



SELARAS PRINCIPLE FOR SUSTAINABLE BIOMASS PRODUCTION

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BACKGROUND



12. Today we agreed:

13. *To launch a framework that lays out the policies and the way we act together to generate strong, sustainable and balanced global growth. We need a durable recovery that creates the good jobs our people need.*

INDONESIA COMMITMENT



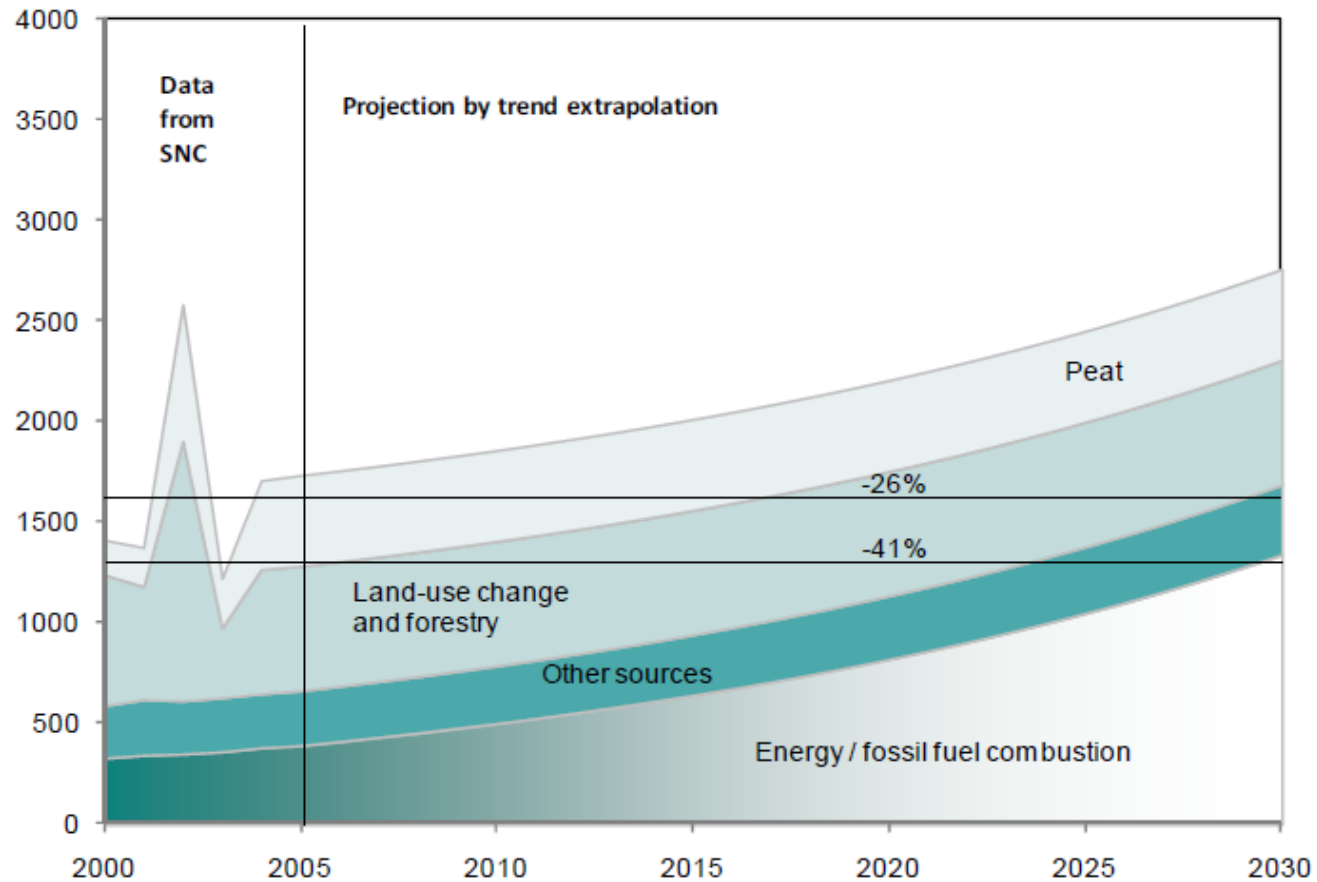
Sep 25, 2009 (Pittsburgh), President RI at G20 Leaders' Summit: "Possible to cure the global economy and save the planet at the same time".

