CASSAVA IN INDONESIA:

PRODUCTION, UTILIZATION, CONSTRAINT AND STRATEGY FOR IMPROVEMENET

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The important of Cassava in Indonesia : Cassava is the most important tubers crops, the 3rd important food crops after rice and maize. In 2004 it contribute Rp.6.1 billion to GDP. It has been grown for a long time, and it can grow in all part of Indonesia.

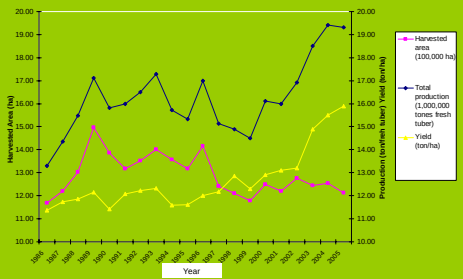
Contribution to world production :In term of area, Indonesia is the largest producer in Asia, but in term of production, Indonesia is the 2nd after Thailand, and the 4th in the word. However, its contribution to marked world is very small (3%)

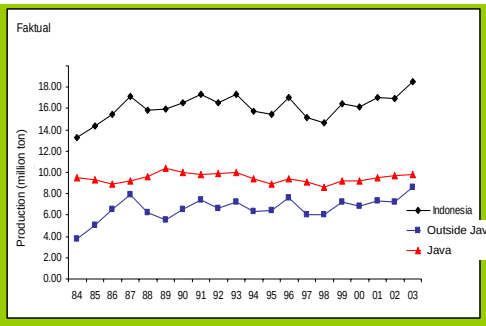
Table 1. Cassava production, area, and yield in the world, the continent, and in various country in Asia, in 2004.

	Production ('000 tonnes)	Area ('000ha)	Yield (t/ha)
World	195,574	17,871	10.94
Africa	103,423 (53%)	11,663	8.87
LAC	33,601 (17 %)	2,683	12.52
Asia	58,373 (30%)	3,508	16.64
-China	3,901	240	16.25
-India	7,100	270	26.30
-Indonesia	**19,197**	**1,285**	**14.93**
-Malaysia	380	38	10.00
-Philippines	1,400	180	7.78
-Thailand	20,400	1,050	19.43
-Vietnam	5,370	371	14.49

Source : Howeler (2006)

PRODUCTION : during the past 2 decades harvested area decrease, total production, especially in the past 4 years increase. The increase in the total production indicate the increase in the yield per ha.





National Cassava production in last 20 Years : Although cassava grow in all Indonesian island, Java is the major producers (55% of total production), then followed by Sumatra (30 %). In Java cassava is planted by small farmers (less than 1.0 land area)and mostly in mixed cropping, and/or in marginal soil. In Sumatera, esp. for industrial purpose cassava planted in monoculture system. The average national yield is still low (16 t/ha), far below the potential yield.

Yield variation : although the average national yield is low, the actual yield in some area is very high (close to the potential yield)

Table 2. Variability of Yield in Major Cassava Growing Area in Indonesia

Province	:	cassava tuber yield t/ha)	
	average yield	lowest yield	highest yield
1. East Java	19.4	11.5	45.6
2. Lampung	18.8	8.3	24.5
3. Central Java	17.3	11.5	60.6
4. West Java	16.8	11.6	34.8
5. Yogyakarta	11.9	8.5	30.4

Source : the average yield was obtained from Statistical book of Each province, The lowest and highest yield were obtained from direct observation of yield obtained by some farmers in the regions.

- Growing cassava in marginal soil in Yogyakarta. Cassava yield about 10 t/ha

- Cassava + upland rice and maize intercrop, in Yogyakarta. Cassava population is low (less than 4,000/ha), hence the yield is also low (about or less than 10 t/ha)

- Cassava + maize intercops in west Java. Cassava yield 20-25 t/ha

- Cassava monoculture in Pati which yield more than 60 t/ha

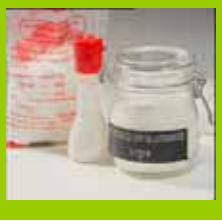
Utilization : a decrease in human food utilization, an increase in industrial use. For human consumption there is a change in the way cassava is consumed. In the past it is in a simple form (fresh or dry), now it is processed into many product/forms.

