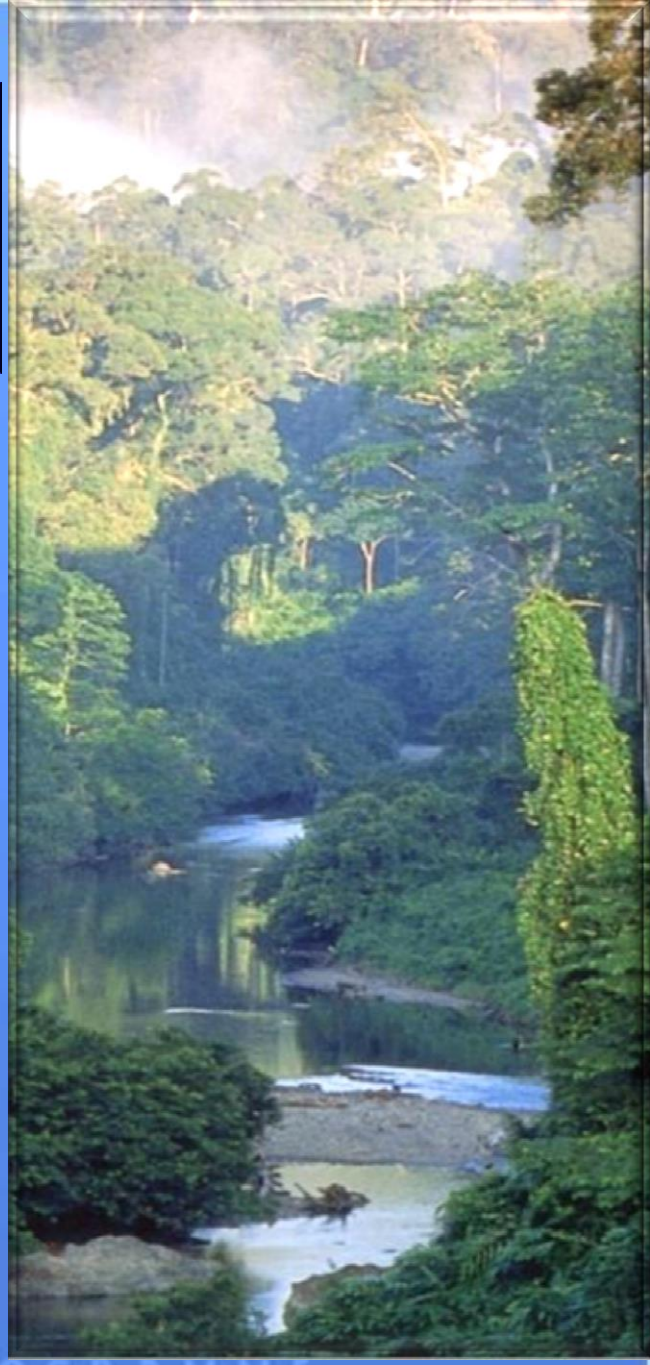
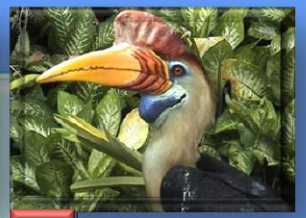
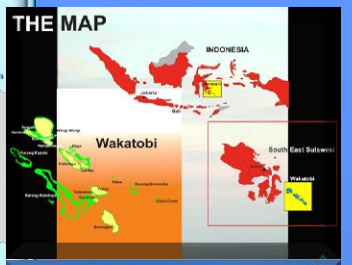
SUSTAINABILITY IN INDONESIA'S BIOSPHERE RESERVE DEVELOPMENT

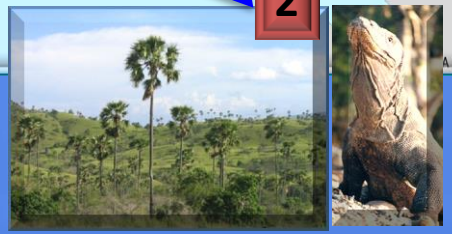
Y. PURWANTO
The Indonesian MAB Program National Committee, The Indonesian Institute of Sciences (LIPI)

