal and external cooperation between stakeholders
- Need for increased involvement of local people
- Fire management must be an integral part of land management i.e. IFM

In closing Mr. Vuorinen stated the primary objectives of the workshop which were to inform participants of CBFiM through examples so that they might encourage and promote the role of communities in fire and landscape management in their home countries.

Dr. Ganz (Director Global Fire Initiative – TNC) welcomed the leaders of the workshop and workshop participants and went on to explain that TNC has been a provider of technical support on CBFiM since 2002 and that Asia is a TNC priority region for this type of technical support.

Mr. Yang Songhai (Director Xishuangbanna National Nature Reserve) explained that Xishuangbanna is a significant forestry and conservation area in China and that Xishuangbanna has a minority culture (Dai) that has a desire to be recognised and promoted. The Chinese government is taking increasing notice of Xishuangbanna and the management and development of this area and as a result there are many existing conservation projects in Xishuangbanna and many more being planned. He closed by inviting participants to enjoy their stay in Xishuangbanna and to take part in the unique culture that exists in the region.

Day 1

Global Perspective of TNC

(Darren Johnson)

TNC is an international NGO dedicated to conservation of biodiversity with headquarters in Arlington Virginia in USA. TNC currently has programs in 35 countries. The Global fire initiative (GFI) was Launched in 2002 its primary purpose to combat the mis-use, lack of use, over use of fire in biodiversity conservation efforts. The GFI currently employs 18 full time staff. TNC co-sponsored CBFiM Workshops in South Africa (2004), Belize (2006) and Indonesia (2007). Focal areas of GFI are training. education and outreach, application of prescribed fire and scientific expertise

The GFI is currently involved in 2 large US based projects, the Fire Landscapes and People Initiative (FLAP) and LANDFIRE. FLAP is a partnership between TNC and several US Government Agencies that has 3 primary components:

- US Fire Learning Network
 - A fire learning network is collaboration and sharing of ideas
- Fire training program
 - Training in the protection of buildings from fire
 - Training of people in the implementation of fire
 - Training in fire effects monitoring
- Fire education and outreach
 - Development of CD's, brochures, newsletters and technical documents to share knowledge and information

LANDFIRE is a project designed to generate consistent and comprehensive maps and data describing fire and fuel characteristics across the United States. The project is a collaborative effort between TNC and several US federal agencies. The LANDFIRE project will develop more than 20 spatial data layers in addition to non-spatial vegetation models that describe ecological systems. Some of the tools and outcomes from the US LANDFIRE project can be applied to other countries. A recent example is the China Songshan Nature Reserve fire regime assessment which used a non-spatial vegetation model to simulate disturbances.

<http://www.landfire.gov/>

Fire People and Ecosystems

(David Ganz)

Why are we working on Fire?

- Fire is a natural process that operates as an integral part of ecosystems within which it occurs.
- Fire is a natural disturbance mechanism
- Humans have the ability to change how fire behaves across the landscape
- Fire is not an isolated event by is regular in a cycle

- Fire will be a result of the cyclical conditions, historical conditions and current people behaviour
- Ecological effects of fire can be complex
- Fire should not always be seen as a catastrophic event
- Fire should not always be seen as a negative event, it has a good side.

Integrated Fire Management (IFM):

- Communities (fire use, cultural fire, social / economic impacts and benefits of fire in a landscape)
- Fire Science (ecological impacts, fuels, fire behaviour)
- Fire Management (prevention, suppression and fire use)

Community Based Fire Management (CBFiM) Principles:

There is no single definition of CBFiM but rather principles in which examples have evolved around the globe. CBFiM is more than just community labour. It is recognised that community involvement covers a wide spectrum of circumstances ranging from forced participation to free and willing participation developed by the communities themselves.

The focus of CBFiM is on people and organising those people into structures or groups. The focus is on people not equipment and legal constructs.

Sense of ownership – this is not necessarily legal or formal ownership, but a way to identify for “whom” CBFiM is benefiting, i.e. the community or external actors. A system of clear land tenure facilitates CBFiM.

Adaptation of Knowledge – there is currently an erosion of indigenous or traditional knowledge in fire management leading to a loss of some sustainable fire management practices. Indigenous knowledge on fire needs to be captured and adapted to fit with rapidly changing human and ecological circumstances.

Prevention over suppression – There is a tendency to focus on prevention activities over suppression activities. There is a tendency toward avoidance of damage that focuses on prevention. External support is often required to manage large scale suppression activities.

Balancing the Approach – Communities should not be expected to shoulder the entire burden of fire management. Respect for the community and supporting all CBFiM principles will assist in balancing fire management activities between the community and external stakeholders.

Regional Perspective: Asia

(David Ganz)

Fire regime – a natural fire regime is the roles that fire plays in the ecosystems of a given landscape in the absence of modern human intervention – it includes the influence of indigenous burning.

There are three broadly classified types of fire ecosystems. Each ecosystem must balance fire to be just right (not too hot, not too cold, not too much, not too little).

- 1) Fire dependent ecosystem – cannot persist for long without right fire at the right time of the year
- 2) Fire Sensitive ecosystem – ecosystems developed in the absence of fire and can be destroyed by fire
- 3) Fire independent – ecosystems that are either too cold as in tundra or too sparsely vegetated for fires to get started and burn large areas

Status and Trends:

More than half of all eco-regions have degraded fire regimes but could be restored to healthy ecosystems. However the fire regimes in almost 60% of eco-regions are declining because of fire suppression in fire dependent ecosystem and too many intentionally lit fires in fire sensitive ecosystems.

China Case Study

(National Forestry Department) - State of Fire Management in P.R. China

It is felt that the government should be responsible for general fire management in China and in the case of leased land the lessor should be the responsible party. It is also suggested that fire management be based upon law and regulation and carried out under this auspice. Fire management infrastructure should be integrated with the economy and have a managed budget. The preference is to rely on professional fire management team and equipment. Publicising awareness of fire management to the general public via posters, slogans, and public speaking is very important and critical to the success of fire management in China. Under the leadership of the government each department should cooperate to improve fire management

Technology and Fire Management:

- The country is divided into three fire regions based on fire risk
- There is a national weather broadcast for fire danger
- Monitoring of fire on the ground as well as fire towers, video monitoring for fires, aerial fire monitoring, satellite monitoring. Monitoring for lightning strikes is also taking place.
- Fire breaks are made by ploughing, clear cutting and using existing features such as rail lines as fire breaks:
 - 1) Ecological fire breaks (wetlands, vegetation types)
 - 2) Prescription burning
 - 3) Fire suppression equipment (blower, water gun, hand tools, water bombing, aircraft)

Mongolia Case Study

(Galbadrakh Davaa)

In Mongolia's eastern steppe region there exists three primary eco-regions, Duriian Forest Steppe, Mongolian Manchurian Grassland and Boreal Coniferous Forest. Mongolia has three principal fire seasons and on average each fire season results in approximately 160 fires (over 2million ha/year):

- Spring (February-June) human caused
- Summer (July-August) caused by lightning
- Fall (September-October) human caused

Major Land uses and Impacts on Fire Regimes:

- Cities and towns
- Road and rail
- Crops
- Mining
- Oil development
- Grazing

Land use Impacts:

- Effective fire prevention and suppression during the socialist times may have altered the historical fire regime.
- Intense grazing, fuel wood collection and collection of NTFPs removed much of the understory in forested areas.
- Illegal and legal logging for timber
- Over grazing of pasture land and hay harvesting of grassland
- Roads and rail is stopping fires spread
- Oil development is occurring in the grasslands (fire dependent ecosystem) and the oil developers demand that no fires occur and as such suppress all fires
- Trans boundary fire/haze from Russia
- Grazing for commercial purposes is intensifying changing the fire regime

Fire Policy and Infrastructure:

Pre soviet time there was little to no information on fire management (up to 1921)

Soviet time (1921-1991) fire was considered a threat to the forests and there was a state resource so a lot of fire suppression effort occurred.

Post socialist period 1991 to today – there is still a handover from the soviets and little understanding of the role of fir in the ecosystem and fire is perceived to be a damaging occurrence and suppression policies still prevail.

Fire and the Emergency Authority:

Fire is managed by the National Emergency Management Agency

There are provincial division of the emergency agency

At the local levels there is some professional part time staff and volunteer staff only.

Fire Suppression Capacity:

The soviet subsidised fire suppression capacity but this collapsed in the 1990s

There is no longer working equipment and fire is largely managed with crude hand tools and swatters.

