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Yam: Threats to its Sustainability in Nigeria

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Introduction

Yams (*Dioscorea species*) are important carbohydrate staple food in West Africa. Yams are also of considerable importance in parts of East Africa, the Pacific area including Japan, the Caribbean and tropical America. Yam production technologies vary in response to differences in ecology and biodiversity in yam zones. About 95.3% of the world yams are produced in Africa out of which Nigeria accounts for 74.6%. Ethnocentrism is associated with yam in Nigeria, where yam is designated a 'king crop' among other roots and tubers. Nigeria is reputed to have the most advanced yam culture and civilization in the world. Yam is still a totem of maleness and a compulsory item in marital ceremonies among the Igbos of Nigeria. In spite of its socio-cultural importance and culinary roles, yam has received little research attention. This is a threat to the sustainability and productivity of yam.

This paper reviews the threats in yam production and offers solutions to boost and sustain the productivity of Nigeria's 'king' of root and tuber crops.

Importance of yam in tropical regions

Yams are important staple carbohydrate food in the tropics. They are the most preferred of all roots and tubers by millions of people in the yam zones of Africa. Although Africa produces over 95% of the world's yam, all of it is consumed as food. The habit of swallowing as opposed to chewing by West Africans probably developed from the use of yams. In coastal West Africa, more than 60 million people obtain over 200 dietary calories per day from yams. Until recently, yams were regarded as an inferior source of dietary protein. Some species such as *Dioscorea dumetorum* are marginally inferior to maize in crude protein and amino acids. On a dry weight basis, yam tuber contains 71% water, 3% protein, 23% carbohydrate and 1% ash.

Yams are very important in local commerce in Africa and account for about 32% of farm income earned from crops. As a source of foreign exchange (Table 1), they are exported from Caribbean countries to Europe and North America, primarily to meet the needs of Africans and African descendants in these regions.

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Table 1 Regional yam production statistics for major yam producing countries.

Region/ Country	Total Production (1993)	Domestic Production (1984 - 1986)	Export	Export as % of Production
	World	28,126	-	-
Africa	26,810	-	-	-
Benin	1,233	1	0	0
Central African Rep.	224	58	0	0
Cote d'Ivoire	2,480	261	-	-
Ethiopia	262	-	-	-
Chad	245	-	-	-
Ghana	1,000	1,480	0	0
Nigeria	20,000	1,903	0	0
Togo	529	13	0	0
Zaire	315	-	-	-
Caribbean	480	-	-	13
Jamaica	215	31	10	32
Latin America	305	-	-	-
Brazil	215	9,573	6	0.06

Sources: FAO (1993) Production Yearbook, FAO (1984-1986) Food Balance sheets 1984/1986 Average, FAO Rome, Italy.

Importance of yam in Nigeria

In the 1800s, yams represented the main article of food of the chiefs, who utilized slave labour to cultivate extensive areas. The value of yams in 1957 (N2,282.6 million) represented 39.2% of the value of all foodstuffs produced in the country. In 1969/70, yams accounted for 51.7% of land area under root crops and 57.4% of root crop production. In recent times, out of an estimated 65 x 10⁶ million ha of arable land in Nigeria, 2.31-3.00% is put to yam annually. Yam still leads other roots and tubers in terms of socio-cultural importance, but ranks second after cassava in terms of land area under cultivation and volume of production.

Among the Igbos (a major ethnic group in Nigeria, inhabiting predominantly the southeast agro-ecological zone) great ethnocentrism is attached to yam. As a status symbol, yam remains the totem of maleness. Women's participation in its cultivation is marginal. Among the species of yam *Dioscorea rotundata* or white yam sets a standard of affluence to which the poor aspire. This can be manifest in the number and size of yam tubers presented during feasts, chiefs' meetings, burial and marriage ceremonies, and during annual obeisance to royal fathers (traditional rules). For a man to be admitted into the prestigious society of "Masters of Yam", such as Oba in Ikwuano Local Government Area (LGA) of Abia State, he must feed the whole community with yam from his farm (in olden days). However, nowadays some people buy pick-up

loads of yam to perform the ceremony. Such people are given the title 'Omendi'. In the same LGA acquisition of the title 'Omendi' is one of the prerequisites to attain complete manhood. No person lacking that title can be installed as an Eze (traditional ruler) in any of the autonomous communities in Ikwuano.

In Igboland, yams are compulsory items to be provided in marital ceremonies. In Nenwe community of Aninri LGA in Enugu State (in the olden days) a young in-law customarily sent to his father-in-law a jar (15 litres) of palmwine, 4-6 tubers of yam (each tuber \geq 5 kg), and a giant stockfish during Ani festivals. The presentation of yams has now shifted to Christmas days. Fowl or other sources of meat now replace stockfish due to scarcity and high cost.

New yam festivals (NYF) are annual events that mark the eating of new yams. The festivals were marked by rituals and revelries previously but now Christian worship is added in addition to rituals and revelries to suit people of different interests. Yam performs a religious role. It is used by local priests to appease gods and in thanksgiving ceremonies in the Christian religion.

Yam porridge cooked with spices such as *Gongronema latifolium*, *Piper guineensis*, *Xylopi* spp and *Monodora mystrica* and fish is among the first food given to a nursing mother within the first month of delivery. It is believed to have a medicinal effect and be good for the health of the nursing mother.

