



Climate change impacts on tropical forests, vulnerability and the adaptive capacity: lessons learned from TroFCCA experience

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Outline:

- Introduction: Forests and Climate change
- Impact of Climate Change on Forestry
- TroFCCA Experiences: impacts, vulnerability and adaptive capacity
- Need of Adaptive Capacity Enhancement: forest fires in Indonesia
- Conclusion



Definitions

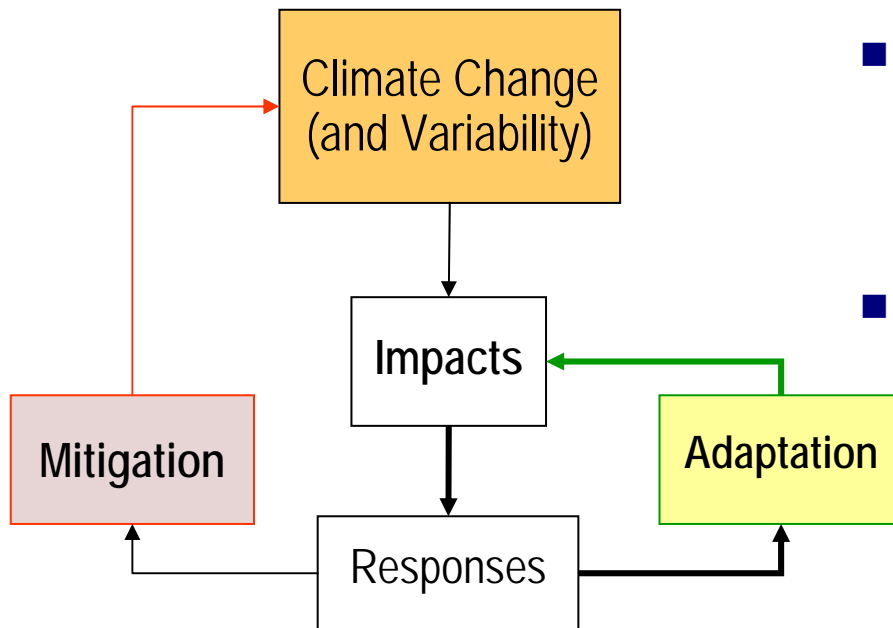
- ❑ Mitigation: human interventions to reduce the sources or enhance the sinks of GHGs
- ❑ Adaptation: adjustment of social and natural systems to respond to the impacts of climate change and variability
- ❑ Vulnerability: the degree to which a system is susceptible to or unable to cope with adverse effects of climate change/variability and extreme events. It is a function of character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity.
- ❑ Sensitivity: the degree to which a human-environment system is affected, either adversely or beneficially, by environmental change.

Source: IPCC (2001)

Introduction:

Forests and Climate Change

*Forestry sector has a unique role in climate change which can work with focus on both **mitigation** and **adaptation***