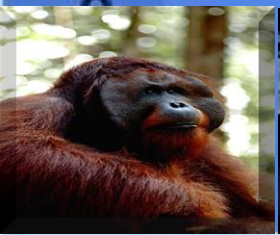


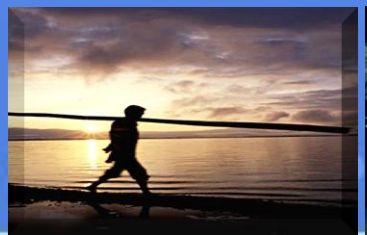
INDONESIAN BIOSPHERE RESERVES

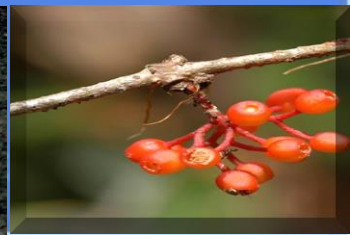




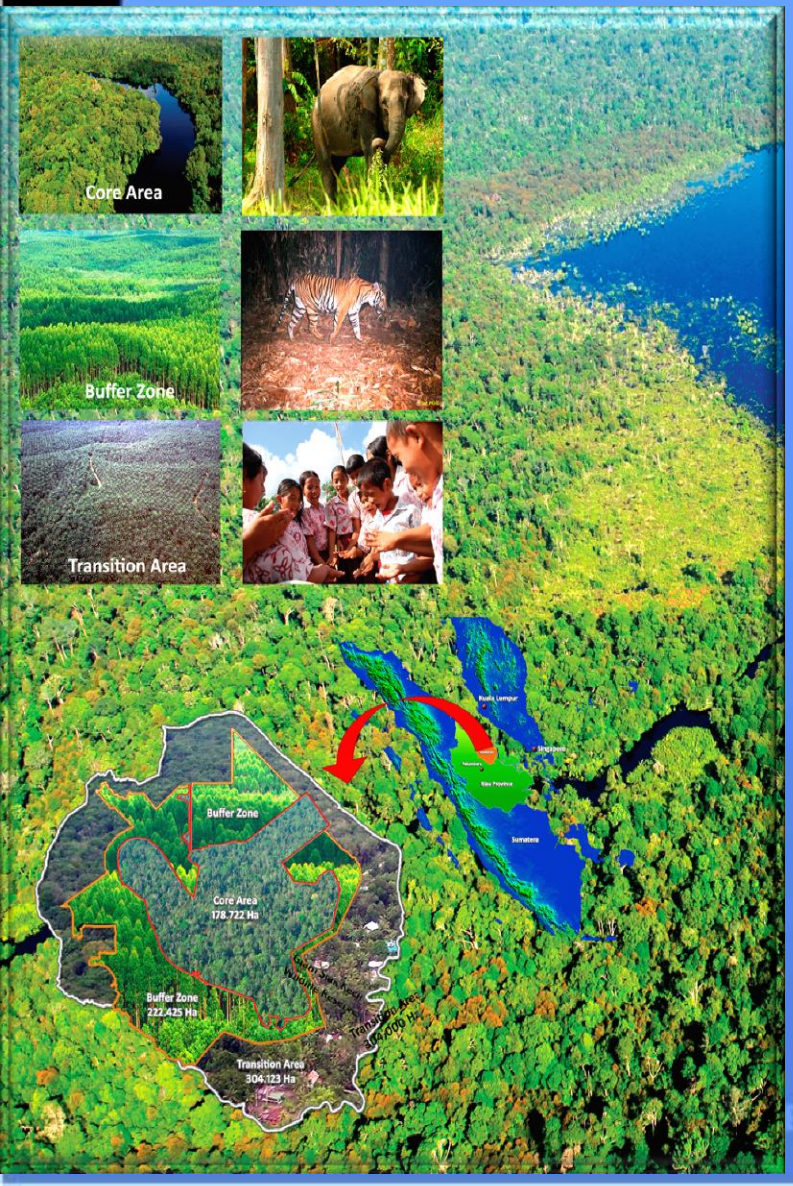


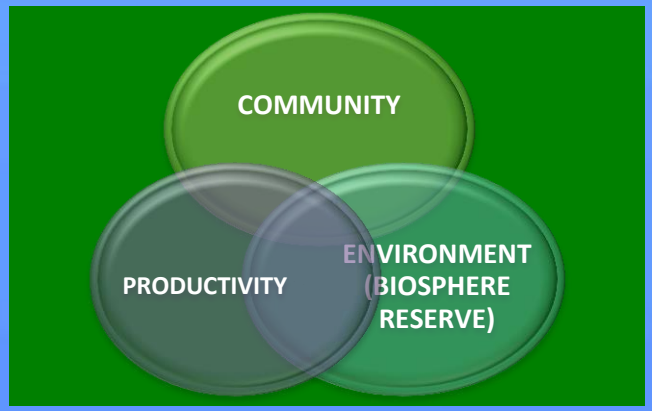






LEARNING SITE FOR SUSTAINABLE DEVELOPMENT

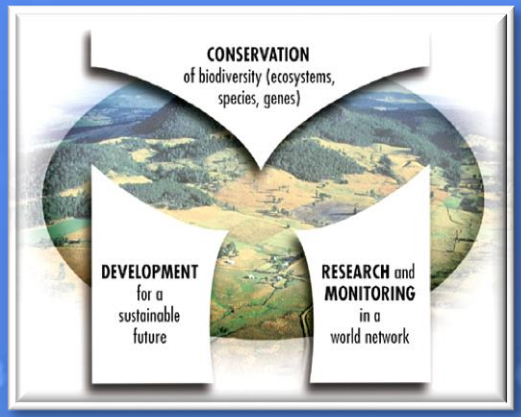


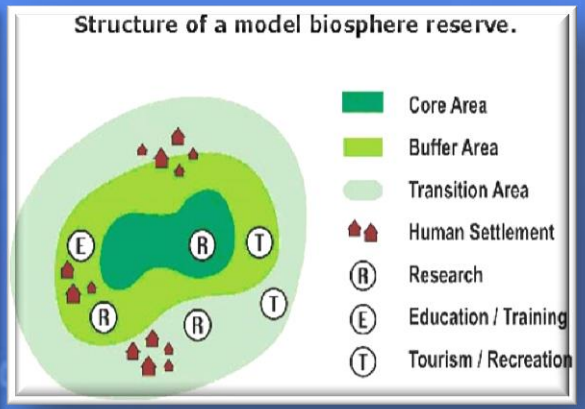


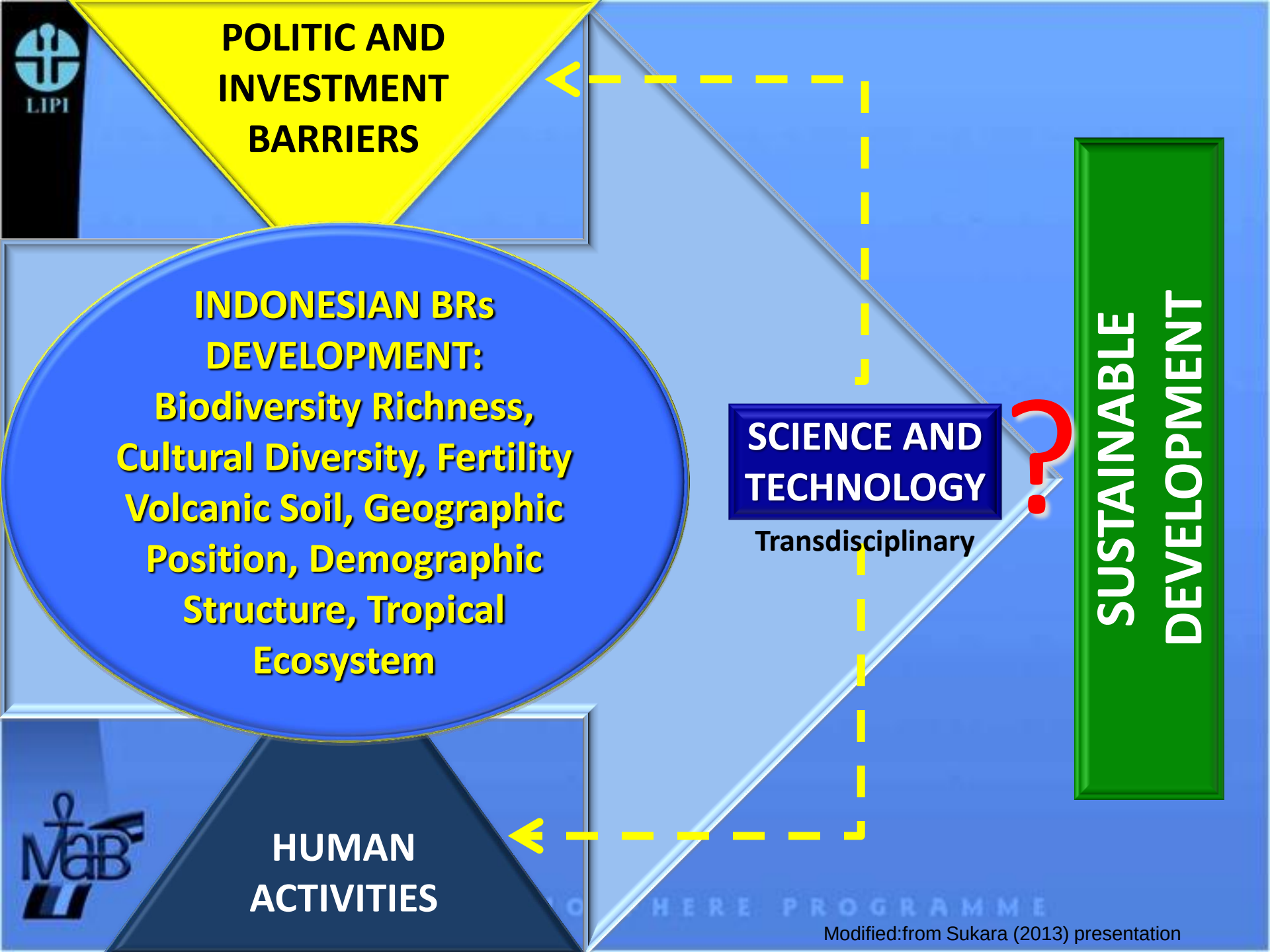
Sustainable Development

Continuous Improvement

SUSTAINABILITY SCIENCE







Modified:from Sukara (2013) presentation

Moving forward
Socialization, Capacity Building, and Real Action

- Strengthening management institution