It is a taboo to cook yam and cassava together in the same pot at the same time in traditional Igbo communities. Women in their menstrual periods are not allowed into the yam barn. A special knife is exclusively reserved by the Okojis and Omendis to cut yam setts. Before the advent of land scarcity, some soils were designated yam soils. It was a serious offence for a woman to plant cassava on such soils.

Research support and yam productivity

A workshop jointly sponsored by the Root and Tuber Crops Programme of the International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria, the Nigerian Seed Yam Growers Association and the National Root Crops Research Institute (NRCRI), Umudike, Nigeria, held in 1991 at IITA, Ibadan, Nigeria, to review the status and trends in yam research and production revealed that

Message from the Director

The CGPRT Centre is preparing to start a new project "Stabilization of Upland Agriculture and Rural Development in El Niño Vulnerable Countries (ELNINO)" in April 2000.

This is a three-year research project funded by the Government of Japan to be implemented in collaboration with five countries, Indonesia, Malaysia, Papua New Guinea, the Philippines and Thailand. Participation of these countries has already been confirmed and appointment of a regional advisor and five national experts is under consultation with the participating countries. A project leader from Japan will join us very soon.

The principal objectives of this project are to mitigate the damage caused by the El Niño-induced abnormal weather, drought in particular, on upland agriculture in El Niño vulnerable developing countries in the Southeast Asia and the Pacific subregions and to stabilize upland agriculture and rural development in these countries through analytical country and regional studies and by proposing policy recommendations. These principal objective will be achieved by fulfilling following immediate objectives:

- (i) To collect and analyze data and information on El Niño-related abnormal weather changes, drought in particular, in the Asia and the Pacific region and their impacts on regional upland agricultural production and on regional trade;
- (ii) To collect and analyze data and information on abnormal weather-related damage in upland agricultural production in the participating countries;

- (iii) To collect and analyze exact data and information on upland agricultural technologies, resources, infrastructures, institutions, farm management and household economy based on crop and locality-specific characteristics in the participating countries, with a special emphasis on vulnerability and strategies to cope with El Niño-induced agricultural risks;
- (iv) To elucidate the degree of preparedness and to propose institutional or administrative schemes to predict El Niño-related abnormal weather change and upland agricultural risks in the participating countries as well as in the region; and
- (v) To prepare strategic proposals for technologies, farm management and administrative policies to stabilize upland crop production and farm economies in the participating countries under the frequent abnormal weather, drought in particular.

As indicated in the objectives, the CGPRT Centre is trying to shift its focus more towards the household economy and rural development in this project compared to the previous projects "MPUPA" and "TradeLib" in which most attention was paid to domestic and international trade of agricultural commodities.

I hope we can find ways through this project to strengthen preparedness of farmers as well as communities to cope with unfavourable weather conditions and to recover from the damage. A durable agriculture is a potential strength of a country.

HARUO INAGAKI

yam research in underrated. Other outcomes of the workshop showed that yam as a food crop is declining. On a global basis, yams do not receive adequate support in terms of material and personnel relative to cassava (*Manihot esculenta*), sweet potato (*Ipomoea batatas* L) and potato (*Solanum tuberosum*). At the international level, only the IITA has a mandate for yam research among other

crops (Table 2). Out of 54 plant exploration missions undertaken by IITA in 30 African countries since 1975, only about 2,250 accessions of yam germplasm are conserved. When viewed globally, this number of accessions represents about 33.3% of cassava and sweet potato accessions, respectively, and 50% of potato accessions (Table 2). In Indonesia, an analysis of the Central

Research Institute for Food Crops (CRIFC) showed that yam received almost no attention (Table 3). Several reasons account for the poor attention to yam research. Major yam producing countries in the world have poor economies and are concentrated in the tropics. They lack both material and human resources to support yam research. Yams produce large quantities of small chromosomes, which are difficult to handle. Facilities for cytological studies are not easy to come by. Little is known about the diversity of yam species and genotypes and their distribution across ecologies and national boundaries in Africa. The genetics of inheritance of the major economic traits in yam are unknown. Consequently, the causes of incompatibility and infertility in yam are still poorly understood. These factors militate against formulating strategies on yam breeding, agronomy, farming systems, plant protection, mechanization, post harvest storage and utilization. While information is available on improved varieties of other competing crops (cassava, sweet potato, potato and maize), no new variety of yam is, at present, available to rural farmers. Any information on new yam genotypes is still within upstream research (in research institutes). The process of release to farmers of these new hybrids has reached an advanced stage.

Efforts to improve the landraces resulted in yam miniset technology developed by scientists at NRCRI, Umudike, Nigeria. Yam minisetting came as a solution to the constraint imposed by scarcity and

high cost of planting material (seed yam). Through this technique, a multiplication ratio of 1:40 by number and 1:70 by weight is attainable compared to 1:2-6 by the traditional method of seed yam production. An appraisal of the miniset technology showed that over 70% of farmers in southeastern Nigeria either discontinued the technology or failed to adopt it, because the seed yams produced are too small or because they practice mixed cropping systems. The miniset technology was developed under monoculture. Technologies for intercropping yam miniset with egusi (melon) and maize have been developed. Farmers in southeastern Nigeria grow ceremonial yams weighing $\geq 5-10$ kg per tuber, which is not achievable with a miniset of 25 g set purposely meant to produce whole seed yam (≤ 1 kg). In view of this, the miniset has been scaled to between 25 and 50 g, so as to produce seed yams for ceremonial yams.