Summary:

- Fire is managed by a national disaster agency (separated from the environment / forestry agency)
- The management structure is at the national level and regional level but not the local level
- Fire is regarded as a threat to the timber and grass resources (grazing) as well as the oil industry
- Existing fire prevention campaigns have focussed on the negative aspects of fire
- There is a lack of understanding of the ecological role of fire
- Lack of research, monitoring, data, maintenance, and interpretation
- Suppression and prevention efforts are ineffective due to a lack of funding

Needs:

- Establish long term monitoring and research program
- Increase understanding of ecological role of fire
- Improve coordination amongst the different government agencies
- Build capacity at local level and formal training in fire techniques
- Education and awareness campaigns that focus on prevention and suppression
- Identify opportunities to insert fire management into the existing local communities structures
- Don't create new community structure try to use the existing structures

Philippines Case Study

(Mike Jurvélius)

In 2008 a new Republic Act or Fire Code of the Philippines was enacted – the act states “During fire fighting operation, fire volunteers shall be under the direct operational control of the BFP ground commander” But in the field only a DENR (environment officer) is available, not the BFP. Therefore there is disconnect between the legislated role and the enactment of this on the ground.

Korea Case Study

Forest Research Department (Dr. Kyo Sang Koo)

Korean Forestry Institution consists of 4 departments, 18 divisions and 3 experimental stations

Division of Forest Fire (three main groups):

- 1) Fire prevention team
- 2) Fire suppression team
- 3) Restoration team

Status of Forest Fires in Korea:

Korea has a recurrent history of large scale fires (not frequent but they occur). Spring and winter are when 90% of the fires occur.

| | | |
|---------|---------|-----------|
| 1) 1996 | 3762 ha | \$23mill |
| 2) 2000 | 17000ha | \$36 mill |
| 3) 2002 | 3000ha | \$6mill |
| 4) 2005 | 973 ha | \$18 mill |

Fire Causes:

Children's fireworks 3%
Others 11% (arson, electric power lines)
Visitors to grave 8%
Tobacco rubbish 10%
Waste burning 8%
Weed burning 18%
People negligence in the mountain (42%)

Fire Prevention:

- Automatic watch towers in 630 sites at 305 zones across the country which means that 93% of the total forest area (over 6,000,000 ha) is covered by cameras.
- There are forest patrols but the numbers are deficient.
- There is a Korean fire danger rating system (using the standards of fuel, weather, etc)

Wildfire Suppression Using IT:

- A series of databases and networks are used to create mobile GIS tools for field crews
- The mobile GPS recon units and data they produce are used to locate fire (coordinates) and send images of the fire back to the fire controller.

Monitoring Post Fire Recovery:

- Intensive vegetation surveys
- Public surveys followed by a 5 year restoration plan
- Plan outcomes
- Emergency treatments to prevent landslides and reduce soil erosions
- Artificial and natural regeneration
- Landscaping

Vietnam Case Study

(Nguyen Tan Phong)

The annual fire management work plan is developed and approved by FPD with forest fire equipment being supplied by the government. However local communities are not trained in the proper use of the fire equipment and staff are not technically trained in fire suppression and prevention techniques. An IFM strategy was developed in 2003 but it has not yet been approved by the Provincial government. Within U Minh Thuong N.P. the water table is artificially high compromising biodiversity. Many native species and communities depend upon the wetland resources.

There is a national structure of fire management through the Government, MARD, Kien Giang PPC and to Kien Giang Biosphere Reserve. At the biosphere reserve level an iterative approach is used in that they prepare an annual work plan and technical report, go through implementation and then report back.

Fire Causes:

- Forest violations
- Honey harvesting
- Fishing
- Local unawareness
- Local careless burning
- Natural fires

Measures to Suppress Fire:

- Local task force
- Mobilisation of other task forces from outside of the region

Methods:

- Direct local force
- Mobilise local force
- Local equipment
- Local logistics

Policy:

- Strengthen ranger systems
- 100% allowance for rangers in fire season
- Full deployment in fire season

Equipment:

- Bulldozers
- Float water pumps
- Hoses
- Shovels
- Watch towers
- Special trucks for fire suppression
- Mobile telephone
- Speed boats

Fire Prevention:

- Fire breaks
- Cleared vegetation
- Controlled burning with permission from local authorities
- Small reservoir and canal
- Early fire warning and detection
- Village convention on fire management

Fire Preparedness:

- Technical training for rangers
- Fire awareness campaigns for people

Issues:

Can the staff of Kien Giang Biosphere protect the fires efficiently?

Can they protect the forest on their own?

Does Kien Giang Biosphere exist before the communities?

How can communities get involved in forest/fire management as well as forest/fire policy?

Discussion:

How to implement IFM?

What are the right types of equipment to use (safety, fire suppression, Public)?

What is the local framework, and policies for community involvement?

What is appropriate technical training for staff in forest fire management?

What is the relationship between fire management water regimes and fire ecology?

What is an appropriate land allocation for forest management?

Day 2

China's forest certification and relations with IFM and Climate Change

(Xiaoqian Chen)

Forest cover in the Asia Pacific Region is 26 % of the land area, approx 734,000,000 ha (source FAO). Net gain in forest coverage between 2000 and 2005 was 3 million ha. China's forest resource is 170,000,000 ha, and is approx 18% of the land area. The per capita forest coverage per person is quite low 0.06 ha/person which is approx 20% of the global average. China is considered to be a forest rich country based upon total area but on a per capita result it is quite poor in this resource.

China has its own sustainable forest management national standards and indicators but it is relatively complicated system and lacks a lot of instruction at the local and regional scales. In 2006 a set of 5 principles were established to try and more widely assimilate the sustainable forest management practices desired. Since 2006 100 sites have been established to pilot examples of sustainable forest management.

Issues for Sustainable Forest Management (SFM) are:

There are forest management plans for the local forestry units but the focus of the plans is on timber production and less on the social issues

The standards and indicators do not have practical instructions for the local people to use on the ground

There are not enough participants on the ground to fulfil the desired national SFM objectives.

Challenges and Opportunities:

Forest certification is proposed to be used as a marketing tool to promote SFM

China is proposing forest certification for its forest management and associated Chain of Custody.

The Standards:

- FSC and PEFC can be categorised into three spheres; economic, social and environmental
- In 2001 China began to establish a China National Forest Certification Scheme (CFCC) and it continues to evolve through to 2009. In 2009 the CFCC has been published and will be promulgated from April 1st, 2009.
- CFCC has 9 principles, 45 standards and 118 indicators
- A pilot program was established in 2006 to promote the national CFCC scheme, being tested on 20 forest units on the ground
- Fire management is one of the 9 principles in the CFCC scheme
- The CFCC scheme requires sound forest fire management to be implemented via a fire risk zone system, and establishing prevention and suppression systems
- The underlying focus is that is China can address certification using CFCC. This includes a focus on improving fire management positioning China to be in a better position to address climate change.

REDD Technical Elements

(David Ganz)

There are three primary components of REDD: 1) Additionality/Baseline; 2) Leakage/ Non-permanence and; 3) Measurement and Monitoring.

Additionality:

Additionality is the cornerstone of climate change mitigation. There are three tests but these cannot be measured exactly.

Baseline:

Baseline is used to show what amount of carbon storage will come from a project. Baseline can be determined by historic statistics or negotiated using best data and modelled scenarios.

Leakage:

“Activity leakage” is when a shift of pressures occurs at a local or regional scale. “Market leakage” is at a regional to global scale due to reduced supply but undiminished demand shifting pressure to another country (or similar).

Permanence:

Permanence addresses carbon which must be maintained across the time period in which the project is maintained. The carbon buyer needs assurance that this will occur.

Measurement and Monitoring:

There are links with the Chinese CFCC scheme. There are several types of measurement and monitoring tools available including remotely sensed data and on the ground teams.

Communities and Carbon Credits (Ma Jian):

Forests are defined in China as having Crown canopy >20%, Height >2m and Continuous area >0.067 ha. Total amount of carbon available from forestry in China is estimated at 50 million tonnes.

Two Types of Markets in Operation:

Kyoto Market

Non Kyoto market

Multiple Benefit Projects in China:

These projects are aimed at introducing the concept of payment for ecosystem services. To date projects have already sold 22,000 tonnes of carbon via a voluntary carbon market system at approx \$10usd / tonne or USD \$2,200,000. Up to 800 new jobs will be created over the life of the projects which are aimed at supporting social capital, financial capital and sustainable forest management.

Summary of Chinese Fire Management Policy and legislation

(Xiaorui Tian)

At the national level through to the local level there is an office in charge of fire control. In addition to the national level there is also a military structure for forest fire control. Fire management policy and law is developed and disseminated at the national level.