- Development of zonation (re-zoning system)
- Increasing development program and revise integrated management and action plan
- Capacity building, and prevent and control illegal activities

- Improve investment in ecosystem services
- Increase the capacity of financial, social-economic, branding and Trust Fund (in process)
- Policy support, legal aspect, communications and program synergy
- Build cooperation and networking with various stakeholders commitment

MAN AND BIOSPHERE PROGRAMME

BIOSPHERE RESERVE DEVELOPMENT PROGRAM IMPLEMENTATION

BR DEVELOPMENT PROGRAM

SCIENCE AND TECHNOLOGY (SUSTAINABILITY SCIENCE)

SUSTAINABLE DEVELOPMENT

CONTINUOUS IMPROVEMENT

CONSERVATION

ECONOMIC DEVELOPMENT

LOGISTIC SUPPORT

- MULTIDISIPLINARY RESEARCH
- INTERDICIPLINARY RESEARCH
- TRANSDISCIPLINARY RESEARCH

NEW STRATEGY

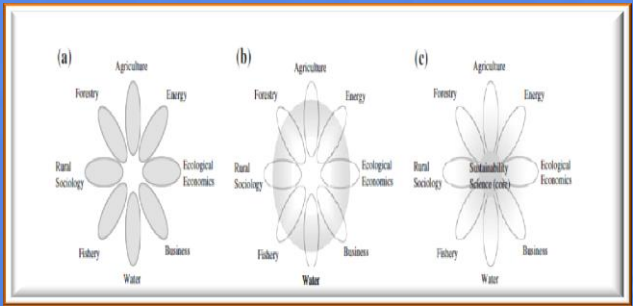
APPLIED TRCHNOLOGY ADAPTED

PROBLEM SOLUTION

COMMUNITY

PRODUCTIVITY

ENVIRONMENT (BIOSPHERE RESERVE)



Continuous improvement by implementing the principles of "economically feasible, environmentally viable, socially acceptable and technologically appropriate".

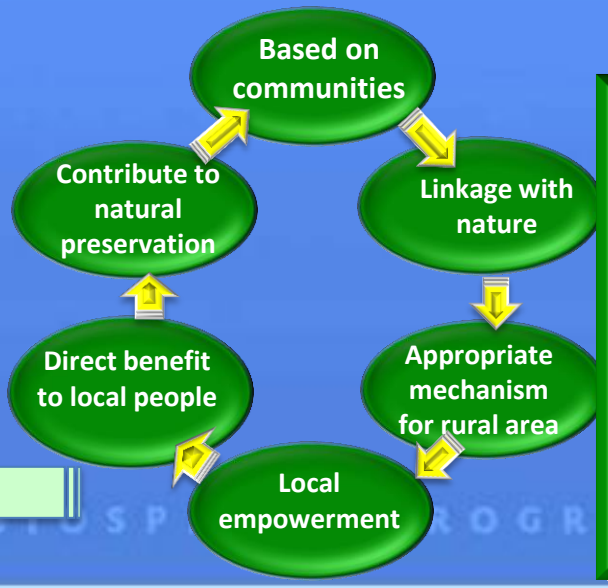
ECO-TOURISM DEVELOPMENT

Main requirement to develop ecotourism in Biosphere Reserve:

- Accessibility
- Accommodation
- Attraction
- Acceptability
- Agency Cooperation

Scheme for Developing Ecotourism in Indonesian Biosphere Reserves

SUCCESS INDICATOR



Small Scale Model

- Operate by local community
- Traditional/simple usage of technology
- Basic tourism facility
- Give traveler the most intimate experience

Trajectory of Social Well-Being and Environmental Damage before BR development (GSK BB area)

- Reduced supply of forest good e.g. wood, NTFPs
- Increased GHG emissions
- Reduction of habitat quality (Fragmentation Peat subsidence)
- Reduced water quality for domestic & Industrial use Agric/fishery, etc
- Increased soil Erosion, floods, drought., etc

Bio-Physical Effects

- Increased vulnerability to climate change Extreme events e.g. flood, etc
- Loss of economic Development Opportunities e.g livelihood

Socio-Economic Effects

Unsustainable Resource Extraction Practices & Use

Deforestation
1. Conversion to agric plantations
2. Clearing for human settlements
3. Large landscape forest fire
4. Illegal logging

Forest Degradation
1. Unsustainable harvesting & use
2. Poor water management in peat
3. Peat subsidence
4. Fragmentation & edge effects
5. Slash-and-burn cultivation

Direct Causes

Indirect Causes

Population Growth
Poverty & lack alternative livelihood
Policy and governance

Source: Modified from Subiyanto (2012)

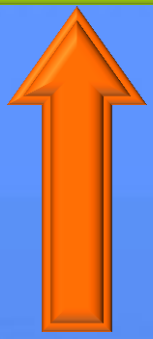
Conservation Management Intervention

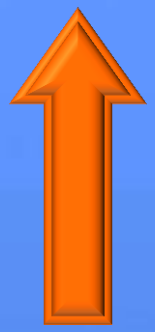
Integrate conservation with socio-economic development

Improved supply of forest good e.g. wood, NTFPs	Reduced GHG emissions	Enhanced habitat quality e.g. fragmentatio Peat subsidence	Improved water quality for domestic & Industrial use Agric/fishery, etc	Reduced soil erosion, floods, drought., etc	Mitigate vulnerability to climate change Extreme events e.g. flood, etc	Improved economic development opportunities e.g. livelihood

Biological-Physical Effects

Socio-Economic Effects





Conservation Management Intervention

Improved integration of forest and conservation management with socio-economic development in the GSK-BB

Clear definition of roles, institutional or organizational arrangements & ownership of responsibilities in the use of resources and mechanism

MAN AND BIOSPHERE PROGRAMME

Source: Modified from Subiyanto (2012)

RESEARCH AND DEVELOPMENT PROGRAM IN CORE AREA OF BIOSPHERE RESERVE

Target of this research

Research & Development for Establishing the Sustainable Management of Forest in the Biosphere Reserve