Reduce emissions 26% by 2020, and with international support, by as much as 41% from Business As Usual.

Achievable, because 60%–80% Emission from forest related issues, such as forest fires and deforestation.

TREND OF NATIONAL EMISSION

MtCO₂-e/year



GREEN PAPER FOR CLIMATE CHANGE MITIGATION

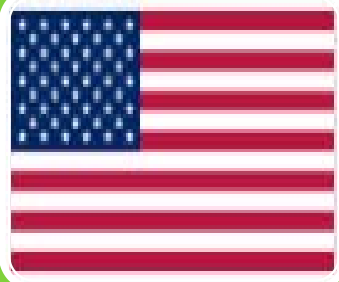


Green paper policy approaches for cost effective reductions in greenhouse gas emissions in line with development and poverty reduction objectives, and needs sound economic policy.

INTERNATIONAL SUPPORTS



May 26, 2010 (Oslo), Letter of Intent on REDD+ with Grand One Billion USD to finance the program.



Jun 27, 2010, Comprehensive Partnership with USA, worth 136M USD toward Environment and Climate Change Cooperation including SOLUSI partnership (Science, Oceans, Land Use, Society and Innovation)

MORATORIUM & STRATEGY

May 20, 2011, 2-year moratorium not use primary natural forest and peatland.

Governance as a key area for improvement.

Ministries, agencies and privates work together.

Drafting REDD+ National Strategy

Pilot projects, through transparent and inclusive multistakeholder process

A countrywide MRV system



STRATEGI NASIONAL REDD+

DRAFT

PUBLIC REACTIONS

Policy on Moratorium and REDD+ has driven mixed public reactions from stakeholders: scientists, academics, environmentalists including biomass producers.

Diverse effects on forestry industries, which have already been facing smeared campaigns elsewhere including boycotts to their products in the world markets.



OPPORTUNITY



Pulp and paper industry developed and attracted investment USD 16 Billion.

Absorb 242,822 workers and contribute USD 4 billion, or about 6.1 percent of the total production in the manufacturing sector.

Ranked 9th in the world with an average export of 1.6 million tons per annum.

Ranked 12th in the list of paper exporters with an average export of 1.7 million tons annually.



ENVIROMENTAL PROBLEMS

Peat is very fragile materials which can change their biophysical properties easily when exposed to continuous drying (Setiawan, *et.al.*, 2001).

Uncontrolled drainage was another factor of human made error that has caused soil subsidence and increase of soil acidity in shallow peats.

Neighboring farmers burn forest illegally seeking inexpensive cost for new agricultural lands.



LAND CLEARING BY BURNING (SONOR)



For fishing



For Paddy Fields



ENVIROMENTAL PROBLEMS

Long drought produces drying litters and surface vegetation that would boost high risk to the forest plantation.

Without proper practices, forest plantation occupying peat lands would produce high CO₂ emission due to a combination of decomposition and soil respiration (Nagano, *et.al.*, 2010; Nagano, *et.al.*, 2011). .

Forest plantations that do not comply with the current laws and regulations would contribute to biophysical degradation.

DEGRADED LAND AND AFTER REFORESTED WITH ACACIA CRASSICARPA



Subsidence due to fires
(2005)



Reforested with Acacia
(2007)



CHALLENGES TO DEVELOP PEATLANDS

Natural peats less water retention, appropriate water management is a key factor to keep the wetness of peats conducive for plant growth, resistive to fire and defensive to subsidence.

Water management should also consider mobility of personnel and equipments since water is the main transportation mode in peatlands.

Off farm management is another complicated matters especially when dealt with inside, outside and/or even international communities, which also would have many different perspectives.



