INDONESIA SUSTAINABLE AGRICULTURAL MECHANIZATION STRATEGY TO SUPPORT RICE SELF SUFFICIENCY, SURPLUS AND EXPORT

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UNITED NATIONS ESCAP
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OUTLINE

1.INTRODUCTION.

2.STRATEGY TO ACHIEVE THE SUSTAIABLE RICE SELF SUFFICIENCY AND EXPORT

3.DEVELOPMENT OF SUSTAIABLE AGICULTURL MECHANIZATION TO INCREASE RICE PRODUCTION, SURPLUS AND EXPORT

4.SOME PROBLEMS IN DEVELOPING SUSTAIABLE AGRICULTURAL MECHANIZATION IN INDONESIA

5.STRATEGY FOR DEVELOPMENT OF SUSTAINABLE AGRICULTURAL MECHANIZATION TO SUPPORT RICE PRODUCTION AND SELF SUFFICIENCY AND EXPORT

6.CLOSURE

1. INTRODUCTION

INDONESIA

Tolat Area	**: 5.193.250 km2**
- Land	**: 1.919.440 km2**
- Water	**: 3.273.810 km2**
Number of Island	**: 17.508**
Total Population	**: 253 Million**

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STATUS OF INDONESIAN AGRICULTURE 2016

Population : 253 million people

Population growth : 1.13 % per annum.

Stapple food : Rice

Rice consumption : 33.84 million ton.

Rice production : 47,5 mill ton

Total Indonesian farmer : 37 % of the total population

The total agricultural area : 20 million ha

Wet land paddy area : 8.11 million ha,

Upland and garden : 11,87 million ha

Average land holding : 0,3 ha per farmer.

The Target of National Agricultural Development

a. Increasing food production, surplus and export of food and agricultural product.

b. Increasing Food diversification

c. Increasing added value, competitiveness of agricultural product

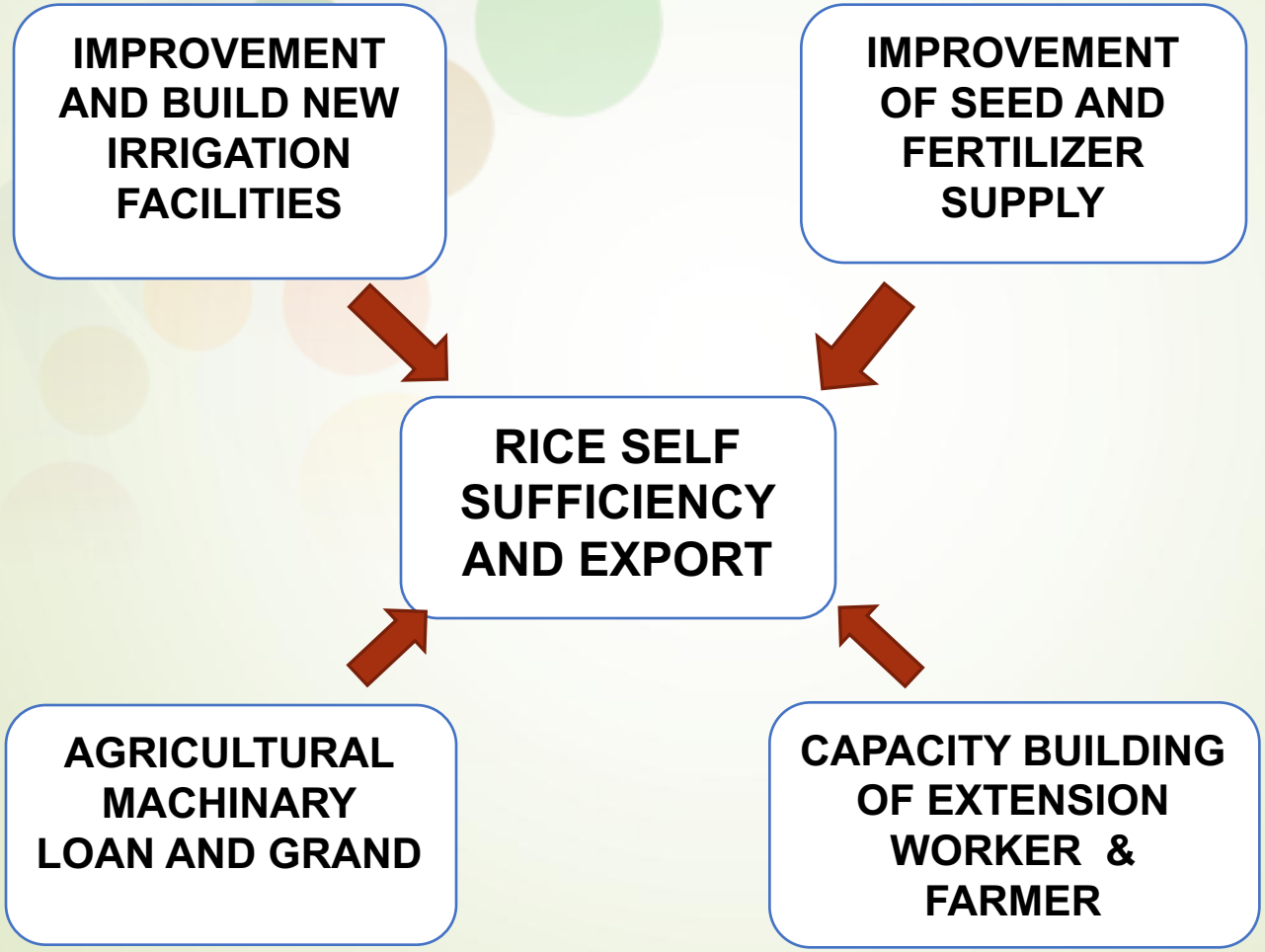
d. Providing raw materal for bio industry and bio energy

