Energetic and Industrial or use of wood in Indonesia – an overview

(Energetiache und Industrielle Nutzung von Holz in Indonesien – ein Überblick)

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Out line

1. Introduction
2. Teaching activities
3. Research activities
4. Community services

- It is generally known and acknowledged that forest resources not only have local impact but also national, regional and even international impact.
- For instance, the role of forests in the provision of global public goods, renewable energy and healty climate

- Indonesia as tropical country has opportunity condition in growing biomass. Therefore suitable, sustainable technology and efficiency should be primary concern in the utilization of biomass.

• BIOMASS UTILIZATION

- PRODUCTION OF BIOMASS
- VALUE OF BIOMASS
- TECNOLOGY DEVELOPMENT

- It is showed that plywood, veneer, and block board industries as well as the sawnwood industry would still face that wood waste is not a valuable material and need an additional cost to avoid them.

- One solution of this problem, would be the developing integrated industry which wood waste will be calculated as an input or raw material for the next industry.

Indonesien Forest

- Based on the data from Center for Forestry Planning and Statistics, Ministry of Forestry (2009) about
- 133.6 million ha of the total land area are stateowned forest areas (or 72%) and 54.3 million ha are non-forest areas (or 28%).

- Forest areas are then classified based on their main functions: Conservation Forest (19.9 million ha or 11%), a forest that preserves biodiversity and the ecosystem;
- Protection Forest (30.1 million ha or 16%), a forest that protects life-supporting systems for hydrology, controls erosion, and prevents sea water intrusion;
- Production Forest (60.9 million ha or 33%), a forest that produces forest products; and
- Conversion Forest (22.7 million ha or 12%), a forest that can be converted into other land use such as agricultural expansion

- historically Indonesia's forests have long been managed in sustainable based forest management system. For example, forests in Java, managed by state-owned enterprise (Perum Perhutani), are predominantly teak plantation have been managed in “a sustainable way according to forest planning system.
- Furthermore in the outer island of Java due to different types of forests and the variety of species composition and richness, the forests have been managed based on the cutting block system with cutting cycle of 35 years.
- The forests are also managed in a certain cutting quota with limit diameter cutting is the same or above 50 cm dbh, named as Indonesian Selective Cutting and Replanting System.

- The oldest wood industry in Indonesia is sawmill then follow by plywood, particle board and pulp industry. The development of forest industry is accelerated by the implementation of concessions system. In 2007 Sixty-seven percent of forest concessionaire units are private companies, which represent 71% of forest concessionaire areas

- The need of Round Wood Equivalent rose sharply from 11.7 million m3 in 1980 to 24.1 million m3 in 1985, peaked at 52.7 million m3 in 2003, and then fell drastically to 39.2 million m3 in 2006. Meanwhile, the timber industry also faced changes in sources of raw materials, which affected their quality.
- In that time some industry dicided to solve the problem by increasing the assurance of raw material by planting industrial wood with intens management system

- Balancing between planting and wood processing is the key factor for the sustainability for the industry. In this way Indonesia has an advantages due to the tropical region, that mean optimum wood or biomass production

Indonesien has 10 faculties of forestry

- Main task of all lecturer
  1. Teaching
  2. Conducting Research
  3. Community services

  Teaching subjects

  Wood technology

  Wood energy

  Wood processing and recycling

Wood waste as renewable energy resourches, case study of wood waste of Acacia mangium in south kalimantan

Quality of sawdust of *Acacia mangium*

	Code	M.C (%)	Ash content(%)	Volatile matter (%)	Fix carbon(%)	Calorific value(calori/gram)
Saw dust	A	13,480	2,489	64,200	33,311	4138

Wood waste as renewable energy resourches, case study of wood waste of Acacia mangium in south kalimantan

Raw material	Calorific value (calori/gram)				Average
Sawdust	4002	4271	4275	4006	4138
Briquettes of Charcoal	6927	7002	6987	7272	7047

Properties of charcoal from oil palm's emty fruit bunches waste and oil palm's shell

- The best quality of charcoal briquettes is obtained from the combination of 2500 psi press load and ratio of material (oil palm's empty fruit bunches waste and oil palm's shell) composition 25%:75% with the specification as follow:

  6.491% moisture content

  0.874 gr/cm3 density

  6931,581 kal/gram

  calorific value

  6.219% ash content;

  42.875%;volatile matter content; and

  44.415% fixed carbon.