■ Focus on the mitigation side

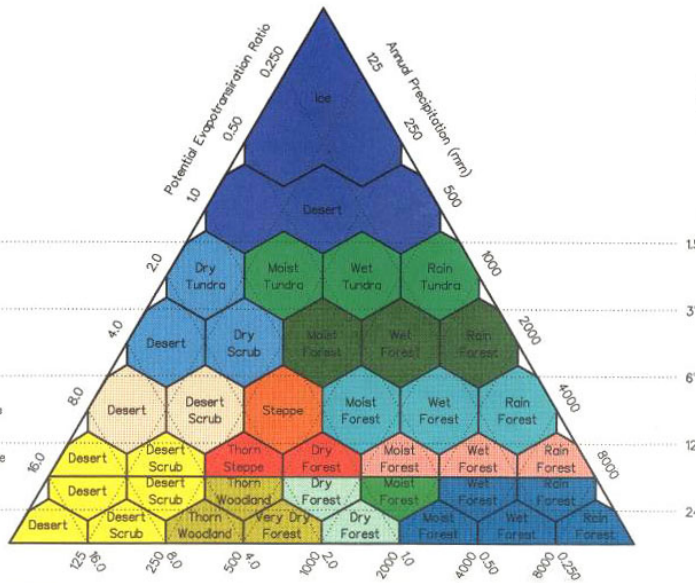
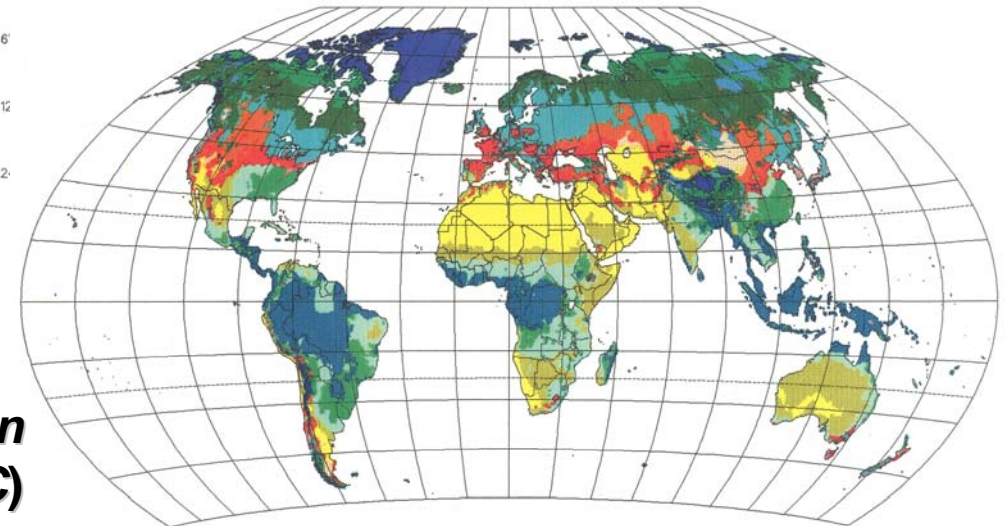
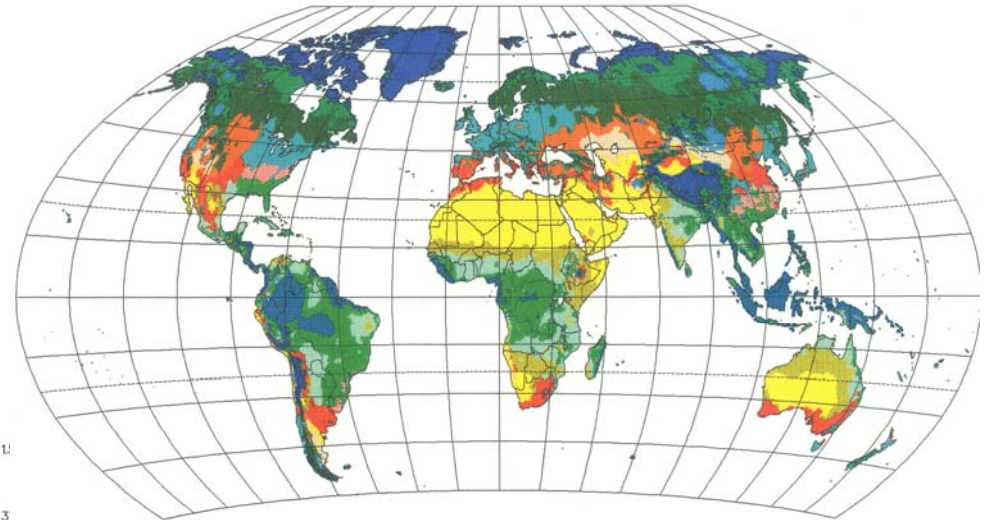
- Sinks (removing carbon dioxide);
- As energy substitutes (bioenergy, wood)

■ Focus on the adaptation side

- Foregone goods and services from forests (NTFP, timber, biodiversity, water, etc.);
- Climate change add to processes that lead to more stressing conditions

Impacts on Life Zones

Current...