SOLUTION APPROACH

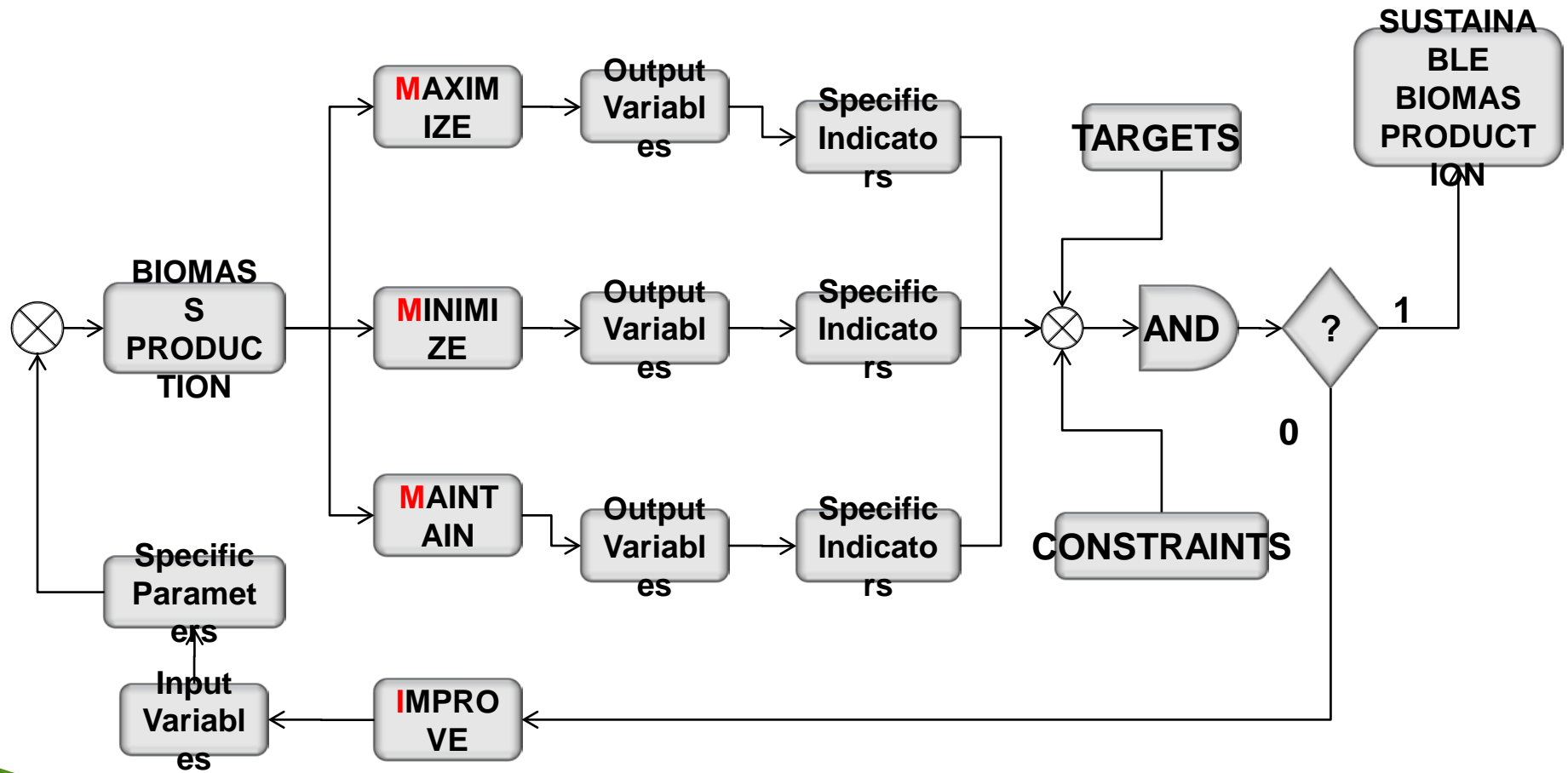
How to manage forest plantation to produce biomass sustainably subjected to acceptable targets, tolerable constraints and expectable goals.