e. Increasing farmer income and welfare

Problems in Achieving the Target:

a) High agricultural land conversion rate,
b) Decresing of agriculturral labour,
c) Climate change (cased: flood, drought and pest explossion)
d) Damage of irrigation cannal
e) High post harvest losses,
f) Some existing agricultural machinary does not match with the condition of agro-ecosystem, social and cultural.
g) Low skill and knowledge of the farmer to manage and operate agricultural machinary

2. STRATEGY TO ACHIEVE SUSTAIABLE RICE SELF SUFFICIENCY AND EXPORT



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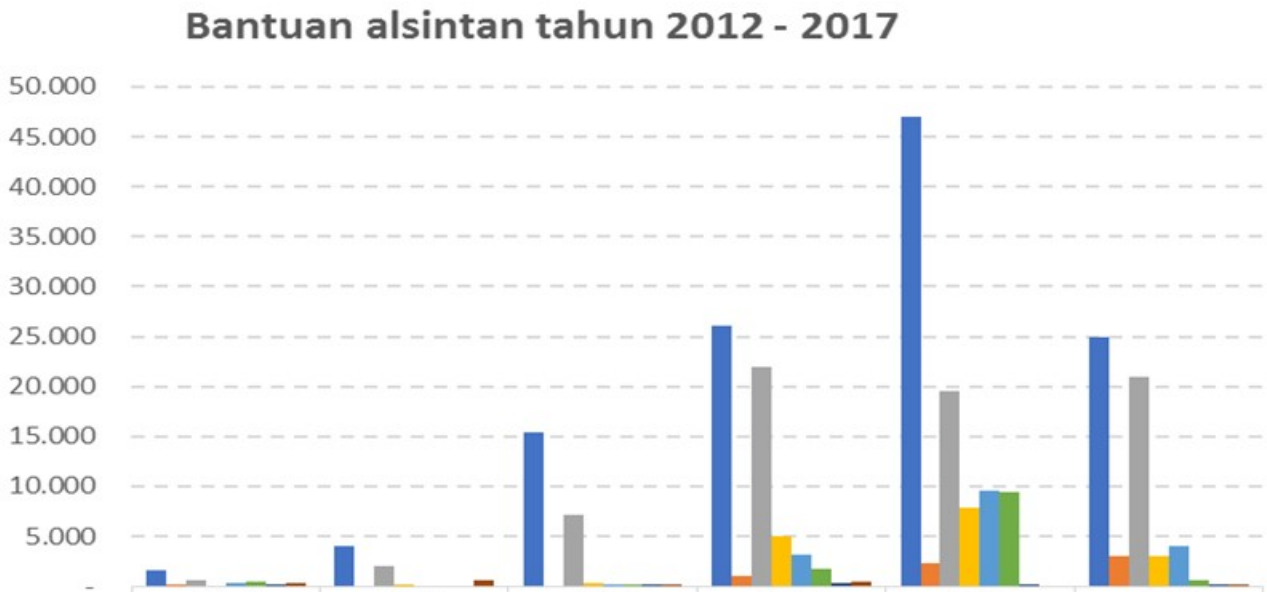
Farm Machinary loan and grand 2014-2017