Apart from institutional research efforts on yam, farmer's research capability is severely limited by illiteracy. Across the root crop belt of Nigeria, over 60% of yam farmers compared to 33-48% of cassava farmers, 27-40% of cocoyam farmers, 32-50% of sweet potato farmers and 18% of potato farmers are illiterate with only non-formal education (Table 4). This makes the adoption of any improved yam technology difficult. Agronomy of yam is not standardized. Seed yams (whole tubers or setts) differ in terms of size, length, shape and weight. The

Table 2 Germplasm holdings of important root crops in some international agricultural institutes.

Holding Institution	Yam		Cassava		Sweet Potato		Potato	
	Wild	Cultivated	Wild	Cultivated	Wild	Cultivated	Wild	Cultivated
IITA	na	2,250	na	1,704	na	1,000	-	-
CIP	-	-	-	-	760	4,985	1,500	3,955
CIAT	-	-	397	5,035	-	-	-	-
Sub-total		2,250	397	6,839	768	5,985	1,500	3,955
Total		2,250		7,136		6,753		4,455

Source: International Board for Plant Genetic Resources Institute (IBGR 1992).

Partners in Conservation, Plant Genetic Resources and the CGIAR System, 2nd ed; IBGR, Rome, Italy.

IBGR 1994, In Defence of Diversity, IBGR, Rome, Italy.

IITA = International Institute of Tropical Agriculture, Ibadan, Nigeria.

CIP = International Potato Centre, Lima, Peru.

CIAT = International Centre for Tropical Agriculture, Cali, Colombia.

na = Data not available.

- = Outside the mandate of the Institute.

Table 3 Distribution of budget and staff on root crops in Indonesia's Central Research Institute for Food Crops 1990.

Crop	Budget	Staff	Value
Cassava	-	3.0	7.3
Sweet potato	-	1.3	1.6
Yam	-	0.1	-
Root crops	3.6	4.6	9.0

proportion of the tuber that should be regarded as the head, the middle and the bottom region is not well defined. It makes uniformity trials difficult in case one wants to plant the three portions separately. Plantable diameters of seed yam vary between 4.5 and 8.0 cm and their length varies from 10 to 15 cm. Seed yams can be pre-sprouted or not

before planting in holes, mounds, and ridges to a depth of 10-15 cm with a spacing of 100 x 25 cm for miniset and 100 x 200 cm apart for ware yam (tuber \geq 1 kg) on farmers' farms, as compared to a recommended spacing of 100 x 100 cm apart. Staking methods can be trellis, pyramidal, individual staking or no staking at all. Stakes range from bamboo and sticks to grasses (*Andropogon spp*) depending on the ecology and size of the yam tuber envisaged.

The consequences of all these problems and gaps in knowledge are declining productivity, lower total production and reduced area devoted to yam. Productivity of yam (t/ha) on a global basis from 1975-1981 showed a gradual increase, except in Asia. After this period, productivity declined by 7.14% in world average and 7.5% in Nigeria (Table 5). However, a global increase in annual production is recorded in recent times.

World production figures for yam and its keen competitor crop (cassava) in Nigeria showed that yam production relative to cassava production decreased from 102.6% to 49.0% and to 34.4% in 1963, 1973 and 1980, respectively (Table 6). In 1993, total yam output was 6.98% less than the quantity of cassava produced. It is evident that cassava production in recent times leads yam.

National production statistics of cassava and yam showed a similar trend. Using 1976/77 as a base year (Table 7), total output of cassava declined by 36.4% in 1984/85 and rose astronomically and progressively to over 60.0% in 1985/86 and 1986/87. Yam production declined by 5.16%, increased momentarily by 52.4% in 1985/86 and rose by 15.2% in 1986/87. In the decade from 1986 to 1996 cassava production increased by 950%, while yam production increased by only 130%.

Table 4 Educational status of root crop farmers in Nigeria.

Crop	Root Crop Zone	No of Respondents	Non-formal Education	Formal Education		
				Primary	Secondary	Tertiary
				-----%-----		
Yam	North	19	63	21	11	5
	South east	15	61	13	13	13
	South west	9	67	22	11	0
Cassava	North	23	48	30	13	9
	South east	15	48	30	13	9
	South west	11	45	45	10	0
Cocoyam	North	11	48	28	15	10
	South east	6	33	50	17	0
	South west	11	27	55	18	0
Sweet Potato	North	22	32	41	13	14
	South east	15	35	40	27	0
Potato	South west	8	50	38	12	0
Potato	North	11	18	55	9	18

Table 5 Productivity of yam (t/ha) on a global basis.

	1975	1979-1981	1989
World	9.57	9.90	9.24
Africa	9.54	9.98	9.28
North & Central America	11.1	5.93	5.86
South America	4.96	9.06	8.42
Asia	11.4	10.1	12.7
Oceania	13.5	14.7	13.9
Nigeria	11.1	11.5	10.7

Table 6 World production figures for yams and cassava in Nigeria ('000 tons).

Year	Cassava	Yam	Yam Production Relative to		Change in Production			
			Cassava		Yam		Cassava	
			(tons)	(%)	(tons)	(%)	(tons)	(%)
1963	7.80	15.8	8.00	102.6	-	-	-	-
1973	9.60	14.3	4.70	49.0	-1.50	-9.49	-1.80	23.1
1980	12.5	16.8	4.30	34.4	2.50	17.5	2.90	30.2
1993	21.5	20.0	-1.50	-6.98	3.20	19.0	9.0	72.0

Table 7 Nigerian production statistics of yam and cassava ('000 tons).