... 2 x CO₂ concentration
(+ 2.6°C)

Impacts of climate change to the ecosystem and forest products (IPCC, 2007)

- The resilience of many ecosystems is likely to be exceeded this century by an unprecedented **combination of climate change, associated disturbances** (e.g., flooding, drought, wildfire, insects, ocean acidification), and **other global change drivers** (e.g., landuse change, pollution, over-exploitation of resources). **
- Over the course of this century, net **carbon uptake by terrestrial ecosystems** is likely to peak before mid-century and then weaken or even reverse, thus amplifying climate change. **
- Approximately 20-30% of plant and animal species assessed so far are likely to be at **increased risk of extinction** if increases in global average temperature exceed 1.5-2.5°C. *
- For increases in global average temperature exceeding 1.5-2.5°C and in concomitant atmospheric carbon dioxide concentrations, there are projected to be **major changes in ecosystem structure and function**, species' ecological interactions, and species' geographical ranges, **with predominantly negative consequences for biodiversity, and ecosystem goods and services** e.g., water and food supply. **
- Globally, commercial **timber productivity rises modestly** with climate change in the short- to medium-term, with large regional variability around the global trend. *

Disasters

Resources change

Resource change

Resource change

Resource change



VULNERABILITY – may vary locally / regionally; poor country = most vulnerable

Development Modality

Natural resources

Finance/ funds

Human resources

Exposures

Sensitivity

Adaptive Capacity

Impacts

A. Disasters

B. Resource change/
degradation

Focus of Adaptation

Risk Reduction

Ecosystem protection

Human Development/
Socio-economic adjustment

mainstreaming

OTHER SECTORS

TroFCCA

- TroFCCA = Tropical Forests and Climate Change Adaptation
- Main objective: to promote adaptation strategies concerning sectors associated with tropical forests management to the adverse effects of climate change through vulnerability assessments
- Work in 3 regions



Summary table: TroFCCA work regions

Region and countries	Economic / Human Development parameters (HDI rank and GDP per capita) *	Forest cover (% of the total land area of the country)	Current climate Annual precipitation (mm) Sea-level Temperature (°C)	Projected climate change / variability by region	Priority forestry related sectors and impacts (decided through consultations with National Focal Points)	Focus of adaptation strategy response
SE Asia - Indonesia - Philippines	[108]; \$3,609 [84]; \$4,614	19.4 45.7	> 2000 mm 26 – 27 °C 956 – 4,064 mm 26.6 °C	Higher precipitation, Higher temperature, More frequent extreme weathers (El Nino and La Nina)	Forest fires, Landslides Water resources (floods and droughts)	Disaster risk reduction Socio-economic adjustment (water allocation management)
Cntrl America - Costa Rica - Honduras - Nicaragua	[48]; \$9,481 [117]; \$2,876 [112]; \$3,634	26 ~ 37	20 – 40 °C	Lower precipitation, Higher temperature, Possible more intense extreme weathers (ENSO)	Water for hydropower and domestic use	Ecosystem protection (for continuous forest services)
West Africa - Burkina Faso - Mali - Ghana	[174]; \$1,169 [175]; \$998 [136]; \$2,240	10.8 ~ 27.8	< 600–1000 mm, 35 °C ^a < 200–1200 mm, 35 °C ^a <1033–2200 mm, 28 °C ^a	Lower precipitation, Higher temperature	Water for drinking, fuel wood, NTFP (foods and medicinal products)	Socio-economic adjustment (due to potential forgone forest goods and service)