	2012	2013	2014	2015	2016	2017
Traktor R2	1.567	3.996	15.435	26.100	46.980	25.000
Traktor R4	50	-	-	1.000	2.280	3.000
Pompa	600	2.002	7.122	21.953	19.518	21.000
Rice Transplanter	-	153	279	5.000	7.854	3.000
Combine Harvester	355	-	180	3.185	9.564	3.984
Power Thresher	400	-	201	1.654	9.432	604
Dryer	183	-	29	271	11	2
RMU	333	575	151	386	-	21

4. SOME PROBLEMS IN DEVELOPING SUSTAIABLE AGRICULTURAL MECHANIZATION

Problems:

a) Miss match between agricultural machinery and agroecosystem, socio-economic and cultural condition of Indonesian farmers in each district.

b) Lack of number and capability of human resources dealing with agricultural mechanization development are weak,

c) Inspection and control of agricultural machinary at the market are weak,

5. STRATEGY FOR DEVELOPMENT OF SUSTAINABLE AGRICULTURAL MECHANIZATION TO SUPPORT RICE PRODUCTION AND SELF SUFFICIENCY AND EXPORT

Based on the experience in developing agricultural machinary custom hiring unit, Agricultural Mechanization in Indonesia in Indonesia will sustain if there are:

a) Able to respond the problem in the right manner,
b) Has comparative advantage compare to other technology,
c) Suitable with farmer and farming condidtion,
d) Environtmentally aceptable,
e) Give benefit and better income to the stakeholder,
f) Available after sales service guarantee are available (training for manager, technician, operator, spare part, repair and maintenance).

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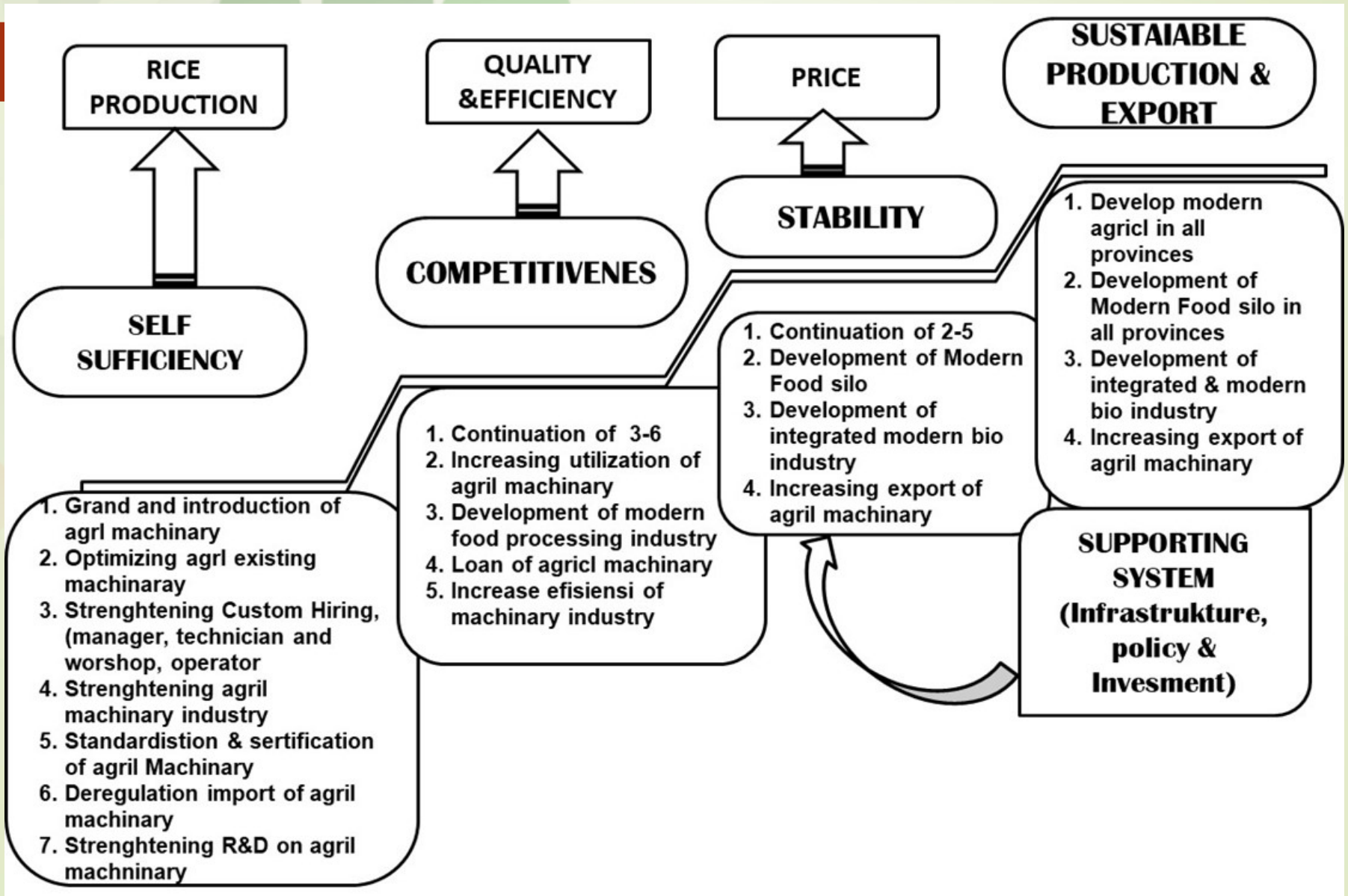
A. REGULATION