Year	Cassava		Yam	
	Production	Change in Production (%)	Production	Change in Production (%)
1976/77	1,876	-	6,556	-
1984/85	1,193	-36.4	6,218	-5.16
1985/86	1,930	61.8	9,478	52.4
1986/87	3,151	63.3	10,917	15.2
1996	33,192	953.4	25,169	130.5

Socio-cultural and economic threats to yam production

Accelerating rural development and demographic pressure continually diminish available agricultural land and intensify land degradation. Fallow periods are reduced. Farmers are pushed to marginal lands where soil fertility cannot support intensive yam production. This necessitates the use of mineral fertilizers to improve soil fertility. Unfortunately, the use of mineral fertilizers in Nigeria is limited by scarcity and high cost. Inhabitants of the major yam growing zones in Nigeria are predominantly Christians. New denominations of the Christian religion are springing up. One man one wife, and celibacy in some cases is the rule in Christian doctrines. Consequently, the amount of 'free' household labour available for yam production is reduced. Most 'Di-Jis' (Masters of Yam) or renowned yam farmers bestowed with yam titles such as Oko ji, Omendi, Onyiba, etc. in traditional Igbo communities of Nigeria were and are polygamists.

Present national agricultural policy and agricultural research focus on resource-poor farmers. The paradigm of resource-poor farmers as the target in agro-technology generation and transfer in the third world could boost and sustain other crops but not yam, because yam is not a poor man's crop. Renowned yam growers in the past and the present are not poor, relative to their socio-economic and cultural environment. Poverty can be

manifest in lack of finance to source inputs, or as a shift in the demand and consumption of yam, which is more expensive than cassava and sweet potato, among the low-income groups. In the western region of Nigeria, the contribution of yams to caloric intake decreased from 33.0% in 1951/52 to 16.4% in 1963/64, while the contribution from cassava increased from 20.2% in 1951/52 to 40.9% in 1963/64. Also risk aversion to achieve food security and cash income motivates farmers to diversify crops produced and sources of income. The outcome of all these factors is inability or unwillingness to expand yam production per household. The economics of cassava production and seed yam production using miniset technology in the rainforest ecology of Nigeria with particular reference to labour and planting materials as inputs is shown in Tables 8 and 9. A net income of ₦ 22,284.00 per ha for cassava and a loss of ₦ 558.20 per ha for seed yam were obtained. The planting material represents 8.20% of the total cost for cassava and 68.3% for yam. This explains why more land is being devoted for cassava production and more people are switching over to cassava. Apart from the low input requirements of cassava, it tolerates marginal moisture and marginal soil better than yam. These are the threats against the sustainability of yam.

Table 8 Costs and returns per ha of upland and lowland and yam production systems in 3 villages of the Southern Guinea savanna of Nigeria, 1977/78.

Item	Osara		Egani Near		Tawari
	Upland	Lowland	Upland	Lowland	Upland
Gross margin (₦)	1,890	2,279	1,954	3,111	1,414
Labour (manhours)	1,599	2,447	1,259	2,342	1,356
Gross margin/manhour (₦)	1.18	0.93	1.55	1.33	1.04
Return to capital (%)	290	229	443	541	237

₦ 1 = US\$ 1.50.

Table 9 Costs and net income per ha of cassava at Ohosie Bendel State in 1989 and seed yam produced from minisett technology at Umudike Abia State in 1990.

	Cassava	Yam
Gross output (revenue)	₦4,114.00	₦4,255.10
Cost of planting material	150.00	3,285.20
Cost of labour	1,680.00	1,528.10
	(₦10/manday)	(₦10/manday)
Total cost	1,830.00	4,813.30
Net income	2,284.00	-558.20

N/B: Net income was computed as gross revenue - total cost. ₦ 1 = US\$ 0.40.

Conclusion

Yams are of great culinary, economic and socio-cultural importance. Research on yam should be encouraged and promoted. Research should centre on breeding of high-yielding cultivars, mechanization of production, storage and processing of fresh tubers as well as improvement in agronomic and soil management practices. Socio-cultural values of yam should be amplified. Commercial seed yam and ware yam growers should be encouraged. These measure will give a boost to yam production and the growth of yam-based industries.

on imports are being phased out and exports are also being liberalized. Agricultural exports as well as imports are now permitted through private trade, except for a few commodities. There is lot of anxiety, interest and apprehension about the impact that trade liberalization may have on producers, consumers and the economy. The present study is an attempt to analyze the impact of trade liberalization on selected commodities and locations and it reviews production, marketing and trade-related policy concerning these commodities. It also discusses the strategy and prospects of trade liberalization to meet WTO obligations.

The study focuses on four crops, namely paddy (rice), maize, chickpea and rapeseed-mustard. Of these, rice is the most important for food security of the country as it constitutes 44% of total foodgrain consumption. Rice is also the most important crop for farmers. It occupies 23% of the gross sown area of India, which is the highest among all the crops grown in the country. Traditionally, India used to export only Basmati rice, but since 1991/92 non-Basmati rice has emerged as a significant export crop.