Physical and chemical properties of charcoal briquette from corn cob waste

- The results showed that charcoal briquettes had the following quality parameters: i.e. moisture content 6.113% - 6.899%, specific gravity 0.547 - 0.692, calorific value 6,432 – 7,371 calori/gram, ash content 4.750% - 7.197%, volatile matter content 32.585% - 35.988%, and fixed carbon content 51.342% - 55.777%.
- The best charcoal briquettes obtained from combination of adhesive concentration of 6% and press load of 3,000 psi that produce briquette charcoal with the following specifications:
- moisture content 6.715%;
- specific gravity 0.692;
- calorific value 7,371 cal/gram;
- ash content 5.183%; v
- volatile matter content 34.307%; and f
- Fixed carbon content 53.795%.

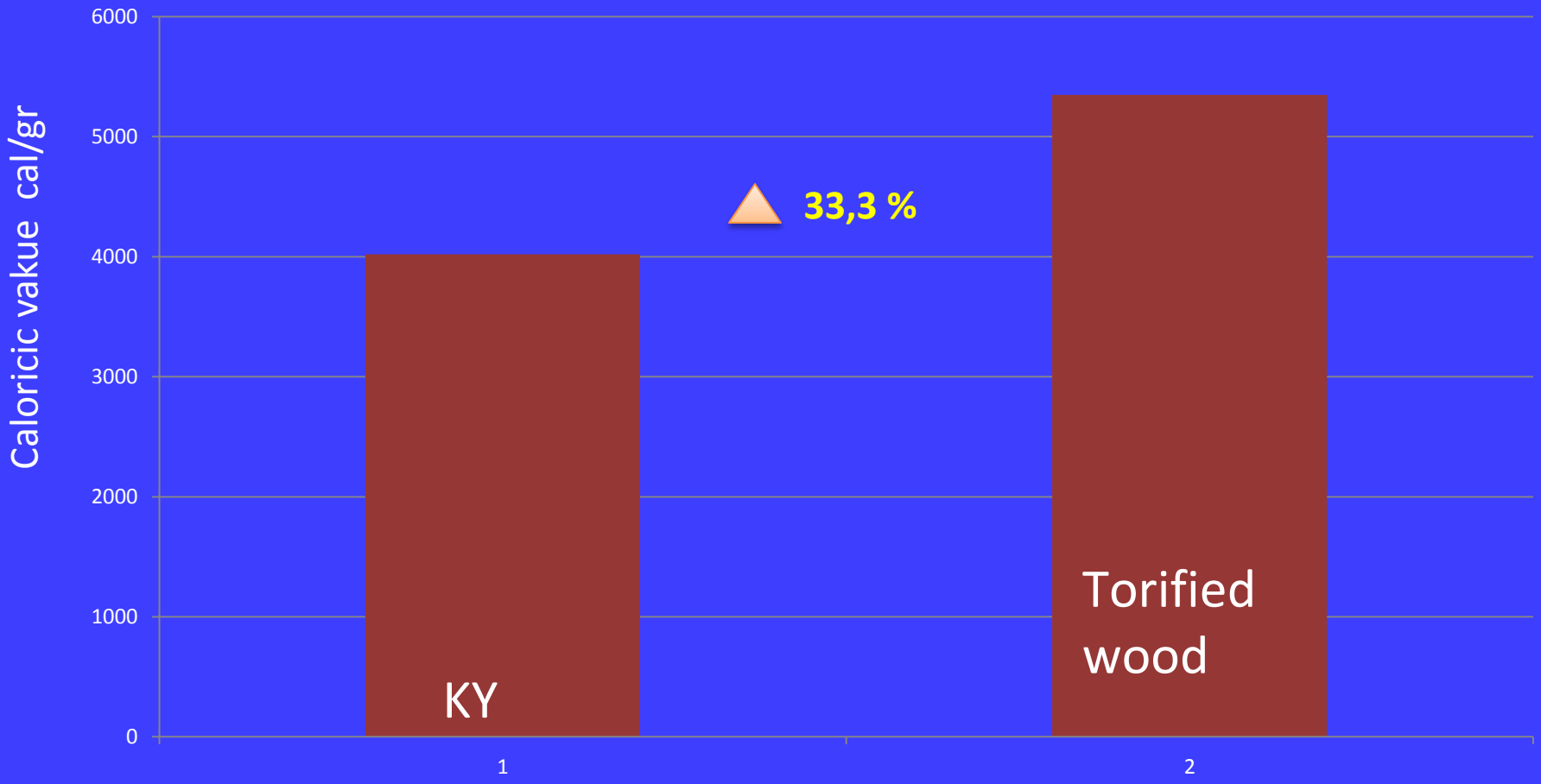
- The benefit of wood recycling and alternative utilization of wood waste with some example of the praxis in mirror gallery in Yogyakarta is well known.
- For the developing of the concept of wood recycling and the wood recycling regulation would be the real need in Indonesia.