1. Government Regulation Number 65, year 1971 related to the regulation of industry of rice milling unit, rice husker and polisher. (to control the number and specification of RMU to increase recovery, rice quality and efficiency of RMU)
2. Indonesia Act Number 12 year 1992 concerning Crops Farming System. (Production and distribution of agricultural machinery and toolls need to be controlled, monitore and supervised)
3. Ministry of agricultural regulation Number 65 year 2006. (Procedure of controlling on marketting, purchasing and utilization of agricultural machinary in Indonesia).
4. Ministry of agricultural regulation Number 05/ Permentan/12/2006 year 2006 (Testing Procedure and Certification of Agricultural Machinery).
5. Ministry of agricultural regulation Number 25/ Permentan/pl.130/5/2008 year 2008. (Development of Agricultural Machinery Custom Hiring Business).
6. Ministry of Manpower Regulation Number No 217 year 2016. (Performance Standard of Competency for Indonesian Woker working in in the area of Agriculltural Mechanization Development for: planner, engineer, manager, operator and technician of agricultural machinery and tools.
7. Gideline of DG of Agriculture Infrastructure, 2017. (Guideline for the implementation of procurement, distribution, and grand of Agricultural Machinery)
8. Gideline of DG of Agriculture Infrastructure, 2017. (Guideline for Implementation and Management of Agricultural Machinary Brigade).
9. Road Map of Agricultural Machinary Technology to Support the development of modern farming by Indonesian Agency of Agricultural Research and Development, Ministry of Agriculture, 2017.

B. Strategy for Development of Sustaiable Agricultural Mechanization



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Srtrategy Phase I.

1. Introduction of agrl machinery,
2. Provide grand to farmer and farmer group
3. Optimie existing agricultural machinary through developing various model of sustaiable agricultural mechanization
4. Strenghtening Custom Hiring Business Unit (manager, technician, operator and worshop)
5. Strenghtening agricultural machinery industry
6. Strenghtening standard & sertification of agricultural Machinary
7. Deregulation import of agricultural machinary
8. Strenghtening R&D on agricultural machninary

Srtrategy Phase II

1. Continuation strategy phase I number 3-6
2. Development modern farming system with agricultural mechanization in all provinces
3. Development of modern food processing industry
4. Provide loan for agricultural machinary to farmer and farmer group
5. Increase the efisiency of agricultural machinery industry

Srtrategy Phase III

1. Continuation strategy phase II number 2-5
2. Development of modern food silo
3. Development of integrated modern bio industry
4. Increasing export of agril machinary

Srtrategy phase IV

1. Development of modern Food Silo in all provinces
2. Development of integrated & modern bio industry
3. Increasing export of agricultural machinary

C. PROGRAM

Model of modern rice farming system fully mechanized has been developed and tested in number of district, i.e. in Jawa, Sulawesi and Kalimantan Provinces

The area of the each model was between 100-200 ha.