Table 3. Cassava Utilization in Indonesia

Cassava utilization	tones1) x 1000	% of total product	2002 2)
Human food	12.50	53	64
Animal feed	0.34	2	2
Food Industry	2.01	8	13
Non-food Industry	8.93	37	11
Total requirement	23.78		
Total production	19.32		
Deficit	4.46		

- Source : (1) Indonesian Statistics Bureau (2005),(2) National Census (2001)









Distribution of cassava industry : Although Java is the biggest producer, big cassava industry is mostly in Sumatera

Table 4 : The distribution of Tapioca Industry

Island	Number of industry		
	Small	medium	large
Sumatera	13	19	70
Java	211	80	0
Kalimantan	0	4	4
Sulawesi	0	0	11
Maluku and Papua	0	2	2

Source : Wargiono (2005)

Sufficiency : although as one of the biggest producers, Indonesia still import cassava product, mainly due to low quality of cassava product in country so it does not meet the requirement

Table 5. Cassava export and import during the last 5 years.

Year	Export				Import	
	Gaplek	Tapioca tones X 1000	Tpca waste tones	US$	Tapioca tones X 1000	US$
2001	177,07	40,52	456	18,48	66,59	10,03
2002	70,42	29,82	998	11,52	25,97	4,83
2003	21,99	21,96	1,813	5,36	190,62	33,89
2004	234,16	252,61	590	61,82	56,76	10,46
2005	106,53	106,68	1,410	29,33	49,30	11,60

Source : Dir. General of Food Crop (2006)

Present and future condition

- Present :

1. Cassava is considered as one of the important crops, but government attention is low (low priority R&D and dev. program, inconsistency policy etc.)
2. Cassava is assumed to be inferior crops, less competitive

- Future:

1. Cassava has had and still have an important role in national economic and food security for Indonesia. As a crop, cassava has many comparable advantage. Cassava is very tolerable to any bad condition, very efficient use of energy, and the product can be use for many purposes.
2. Cassava requirement, either to fulfill national and world requirement will increase. As one of the largest cassava producer, Indonesia still has the potential to increase its production, therefore, should play an important role in increasing world cassava production.

Future condition (cont….)

- Lately, after the increase of fuel price, government and private sector take attention to cassava development. Cassava expand rapidly to other island, such as Kalimantan and Sulawesi.
- GOI projected that by the year of 2025, Indonesia able to produce 30 millions tones cassava tuber.
- This can be done by increasing harvested cassava area (from 1,2 millions ha up to at least 3,0 million ha) or increase the yield from nowadays (16 t/ha) to the levels of approaching the field potential yield (25 – 35 t/ha)
- The resources (area and variety and technology) are available, but there are also some constraints.

SWOT analysis for arrangement of cassava development program

1. Inventory the internal factors (strength and weakness), and external factors (opportunity and threat)
2. Determination of the Weight factor (W) of each sector based on the urgency of the sector.
3. Determination of the supporting value (S) each sector for cassava development by scoring 1 to 5, then calculate the Means supporting value (MS) from 5 different expert.
4. Calculation of the weight of supporting sector, WS = W * S , and Total Weight Factor (TWF) which was calculated, i.e.; TWF = WS + (S*MS)
5. Determination of the priority of each factor of strength, weakness, opportunity, and threat. Mapping in a quadrant form.
6. Arrangement of the development strategy. This strategy is grouping into 5 sectors, i.e. : (1) Research and development, (2) production system, (3) harvest and post harvest, (4) distribution and marketing, and (5) Institutionalism.

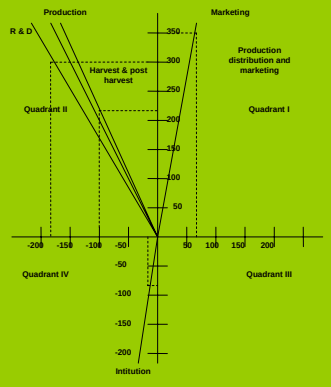
Table 6. The internal and external factors which considered influence Cassava development program.

Factors :	Research & Development	Production System	Harvest & Post harvest	distribution & marketing	Institution
INTERNAL:					
Strength					
1.	potential of researchers	high yield potential	various use of cassava	Cassava Farmer Assoc.	Gov. support
2.	A lot of product can be dev.	Availability of area	a lot of tech.	support from government	Gov. support
3.	A lot of genetic Resource	Availability of technology	flexibility in harvest time	Strength of R&D Inst.	potential of Spreadness
Weakness					
4.	Limited fund	farmer's low In capital, low adoption tech.	cassava easy being rot	weak farmer's management	price variability is high
5.	Limited number of researchers	live cycle is long	the competitive ness is low	weak support capital & markt	yield var.between province high
6.	Interest of being Cassava reschr is low	production is low	product quality is poor	expensive transportation	low performance of farmer org.