- Fire wood, Wood waste and its utilization

- POTENSI
- Kalimantan Selatan Province
- Sawn timber in 2009 and 2010 are 10.638 M^3 and 17.228 M^3 respectically (Dishut, 2011).

- App. amount of saw dust in 2009 and 2010 will be 4.307,0 M^3 and 2.659,5 M^3

Torifaction



- COMMUNITY SERVICES

COMMUNITY SERVICES

S E C I approach (adopted from Nonaka)

- Socialisation
- Eksternalisation
- Combination
- Internalisation

SECI in the Mini Workshop

People participation

- Tacit Knowledge
- Explicit Knowledge

- LEARNING SOCIETY

knowledge creation

Reference : Nonaka

Fire wood


KERUPUK KULIT
CIKAMPEK
CONCENTRAT LAYER PHOSUS SUPER


15000

Conversion biomass to charcoal

Nilai Kalor

- Wood charcoal
- 6723,068 Calori /gram

- Corn cob
- 6307,52 Calori /gram

- 50% WASTE IS SAW DUST

- Raw material (M) Product (P)
- and Waste (W)

- $$M = P + W$$

BAGASSE

- SELLULOSE 46 %
- LIGNIN 23%
- PENTOSAN AND HEKSOSAN 26 %
- OTHERS 5%

- Joesoef , 1980

BAGGASE

	Pentosan %	Lignin %	C B Cellulose %	Alpha Cellulose %
Softwood	13	30	59	34
Hardwood	23	25	59	33
Bagasse	27	20	52	39

