

IRRIGATION MANAGEMENT TO INCREASE AGRICULTURE PRODUCTION

(Indonesian Experiences)

Presented by

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Background



Base 802899A1 (C00429) 11-02

- Indonesia consists of about 17,508 islands of which 6,000 are inhabited
- The archipelago covers 8 million square km of the earth's surface with a total land area of about two million km²
- Population is estimated at about 232 million with a growth rate of 1.49%
- Indonesia has varied rainfall distribution from 800 – 4,000 mm/year. The rainfall is mostly concentrated within 6 months, whereas the other 6 months face a dry season.

INTRODUCTION

- Rice is the main staple food for most Indonesian, produced mainly on irrigated land.
- Indonesia astride over the equator, stretching 5,120 km from east to west and 1,888 km north to south.
- Rainfall pattern varies from more than 3,500 mm/year (some parts of Sumatra, Kalimantan and West Java) to less than 1,750 mm/year such as in East Nusa Tenggara.
- There are about 5,886 main rivers in Indonesia and the run-off flow has already been used for irrigation. Exploitation of the river flows depends on the storage of river supplies during rains.

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In this regard the Indonesia Government Regulation No. 7/2004 concerning Water Resources and the Government Regulation No. 20/2006 on Irrigation stated that responsibility of irrigation network depend on the size of the irrigation scheme determines at which level of Government is responsible for securing the budget:

- a. Central level for schemes >3,000 ha and cross-province schemes
- b. Provincial level for schemes 1,000-3,000 ha and cross-district schemes;
- c. District level for irrigation schemes smaller than 1,000 ha

POTENTIAL OF IRRIGATION AREA

Total of Irrigation Potency

10,865,200 Ha

Developed

7,230,183 Ha

Undeveloped

3,635,017 Ha

Identified

(2010 – 2014)

566.000 Ha

Unidentified

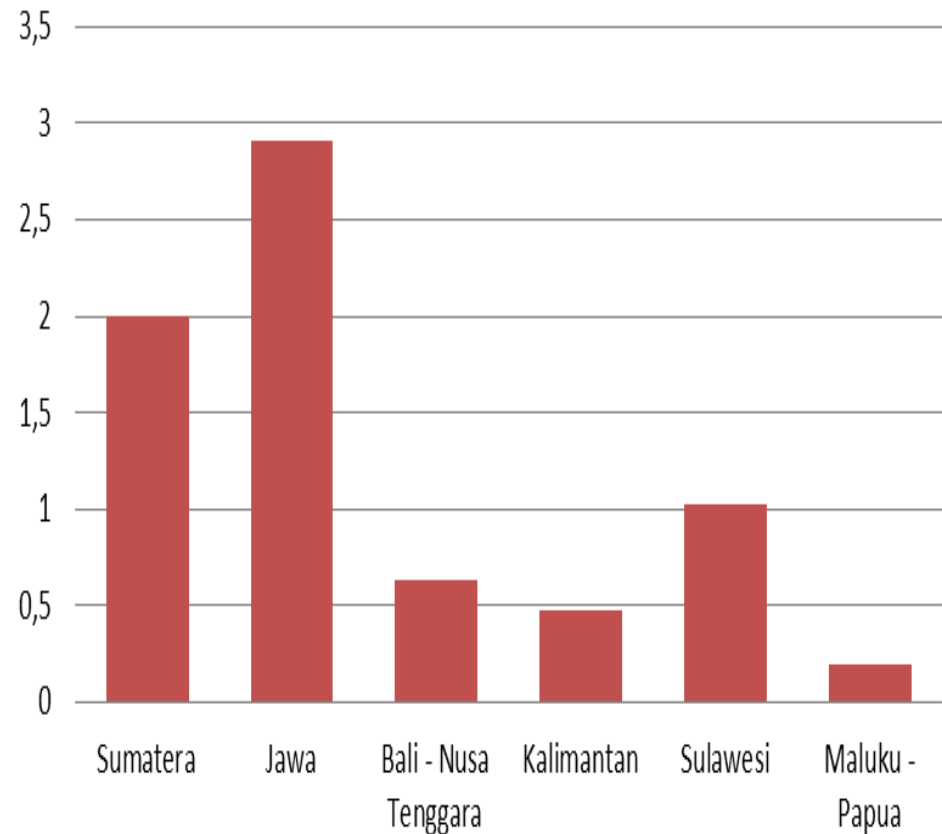
3,069,017 Ha

Con't...