Need systematical and comprehensive solution approach in obtaining optimum solutions for sustainable biomass production.

We introduce solution approach is named as Selaras Principle.

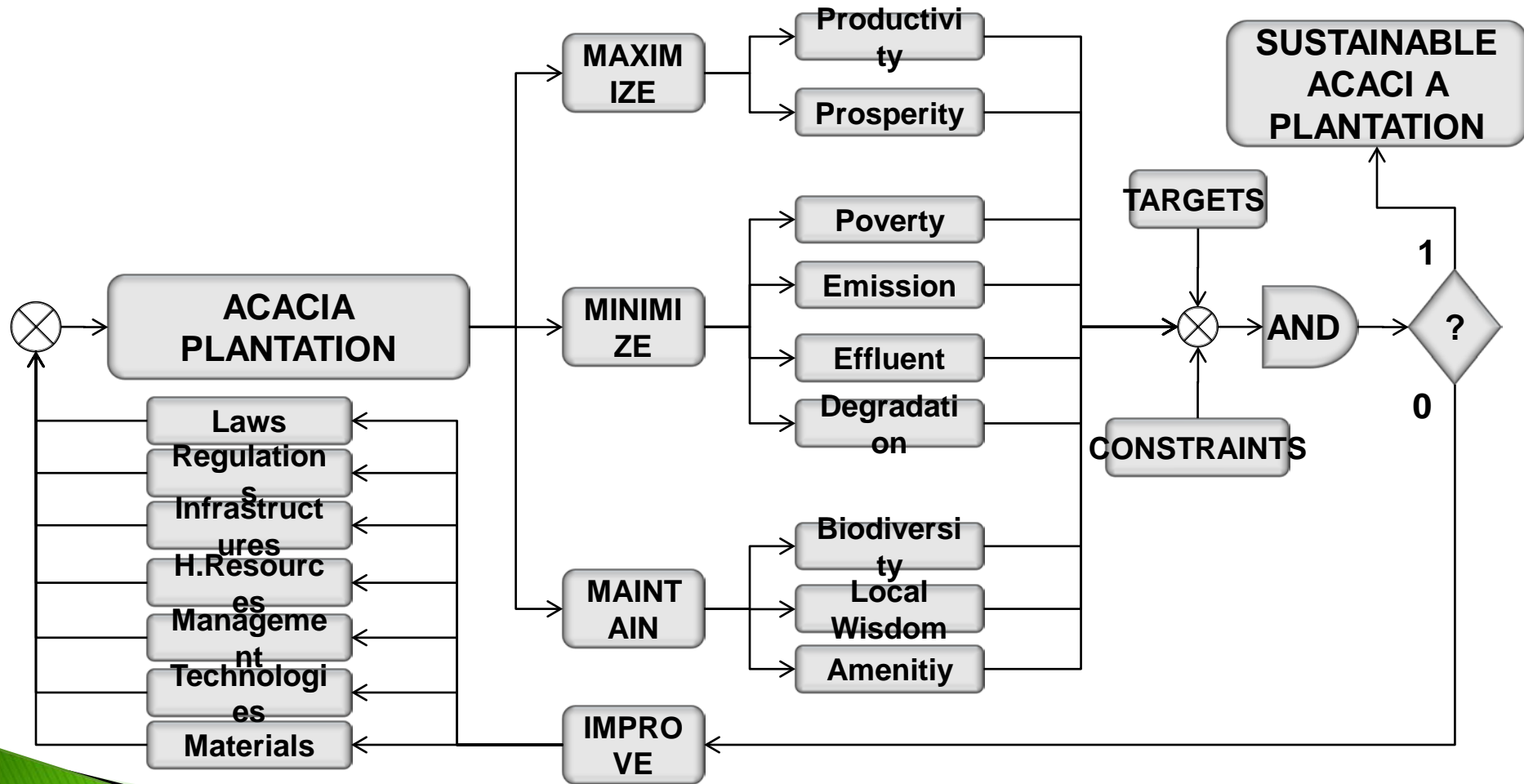
Selaras is an Indonesian word, which simply means harmony: “a pleasing combination of elements in a whole”.