The Forest Law:

- There is a regulation that stipulates that the local government should organise forest fire control
- There is a regulation requiring protection of the forest resources
- There is also a regulation for the military to provide forest fire suppression
- There is a fire control regulation (1998, revised 2008). In the 2008 regulation the forest fire does not include the urban area. There is a guideline to focus on prevention
- Within the state council there is a group responsible for fire across the whole country
- At the Provincial and County level the governor is responsible for fire control
- In the forest the forest owner is responsible for fire control
- The local government can identify areas that are higher or lower risk of fire
- There are professional forest fire control team established across the country developed by the county government.
- The national fire control office publicises the telephone numbers for fire control
- Fire suppression is left mainly to professional teams which also includes the military. Other government offices will coordinate and participate as required.
- There are four levels of fire identified from a small fire to a large scale fire.
- If a large scale fire occurs control is elevated to the state offices.
- If a fire occurs at a national border the control of that fire will be managed by agreement between the two countries
- Pasture fire control is the jurisdiction of the agriculture department
- Forest fire control is the jurisdiction of the forestry administration

- The local governor is the first person to be called upon for both pasture fires and forest fires
- Pasture fires are classified into four classes based upon scale
- In 2003 the state council developed a critical document for each province to have their own document related to the state council and within these documents forest fire control is noted.

Fire Policy in Yunnan Province:

Yunnan Province has its own forest fire control regulation and there exists a separation of responsibility amongst the government agencies in the province. There are specific procedures between government agencies for fire control (including how to establish a fire control team).

There are also rules for fire prevention including fire permits for prescribed burning. Small fires are managed at a local level and the management of larger fires is elevated to the jurisdiction of the provincial office. There are regulations on how to use fire in forest/land management. For example permits are available for using fire in reforestation and land preparation activities.

However, there are restrictions on which specific forest types fire can be applied, as fire is not allowed in all forest types. The ignition of unauthorized fires is punishable by law.

Problems:

The biggest problems are a lack of technical support in the areas of:

- Fire information on the ground.
- Not understanding the role of fire in different ecosystems
- The impacts of fire on climate change

In the future it is desired to have a fire emergency alarm system

Strategies to strengthen legislation pertaining to fire – a natural reserve perspective

(Li Zhong, SFA)

China has 152,000,000 ha of protected natural reserves which is equivalent to 15.8% of the total forest area. This is considered to be a high percentage worldwide. However, due to the population pressures increasing the number of reserves is not an easy prospect. In china the natural reserves are managed by several departments including forestry and agriculture. The forestry depart first began natural reserves in 1956 and one of the first reserves was established in Xishuangbanna prefecture in Yunnan province.

Forestry Department:

120,000,000 ha of nature reserve is managed by the forestry department which is equivalent to 12.7% of the forested area in China.

Natural reserves protect approx 90% of the natural ecosystems in china
They protect 85% of the native wildlife species including rare and endangered
They protect 65% very high value species
They protect more than 300 endangered species
The nature reserves have a focus on the prevention of unwanted fire
There are allowable activities that occur in the forest reserves including ecotourism
The most important work in the forest reserves is fire control.

Fire Use in the Nature Reserves:

Fire can have a positive role in the ecosystem. There is an example where a large population of cycads are being managed by changes to the fire regime and reduction in fire wood collecting. But after several years of preventing fire from occurring the reserve staff realised that fire was needed and it was applied in the nature reserve to reinvigorate the cycads.

Fire is used to manage a population of sacred deer. Following the establishment of the nature reserve there was strict control on the use of fire and no activities could occur in the forest (they stopped fire wood collection and changed to gas in the household. They realised that the shrubs grew very fast and were overgrowing too quickly. A small experiment was used to introduce shrub culling and fire. The results of this increased the number of deer due to increased habitat.

Conclusion:

The use of fire has resulted in changes to vegetation structure and composition that impacted specific habitats resulting in the achievement directed and desired outcomes. The forestry department has experiences in the use of fire across a range of ecosystems in china (Desert, wetland, forest etc) and some of these experiences are not all positive. In a wetland areas used by migratory birds the use of cutting of the grass and burning for access proved to be detrimental for the bird habitat.

Fire Management - Voluntary Fire Guidelines (Petteri Vuorinen, Forestry Officer – FAO)

This is the main component of the FAO Fire Management Strategy. It is in all practically a tool for planning, management, monitoring and cooperation in fire management. It is aimed to support policy development, legal, regulatory and technical enhancement. The document was developed under the auspice of many stakeholders, directed by a mandate from the COFO 2005 meeting. The draft guidelines were developed with considerable stakeholder input and participation.

Scope:

- The scope is global in nature
- It is not legally binding it is voluntary
- It is aimed at all levels of civil society and the private sector from the policy level to private level

Objectives:

- Promote sustainable land management by establishing principles for the responsible use of fire
- Facilitate establishment and implementation of policies and planning mechanisms
- Promote CBFiM
- Promote cooperation in fire management between agencies and organizations

Content:

- International and sub-national links
- Cross sectoral issues
- Principles (Social, Economic, Environment, Institutional, Enhanced capacity)
- Strategic actions
- Bibliography
- Annexes

Implementation:

- National and international agencies
- Universities
- Fire management action alliance

ITTO Fire Guidelines (Mike Jurvelius)

A summary of the ITTO/IUCN guidelines was provided detailing their use in other locations and the opportunity that exists to utilise them in China, Vietnam, Mongolia and South Korea.

Characterizing Fire Management (Brett Shields)

A summary of a framework of fire management was used to show how fire management can be analysed and understood. The framework uses the PPRR structure.

PRA Tools (David Ganz)

A summary of PRA tools and their use in rural communities was provided. A focus on the use and application of Semi-Structured Interviews was conducted and how its can be applied in the field during the field study.

The use of the structured tables and frameworks for assessing CBFiM were introduced.

Workshop participants were then placed into 5 working groups and worked within those groups to develop and refine PRA questions and approaches for use in informal interviews with villagers and park staff the following day.

Day 3

Field Trip to Xishuangbanna Nature Reserve

The workshop participants travelled to Mangun village on the edge of the Xishuangbanna national Nature Reserve. Using Participatory Rural Appraisal (PRA) techniques and approaches learned the previous day participants conducted 2 hour semi structured interviews with several different groups including a women's group, an elders group, a community leaders group, a men's group and a group consisting of park staff.

Following the interviews the group travelled to the edge of the nature reserve where the park staff conducted a prescribed burn. The burn objectives were:

- To provide a fire break barrier between the community paddy fields and the majority of the park.
- To reduce fuel loading in the forest understory.

The last stop of the day was the Xishuangbanna Museum of Natural History in Jinghong.

Day 4

Field Trip Summaries (David Ganz)

The field trip offered the opportunity to try out one of the PRA tools. Each group will now work to synthesis the information gathered in the field. It will be an opportunity to cross-check the information from the field with other groups. This is important as there are many different perceptions from both within and outside the community.

Community Based Fire Management Analytical Table:

The Community Based Fire Management Analytical Table is designed to capture non-detailed types of information related to a particular group or community's use of fire.

Community Based Fire Management Analytical Table

| Types of Fire Being Assessed Within a Community Perspective | | | | | | |
|---|----------|--------------|----------|-------------------|------------------|-------------------|
| 1 | | | | | | |
| 2 | | | | | | |
| Point of Origin | | Impact (+/-) | | Ability to Change | Intent to Change | Shared Objectives |
| | | | | | | |
| Insider | Outsider | Insider | Outsider | | | |
| | | | | | | |

Types of Fire Being Assessed Within a Community Perspective:

Identifies the types of fire typically being used by community members i.e. cooking fires, agricultural or land clearing fires, and fires for hunting etc.

Point of Origin:

The perceived point of origin of fires. This should include the perceptions as to whether this is inside or outside of the control of the village or park staff. There may be different perspectives on who caused a fire.

Impact:

This is a summary table and is to identify the positive and negative impact that the fire may have on the community and the other stakeholders (outsider).

Ability to Change:

This is possibly the most important aspect of the assessment and the hardest to fill in. This is the community’s capacity to organise itself, and in the case of fire it the community’s ability to address, response and recover from fire. We need to go back to this aspect and cross check to ensure that we are not overestimating or underestimating the community’s ability to manage fire.

Intent to Change:

This is the relative need to intent to change based upon the strength of capacity to change.

Shared Objectives:

As communities are often heterogeneous this is used to formulate shared objectives of some sort with a multi stakeholder group. This aspect may raise some conflict and it may be necessary to use some conflict resolution tools to reach a consensus. This is used to try and understand if there is a shared interest in managing fire. This is a useful point in a rapid assessment to begin a dialogue between stakeholders for collaborative management agreement.