Maize is one of the important coarse cereals grown in India and it occupies an important share in the food basket of poor people. Rapeseed-mustard is the second most important oilseed crop grown in India. It is grown on about 6.66 million hectares, which constitutes one-fourth of the total area under all oilseeds grown in India. Rapeseed-mustard is mainly used for edible oil. There is a chronic

Effects of Trade Liberalization in India: Commodity Aspects

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Executive summary

India is a founder member of the World Trade Organization (WTO) and is thus committed in moving in the direction of liberalization of trade in agricultural commodities. Quantitative restrictions

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shortage of edible oils in the country, which is met through large imports. According to some studies, India does not have comparative advantage in producing edible oilseeds including rapeseed. Therefore, liberalization of trade is expected to encourage imports and decrease domestic prices of rapeseed-mustard. This crop represents the case where trade liberalization is going to have a negative effect on domestic production. Chickpea is the most popular among all pulses in India. It comprises about 30% of the area under all pulses in the country. There is a chronic shortage of pulses in the country, which is met through large imports.

The effects of trade liberalization on the four commodities were studied at the national level as well as at the farm level. The effect at the national level was studied by estimating the impact on wholesale and farm level prices and by estimating consumer surplus, producer surplus and net social welfare. To study the farm level effects of trade liberalization, partial budgets for each of the selected commodities were prepared using survey data for the chosen locations. The effect was measured on crop income by substituting existing domestic prices with international reference prices for comparable quality produce.

Until 1991 export as well as import of the selected commodities was subjected to various kinds of regulations and restrictions. There was no restriction on export of Basmati rice, but common rice was subject to canalization, minimum export price and export quota until 1991. Restrictions on export of common rice were somewhat relaxed during 1992 following initiation of economic reform programmes in June 1991. A major boost to rice export occurred during 1995/96, when under a major policy change the government of India decided to release 2 million tons of rice for export. Due to a comfortable situation on the food front, quantitative ceilings on exports have now been abolished. There is no duty on import of rice.

There has been no special policy for import-export of maize, nor is this crop considered very important from the trade point of view. Like other cereals, maize export and import have been subject to several restrictions, except for feed grade maize for poultry or animals. There is no duty on import of maize.

Due to a growing imbalance between demand and supply of edible oilseeds in the post green revolution period, India had to import a massive amount of edible oil, which constituted 30% of the

total supply by the mid 1980s. Prior to 1994 the oilseed sector was protected through QRs on imports and exports and imports were canalised through state agencies. Domestic prices of oilseeds were maintained at more than double the world prices. In 1995 rapeseed-mustard oil was put under OGL at an import tariff of 30%. The tariff has been further reduced in stages to the present level of 15%. Trade policy on rapeseed/mustard and edible oils has been caught between two opposing viewpoints. According to one viewpoint India would benefit by liberalizing import of rapeseed-mustard oil and other edible oils as their domestic prices have been higher than world reference prices for several years. According to the second viewpoint the policy of import liberalization would have an adverse impact on the oilseed sector and Indian producers. It is asserted that world prices of rapeseed/mustard are low because the U.S. and Europe provide large direct and indirect subsidies to the producers, so world prices are not an appropriate yardstick for comparison with Indian prices.

Despite a highly favourable resource cost ratio and high domestic profitability, chickpea area and production did not show any perceptible growth during the last 20 years. While chickpea export is restricted, its import is free and is regulated mainly through tariffs, which are also quite low at present.

As such, there is no discernible impact of liberalization of the rice trade and increase in its export during the last six years on area allocated to rice and its output. One reason for this could be that the benefit of rice export has not percolated down to producers in terms of higher prices and income.

The impact of trade liberalization on the selected commodities has been analysed for two situations: first, if trade were liberalized in the past, how would it have affected domestic prices during the last six years; and second, by comparing a base scenario represented by the triennium ending 1996/97 with a free trade scenario as it existed in this period and projected multi-lateral free trade scenario with full compliance with the Uruguay Round agreement.

A comparison between domestic and international prices of selected commodities during the recent four years shows that international prices of rice of comparable grade have been more than one-third higher than the domestic price. There is no clear difference between international and domestic prices of maize. In some years the domestic price is lower and in other years it is

higher than the international price. The position of rapeseed-mustard oil is the opposite of rice. Per ton prices of rapeseed-mustard in the country ranged between \$839.3 and \$962.3 during 1994 to 1997, while international prices varied between \$557 and \$617. In the case of chickpea there is tremendous inter and intra year instability in domestic prices, so it is difficult to say whether international prices are consistently lower/higher than domestic prices.

A comparison of international and domestic prices sometimes does not indicate trade possibilities since freight, insurance and related charges can make a significant difference to price. Accordingly, prices were compared using the CIF price for importable commodities and the FOB price for exportable commodities.

Comparison of domestic wholesale prices with CIF world prices for importables and FOB world prices for exportables relevant to India reveals that liberalization of agricultural trade would lead to an increase in export of rice and maize. On the other hand, trade liberalization would lead to large-scale import of rapeseed-mustard oil. Thus, one can expect that domestic prices of rice and maize would go up and that of rapeseed mustard oil would go down because of trade liberalization. This may have further adverse effects on rapeseed-mustard area, output and its producers, whereas rice and maize area, output and producers may be affected favourably. In the case of chickpea, it appears that trade liberalization would not have significant impact on domestic prices and production. Import would continue to fill the gap between domestic demand and supply without seriously affecting domestic production.