Blackburn 1984

PELLET

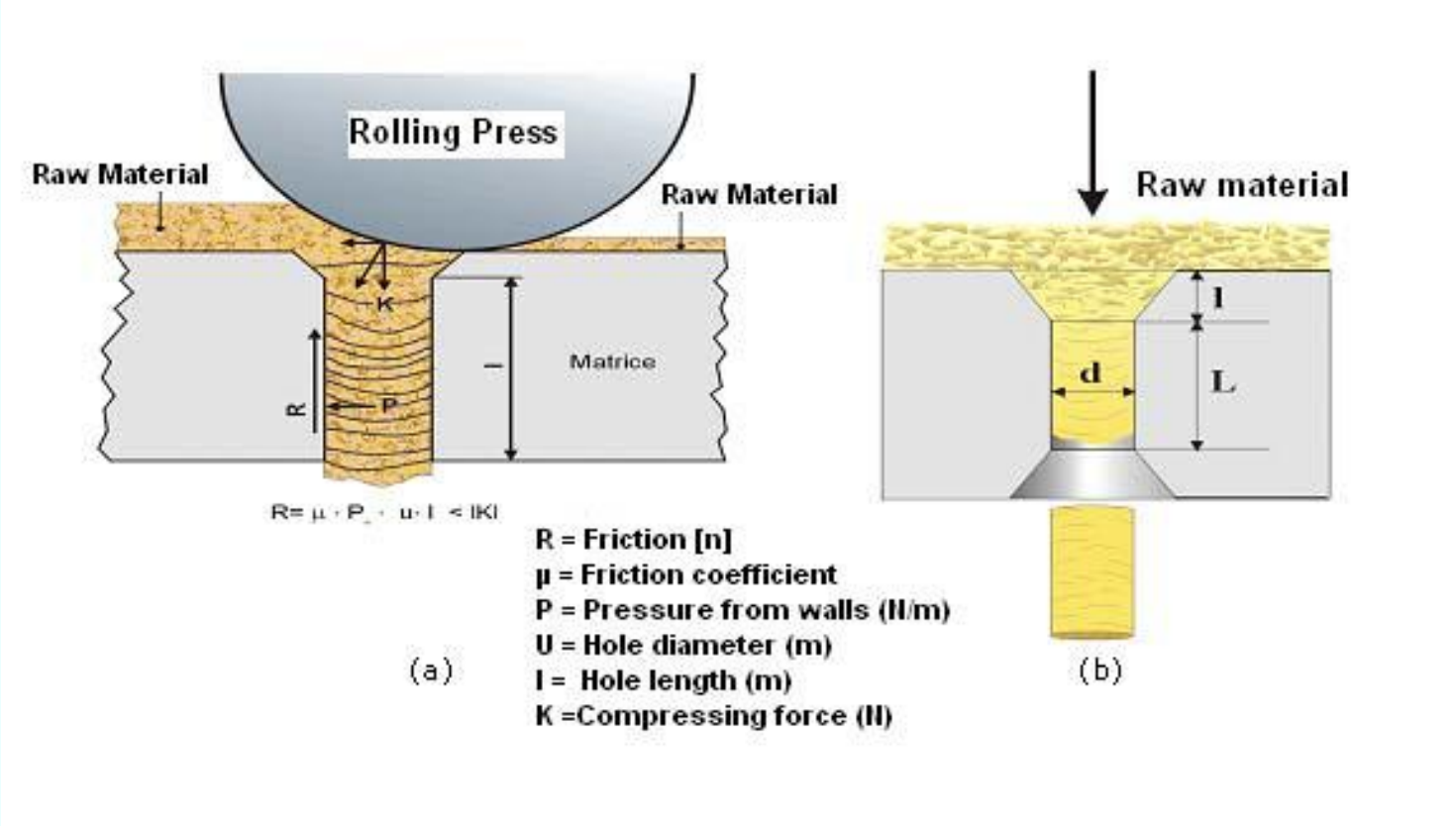
- Due the disadvantages of biomass as raw material for an energy i.e. its low bulk density, pelletizing and torifaction are ways to form a densified wood biomass, the most advantages of this proces is the high density and high calorific value of the product.
- PELLETS ARE A MODERN FORM OF DENSIFIED BIOMASS
- THE MOST ADVANTAGES IS THE HIGH DENSITY OF THE PRODUCT AND THE HIGH ENERGY CONTENT
-

PELLETIZING PRINCIPLE

- Raw material is drained in the drum where roller presses press the raw material into pellets through cylindrical holes in the die block

- Raw material from hard wood need higher pressure in the pelletizing process

PELLETIZING PRINCIPLE



SOURCE: ENGLISH HANDBOOK FOR WOOD PELLET COMBUSTION

Pellets diameter is between 3 and 25 mm
Briquette diameter should be more than 25 mm

SOURCE: ENGLISH HANDBOOK FOR WOOD PELLET COMBUSTION

Solar Park Indonesia Pellet insustry, in Wonosobo

Simple criteria for quality testing of pellet

1. The smell when burning should be the same when we burning wood
2. The colour like wood or should be woody
3. Specific grafity 0.65 up
4. Without additives
5. MC < 12%
6. Not too much dust

Positive mood

- DESEMINATION : How to make modern wood pellet heating plants run just as well as oil or gas heating plants.
- DESEMINATION : In order to be able to accomplish a successful project and avoid scepticism towards a new technology
- INTERNALIZATION : it is important that the relevant people receive information and well motivated toward the implementation of a wood pellet plant

Inspiring Questions

1. *Small size industry?*
2. *Home industry?*
3. *Increasing calorific value*
   of the raw material ?