* UNDP (2006); ^a summer temperature

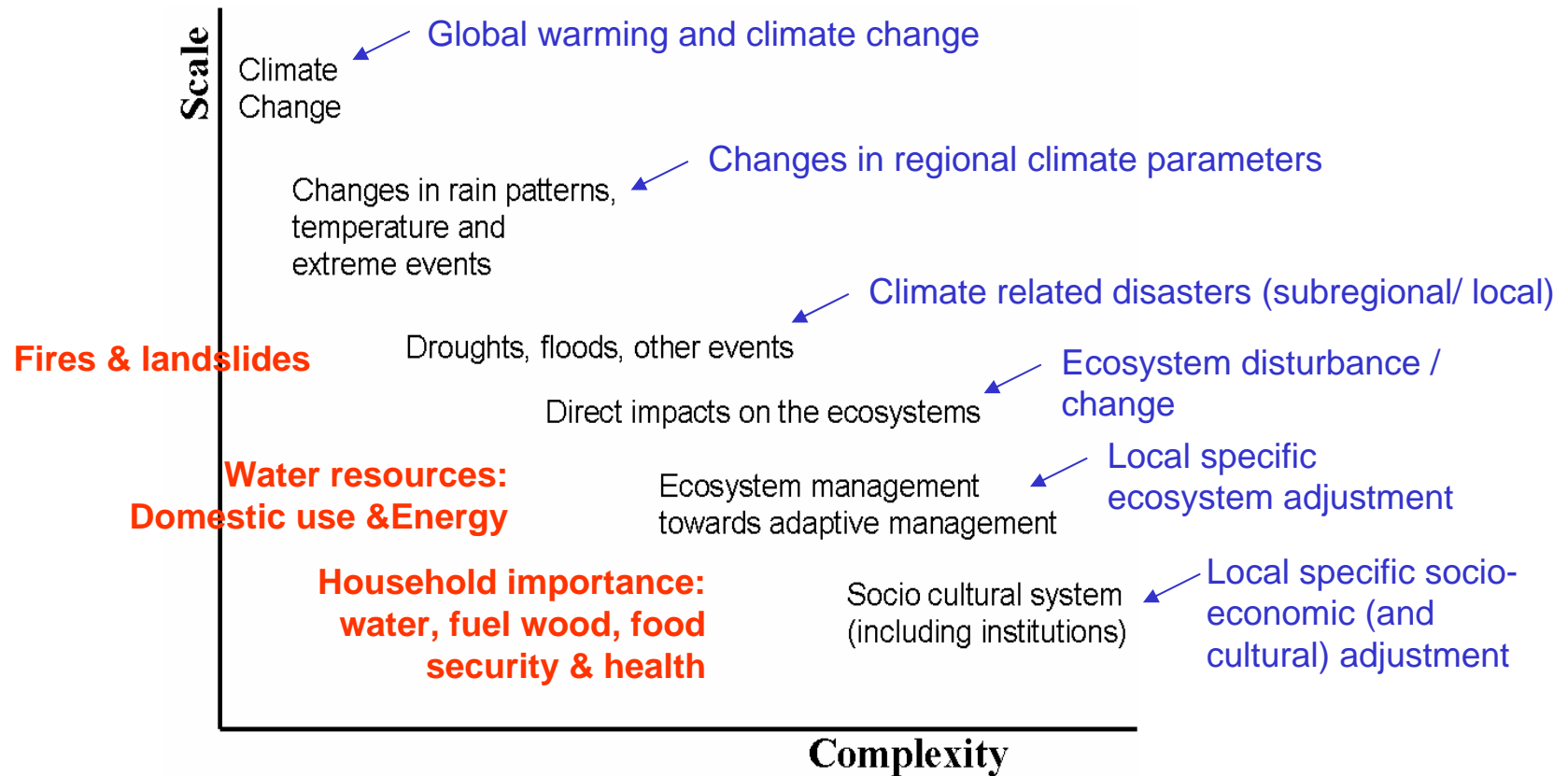
- **Vulnerability is local specific**, i.e. different potential impacts, different base-line conditions (availability of resources, knowledge, adaptive capacity).

It means that the selection of the prioritised related sectors and the responding strategies depend on:

- **Highest risk** or most dependent sector on the natural resources to be considered (e.g. hydropower in Costa Rica, fire in Indonesia, sustainable household importances in West Africa).
 - **Current availability** of resource or alternative resources (water is very limited in West Africa, but still much in Central America).
 - Socio-economic / development **modality**, such as economic strength for infrastructure development (fire monitoring and water management in Indonesia), and knowledge or experiences (PES in Costa Rica).
- In the forestry, ALL adaptation strategies are part of forestry management, but the focuses / approaches may vary → **different complexity**