Year-wise comparison indicates considerable volatility in the international price of rice, whereas the domestic price has maintained a steady trend. Unlike rice, the domestic price of maize shows oscillations in price. The volatility in FOB export price was found to be much larger than in the domestic price. The CIF price of rapeseed-mustard oil imported by India showed violent fluctuations. In fact this fluctuation is not in the international price. The actual CIF price of rapeseed-mustard oil imported by India was found to be quite high compared to the imputed CIF price derived by adding freight charges to the international price. The reason for this seems to be that India is not a stable importer of rapeseed-mustard oil and the quantity imported varies considerably depending upon the domestic supply situation. The country does not

have a stable trading source or partner for the import and there is not sufficient planning of imports. As a result when a shortfall in domestic market is felt, the country resorts to panic buying for fear of a violent rise in domestic prices. With proper and advance planning, the country can have access to cheaper imports compared to what it has been paying.

India is big importer of pulses including chickpea. However, domestic prices of chickpea in the wholesale market of the biggest producing state were lower than the CIF price at port in three out of the six years. When internal cost is added to the landed cost, then the import price turns out to be higher than the domestic price only in one out of six years. It may appear ironical that import of chickpea took place when domestic prices were lower than the CIF import price. One explanation for this seems to be that there is considerable intra year and inter market variation in chickpea prices in the country and imports are undertaken to keep a check or to take advantage of peak prices in the lean months in some of the markets.

In the ex ante analysis we have estimated the impact of trade liberalization on prices in the baseline scenario which is taken as an average of the triennium ending 1996/97. The impact is studied in two ways:

- assuming unilateral free trade by the country in which there is no restriction on imports and exports: this would imply that domestic prices would be equated to corresponding CIF or FOB prices during TE 1996/97, adjusted for internal marketing and transport cost. This has been termed the baseline scenario with liberalization.
- the other scenario refers to year 2000 and assumes multilateral trade liberalization with full Uruguay agreement impact, in which subsidies, etc. are removed as envisaged in the Uruguay round. This would entail an increase in international prices by 7% in the case of rice and 4% in the case of maize and rapeseed-mustard oil.

For rice, the reference price in the base scenario arrived at by adding internal costs to domestic price works out to be Rs 8,548 per ton while the FOB price was Rs 8,653. Corresponding to this FOB price the domestic price works out to be Rs 7,684. This shows that if trade were liberalized the domestic rice price would go up by 1.39% and the farm level price of paddy would rise by 1.45% in

the base scenario. The impact is quite strong in the free trade scenario with full Uruguay impact, which envisages a 7% rise in international prices and thus makes exports more attractive. Under free trade this would result in a 9.38% increase in the rice price and a 9.81% rise in the farm level price of paddy in India.

The impact of freeing export on maize prices is very strong. In the base scenario trade liberalization involves about a 21% increase in domestic wholesale and farm level prices. Multilateral free trade with full Uruguay impact would raise the base level wholesale price by more than 25%.

Free import of rapeseed-mustard oil in the base scenario would have rendered this edible oil cheaper by 18%. Similarly, prices received by farmers for rapeseed-mustard seed would go down by about 16%. In the second scenario, in which the international price increases by 4%, the domestic price of edible oil falls by 14.75% and the farm level price of seed declines by 13%.

Changes in consumer surplus and producer surplus were estimated from changes in prices due to liberalization and resulting changes in demand and supply. Liberalization of rice export in the baseline scenario would have a very small impact on the producer price and hence on supply. This would result in an increase in producer's surplus by Rs 7,237 million. The impact on consumer surplus is Rs 7,545 million, which shows that there would be a decline in net social gain due to liberalization in the base scenario. Under multilateral free trade the difference in producer's gain and loss in consumer surplus would increase further. These calculations demonstrate that free trade in rice would lead to a small net social loss to the country. In the case of maize, liberalization of trade is found to be highly beneficial to the country. The gain to producers is almost double the loss to consumers due to the price rise.

In the case of rapeseed-mustard, when the domestic price of its oil is equated to the relevant import price and the required change is incorporated in the seed price, the net social welfare improves by Rs 563 million. In the second scenario international prices increase by 4% and the difference between CIF and domestic prices is narrowed down. The net social gain still remains positive, but is less than in the base scenario.

It was observed that results based on a single year price can lead to misleading conclusions because of considerable year to year variation in

domestic as well as international prices. Also, the impact of trade liberalization would not be uniform across commodities.

The study shows that implementation of WTO would have a mixed impact on net social welfare of India. The country would be a net winner in some commodities and it would be a net loser in some other commodities.

The impact of different levels of trade liberalization and removal of subsidies on farm level income was studied by preparing partial budgets based on primary data taken from representative locations. Gross returns from paddy production increased from Rs 19,006 per hectare in the base scenario to Rs 19,282 under free trade prices of the base scenario and further to Rs 20,870 in the free trade scenario with full Uruguay impact. However, when subsidies are removed along with free trade, then the gross return without liberalization is higher than the gross return under free trade. A similar pattern holds for the net income. Reduction in income due to removal of input subsidies in rice production would not be compensated for by the access to international prices under free trade.

Trade liberalization in the base scenario increased net returns from maize cultivation by Rs 1,007, while the increase due to free trade with full WTO impact is Rs 1,279. The domestic subsidy for maize is Rs 729, which is lower than the gain from trade liberalization.

In the case of rapeseed-mustard, liberalization of oil imports would reduce the net return to farmers by 25% of the existing net returns. Along with this, if subsidies are removed, the net return declines by about 35%. As multilateral trade liberalization takes place leading to a rise in international prices, the adverse impact on net returns would be reduced.