4. Pellet industry vs poverty reduction ?

Charcoal production with simple method






COLABORATION WITH JICA, 2008

Community services

Gambar 1. Instalasi Reaktor Biogas Skala Rumah Tangga

DIGERSTER INSTALATION

BIOGAS

- Filling Dunge in the digester

Biogas instalation

- Gas Storage

- Direct biogas utilization

- Waste / sludge from digester is a good fertilizer

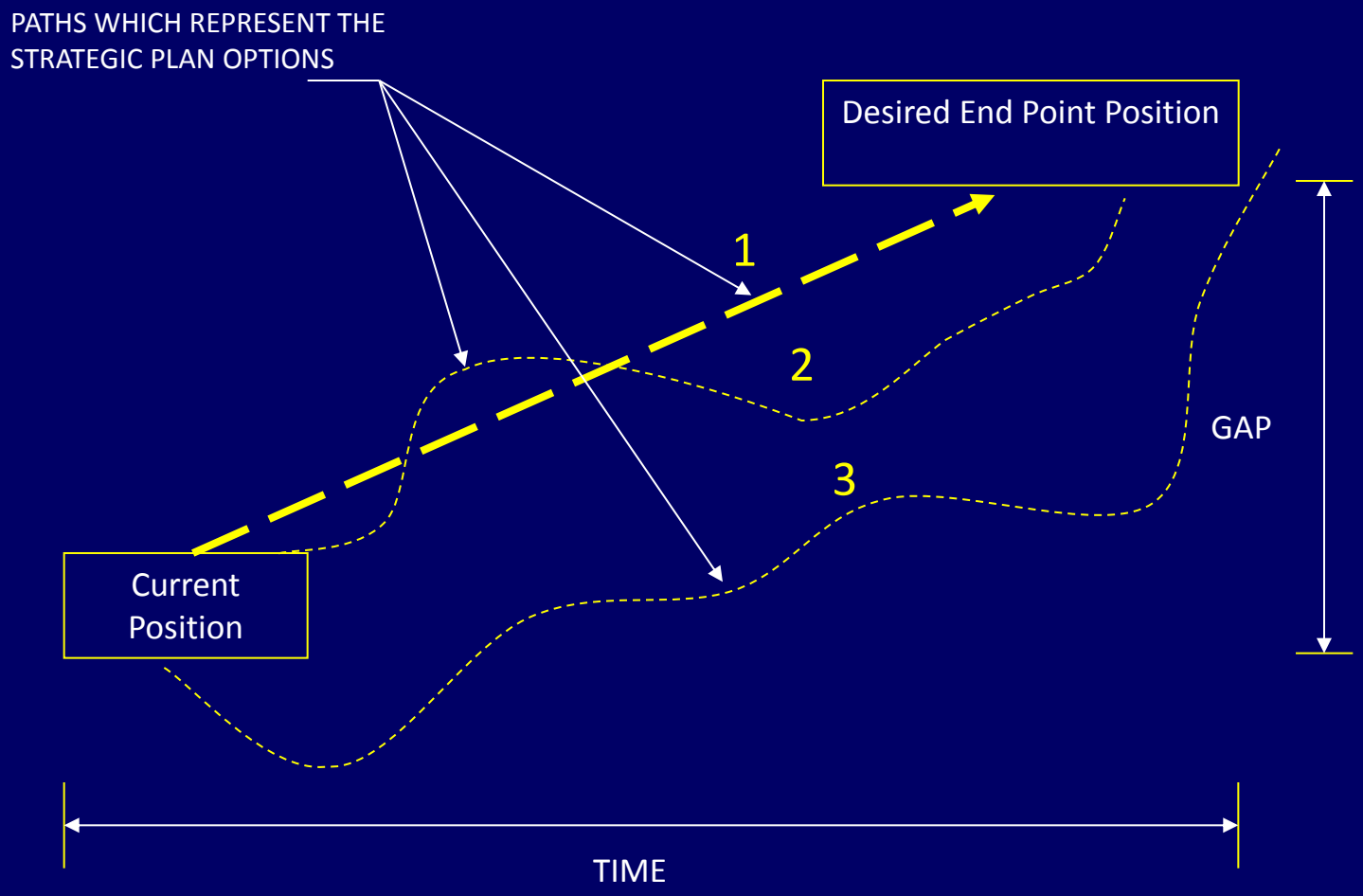
KOMPOS PRODUCTION

(DESA BOGEM, 2008)