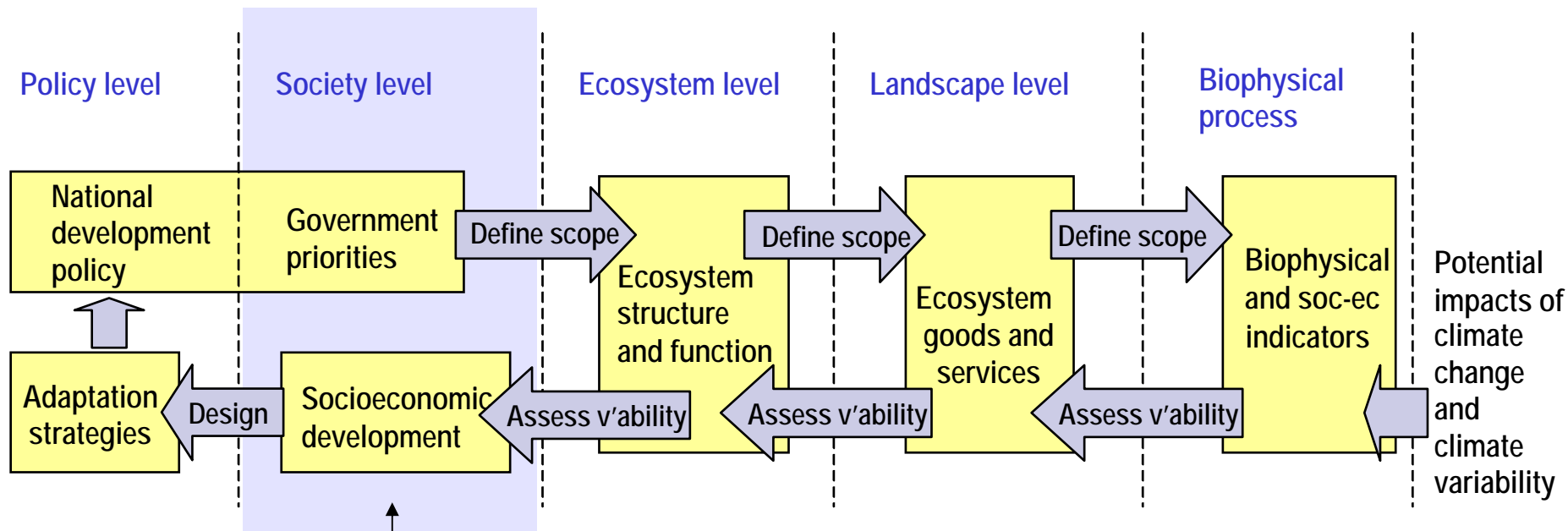


The adaptation focuses varies in complexity



- The appropriate scale of scoping area varies depending on the adaptation focus (and extent of impacts)
 - **Disasters risk reduction** = national scale → focus on national to local level actions
 - **Ecosystem protection** = ecosystem / landscape → focus on ecosystem to local level actions
 - **Socio-economic and cultural adjustment** = local community → focus on local community actions
- **Multi-level vulnerability assessments** for identification of appropriate and harmonized multi-level actions are needed.

General approach of TroFCCA



- **Dialogues and negotiations:** multi-stakeholders, multi levels → **mainstreaming**
- **Cross-fertilization** between model based strategies and actions / practices in coping with current problems
- Requires **awareness and adequate knowledge** from all stakeholders

Mainstreaming Adaptation

What is “mainstreaming”?

- *Mainstreaming* is an effort in bringing a **sectoral issue to become a communal agenda** for all development sectors, which often requires a synergy in the identification of priorities and the optimum use of sectoral resources (*TroFCCA SE Asia Kick-off Meeting, 2006*)

Why?

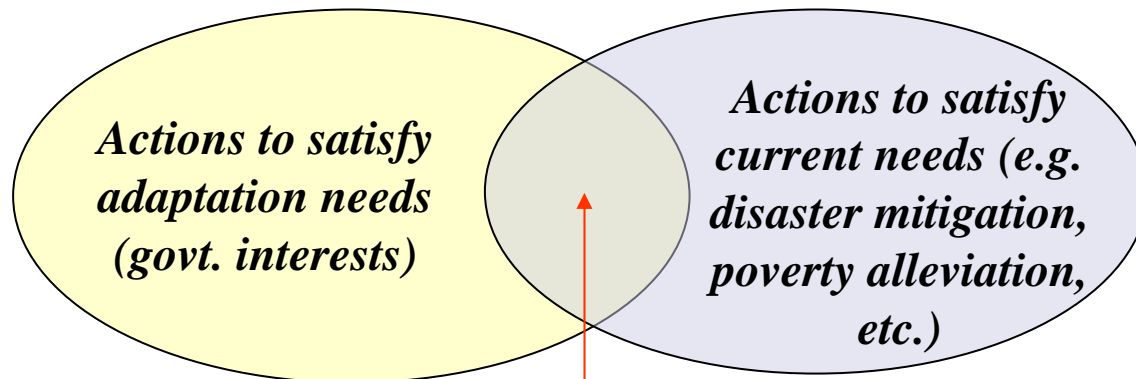
- Climate change affects many sectors, and priority setting is often needed.
- Direction and program of adaptation need **consistent supports** from all relevant government institutions.