Fire Impacts Table:

The Fire Impacts Table is a more detailed perspective of fire impacts and provides the opportunity to separate out and describe those impacts (See Appendix 3 and 4 for completed tables).

Fire Impacts Table

| Fire Type | | | | |
|--|----------|----------|----------|----------|
| 1 | | | | |
| 2 | | | | |
| Impacts | Inside | | Outside | |
| | Positive | Negative | Positive | Negative |
| Ecological | | | | |
| Environmental | | | | |
| Social | | | | |
| Safety | | | | |
| Health | | | | |
| Economics (subsistence & livelihoods) | | | | |
| Political | | | | |

Day 5

Application of prescribed burning in Xishuangbanna Nature Reserve

(Mr. Tang Zhongming, vice director Xishuangbanna NNR)

The Xishuangbanna Nature Reserve was established in 1958, in 1986 it was upgraded to a National Nature Reserve and in 1988 the National Bureau for the management of the nature reserve was established. There are five parts to the nature reserve. The nature reserves are home to Asian elephants and several areas border with Laos. The total area 243,000 ha, and make up 12% of the total area of Xishuangbanna. There are 122 villages with a total of 25,000 people located inside the nature reserve. Adjacent to the nature reserve there are 138 villages with a total population off 38,000 people. In 1992 a management regulation was established and is still used. The regulation provides legislative power for the protection of the nature reserve.

There is also a national management plan for the reserve as well as a general plan for the management of the reserve (2005-2015).

The nature reserve is divided into three classifications:

- Core zone for conservation
- Buffer / transition zone
- Experimental area

The main conservation purposes are:

- Tropical forests
- Evergreen forests in sub tropical climates
- 153 plant species
- 134 species are endangered
- 96 animals (Asian elephant (approx 250), deer, wild buffalo, long monkey, Indo tiger)

Organisational Structure:

- 255 staff
- Bureau
- Divisions (general office, financial, resource division, police division)
- Management stations

Work in Fire Management:

- There is an established team and organisation for fire management
- There is publicity and education on fire control and prevention (conducted in January).
- There are some fire watchtowers
- Prescribed burning used within the park

Planning a Prescribed Burn:

Prior to burning a plan must be completed that includes a map of the burn area, prevention measures, ignition technique, time of proposed burn, resources available (personnel and equipment), and a supporting budget. The plans are typically approved by the county fire department. Staff participating in the burn are organized beforehand this includes a pre-briefing and safety briefing. These staff are trained and experienced and the chain command is very clear.

Following the burn the staff confirms that it is completely extinguished prior to leaving the site. Follow up monitoring occurs as a further precaution. There is no prescribed burning in the core area of the nature reserve or along road edges. There are 5 burning principles:

- 1) if not approved you cannot burn
- 2) if there is no commander you cannot burn
- 3) if there are no fire breaks you cannot burn
- 4) if there is no staff can't burn
- 5) if the wind is more than 3km/hr cannot burn

Benefits of Prescribed Burning:

- Promotes regeneration
- Prevents pests (mice, rats and various insects)
- Food for animals
- Reduce fuels

- Improves elephant habitat

Fire will contribute to the conservation of the tiger and elephant in

Xishuangbanna

PhD student (Limin Feng)

There are four known species of wild tiger in China. Of these the Indo-Chinese tiger is only found in Xishuangbanna National Nature Reserve. Herbivores found in the nature reserve include elephants, wild bulls, monkeys and deer. The density of large animals is key to the survival of the tiger. For example one adult tiger needs to consume several hundred large ungulates each year in order to survive.

90% of all Asian elephants in China reside in Xishuangbanna National Nature Reserve. This equates to between 165 and 213 animals. The elephants preferred habitat is grassland and bamboo forest types and to a much lesser extent tropical or broadleaf evergreen forest types.

One recognised difficulty of elephant conservation in China is the fragmentation that occurs within many of the nature reserves.

It is suggested that tigers and elephants need fire for improved grass land habitats. However, fire can induce invasive species such as 'bladey' grass. When it is young (one year old) this type of grass is very palatable to the elephants, but as it matures becomes hard and more unpalatable.

ITTO Project in China (Chinese Academy of Forestry, Dr. Yi Haoruo)

The International Tropical Timber Organization (ITTO) currently has 60 members globally. Its objective is to organise and promote sustainable management, use and trade of tropical timber.

ITTO project in China – Tropical Forest Fire monitoring and Management System based on Satellite Remote Sensing data in China. This is being conducted across three counties in one province. The goal is to protect the tropical forest, reduce fire in the forest and to promote the use of tropical forest products.

TropFireMAS:

Fire information system
Public education materials

Technology Use:

Application for fire satellite monitoring
Fire scar monitoring

There is a fire broadcast delivered via Closed Circuit Television (CCTV2). There is also a national Fire Danger Rating system that was developed using 700 weather stations which is broadcast via CCTV2.

Sharing Fire Data:

A network platform has been set up for internet access to fire data with restricted access.

Project Achievements:

- Forest fire database
- Base geographical information (land use, topo, vegetation)
- Monitoring models and methods
- Regional fire maps and checklists
- Fire danger rating system (base data assessed)
- Developed the CCTV2 broadcast model
- The project is on the web “tropical forest fire in china” (ITTO)

Ecology of Fire in West Africa, Ghana (Mike Jurvelius)

Ghana occupies 20 million ha. The north on the country is wooded savannah and the southern portion is predominantly tropical rainforest. The main issue in Ghana is illegal logging. Illegal logging is opening up the forest and changing the forest composition. Approximately 240 million ha of burning is conducted each year in Africa.

Human Behaviour vs. Fire Use, NEA Russian Handbook (Mike Jurvelius)

The handbook focuses on fire awareness training and training in the use of fire. The longer a fire burns the more expensive it becomes.

What triggers motivation:

- 1) existing needs (psychological and safety needs)
- 2) related needs

Results of CBFiM:

In Namibia 10 years after the concept of CBFiM was introduced and implemented the region was able to increase the cattle on ground from 30,000 head to 130,000 head. Changes in human behaviour takes a long time but it is important for local people to see these types of results and how they can directly benefit from them.

Beliefs on Fire:

Awareness raising leads to a change in attitude which leads to changed intention and determination and finally to a change in behaviour.

Prescribed Fire Techniques (Darren Johnson)

There are two commonly used types of fire breaks: 1) hard fire breaks (exposed mineral soil) and; 2) soft fire breaks which have a lower environmental impact. However a soft fire break is less secure than a hard fire break and may require additional patrols to secure the line.

Fire break placement:

- Use existing barriers where possible
- Make the line as short as possible
- Avoid curves and sharp angles

Width of fire break:

- Width depends upon the type of fuel inside and outside of the burn unit
- Generally the width of a fire break should be 2 or three times the height of the flanking fire

Day of the Burn:

- Obtain authorisation
- Notifications
- Ensure predicted weather is within the burn prescription
- Pre-burn briefing with the fire crew

Ignition Plan:

- Where is the test fire going to be conducted?
- What is the ignition pattern?

Holding Plan:

- Who is responsible for patrolling the fire?
- Are there any critical areas or weak points in the containment lines?

Contingency Plan:

- What actions will we take if the fire gets away?
- Do you have enough resources to handle a fire escape, if not where can more be secured?

Go/NoGo Checklist:

- A checklist to ensure that all the relevant authorisations and prescription parameters and resources are in place for the prescribed burn.

Safety Plan:

- Qualified First Aid person on site
- Identify location of first aid kits
- Review medical emergency procedures
- Review and identify emergency evacuation routes

Ignition Tools Commonly Used:

- Drip torch
- Flares or fuses
- Aerial ignition

Post Burn:

- A critique and evaluation of the burn is conducted that generally includes all personnel involved in the event i.e. what went right and what went wrong

Monitoring:

- Allows for analysis of whether or not burn objectives were met and subsequent adjustment of prescription to better meet objectives if they were not met.

Fire Management in Yunnan Province (Yunnan Forest Deputy Forest Fire Control Office – Cengsheng Li)

Yunnan has rich forestry resources and also experiences forest fires. The fire occurrence is related to the geography and socio economic conditions. Approximately 94% of the province is mountainous and 57% of the province is covered by forest. Yunnan has the second largest forested area in China and is one of the most biodiverse ecosystems in the country. Winter and spring are dry with relatively little rainfall but high humidity. Recently there was a 3 month period in Xishuangbanna during which there was no rain. This is considered to be an unusual event for the region. Approximately 77% of the population live in the mountainous areas of the province. In the mountains there are a variety of rural livelihood activities such as cropping, grazing etc. There is a concentration of the minority groups in Yunnan and these minorities have a tradition of using fire.