- Agriculture irrigated area in Indonesia covers about 7.2 million ha and has very important role due to :
 - i. agricultural irrigated land produce 85% of rice national production in; and
 - ii. 95% of Indonesian people consume rice as a staple people (in average 139.15 kg/cap/year)
- 40% of irrigated area in Indonesia located in Java, which :
 - i. has a productivity between 1.2 – 2.0 times of land outside Java; and
 - ii. inhabited by nearly 60% of total population

DISTRIBUTION of IRRIGATION AREA by REGION (million hectares)

Source : BAPPENAS, processed from Ministry of Public Work 2007

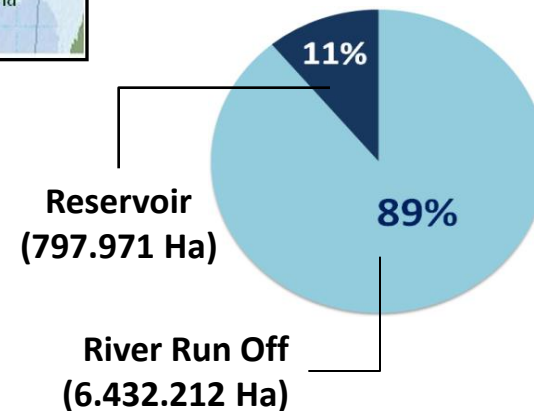


DISTRIBUTION OF IRRIGATED PADDY FIELD AREA IN INDONESIA

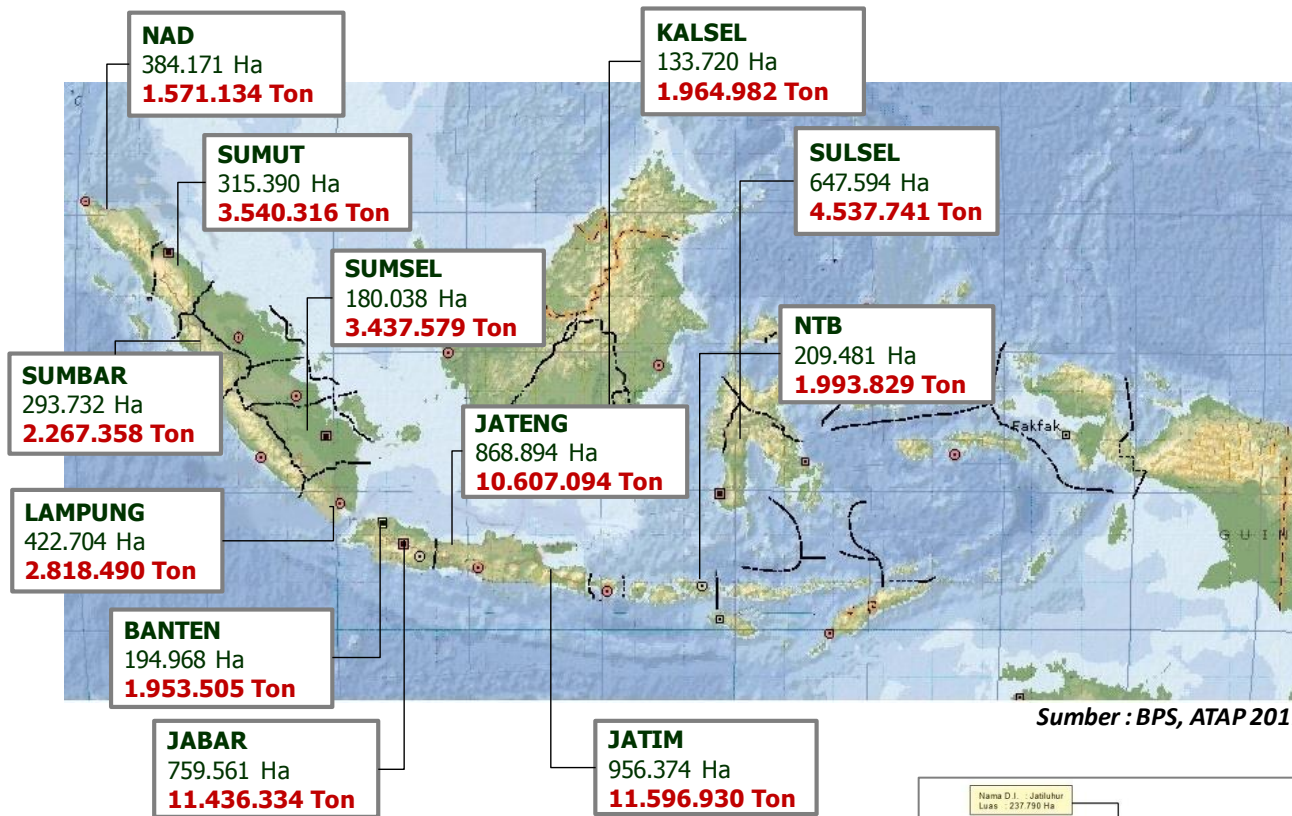
TOTAL AREAL : 7,230,183 HA



ISLAND	CI	Productivity (ton/ha)
SUMATERA	1.3	5,1
JAVA	1.9	5.8
KALIMANTAN	1.4	4.8
SULAWESI	1.0	5,1
BALI + NT	1.3	4.8
MALUKU	1.4	4.2
PAPUA	1.0	3.8
AVERAGE	1.4	5,3