COMMUNITY SERVICES

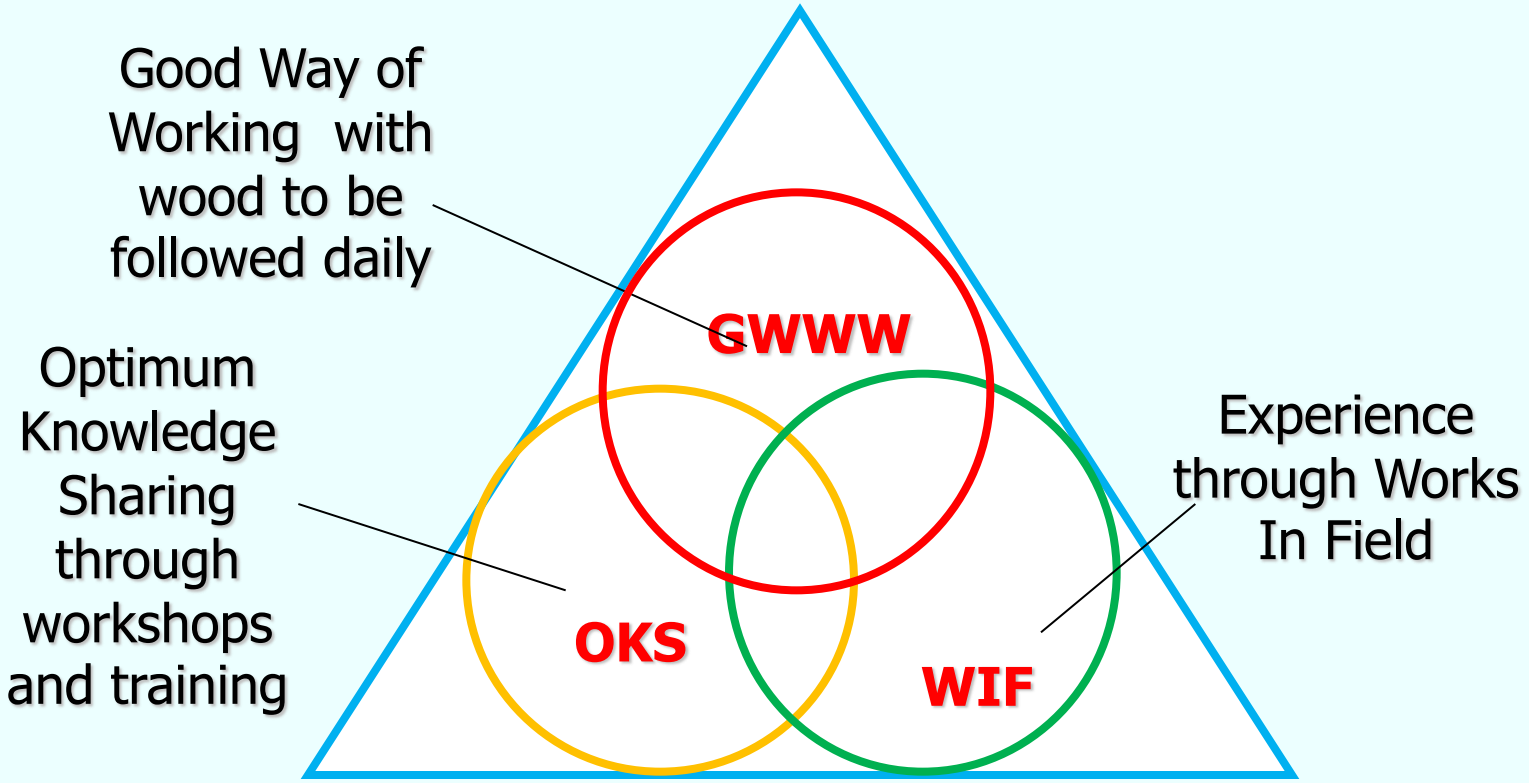
(DESA NGERANGAN, 2008)

STRATEGIC PLAN(S)



Introducing "a new way of working with wood"

The function of facilitating, empowering and enabling strategies



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- Thank you