Good agricultural panctices (GAP) was rice planting using Jajar Legowo method, application of balance fertilizer base on soil fertility map, pest control and introduction of farm machinery for land preparation, rice transplanting, weeding and harvesting

Location of modern rice farming system :

Sukoharjo, Central Jawa: 200 ha, 2015

Pontianak, West Kaimantan; 100 ha, 2015

Boyolali, central Jawa, 100 ha, 2016

Sidoarto District, East jawa 100 ha, 2016

Klaten, Central Jawa. 100 ha, 2017

Indramayu district, West Jawa 150 ha, 2017

Activity and output of the model

Power tiller and 4 wheel tractor equiped with disk plow, rotary tiller, and leveler for land preparation, walking type jajar llegowo rice transplanter.with dapok seedling trays, power weeder, combine harvester and post harvest machinery consist of circulated vertical dryer, rice milling unit to produce good quality of milled rice and storage has been introduced to farmer and group

Modern rice farming has increases productivity by 2 ton/ha, Reduce the use of labor up to 70% and reduce labor cost up to 30% compsred to manual method. The scattered losses decrease by 6 %, milling recovery increases by 6% and rice qualirty increases compare to existing methods (Tabel 2, 3 and 4).

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Tabel 2. The use of agricultural machinery has speed up field activity and reduces the use of labor in many provinces in Indonesia

Field activity	Manual (man days)	Full Mechanized (day)	Time Reduction	
			(man days)	%
• Land preparaation	20	3	-17	-85,0
• Seedling and planting	19	7,5	-11,5	-60,5
• Weeding	15	2	-13	-86,7
• Harvesting	40	7,5	-32,5	-81,3
Total	94	20	-74	-78,4

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Table 3. The use of agricultural machinary has reduced labor cost/ ha-season

Activity	Manual (Rp/ha)	Full Mecanized (Rp/ha)	Cost reduction	
			Rp	%
• Land preparaation	1.600.000	1.200.000	-400.000	-25,0
• Seedling and planting	1.720.000	1.100.000	-620.000	-36,0
• Weeding	1.200.000	510.000	-690.000	-57,5
• Harvesting	2.857.125	2.285.700	-571.425	-20,0
Total	**7.377.125**	**5.095.700**	**-2.281.425**	**-30,9**

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Table 4. Loss reduction due to the use of combine harvester and improved RMU

ACTIVITY	LOSES (%)		QUALITY (%)	
	Existing method	Improved machinery	Existing method	Improved machinery
Rice harvesting	± 9,4	± 3		
Threshing	± 5	± 2		
Drying :	-	-		
▪ Milling Recovery			± 59	± 62
▪ Whole grain			± 35	± 65
▪ Broken grain			± 65	± 35

Indonesian Agency for Agricultural Research and Development, 2013

MODERN RICE FARMING IN BOYOLALI DISTRICT, CENTRAL JAWA PROVINCE (2016)

- Land preparation: 2 and 4 wheel tractor
- Transplanting : Jajar Legowo Transplante
- Weeding : Power weeder
- Harvesting: combine harverter

GAP: combination of "Jajar Legowo Super" techniqe and Transplanter,
Rice productivity has increase from 6 ton/ ha to 9.5 ton/ ha of dried paddy in

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7. CLOSING REMARK

Indonesia Policy, regulation, strategy and program of the development sustaiable agricultural machinary to increase rice production and surplus, increasing competitiveness and stability and finally export has been formulated.

Various model of modern rice farming supported with full agricultural mechanization have been developed.

The sucess in implementing the policy, regulation, program will srongly depend on inplementation and collaboration between all stake hoders.

THANK YOU

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RICE PRODUCTION AND CONSUMPTION IN INDONESIA

Year	Harvested area (mill ha)	Yield (mt/ha)	Production (mill mt, paddy)	Consumption (mill mt, rice)	Import (thousand mt)
2005	11.8	4.6	54.2	33.7	236.9
2006	11.8	4.6	54.5	34.2	189.6
2007	12.1	4.7	57.2	36.8	1406.8
2008	12.3	4.9	60.3	37.4	286.7
2009	12.9	5.0	64.0	39.9	250.5
2010	13.3	5.0	66.5	41.2	687.6
2011	13.2	5.0	65.8	43.3	2750.5
2012	13.4	5.1	69.1	43.5	1810.4
2013	13.8	5.2	71.3	45.4	472.2
2014	13.8	5.1	70.8	46.2	844.2
2015	14.1	5.3	75.4	48.1	*)
Growth (%/year)	1.76	1.55	3.41	4.01	-

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TREND OF POPULATION, RICE PRODUCTION AND CONSUMPTION IN INDONESIA