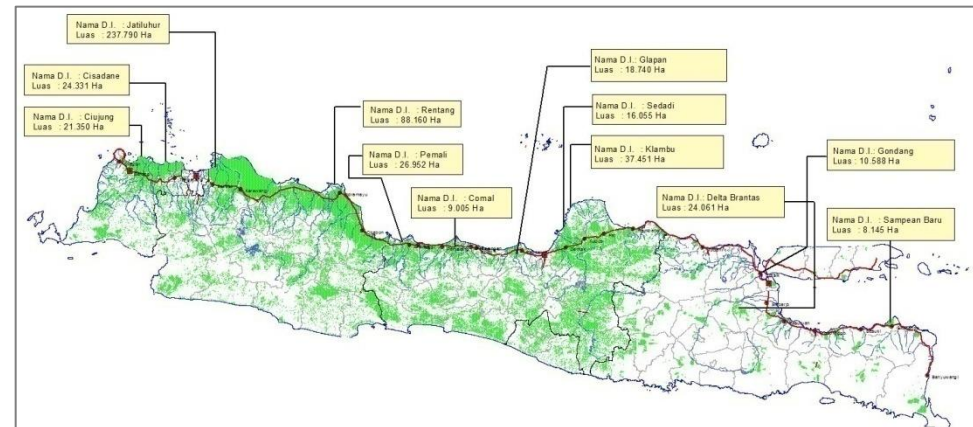
THE 12 PROVINCES RICE CONTRIBUTOR



Sumber : BPS, ATAP 2011

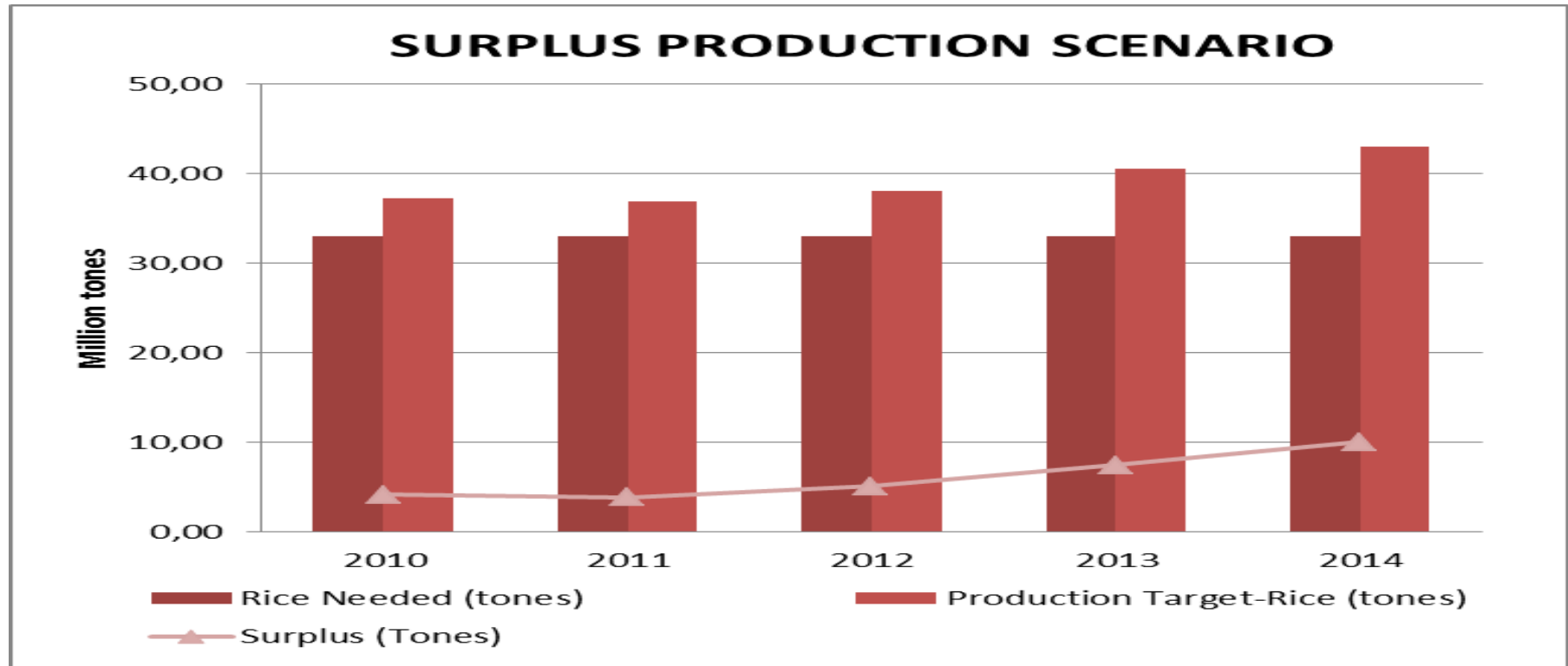
The concern for both intensification and expansion shall be given to 12 provinces, the main contributors of national rice production

Particularly for the irrigation area located along the northern coast of Java, which are contributing to almost **50%** of national rice production in **2011**