EXTERNAL					
Opportunity:					
7.	Demand for Various product	export commodity	high demand for processed	willingness of investation is high	high incountry marked demand
8.	Cooperative Research	development of agric.supp. industry	development of cassava proc. industry	export demand is high	Regulation by government
9.	Gov. support For Cassava Res. Is high	willingness for growing cassava high	potential used for food diversification	Industry Assoc. formation	Industry devlp.
Threat :					
10.	Inconsistency Res. Policy	land and soil degradation	import of cassava product	import	inconsistency gov. policy
11.	Land degradation	Agric. Input is expensive	high standard for export Product.	High and free competition	other country also increase Cassava prodc.
12.	Budgeting and planting time is not meet.	Import is high	cassava waste as pollutant	high transp. cost	weak coordination between gov. Inst.

Table 7. The result of analysis of Total Weight Factor of internal And external factors that influence cassava development

Internal and		Total Weight Factor (TWF)				
		Res. and Dev.	Prod. Syst.	Harvest	Dist.&market	Institution
INTERNAL :						
Strength	1.	148.32	170.28	140.24	156.36	43.52
	2.	74.84	65.33	139.93	151.71	156.00
	3.	42.55	105.70	52.07	73.12	147.01
Weakness :	4.	169.04	138.18	205.89	109.96	157.48
	5.	107.05	182.40	83.13	120.82	57.70
	6.	167.56	66.91	136.36	98.33	136.15
EXTERNAL:						
Opportunity	7.	215.56	160.00	239.78	240.29	137.45
	8.	112.00	150.35	121.02	159.42	72.92
	9.	121.02	85.96	132.36	168.73	75.88
Threat :	10.	49.60	108.80	88.15	120.44	126.55
	11.	96.29	42.30	55.13	33.36	114.08
	12.	176.00	176.00	107.78	64.15	120.00



The performance of cassava development in Indonesia

Conclusion of SWOT ANALYSIS

1. R &D : Internal factors : Weakness more dominant than the strength with TWF of – 177.96, i.e.: funds, number of researchers, minimum interest of young scientists to be cassava researchers. External factors : opportunity more dominant than the threat with TWF of +302.69 : increase in cassava product demand (kinds and amount); cooperative research; lately ,support from government and private sector; export opportunity
2. Production system: Internal factors : weakness is more dominant with TWF of – 46.16, : low capital farmers, low (adoption) production technology, long life cycle crop. External factors : Opportunity is more dominant with TWF of + 69.21, : an increase in investor demands, export commodity, and the development of agricultural industry
3. Harvest and post harvest : Internal factors : weakness is more dominant, with TWF of – 93.14, : low quality of the product, low competitive value, cassava easy being rot. External factors : Opportunity is more dominant with TWF of + 242.72, : an increase in the demand of cassava product, development of cassava industry, as alternative food crops and other use

Conclusion of SWOT Analysis (cont…..)

4. Marketing and distribution : Internal factors : Strength is more dominated with TWF of + 52.07. The major weakness sectors are price fluctuation and high transportation cost. External factors : Opportunity is more dominant with TWF of + 350.50, : an increase in cassava product demands, a change in energy policy.
5. Institution : Internal factors : weakness is more dominant with TWF of - 4.80, : inconsistency government policy, low power of cassava farmers association. External factors : threat is more dominant with TWF of -74.38, : an increase of import, the development of cassava in other country.

Strategy for Cassava Development

1. R & D :
   a. use the strong support of government and private sector as the driving force.
   b. Cooperative research as an incentive
   c. Recruit potential young researchers
   d. Research program focused on transfer of improved technologies and alternative use of cassava (incl. processing technology)
2. Production systems :
   a. Speed up technology transfer
   b. expand cassava as cash/industry crops
   c. minimized soil and land degradation
   d. stabilize cassava price at the farm level
3. Harvest and Post harvest :
   a. support the cassava processing at farm level
   b. develop industry to produce simple cassava processing machine
   c. Develop more product from cassava (fuel, plastics, etc)

Strategy for Cassava Development (cont….)

4. Distribution and marketing
   a. minimized transportation in the form of fresh cassava (see strategy 3.a)
   b. concentrated cassava development in a a limited available location
   c. Regulation to help stabilize cassava price
5. Institution
   a. Strengthen cassava farmer's Assoc.
   b. Utilization of government support as optimum as possible
   c. minimize inconsistency government policy
   d. Utilization of R & D to develop production and processing technology that attracted the private sector


THANK YOU