For selected crops, free trade is estimated to have sharp positive impacts on net returns from production of exportables such as maize and rice, whereas it is going to have a small negative impact on net returns from the importables such as rapeseed-mustard. In rice where the input subsidy is high, free trade would not be sufficient to counter the adverse impact on income due to withdrawal of subsidies. It can be concluded from the above analysis that trade liberalization is a mixed bag and its impact will vary from commodity to commodity.

The study shows that implementation of WTO would have a mixed impact on net social welfare of India. The country would be a net winner in some commodities and it would be a net loser in some

other commodities. There is considerable scope for increasing benefits due to trade liberalization by reducing domestic marketing costs and by tapping proper markets for imports.

In our opinion, signals from the ratio of domestic to global prices should not be stretched too far. There should not be major policy shifts for important crops like foodgrains and oilseeds based on global price signals. Agriculture should be subject to world competition, but domestic policy support must continue. The policy of attaining self-sufficiency in oilseeds should also emphasize improvement in resource use efficiency through technological improvements.

The challenges due to import liberalization cannot be met through trade policy changes alone, nor can trade policy in itself help in taking advantage of export in a liberalized world. Both of these would depend on the growth rate in domestic output and production efficiency built into cost of production. If domestic output does not grow to keep pace with domestic demand, then domestic prices would go up, which would be attractive for imports and unfavourable for exports. Similarly, if the cost of production in the domestic market were sufficiently higher than in competing countries, this would attract imports and discourage exports. The best strategy to face the challenge of import liberalization and to take advantage of export potential would be to ensure that (i) growth in aggregate domestic supply is higher than 2.75%, which is estimated to be the growth rate in domestic demand, and (ii) there is continuous improvement in efficiency of production to keep the cost of production low.

Along with trade policy reforms, attention needs to be given to domestic market reforms to improve competitiveness of the country's agriculture and to improve long term growth prospects.

There are formal as well as informal restrictions on inter state movement of agricultural produce, stocking and trading. The consequences of this are slow movement of produce from surplus to deficit markets, low market integration, depressed prices in producing areas and high prices for consuming areas. There are several government regulations such as the Essential Commodities Act (1956), stock limit, credit control, etc. which were meant to deal with scarcity situations and to curb the activity of hoarders. These regulations need to be modified to encourage increased participation of the private sector in agricultural trade and commerce. The idea is not to allow a free ride to

the private sector, but to allow more room for market manoeuvring. Under the provision of levy, millers are required to sell part of the rice and sugar they mill to the government at a price derived from the procurement price. The levy on rice is as high as 75% in agriculturally progressive northern states. Millers often complain that after contributing as much as 75% of their rice at a price which is often below open market price, they are left with little produce to run their business and thus are at a disadvantage compared to their counterparts in other countries. Removal of the levy on the export quantity would provide a level playing field to India's rice exporters.

The agricultural trade of India has been significantly affected by the financial crisis that hit Southeast Asian economies in 1997. India's agricultural exports to the four crisis ridden countries had been growing rapidly until 1997. During 1997/98 after the crisis hit these economies, India's agricultural exports plummeted by 22% compared to the previous year. This decline is a result of both very high devaluation of the currencies of the crisis-hit countries and worsening of their economic conditions.

Like agricultural exports, there has been a marked decline in total exports from India to all the four Southeast Asian countries, whereas imports from these countries increased significantly due to exchange rate developments. Exports to the four countries during the period April-December 1998 declined by almost half over the corresponding period in 1997. There has been a slowdown in exports to other countries also, which can be partly attributed to an indirect effect on India's export due to the effect of the crisis on the rest of the world. Depreciation of Southeast Asian currencies has adversely affected India's exports and balance of payments. Due to this depreciation, competition for exports from India has increased, which has implications for exports and the economy.

CGPRT Centre News and Activities

TradeLib

The second country report of Viet Nam and the proceedings of the regional workshop held in October 1999 in Bogor, Indonesia were printed. The manuscript of the integrated report is in the final stage of refining.

A series of in-country seminars as a follow-up activity of the project started in January to further discuss and disseminate those findings and policy recommendations achieved in the country studies under the project. Seminars were held in Pakistan (18 January), India (10 February), the Philippines (22 February) and Japan (3 March). The series will continue till June.

On 27 March, Dr. Michio Kanai returned to Japan after completing his three-year assignment as the project leader. He is to resume his work at the National Research Institute of Agricultural Economics in Tokyo.

SouthPIC

Dr. Pantjar Simatupang, the project leader, visited Vanuatu from 14 to 18 March 2000. The visit was a problem-solving mission due to withdrawal of Mr. Wycliff Bakeo from the position of national expert of Vanuatu in the SouthPIC project. The specific objectives of the mission are: (i) to conduct an in-country planning meeting with Mr. Shadrack Welegtabit, the new candidate for national expert of Vanuatu in the SouthPIC project; (ii) to conduct preliminary planning discussions with the chief of ESCAP-POC on the SouthPIC workshop which had been scheduled to be held in Port Vila in October 2000.

The in-country planning meeting was held in the ESCAP-POC office. Mr. Shadrack Welegtabit accepted the terms of reference in his SSA as national expert of Vanuatu in the SouthPIC project and will immediately start the implementation stage. It was agreed that the first draft of the country report would be submitted by the end of June 2000 instead of May 2000. Mr. S. Siwatibau, Chief of ESCAP-POC, supported the idea to hold the regional workshop of the SouthPIC project in Port Vila. The

ESCAP-POC office will help the CGPRT Centre in holding the workshop. Considering his advice, the director of the CGPRT Centre has decided to reschedule the workshop from 4-5 October to 26-27 October 2000.