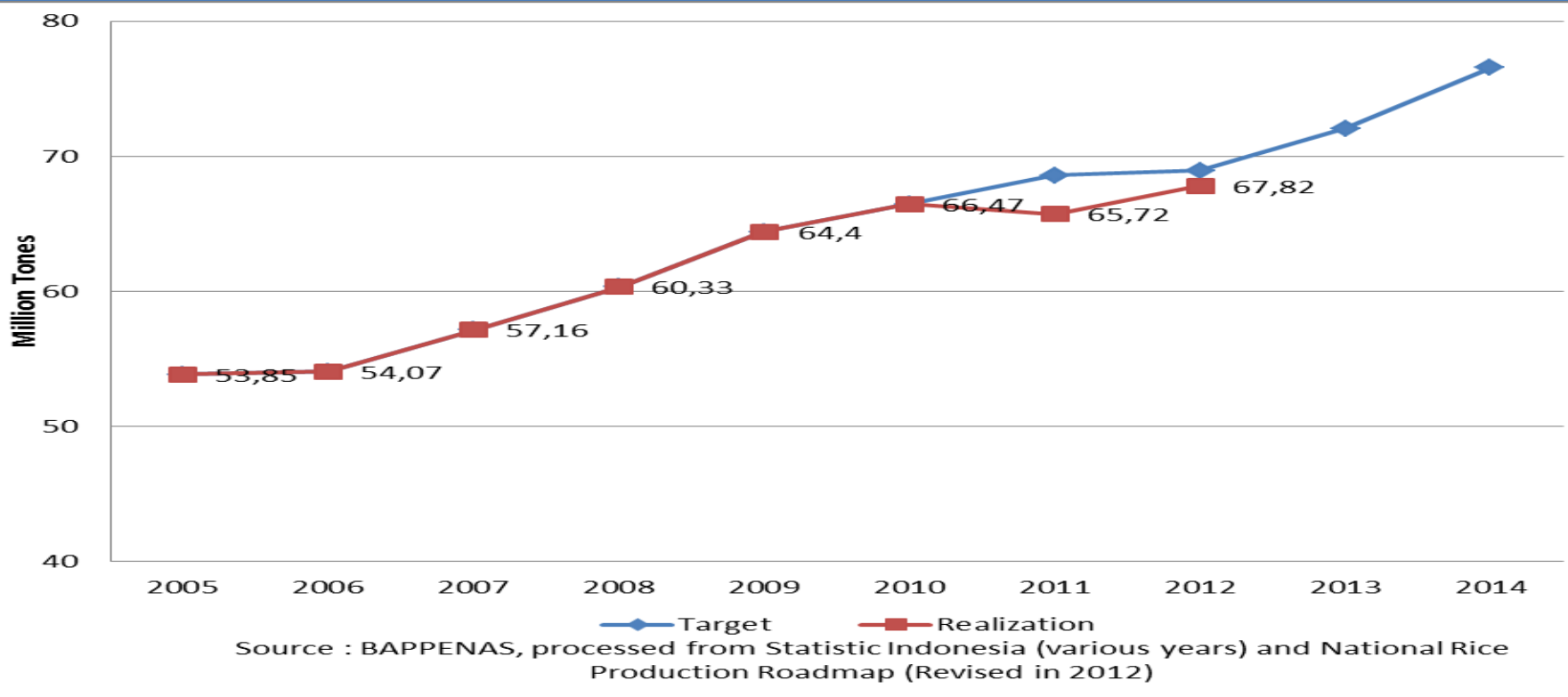


NATIONAL ROADMAP ON RICE PRODUCTION SURPLUS

Year	Production Target (Tones)			Population (persons)	Rice Demand per cap/year	Rice Demand (tones)	Surplus (tones)
	GKG	Increasing Growth (%)	Rice				
2010	66.469.394	3,22	37.222.861	237.556.363	139,15	33.055.968	4.166.893
2011	65.721.601	(-1,13)	36.948.684	241.095.953	137,06	33.045.274	3.903.410
2012	67.824.692	3,20	38.131.042	244.688.283	135,01	33.034.584	5.096.458
2013	72.063.135	6,25	40.514.232	248.334.138	132,98	33.023.897	7.490.335
2014	76.567.719	6,25	43.046.372	252.034.317	130,99	33.013.214	10.033.157



ACHIEVEMENT OF THE ROADMAP



- Productions of paddy/rice at the national level in the last few years have significantly increased;
- Achievement of rice production in 2009 which reached 64,4 million tons is the highest growth (6,8%)
- The achievement of 2011 was below the target, but the forecast II of 2012 shows that production is over the target

POLICY ON AGRICULTURE WATER MANAGEMENT

1. Increasing the effectiveness of water irrigation use by irrigation infrastructure development, water efficient technology and farmers participatory.
2. Improving the sustainable alternatives and small scale water resources development, priority on dry land.
3. Policy development and rehabilitated tertiary canals (on Farm irrigation) should be in the good conditions of secondary and tertiary canal (recommended)
4. Water conservation by surface and rain water harvesting, increasing of the farmers awareness and participatory, water conservation infrastructure development, and drought and flood anticipation in agricultural land.