CONCEPT OF SELARAS PRINCIPLE FOR BIOMASS PRODUCTION

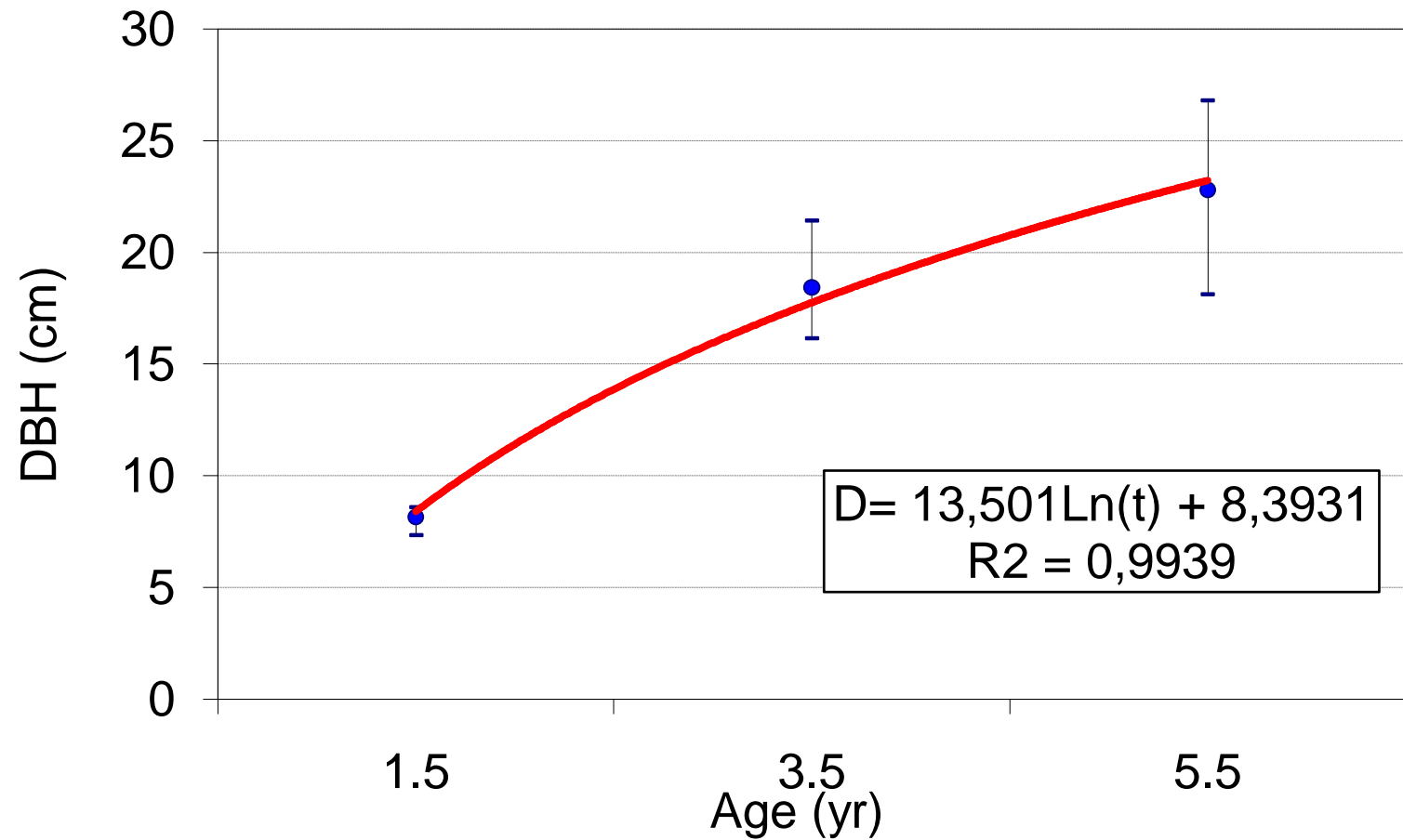


3MI = **M**aximize, **M**inimize, **M**aintain, and **I**mprove

SELARAS PRINCIPLES FOR ACACIA PLANTATION IN PEATLANDS

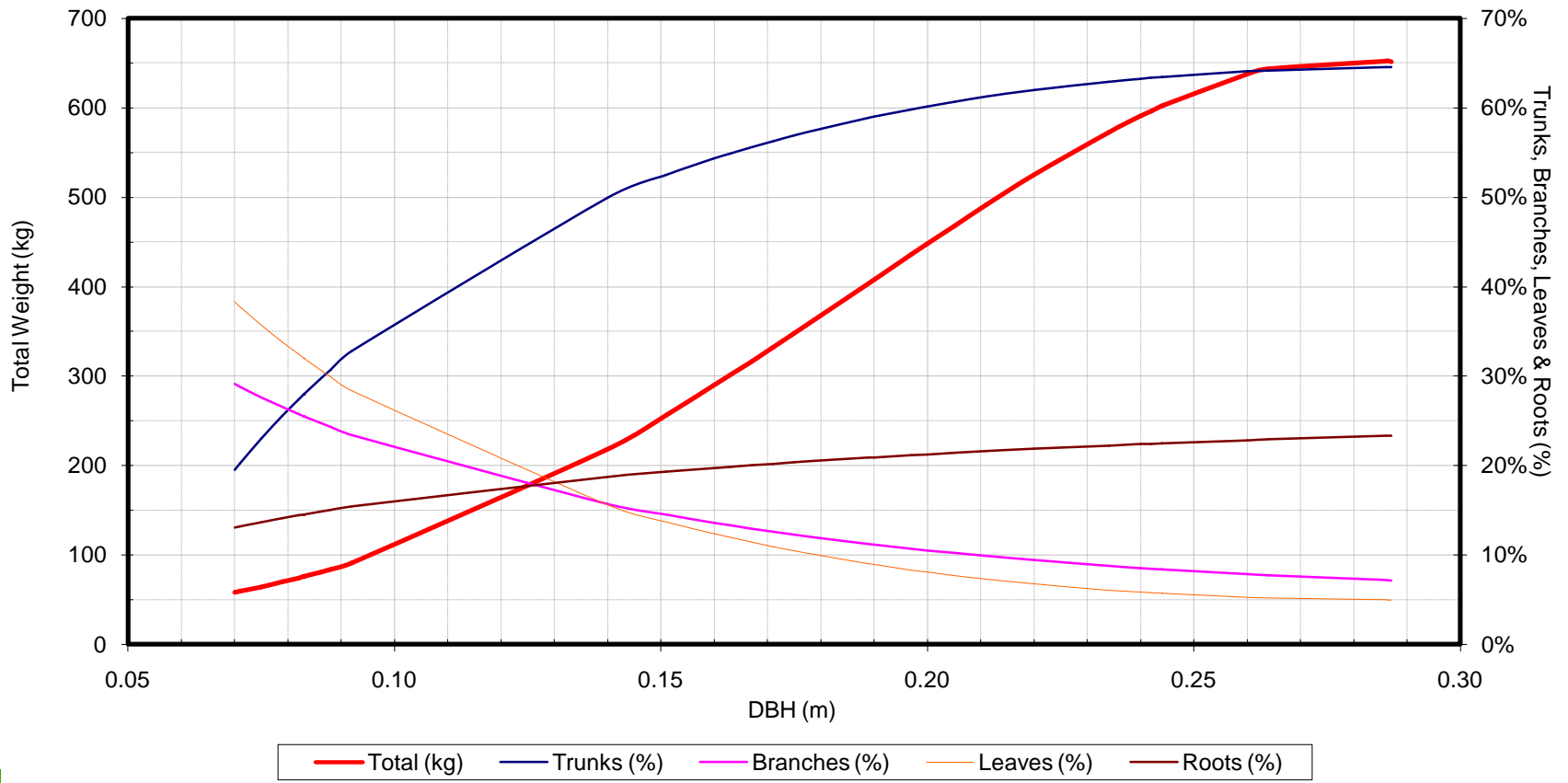


GROWTH OF ACACIA CRASSICARPA



BIOMASS PRODUCTION OF ACACIA CRASSICARPA

Biomass Production of Acacia Crassicarpa in South Sumatra



EVALUATION RESULTS

Variables	Indicators	Baselines	Values	Scores
Productivity	Mean Annual Increment (MAI)	≥ 27 (m ³ /ha/yr)	17.5~37.8	0
Prosperity	HD. Index	≥ 71.76	41.8~77.8	0
Poverty	Daily Income	≥ 1 (USD/day)	1.1~2.5	1
Emission	Carbon emission	≤ 27 (tC/ha/yr)	12.6~22.1	1
Effluent	Contaminants	Env. Standard	na	0
Degradation	Land Subsidence	≤ 7 (cm/yr)	0.3~5.8	1
Biodiversity	HCV Forest	=27 Species	27	1
Local Wisdom	Culture	Malay	Malay	1
Amenity	Bono attraction	Tourists/month	na	0
			AND	0



IMPORTANCE OF WATER MANAGEMENT

Water management for Acacia plantation in tropical peatlands is a key factor in maximizing productivity of Acacia, minimizing gas emission and biophysical degradation of peats.

Wetness of peat is a crucial indicator that has to be maintained in a perfect range that is conducive for plant growth, resistive to fire risk and defensive to subsidence.

Wetness of peat is highly influenced by weather condition and water table beneath the surface.

Since weather is significantly affecting variable then its influence to water table needs extra attention.