ECOPOL

The Economic and Policy Analysis for the Eco-regional Approach in Southeast Asia (ECOPOL) project is designed to bring methodological and applied answers to the issue of sustainable income increase in rural areas. It deals with agricultural policies, economic policies having an impact on agriculture and agriculture-related sectors (agro-industry, trade, services and consumption mainly), and institutional policies. The project started in June 1998 in Vietnam and November 1998 in Indonesia.

Activities in Indonesia

In Indonesia, the checking and cleaning of the data collected through the survey of 120 mainly poor agricultural households is underway and should be completed by mid-April. The Ecopol Team has prepared a set of welfare indicators for data analysis and criteria for refining the households' typology. These indicators and criteria were obtained through the expert meeting approach. The set of welfare indicators include: income/capita; cultivated area; consumption level; share of food expenses in total expenses; net income/worker; the self-consumption/food expenses ratio; the number of activities; and the type of activities. These indicators will guide the process of defining which variables must be used for statistical analysis.

The criteria for the sub-typology of households were defined and ranked as follows (4 main criteria):

- for the agricultural worker group: other sources of income; size of the family, number of working days; and remuneration per working day. Three subcategories were then tentatively defined: agricultural workers' households with other activities, pure agricultural workers' households with less than 120 working days

per year and pure agricultural workers' households with more than 120 working days per year.

- for the tenant farmers group: diversification (other activities besides cultivation); land productivity in value; type of crop; and the size of cultivated land. Additional criteria include: access to capital, land cost, number of active workers, size of the family. The resulting sub-typology is made of four groups: pure rice tenant farmers; pure tenant farmers (rice and/or other crops), tenant farmers working also as agricultural workers; tenant farmers with non-agricultural activities.
- for the owner-farmer group: non agricultural activities; type of crop; land productivity in value; and size of land owned. Additional criteria include: access to capital; the proportion of land directly cultivated; family size and education level. The resulting sub-typology also has four classes: pure rice owner-farmer, pure owner-farmer (rice and/or other crops), owner-farmer working also as agricultural worker, owner-farmer with non-agricultural income.

Statistical analysis will be used for classification of the sample households and the results will be compared to the above typology. By doing so we expect to set up a reliable representation of the situation of rural households in the studied area. A final check will be made with the presentation of the results to the local stakeholders for discussion/validation.

Activities in Viet Nam

In Vietnam, after completion of the first phase, the institutional analysis phase has begun. The ECOPOL Vietnam team came to Bogor for training on institutional surveys and institutional analysis, including training on the use of software developed by CIRAD to help scientists and analysts process the results of institutional surveys.

The training was followed by a "training by doing" phase in Vietnam, to allow the ECOPOL Vietnam team to become familiar with the practical techniques of institutional surveys and analysis of the results.

These surveys will focus on the performance of pig and rice commodity chains in the Red River Delta. All stakeholders that have a direct or indirect influence on the performance of these commodity chains will be interviewed: actors directly involved

such as farmers or traders as well as local authorities, associations, government officials, etc.

The aim is to have a better insight into actors' interactions and to assess the possible actions of each actor for strategic improvements of the efficiency of the two concerned commodity chains.

AGRIND

The project "Avenues for Agro-industrial Development in Southeast Asia (AGRIND)" is currently finalizing a profile of Indonesia's agro-industrial commodities in the food sector. Many post-harvest development activities have been defined in the following commodity groups: carbohydrates, fruit, green chemicals (spices), oil crops, stimulants, sugar crops and vegetables. Many of the determined improvements between farm and factory involve handling and logistics, and a major constraint is the number of middlemen involved.

HRD

Database

The database section activities include:

- Collection of agricultural data (1998) from the Food and Agricultural Organization (FAO) for the countries of Asia and the Pacific.
- Preparing modules for data users.
- Preparation of agricultural statistical profile for Bangladesh and the Philippines.

Notice:

Palawija News publishes information about forthcoming conferences and training courses related to agriculture, especially socio-economic aspects, free of charge according to the space available. The Centre reserves the right to select and edit submissions.

CGPRT Centre

The Regional Co-ordination Centre for Research and Development of Coarse Grains, Pulses, Roots and Tuber Crops in the Humid Tropics of Asia and the Pacific (CGPRT Centre) was established in 1981 as a subsidiary body of UN/ESCAP.

Objectives

In co-operation with ESCAP member countries, the Centre will initiate and promote research, training and dissemination of information on socio-economic and related aspects of CGPRT crops in Asia and the Pacific. In its activities, the Centre aims to serve the needs of institutions concerned with planning, research, extension and development in relation to CGPRT crop production, marketing and use.

Programmes

1. Research, which entails the preparation and implementation of studies covering production, utilization and trade of CGPRT crops in the countries of Asia and the South Pacific.
2. Training of national research and extension workers,
3. Information and documentation which encompasses the collection, processing and dissemination of relevant information for use by researchers, policy makers, and extension workers.

Palawija News

Contributors are invited to submit concise summaries of significant social research related to CGPRT crops for publication. Figures (graphs or tables) may accompany the article. All articles are subject to editing to meet space limitations.

Please send all queries relating to articles in *Palawija News* to Publications Section, CGPRT Centre, Jalan Merdeka 145, Bogor 16111, Indonesia.

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