Scenario for Policy Making

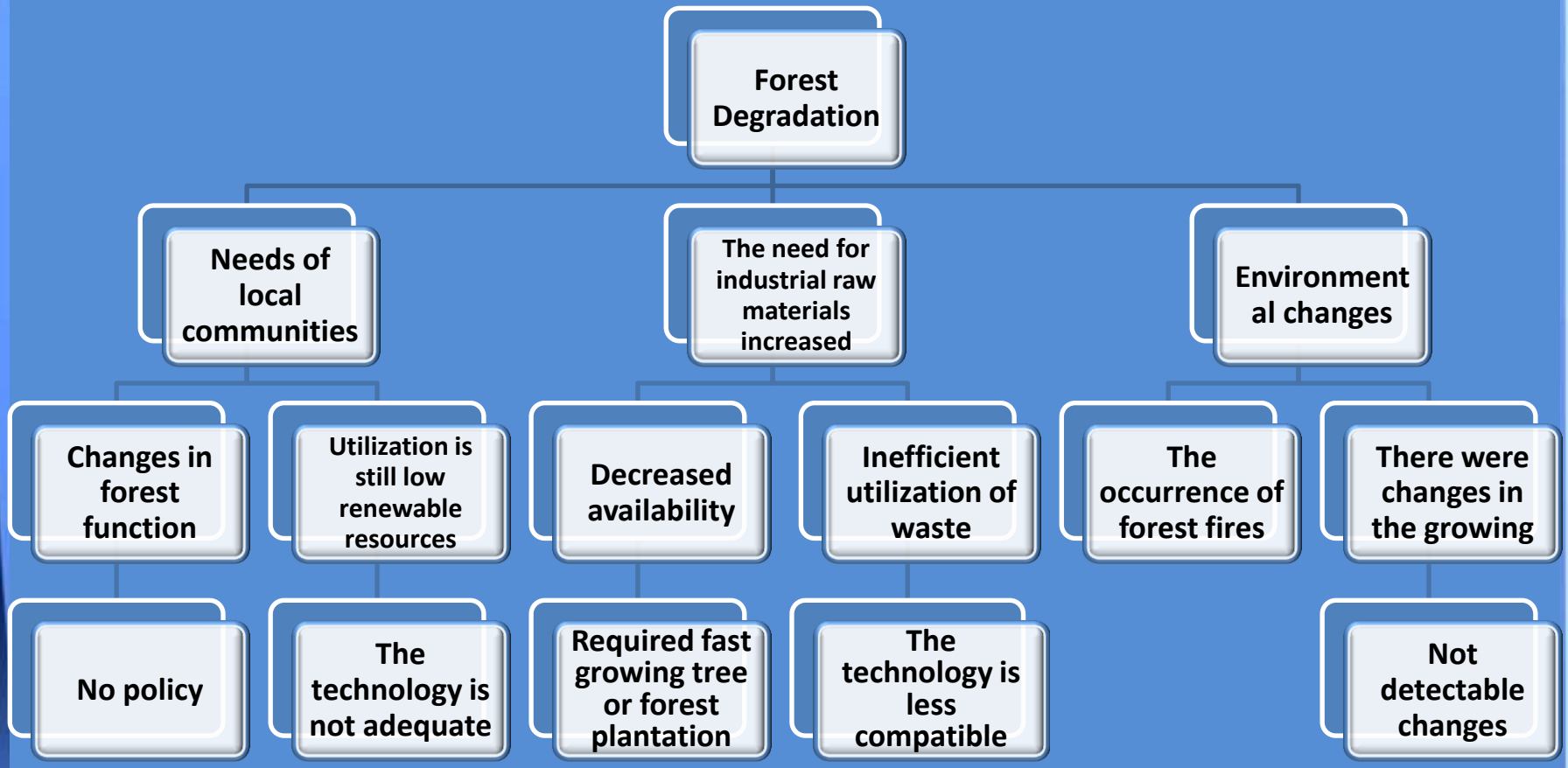
Biophysics assessment and analyses, Mass flow analysis/Life cycle assessment
Dynamic modeling and simulation
Accounting for Green Economy

Scientific Approach

Appropriate forest hydrology, Eco-system forest management, Carbon stock accounting, Innovative technology of resource utilization, and local people knowledge on natural resources management