Fire is a major natural disaster in the province. Yunnan has about 6-10% of the national total area of forest fires per year. There are 10 prefectures within Yunnan province and all of them experience fire each year. Fire control starts from Dec 1 to June each year with the strictest control occurring during the months of March and April. Fire does occur in the mountains and is very difficult to control. Approximately 50% of all fires in the province are a result of agricultural activities such as stubble burning and land clearing, and the other 50% can be attributed to non-agriculture production.

The province is zoned into fire risk zones. There are 127 counties within the province and of these 102 are zoned high risk, 23 medium risk and 4 low risk. In addition there is a fire alarm system comprised of five levels (fire danger rating). During periods of high fire risk the media (newspapers and television) will publish and broadcast notices and professional fire suppression teams will be made ready on high alert.

How Can We Manage Fire at the Community Level?

In past there was tradition for people to go to their ancestors in the mountains and assist them in the use of fire. Today this is no longer the case and fire is not used in a traditional sense by people that inhabit the mountainous regions of Yunnan. There are farmer education programs and campaigns provided by the forest guards that teach fire prevention. In addition there are check stations at the edge of forests to prevent the entry with matches. Lastly there fire prevention education campaigns are directed at schools and school age children.

Use of Fire:

- Mineral earth fire breaks are made
- Green breaks are used
- Prescribed burning is used in non mountainous areas such as Xishuangbanna.

There are professional fire suppression teams (teams are usually 30 members). Depending upon the higher or lower risk areas across the province the government will establish more or less fire suppression teams

Fire Suppression Technology:

- Backing fires are used to create black lines on prescribed burns and to combat wildfires
- Aircraft
- Fire breaks

Community Based Fire Management (CBFiM) in Wenyime Village,

Chuxiong Yi Autonomous Prefecture

(Zhao Yaqiao)

The Objectives of the case study were to: 1) Demonstrate that communities In Dayao country have a need to respond to fire; 2) document traditional methods and uses of fire and regulations for CBFiM and to; 3) define critical elements of CBFiM within a Chinese case study.

Methodology:

- Stayed in villages for 18 days in 2001
- Different methods used to collect data
 - Group discussions
 - Past and present leaders
 - Women
 - Elders
 - Joint defence fire control volunteers
 - Key householders that rely on forest resources
 - Shepherds
- Semi structured interviews
 - Elementary school teachers
 - People who have been punished for starting fires in the village
 - Neighbouring villagers
- Forest resource mapping and stakeholder analysis

Background (Fire History):

A large fire occurred in 1965 resulting in significant losses and a long local memory of those losses. Wenyime is located in one of the most fire prone areas in Dayao County.

Policy:

In 1985 the government passed 'mountain responsibility' to the community, along with the benefits from the forest such as NTFP's. Forest fire management regulations were developed at the state and provincial levels.

Indigenous Uses of Fire:

Agriculture, Lighting, Cooking, Grazing, Cultural use

Organization at the Community Level:

The village level is responsible for holding local meetings and setting up local fire teams (14,700 people at this level). Dayao County established a collaborative network with 18 townships and 6 counties. There is policy and regulation to support fire.

Sense of Ownership:

The village was given ownership and responsibility for part of the mountain region so that they can secure a livelihood from the forest. Non-Timber Forest Products (NTFPs) account for approximately 20% of a typical household's average income. Land tenure is secure and well defined giving a clear sense of ownership.

Adaptation of Knowledge:

Local fire knowledge is passed down from one generation to the next. This is also true of the fire that occurred in 1965. More than 21 separate villages have rules to limit and manage the use of fire around the village and to prevent unwanted fires. Fire is still used in agriculture and for sustainable livelihood development. Fire is used in a responsible way in accordance with the village rules in a way that supports everyone.

Prevention vs. Suppression:

The role of the villagers in fire management is as follows:

- Perform fuel reduction (collection of leaves for use as animal fodder and for crop fertilizer)
- Follow regulations to prevent forest fires from November to May
- Educate children not to play with fire
- Collect the fire ignition tools from children (matches, fireworks etc.)
- Prohibit the use of fire for cooking or heating when in the field
- Volunteer one family member from each household for fire control duty

Balancing the Approach:

- Both the village and the state authorities are cooperating to manage fire
- The state provides professional fire fighters, weather towers and equipment
- The village has set up its own rules to prevent fire
- The village supplies many volunteers if a fire starts

Balancing Government Support:

- The responsible balance and burden for fire fighting is shared between the state and village
- The state supports fire through the Forestry Bureau, the Natural Protection Centre
- Armed Forces Bureau (a total of 80 professional people)

The Results:

- Since 1965 there has not been a large scale destructive fire
- The village has clear ownership and receive all benefits derived from the forest and their lands
- The village has a set of rules established by itself to self regulate leading to stronger fire prevention activities

- The state is providing professional fire fighters and expertise should a large scale fire start

What are the Benefits of CBFiM?

- The mountains are becoming greener
- The watershed and water resources are protected
- The water yields are increased
- Flooding has been reduced and water better regulated
- Forest resources are restored
- Many rare animals are coming back
- The people have improved income generation from NTFPs
- Improved living conditions
- Future generations will benefit from the resources

The Two Faces of Fire (Darren Johnson)

Fire is both a tool and a force of fear. Through prevention efforts nearly all countries have a strong negative connotation toward fire. For many rural people fire is essential however in some places fire is illegal.

Fire in Nature:

- We know fire is a natural process and is essential in some ecosystems
- When fire does occur it influences the composition and structure of the ecosystem
- Fire is not a problem unless used irresponsibly or inappropriately
- Fire has many faces

Bad Fire:

- Disrupts the equilibrium in the natural ecosystem that benefits people
- Negatively impacts human life and property
- Causes 2nd and 3rd order impacts (human society and ecosystems)
- Impacts health and economic well being of people a long way from the fire

Good Fire:

- An essential heating and cooking tool
- An essential process that maintains fire dependent ecosystems
- It is a tool that can be used to reduce fuels and protect against severe fires
- Can be used to protect property and fire sensitive ecosystems
- Can maintain the biodiversity of ecosystem
- Can be used to prepare agricultural crops
- Can be used to improve grazing and domestic and native stock
- Objectives of the Exercise:
 - Each group prepare educational material for good fire and bad fire
 - In your examples include some 1st 2nd and 3rd order fire effects both negative and positive Include community needs and expectations as well as broader benefits and negative effects

Next Steps

Based on what you have learned this week how would you share and spread CBFiM knowledge and technical information in your country. In what ways can TNC/FAO assist?

Vietnam:

1. Organize a workshop on fire management in Phu Quoc and U Minh Thuong National Parks
2. Obtain technical assistance from TNC/FAO in the development and implementation of fire management plans.
3. Develop an integrated fire management plan for Kiengiang Biosphere Reserve

China:

1. Develop and publicize a manual on community based fire management
2. Develop clearly defined theories and methods on community based fire management
3. Improved monitoring and evaluation of prescribed burning

Mongolia:

Mongolian Delegates (the team) for CBFiM Conference Workshop China 2009 are proposing following plan to share CBFiM knowledge and strategies and some further implementation of activities for new prescribed burning approach in Mongolia. These follow-up activities will be focused on eastern Mongolia particularly in Khentii and Dornod provinces and will have provincial level of stakeholders. However, national government representatives will be periodically informed and invited for monitoring and evaluation.

1. Initial step would include conducting workshop for varies stakeholders of wildfire management such as environmental protection agency, professional inspection, disaster management departments and community leaders. The workshop will facilitate involved stakeholders to have common understanding about CBFiM strategies and specially prescribed burning method. Most importantly workshop organizers should convince provincial government to allocate for prescribed burning county. Therefore, the team will have one county in each of the provinces. Khentii will

have forested and Dornod will select grassland ecosystems and these areas must be wildfire prone and shall not be protected area.

2. After selection of certain county, the team will conduct the more comprehensive workshops in the selected counties including government officials and local communities to introduce the goal and as a result of these workshops and consultations the prescribed burning method could be updated to local knowledge.

3. Lastly these selected areas shall have at least three years of consistent implementation of the new approach along with the proper scientific monitoring. The result will be reported to government and study tours should be conducted including other provincial and national leaders to advocate the new approach outcomes.