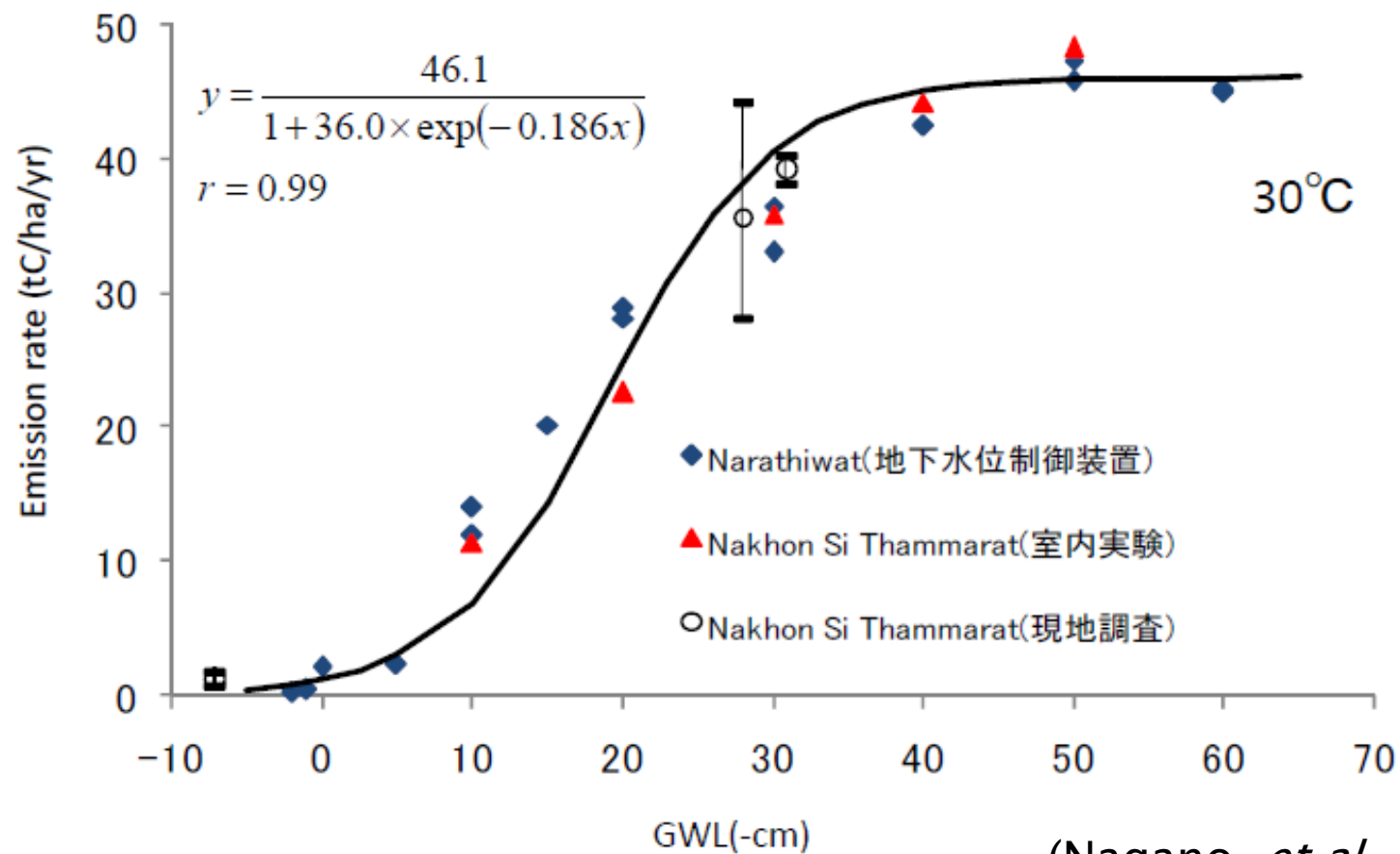
WATER TABLE AND EMISSION

Water table affects carbon emission has been reported from laboratory study by [Nagano, et.al. \(2011\)](#).

In that study, carbon emission from peats with water table 30 cm to 90 cm, would emit carbon around 40 to 50 ton/ha/yr.

Direct measurements of carbon emission under Acacia trees in Riau province resulted in the range of 14.6 to 20.4 ton/ha/yr with water table around 50 cm.

CARBON EMISSION VS GW LEVEL



(Nagano, *et.al.*, 2010)



WATER TABLE AND EMISSION

Same type of peats with different water table would have different results in emission.

A perfect range for water table for Acacia trees in Riau is 40–90 cm, which becomes the acceptance targets for water management.

Fluctuation of water table as a results of occasional wetting from rainfall and drainage would decrease carbon emission (Hadi *et.al.*, 2010).



WATER MANAGEMENT IMPROVEMENT

One promising technology, which is applied in South Sumatra, is **Integrated Water Zoning System** (Setiawan, 2009)

Planted areas are clustered according to land contour. One cluster may have more than one zone. One zone may have more than one block. And, One management unit manages one cluster, or one zone.

One cluster is surrounded by perimeter canal, which has multi functions not only for water reservoir but also for transportation and other means such as fishery.

Water level in the reservoir is maintained and the outflow is directed to one or more corridor canals that connect to the sea or rivers.



WATER MANAGEMENT IMPROVEMENT

The other water management system is called **Ecohydro technology**, which is applied in Riau province.

Both systems have a similar manner in trying to maintain water table by means of constructing perimeter reservoirs, and using a series of by passing small canals to control the outflows from the reservoirs

With these water management systems, water table can be maintained in the range 40–90 cm, conducive for plant growth, resistive to fire risk and defensive to subsidence.



CONCLUDING REMARKS

Indonesia committes to reduce greenhouse gas emission 26% from business as usual scenario unilaterally, and 41% with foreign assistances.

National gas emission so far came out more than 60% from deforestation and land degradation.

Moratorium is underway for 2 years and National Strategy for REDD+ is being prepared.

Forest industry sectors need to develop their management systems subjected to multi objectives involving stakeholders.



CONCLUDING REMARKS

Selaras principle has been introduced to find the optimum solutions in achieving a final goal, which is **sustainable biomass production**.

Applied water management systems to maintain water table in peatlands are very promising but still need further improvement.

Use of wireless information system is necessary due to the vast area of forest plantation, and possible in this recent development on information technology.



THANK YOU FOR YOUR ATTENTION



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