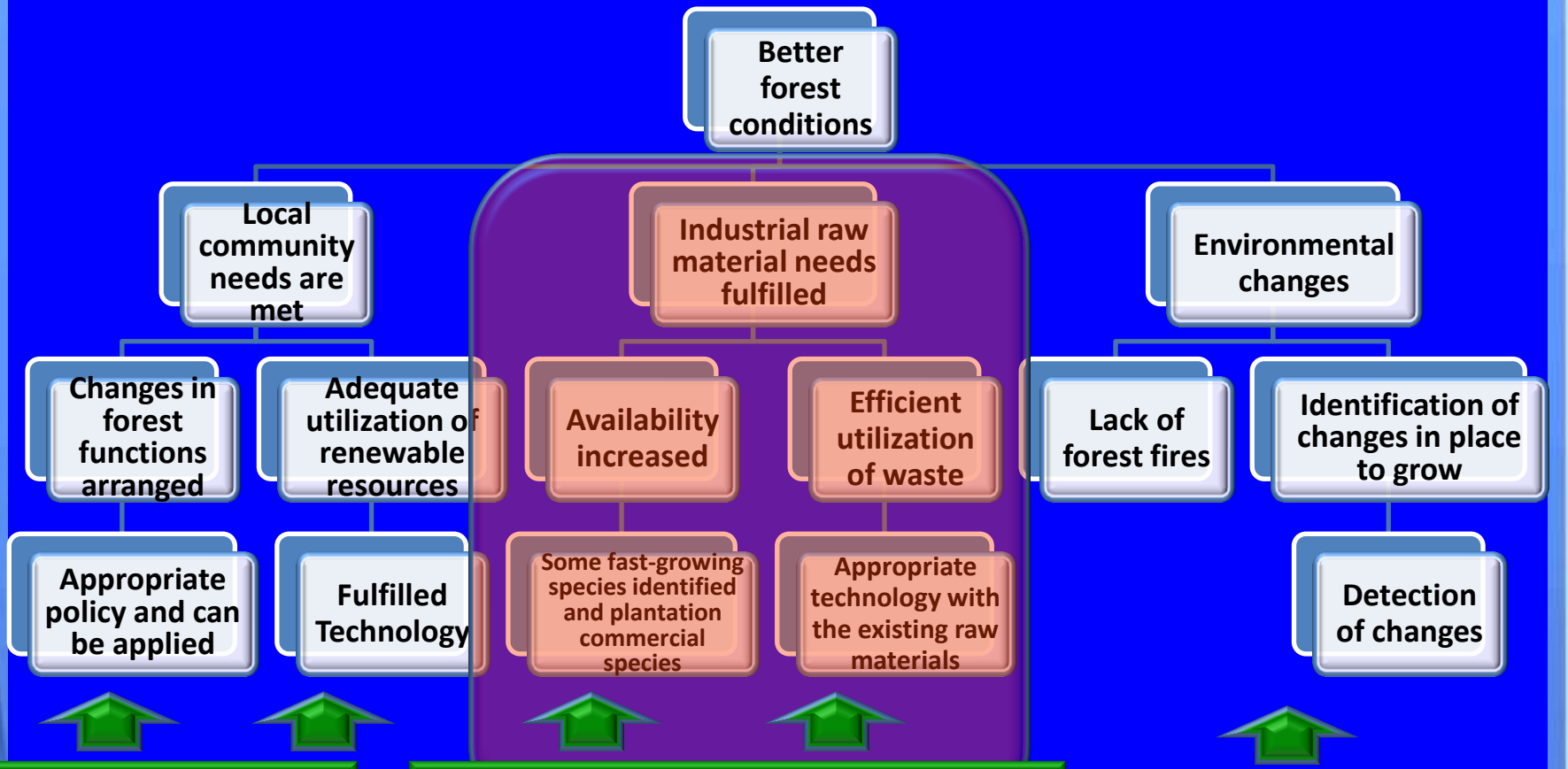
Source: Subiyanto *et al*, 2012

Problem tree



Source: Subiyanto *et al.*, 2012

Objective Tree



Source: Subiyanto *et al.*, 2012

Flow chart of the research program

Geosphere

Environment

Biosphere

Ecosystem

Humanity

Socio-economy

Monitoring unit : Appropriate Peat Hydrology and Eco-system

Production unit: Forest Management and Carbon Accounting

Processing unit: Innovative Technology of Resource

Socio-economy unit: Vitalization by local people and knowledge

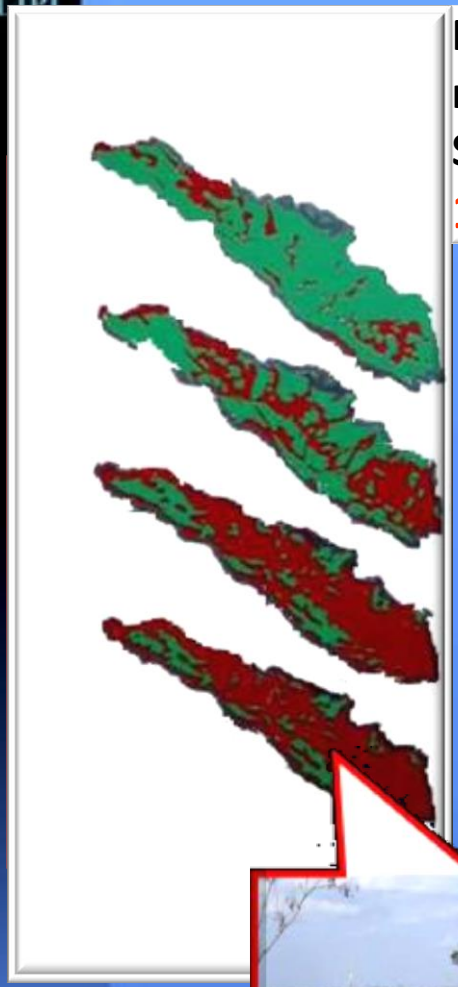
Modeling and simulation unit :