The team will pioneer the use of prescribed burning Mongolia with the hope that after three there will be an amendment made to related legal acts allowing prescribed fire use and CBFiM in Mongolia. Moreover, government and community attitude towards fire will change. In addition the team will use their own capacity to implement this small project but funding and expertise from FAO/TNC could play essential role in the successful implementation of the project.

Appendix 1. Program



COMMUNITY BASED FIRE MANAGEMENT (CBFiM) WORKSHOP China 2009

Programme

| Dates: 2007 | Duration: | Activity: | Speakers: |
|---------------------|-------------|---|---|
| Sunday March 8th | 07:00-18:00 | - Arrival of participants - Transport to the meeting facility - Orientation of the participants upon arriving - Registration | Organizers |
| Monday March 9th | 7:30 | Breakfast | |
| | 08:30-9:45 | Inaugural Session - Welcome - Objectives of the Course. - General vision of FAO | Su Ming (SFA) David Ganz (TNC) Petteri Vuorinen (FAO) |
| | 09:45-10:00 | Recess | |
| | 10:00-10:45 | Introduction of the Participants and Trainers | All |
| | 10:45-11:00 | Announcements - Logistics | Darren Johnson |
| | 11:00-11:15 | Recess | |
| | 11:15-12:00 | Global perspective of TNC - Who is TNC? - What is the Global Fire Initiative? - What is CBFiM/IFM? | Darren Johnson David Ganz |
| | 12:00-13:30 | Lunch | |
| | | General presentations on the programs of fire management at the national level: the successes, the problems and the needs. | |
| | 13:30-14:00 | Regional Perspective: Asia | David Ganz |
| | 14:00-14:20 | Country Perspective: Case study (China) | Fire Prevention Office |
| | 14:20-14:30 | Recess | |
| | 14:30-14:50 | Country Perspective: Case study (Mongolia) | Galbadrakh Davaa |
| | 14:50-15:10 | Country Perspective: Case study (Philippines) | Mike Jurvelius |
| | 15:10-15:20 | Recess | |
| | 15:20-15:40 | Country Perspective: Case study (S. Korea) | Korean Forest Service |

| | | | |
|-----------------------|-------------|--|--|
| | 15:40-16:00 | Country Perspective: Case study (Vietnam) | Nguyen Tan Phong |
| | 16:00-16:10 | Recess | |
| | 16:05-16:20 | Groups develop flip chart summaries | All (break into groups) |
| | 16:20-17:00 | Discussion of country perspective presentations: the successes, the problems and the needs. (presentation of group flip chart summaries) | All |
| | 18:30 | Dinner | |
| | | | |
| Tuesday March 10th | 07:30 | Breakfast | |
| | | Communities and Climate Change | |
| | 08:30-08:50 | Chinese Forest Certification: Linkages between sustainable forest management, IFM, and climate change. | Xiaoqian Chen |
| | 08:50-09:15 | REDD and Carbon Sequestration/ Fire and Carbon Emissions | David Ganz |
| | 09:15-09:30 | Recess | |
| | 09:30-09:50 | Communities and Carbon Credits | Ma Jian |
| | 09:50-10:15 | Session Summary (panel discussion) How to ensure communities benefit from carbon credit strategies such as REDD? | David Ganz Darren Johnson Brett Shields Zhang Xiaoquan Ma Jian |
| | 10:15-10:30 | Recess | |
| | | Policy and Legislation | |
| | 10:30-11:00 | Summary of current fire management policy and legislation in China | Tian Xiaorui & Zhao Fengjun (Chinese Academy of Forestry) |
| | 11:00-11:30 | Strategies to strengthen and to complete appropriate legislation pertaining to fire: A Natural reserve perspective. | Li Zhong (SFA) |
| | 11:30-11:40 | Recess | |
| | 11:40-12:00 | International policy issues for forest fires: Agreements and international groups | Petteri Vuorinen |
| | 12:00-12:15 | IUCN/ITTO Manual on procedures for CBFIM activities (Presentation based on principles outlined in FAO Guidelines) | Mike Jurvélius |
| | 12:15-13:30 | Lunch | |
| | | Tools for Identifying and Characterizing the Fire Problem | |
| | 13:30-14:00 | Tools and basic studies for the identification and characterization of the fire problem: Who is burning, why, when and how? (slides that show the problems with dealing with fire at a national/community level) <i>Examples from China</i> | Brett Shields |
| | 14:00-14:15 | Recess | |
| | 14:15-15:00 | PRA (Rapid Assessment Tools) | David Ganz/Lu Caizhen |

| | | | |
|-------------------------------------|-------------|--|---------------------------------|
| | 15:00-16:00 | Overview of site visit: National reserve fire management program in Xishuangbanna (Logistics, Objectives, etc.) Establish working groups. | Darren Johnson Lucy Guangzhi |
| | 18:30 | Dinner | |
| Wednesday March 11 th | 07:00 | Breakfast | |
| | | Site Visit an Example of CBFiM | |
| | 08:00-12:00 | Site Visit to Xishuangbanna National Reserve | All |
| | 12:00-13:30 | Lunch | |
| | 13:30-16:00 | Site Visit to Xishuangbanna National Reserve | All |
| | 16:00-17:00 | Return to meeting facility | |
| | 18:30 | Dinner | |
| Thursday March 12 th | 07:30 | Breakfast | |
| | | Site Visit Presentations & Discussions | |
| | 08:30-09:15 | Groups prepare site visit presentations | All |
| | 09:15-09:30 | Recess | |
| | 09:30-10:15 | Groups prepare site visit presentations | All |
| | 10:15-10:30 | Recess | |
| | 10:30-11:15 | Groups prepare site visit presentations | All |
| | 11:15-11:30 | Recess | |
| | 11:30-12:00 | Groups prepare site visit presentations | All |
| | 12:00-13:30 | Lunch | |
| | 13:30-14:20 | Site Visit Group Presentations (2) Findings plus strengths and weaknesses of this approach. | All |
| | 14:20-14:35 | Recess | |
| | 14:35-15:25 | Site Visit Group Presentations (2) Findings plus strengths and weaknesses of this approach. | All |
| | 15:25-15:40 | Recess | |
| | 15:40-16:00 | Site Visit Group Presentations (1) Findings plus strengths and weaknesses of this approach. | All |
| | 16:00-16:15 | Site Visit Summary and Conclusions | All |
| | 18:30 | Dinner | |
| Friday March 13 th | 07:30 | Breakfast | |
| | | Integrating Ecological Factors in the Handling of Fire: Natural Protected Areas and communities | |

| | | | |
|------------------------|-------------|---|--|
| | 08:30-09:00 | Xishuangbanna Fire Management Program | Tang Zhongming (NNR) |
| | 9:00-9:30 | Wildlife Conservation and Fire Management | Limin Fang |
| | 9:30-9:45 | Recess | |
| | 9:45-10:15 | Lessons learned: ITTO Fire Project in China | Yi Haoruo |
| | 10:15-11:00 | Ecology of Fire (<i>Impact of Fire regime on development of Community by-laws, Ghana</i>) | Mike Jurvelius |
| | 11:00-11:30 | Basic concepts in fire behavior and the handling of fuels (Chinese analogs) | Lucy Guangzhi |
| | 11:30-13:00 | Lunch | |
| | 13:00-13:30 | Theory and Basic Techniques of Prescribed Burning | Darren Johnson |
| | 13:30-14:00 | FAO Case Study: Wenyime Village north of Kunming | Zhao Yaqiao (CDS) |
| | 14:00-14:15 | Recess | |
| | 14:15-14:45 | SFA fire management in Yunnan | Yunnan Fire Prevention Office representative |
| | 14:45-15:15 | Presentation "The Two Faces of Fire". Assign tasks to groups (developing educational materials that convey the concept of the 2 faces of fires). | Darren Johnson |
| | 15:15-15:30 | Recess | |
| | 15:30-17:00 | Groups Develop Presentations "The Two Faces of Fire". | All |
| | 18:30 | Dinner | |
| | | | |
| Saturday March 14th | 07:30 | Breakfast | |
| | | "The Two Faces of Fire" | |
| | 08:30-08:45 | Human behaviour vs. fire uses (Included as Chapter 2. in the NEA Russian Handbook). | Mike Jurvelius |
| | 08:45-09:15 | Groups Develop Presentations "The Two Faces of Fire". | All |
| | 09:15-10:45 | Group Presentations of Assigned Tasks (3) | All |
| | 11:00-11:15 | Recess | |
| | 11:15-12:00 | Group Presentations of Assigned Tasks (2) | All |
| | 12:00-13:30 | Lunch | |
| | 13:30-13:45 | Next Steps: Strategies for sharing and disseminating scientific knowledge and technical information with regards to IFM-CBFiM within China and other countries represented at the workshop. | All |
| | 13:45-14:30 | Group presentations of next steps. | All |
| | 14:30-14:45 | Closing Ceremony | Petteri Vuorinen |
| | 19:00 | Dinner | |
| | | | |