Mainstreaming also means finding solutions together among many sectors with different interests and perspectives

- Linking **Community** and **Govt. interests** through dialogues for better understanding of each side perspectives (dialogues)
- Linking solutions of **current problems** (required by community or government) and **long term objective to increase the resilience** to adverse impacts of climate change
- Linking solutions with the **development goal** or **current issue**, eg. sustainable development, poverty alleviation.

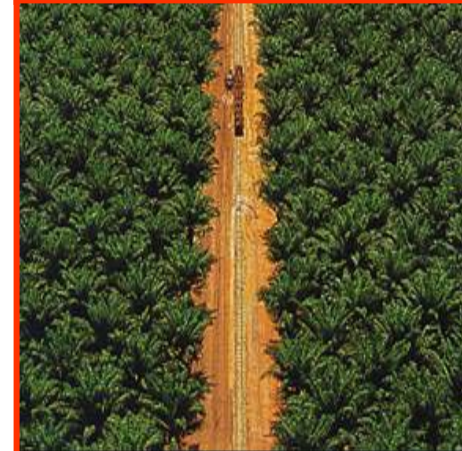
CO-
BENEFITS
or LOW
REGRET
POLICIES /
ACTIONS



Actions that satisfy both

CASE of forest and land fires in Indonesia

- Causes are human actions:
 - Land conversion
 - Unsustainable land management
 - Social conflict (land ownership problem)
 - Livelihood activities (land clearing for farming, hunting and fishing)
- Lost:
 - US \$ 9.1 billion (1997-1998 big fires)
- Link to climate change:
 - Fires are **intensified by drought** (El Niño, prolonged dry-months)



Local community actions*	District/ Provincial Govt. actions	National Govt. actions
<ul style="list-style-type: none"> ▪ Community Based Fire Control (“<i>Mandala Agni</i>”) ▪ Participatory approach for Village Land Use Planning** ▪ Construction of dams to increase the water table level ▪ Mechanised land preparation method (no burning method) 	<ul style="list-style-type: none"> ▪ Organize fire control and suppression ▪ Regulations and policy development that allows controlled burning under specific conditions 	<ul style="list-style-type: none"> ▪ Policies and regulations on fire control ▪ Development of policy on peatland management ▪ Support of actions to suppress and monitor fires ▪ Collaborate regionally with SE Asian countries to monitor hot spots and enhance the capacity for fire prevention

* Supported by projects or NGO actions

** Not connected with regulations at higher levels

Most of these actions are without considering Climate Change ADAPTATION



□ Required actions (for Adaptation):

- Adopt and scale up the good actions to control fires
- Better law enforcement to prevent fires
- Clearer ownership of land
- Forest conservations and rehabilitations through appropriate incentive/ disincentive mechanisms
- Eliminate the underlying causes (poverty, alternative livelihood, etc.)
- Develop appropriate infrastructure measures (fire breaks)
- Verify the inappropriate land use policy
- Clearer command line and organization in fire fighting
- Enhance water management in order to control the water table
- Educate the community for wise use of fires

□ Challenges:

- To sustain good initiatives / actions after projects
- Better institutional organization (including budget allocation, etc.)
- Synergizing the national actions and the community needs



- There is a need to envelope the current and required actions within the adaptation context
 - To implement required actions and to overcome challenges require good **Adaptive Capacity** at the appropriate levels



Conclusions:

- Climate change is a global phenomenon that has some adverse impacts to the ecosystem and people
- The nature of the exposure and the adaptive capacity that exists determines the severity of the impacts, and the poor people in general will suffer most
- Variations in the focus of adaptation cause differences in the scale of scoping area and multi-level vulnerability assessments are required
- Multi stakeholders and multi-level science-policy dialogues can facilitate negotiations of interest and mainstreaming adaptation process
- There is a need to conduct an adaptive capacity enhancement at various levels in order to catalyze streamlined multi-level initiatives towards adaptation strategies for resilient ecosystem, livelihood and community.

Thank you