- Mass Flow Analysis
- Life Cycle Assessment
- Dynamic Modeling
- Simulation

Scenario for Policy Making Accounting for Green Economy

Subiyanto *et al*. (2012)

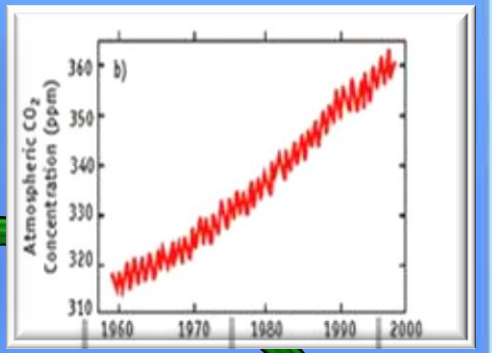
Sustainable CIRCLE of Forest and Forest Products on BR



Rapid decrease of the natural tropical forest in Sumatra, Indonesia
1932→2000

Plantation

Restoration of Vegetation



CO_2 Absorption

Towards the Sustainable Society

Revitalization of regional economy

Supply of biomass resource and energy

Devastated *Imperata* grassland

MAN AND BIOSPHERE PROGRAMME

Subiyanto *et al.*, 2012

AN EXAMPLE OF THE SCIENCE AND TECHNOLOGICAL APPROACH OF THE BIOSPHERE RESERVE DEVELOPMENT

Good Plantation Management Practices

1. SPATIAL PLANNING → ZONATION SYSTEM OF BIOSPHERE RESERVE (BUFFER ZONE):
2. WATER MANAGEMENT
3. FOREST FIRE PREVENTION
4. SUSTAINABLE INDUSTRIAL FOREST PLANTATION

Appropriate infrastructures

Water gates

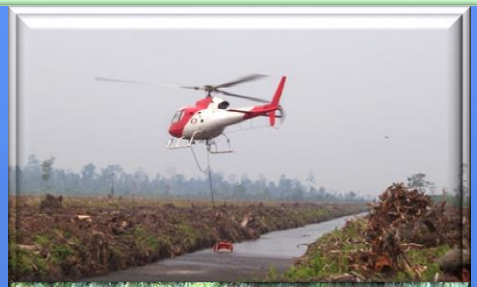
Over flow

Gate Valve

Allocate and manage conservation area set a sides (14% - 20%)

Providing job and business opportunities to local people

Well-resourced fire fighting team at district level (20,000 – 30,000 ha)



INTEGRATED BIO-VILLAGE PROGRAM

Developing empowerment & community livelihood programs (avoiding unsustainable farming practices)

1. Peat water purification → clean water supply.

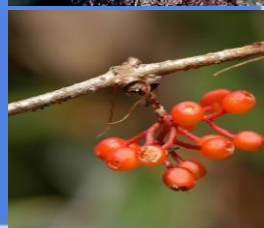
2. Organic agriculture development

3. Freshwater fish farming

4. Bio-energy/renewable energy

5. Ecosystem services: eco-tourism, natural resources utilization

6. Ecosystem restoration



Lessons Learned and Moving Forward

- We find the BR effective in **developing partnerships and cooperation** among key stakeholders, i.e. local and national governments, private sector, local communities, academic and research institutions, mass media, and customers;
- The BR landscape management approach is **a practical framework in communicating, discussing and managing** local sustainable development issues of national and global importance;
- We operate in a landscape considered as a biological and ecological hotspot where social, political and economic dynamics are exciting – combining **scientific knowledge and governance** modalities is a must requirement to implement best management practices;
- R and D ensuring the implementation of BR development → SDGs
- The result of Science, Technology and Innovation (STI) will provide new strategy, applied technology adapted, and problem solution to ensuring continous improvement so that the purposes of sustainable development (SD) in BRs could be pursued in the long terms. **The meaning of "continuous improvement" is implementation of the principles of "*economically feasible, environmentally viable, socially acceptable and technologically appropriate*".**
- **Sustainable funding** is an issue to effectively manage BRs. Monetizing ecological services is certainly an option to effectively manage the Core Area.

Summuriest from several works in Indonesi's BR

United Nations
Educational, Scientific and
Cultural Organization

National Committee of
Man and the Biosphere
Indonesian Program

TERIMA KASIH
Thank you

MAN AND BIOSPHERE PROGRAMME