Appendix 2. Evaluation Summary

CBFIM Course Evaluation (Xishuangbanna, China March 9th-14th, 2009)

Name (Optional):

Presentations

Day 1

Global Perspective of TNC
Summary of IFM/CBFIM
Regional Perspective: Asia
Case Study (China)
Case Study (Mongolia)
Case Study (Philippines)
Case Study (S. Korea)
Case Study (Vietnam)

| | Ratings | | | | |
|--|----------|---|---|---|---------------|
| | 1 (poor) | 2 | 3 | 4 | 5 (excellent) |
| | | 2 | 1 | 3 | 15 |
| | | | 3 | 3 | 15 |
| | | | 3 | 6 | 12 |
| | | | 3 | 3 | 14 |
| | | | 6 | 5 | 11 |
| | | | 6 | 5 | 11 |
| | | | 2 | 8 | 11 |
| | | | 2 | 6 | 13 |

Comments:

Day 2

Chinese Forest Certification: Linkages between sustainable forest management, IFM and climate change
REDD and Carbon Sequestration
Communities and Carbon Credits
Session Summary
Summary of current fire management policy and legislation in China
Strategies to strengthen and to complete appropriate legislation pertaining to fire
International policy issues for forest fires: Agreements and international groups
IUCN/ITTO manual on procedures for CBFIM activities
Tools and basic studies for the identification and characterization of the fire problem
PRA (rapid assessment tools)

| | 1 (poor) | 2 | 3 | 4 | 5 (excellent) |
|--|----------|---|---|---|---------------|
| | | | 4 | 3 | 14 |
| | | 4 | | 3 | 14 |
| | | 1 | 3 | 6 | 11 |
| | | 1 | 3 | 5 | 12 |
| | | | 3 | 5 | 13 |
| | | | 4 | 4 | 13 |
| | | 1 | 2 | 4 | 14 |
| | | | 2 | 7 | 12 |
| | | 1 | 2 | 5 | 13 |
| | | | 1 | 7 | 13 |

Comments:

Day 5

Xishuangbanna fire management program
Wildlife conservation and fire management
Lessons learned: ITTO fire project in China
Ecology of Fire (impact of fire regime on development of community by-laws in Ghana)
Basic concepts in fire behaviour and the handling of fuels
Theory and basic techniques of prescribed burning
FAO case study: Wenyime village
SFA fire management in Yunnan
The 2 faces of fire

| | 1 (poor) | 2 | 3 | 4 | 5 (excellent) |
|--|----------|---|---|---|---------------|
| | | | 1 | 6 | 14 |
| | | | | 8 | 13 |
| | | | 6 | 5 | 11 |
| | | | 4 | 3 | 14 |
| | | | 2 | 6 | 14 |
| | | | | 4 | 17 |
| | | | 4 | 3 | 14 |
| | | | 3 | 7 | 11 |
| | | | 1 | 5 | 15 |

Comments:

Site Visit (Xishuangbanna Nature Reserve)

Was the field trip well organized?
Was the exercise useful?
Did the break out group exercise allow you to properly understand how and why PRA can be used?
Were the group presentation informative (Did you learn something new)?

| | 1 (poor) | 2 | 3 | 4 | 5 (excellent) |
|--|----------|---|---|---|---------------|
| | | | | 2 | 16 |
| | | | | 3 | 18 |
| | | | | 4 | 17 |
| | | | | 2 | 19 |

Comments:

Hotel Accommodations

Was the food (breakfast, lunch and dinner) acceptable to you?
Was the hotel staff friendly and helpful?
Was your room clean and comfortable?

| | 1 (poor) | 2 | 3 | 4 | 5 (excellent) |
|--|----------|---|---|---|---------------|
| | | | 1 | 8 | 12 |
| | | | | 6 | 15 |
| | | | | 5 | 16 |

Comments:

General

In general was the workshop well organized?
Did the workshop achieve its objectives:
1) To inform people of CBFIM through the use of examples
2) Encourage and promote the role of communities in fire and landscape management

| | 1 (poor) | 2 | 3 | 4 | 5 (excellent) |
|--|----------|---|---|---|---------------|
| | | | | 4 | 17 |
| | | | | | |
| | | | | 2 | 19 |
| | | | | 2 | 19 |

Appendix 3 Fire Impact Table

Fire Impacts Table

| Fire Type | | | | |
|--|---|---------------------------------------|---|--|
| 1 Prescribed fire (agricultural) | | | | |
| 2 Wildfire | | | | |
| Impacts | Inside | | Outside | |
| | Positive | Negative | Positive | Negative |
| Ecological | Increased fertility of land Regeneration of pine and oaks Control pests (mice etc.) | Destroys forest | Regeneration of pine and oaks Control pests (mice etc.) | Destroys forest |
| Environmental | | Smoke/haze Reduced water quality | | Smoke/haze Reduced water quality |
| Social | Makes the community happy Social hamony | | Experience in how to prevent agricultural fires buming into the nature reserve Social harmony | |
| Safety | Protects the community | Injuries/accidents Property damage | Avoid fires escaping into the nature reserve forest Promote the skills of the nature reserve staff | Injuries/accidents |
| Health | | Smoke/haze Water Quality | | Smoke/haze |
| Economics (subsistence & livelihoods) | Increased agricultural products Increased household incomes Increased NTFPs (mushrooms) | Economic loss | | Economic loss Costs of conducting burns (labor, fuel etc.) |
| Political | Hamonious society | | Harmonious society | |

Appendix 4. CBFiM Analytical Table

Community Based Fire Management Analytical Table

| Types of Fire Being Assessed Within a Community Perspective | | | | | | |
|---|---|--|----------|--|---|---|
| 1 Prescribed Fire (agricultural) | | | | | | |
| 2 Wildfire | | | | | | |
| Point of Origin | | Impact (+/-) | | Ability to Change | Intent to Change | Shared Objectives |
| Insider | Outsider | Insider | Outsider | | | |
| Rice Paddi | Neighboring villages | (+) minimize harmful forest insects | | Where & when to burn | Comply with policy | Use of prescribed burning |
| Sugar Cane Fields | Nature Reserve | (+) improves grazing for livestock wild animals | | Policy | Adapt fire management practices to minimize conflict with the Nature Reserve | Develop ways to decrease accidental fire events |
| Grasslands (grazing) | Nature Reserve staff | (+) controls grass minimizing comp with seedlings | | No ability for community to change reserve burning practices | Fire is the custom and part of the local culture & needed for agriculture | Reduce fuel loads on the boundary between the reserve and community |
| Forested hillsides | apply fire on reserve boundary where fuel loads are heavy and risk of fire is high. | (+) fertilizes agricultural fields | | Classify the reason for a prescribed burn | Fires are lit after 6:30 pm when fire danger is low | Increase fertility of the soil |
| Celebrations (festivals) | | (+) reduces hazardous fuels | | Prepare burn plans | The community does not intend to change reserve burning practices as they perceived as being +ve and benefit the community (protect the community from large fires) | Possible to create some shared objectives in the Nature Reserve buffer zone |
| | | (+) increases natural tree regeneration | | | May occur in November each year at the prefecture permit stage | |
| | | (-) potential of escaped fires into nature reserve | | | | |
| | | (+) stop large fires | | | | |
| | | (+) improved wildlife habitat | | | | |
| | | (-) Soil erosion | | | | |
| | | (-) Water quality | | | | |
| | | (-) Wildlife loss | | | | |
| | | (-) Tree mortality | | | | |