Con't...

5. Introduced adaptation and mitigation strategy to climate change/climate anomaly anticipation (*el Niño and la Nina*) and its implementations.
6. Promoting farmer community participation in the implementation of Irrigation system development (participatory approach).
7. Farmers are responsible for village irrigation systems and the tertiary level hydraulic infrastructure ; the government is responsible in the development and management of the main irrigation infrastructure. For this purpose water-users-organisations (WUA) at the Farmer level or the tertiary block are organised. In addition, these WUAs are organised in Federations for secondary blocks (WUAFs), while these WUAFs are again organised in a IWUAs at primary level
8. Increasing the quality of WUA's as the institutions coordination for water conflict management

PROGRAMME & ACTIVITIES

- Water irrigation is optimized by rehabilitation of farm level irrigation channel (JITUT), rural irrigation channel (JIDES), micro water channel development (in Swampy area),
- Improving the alternatives and small scale water resources for food crops, horticulture, plantation, and animal husbandry commodities.
- Small dam, farm water reservoir development (*Embung*), surface water irrigation, shallow ground water, deep well irrigation development and infiltration well development.
- Participatory irrigation management (PIM) program , in developing the capacity and capability of WUA/WUAFs in implementation of participatory irrigation scheme management.

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Farm level irrigation channel (JITUT) and Rural irrigation channel (JIDES) rehabilitation development project



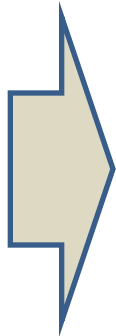
Micro water channel development (TAM) in the swampy land



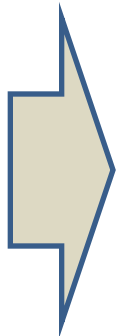
Participatory approach in rehabilitating small/onfarm irrigation canals



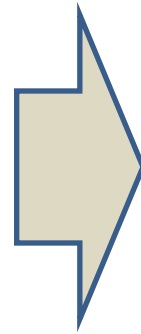
Improving potential water resources by local water wheel in the water withdrawal using water flow energy.



Participatory Irrigation Management (PIM) project , to develop tertiary irrigation cannal



Development of on farm reservoir with focus on dry land in order to store water (conservation/rainfall harvesting)



Furrow Irrigation in Dry Climate Region



Capillary Wells Irrigation System in sandy land



Capillary Irrigation system
for sloping lands



Drip Irrigation system for
water use efficiency for
horticulture commodities





Springkling Irrigation system
for valuable crops (cotton
etc)



Pumping Irrigation system
for shallow ground water

PROBLEMS AND CHALLENGES OF IRRIGATION DEVELOPMENT IN INDONESIA

1. Growing demand with increasing population and developing economy, water supply is decreasing due to watersheds degradation. Global climate change which resulting increase of magnitude of rainfall variability are rendering a high frequency of both floods and droughts in Indonesia.
2. Amid irrigation around 68% of all national irrigation under regional authority there is limitation of both provincial and district authority in term of O&M funding for their irrigation Infrastructure to maintain the irrigation facilities,.

Con't....

3. Some of irrigated areas have been converted into non-agricultural utilization such as plantation (oil palm or rubber in Sumatra and Cocoa in Sulawesi), Industry and housing (many industrial and residential areas in northern coast of Java), etc.
4. With current water utilization at about 80% for agriculture will certainly decrease in the increasingly tight competition

Conclusions

1. Contribution of irrigation to crop yield around (16%) compared with the contribution of fertilizers (4%) , and varieties (5%). So in order to achieved the nation food security we should put more attention in improving water use efficiency and effective use of water resource
2. Based on the population growth (projected for 2010 – 2030), Indonesia has to cater approximately **79.35 million Dry Grain of Rice**.
3. To support the projected rice demand, Indonesia has to expand additional good irrigation infrastructure approximately 2.0 million Ha (or similar to 500 thousand Ha every 5 years) of new irrigated paddy field to maintain national food security when paddy yield is assumed at 4.62 ton/ha;



Thank You