Appendix 5. List of participants

| Name | Title | | Organization | Phone Number |
|----------------------------------|------------|--------------------------|---|---------------------------------|
| Ganbat | Shagdar | Director | Environmental Protection Agency (Dornod Province) | 976-99586969 |
| Galbadrakh | Davaa | Terrestrial Program | The Nature Conservancy | |
| Batjargal | Darkhantur | Director | Environmental Protection Agency (Chentii Province) | 976-91991456 |
| Dorjsuren | Erdene | Director | Green Focus NGO | 976-99001974 |
| Nguyen | Xuan Niem | Vice Director | Department of Science & Technology - Kien Giang | 84-913868049 |
| Nguyen | Tan Phong | Technical Officer | GTZ Project - Kien Giang Biosphere Reserve Project | |
| Huynh | Huu To | Technical Officer | GTZ Project - Kien Giang Biosphere Reserve Project | 84-918483038 |
| Nguyen | Van Tiep | Vice Director | Phu Quoc National Park | 84-919886289 |
| Kyo Sang | KOO | Researcher | Div. Forest Fire, Dept. Forest Environment, Korea Forest Research | 82-2-9612662 |
| Tae Kyu | KIM | | DAEGUE Metropolitan City, Environment and Greenery Bureau, Parks | 82-53-8034402 |
| Seong Seo | PARK | Deputy Director | The Province of Chungcheongnam-do, Agriculture Forestry & Fisheries | 82-422612283 |
| Kyung Chul | KIM | | Southern Regional Forest Service, Administration Division | 82-54-8507730 |
| Ming | Su | Deputy Division | International Forestry Cooperation Center, SFA | 86-10-84238945 |
| Jinhai | W ang | Deputy Division Director | Forest Fire Warning and Monitoring Information Center, SFA | (86)-10-84239143 13683380122 |
| Jie | Li | | Forest Fire Management Office, SFA | 15810421999/010-84239132 |
| Zhong | Li | Division Director | Department of Wildlife Conservation and Nature Reserve Management, | (86)-10-84238525 |
| Aiming | Yang | Chief Clerk | Multilateral Cooperation Division, International Forestry Cooperation | (86)-10-84238960 |
| Fang | Yang | Chief Clerk | Wildlife Conservation Center of Yunnan Forestry Department | 86-871-5110816 |
| Mingchuan | Zhong | Deputy Division | Fire Prevention Office of Yunnan Forestry Department | 86-871-5110816 |
| Cengsheng | Li | Vice Director | Fire Prevention Office of Yunnan Forestry Department | |
| Songhai | Yang | Director | Xishuangbanna National Nature Reserve | 86-13887912888 |
| Zhongming | Tan g | Vice Director | Xishuangbanna National Nature Reserve | 86-13988152990 |
| Mingang | Yao | Vice Director | Fire Prevention Office of Xishuangbanna | |
| Xianming | Gou | Vice Director | Research department of Xishuangbanna NNR | 86-13988136926 |
| Yuanhong | Mao | Station Vice Head | Mengmai Site Station, Xishuangbanna National Nature Reserve | 13988116637 |
| Jiankun | Zong | Station Vice Head | Shangyong Site Station, Xishuangbanna National Nature Reserve | 0691-8129001 |
| W enrong | Duan | Station Vice Head | Mangao Site Station, Xishuangbanna National Nature Reserve | 0691-8122263 |
| Mancai | W en | Station Vice Head | Mengla Site Station, Xishuangbanna National Nature Reserve | 0691-5128546 |
| Jiandong | Li | Station Vice Head | Menglun Site Station, Xishuangbanna National Nature Reserve | 13887921142 |
| Xiangrong | Xu | Director | Taohongling National Nature Reserve, Jiangxi Province | 86-13767216258 |
| Guihong | Mao | Director | Xishuangbanna Forestry Prefecture Bureau | |
| Instructors/Facilitators | | | | |
| Jian | Ma | Project Manager | China Program of The Nature Conservancy | 132.6199.1952 |
| Xiaoqian | Chen | Conservation Director | China Program of The Nature Conservancy | +86-10-8531.9561 |
| Lucy | Guangzhi | Protected Area | China Program of The Nature Conservancy | +86-10-8531.9562 |
| Xiaorui | Tian | Fire expert | Research Institute of Forest Ecology, Environment and Protection, | +86-10-62889519 |
| Fengjun | Zhao | Fire expert | Research Institute of Forest Ecology, Environment and Protection, | +86-10-62889519 |
| Limin | Feng | Ph.D candidate | School of Life Science, Beijing Normal University | +86-13811706323 |
| Haoruo | YI | Fire expert | International Tropical Timber Organization (ITTO) | +86-10-62889166 |
| Brett | Shields | Consultant | GHD Pty Ltd | +61-4-48883171 |
| Mike | Jurvélus | Consultant | Wildland Fire Management, Prevention, Mitigation and Education | 63-9286967617 |
| Petteri | Vuorinen | UN-FAO Forest | FAO Forestry Department | 39-0657655608 |
| Darren | Johnson | Fire Ecologist | TNC - Global Fire Initiative | 001-2076221014 |
| David | Ganz | Director | TNC - Global Fire Initiative | 001-415-6021395 |
| Translators | | | | |
| Yaqiao | Zhao | Co-Director | Community Development Studies | +86-871-4184434 |
| Caizhen | Lu (Karen) | PhD Candidate | | |
| Logistic Supporting Staff | | | | |
| Jing | Chen | Administraion | TNC | 13888785689 |
| Qing | Tao | Conservation Section | XSBN NNR | 138887905828 |

Working papers series on fire management

Fire Management Working Papers: Thematic Paper Series

In Code "Working Paper FFM/xx", "x" indicates the WP series number and a suffix E, F, R or S indicates: E = English, F = French, R = Russian, S = Spanish. No suffix indicates E only.

Available at the Fire Management web site:

| | |
|---------------------|---|
| Working Paper FPF/1 | <i>Guidelines on Fire Management in Temperate and Boreal Forests.</i> November 2002. |
| Working Paper FM/2 | <i>International Wildland Fire Management Agreements Template.</i> Tom Frey, Ricardo Vélez Muñoz. January 2004. |
| Working Paper FM/3 | <i>Legal Frameworks for Forest Fire Management: International Agreements and National Legislation.</i> Fernando Fernández Arriaga, Frédéric St-Martin, Tom Frey, Ricardo Vélez Muñoz. March 2004. |
| Working Paper FM/4 | <i>Community-Based Fire Management in Spain.</i> Ricardo Vélez Muñoz. April 2005. |
| Working Paper FM/5 | <i>Report on Fires in the South American Region.</i> María Isabel Manta Nolasco. March 2006. |
| Working Paper FM/6 | <i>Report on Fires in the North East Asian Region.</i> Leonid Kondrashov. March 2006. |
| Working Paper FM/7 | <i>Report on Fires in the Baltic Region and adjacent countries.</i> Ilkka Vanha-Majamaa. March 2006. |
| Working Paper FM/8 | <i>Report on Fires in the Mediterranean Region.</i> A.P. Dimitrakopoulos and I.D. Mitsopoulos. March 2006. |
| Working Paper FM/9 | <i>Report on Fires in the Sub-Saharan Africa (SSA) Region.</i> Alexander Held. March 2006. |
| Working Paper FM/10 | <i>Report on Fires in the South East Asian Region.</i> B.J. Shields, R.W. Smith and D. Ganz. March 2006. |
| Working Paper FM/11 | <i>Report on Fires in the Balkan Region.</i> N. Nikolov. March 2006. |
| Working Paper FM/12 | <i>Report on Fires in the Caribbean and Mesoamerican Regions.</i> A.M.J. Robbins. March 2006. |
| Working Paper FM/13 | <i>Report on Fires in the Australasian Region.</i> P.F. Moore. March 2006. |
| Working Paper FM/14 | <i>Report on Fires in the South Asian Region.</i> A.M. Benndorf and J.G. Goldammer. March 2006. |
| Working Paper FM/15 | <i>Report on Fires in the North American Region.</i> R. Martínez, B.J. Stocks and D. Truesdale. March 2006. |
| Working Paper FM/16 | <i>Report on Fires in the Central Asian Region and adjacent countries.</i> Johann G. Goldammer. March 2006. |
| Working Paper FM/17 | Fire management: voluntary guidelines. Principles and strategic actions. 2006. FAO, Rome, December, 2006 (E, F, R, S) |
| Working Paper FM/18 | Fire management: Review of international cooperation. FAO, Rome, December 2006 |
| Working Paper FM/19 | Fire management voluntary guidelines - Preparing for action - country and regional level methodology. Vuorinen A. P., Rosengren, L.M. 2008 |
| Working Paper FM/20 | Implementing the Fire management voluntary guidelines - Report of the regional workshop of Trinidad and Tobago, 20-23 November 2007. Vuorinen A.P. 2008 |
| Working Paper FM/21 | Implementación de las directrices de carácter voluntario - Informe del taller regional en Cuba, 12-16 Noviembre 2007.(S) Pieter van Lierop 2008 |
| Working Paper FM/22 | Fire Management Voluntary Guidelines - Preparing for action - country level methodology. Vuorinen A.P. 2008 |
| Working Paper FM/23 | Fire Management Needs and Actions in the South east Asian Region. Johnson D. & Vuorinen A.P. 2009 |

