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Market Prospects for Emerging Commodities in Pakistan

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In this section, some of the new emerging agricultural commodities in Pakistan are discussed, along with their domestic and export potential. Among the new commodities which emerged during recent years, canola (a rapeseed variety), strawberries, and mushroom are worth mentioning. The development of a new enterprise requires coordination and management control over many stages including varietal selection, production, harvesting, grading, packaging, transport and marketing. Integration is required between the various vertical elements in the production-to-market chain. The new commodities will not succeed if researchers and producers independently select varieties and commodities according to their own mandate and schedule and only sell the commodities in local markets. They should be aware of the market potential of the commodity in both domestic and international markets and tastes and preferences of consumers.

Canola

Pakistan is one of the largest importers of edible oil and the world's largest consumer of palm oil. In 1995, around 1.5 million tons of edible oil was imported which cost the national exchequer over Rs 31 billion which is more than 70% of the total foreign exchange allocation to import all agricultural commodities and products. Palm oil and soybean oil are the major edible oils imported from Malaysia and USA, respectively. The imported edible oil meets around 70% of the national requirement and the rest is produced in the country. Cottonseed is the major oilseed crop and accounts for 73% of Pakistan's domestic edible oil production. Rapeseed/mustard is the second most important source of oil and contributes about 16% in domestic production of vegetable oil. Non-conventional oilseed crops (sunflower, soybean and safflower) are only planted on a limited scale and contribute less than 5% in domestic production. Groundnut, sesame, maize and rice husk are other minor sources of edible oil production.

The area under rapeseed and mustard has been declining for the last three decades. In 1970/71, this area was 510 thousand hectares with a production of 269 thousand tons. The area under these crops decreased to 301 thousand hectares with a production to 229 thousand tons in 1994/95, thus registering a 41% decline in area and 15% in

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production during the last 25 years. The area, production and yield are given in Table 1. Rapeseed/mustard crops compete with wheat for area as both are grown in winter. Farmers, especially small ones, prefer to plant wheat and usually inter crop these oilseeds with wheat and fodder. Therefore, these crops never get any respectable place in the prevailing cropping patterns of Pakistan. The average yields of these crops are also low as these are mostly grown on marginal lands.

Rapeseed/mustard are traditional oilseed crops in Pakistan and farmers are very familiar with their husbandry and face no marketing problems. The oil extracted from these crops is mainly used for pickle preservation, hair and body lotions, household cooking and frying, medicinal uses for animals, and as lubricants. However, oil extracted from these crops is not used in the manufacture of vegetable ghee as it contains high levels of erucic acid (40-70%) which is harmful to human health. The indigenous varieties also contain high levels of glucosinolates in the seed tissues, which impart the typical mustard flavor to the product and also inactivate the nickel catalyst used in the hydrogenation process for ghee production. Thus, regular rapeseed is not considered a safe edible oil for human consumption, commercial production and refining.

Canola is a special type of rapeseed which provides a premium quality refined edible oil. Its oil is low in erucic acid (5%) and oil-free meal is low in glucosinolates. Low erucic acid oils are nutritionally rich for human health and similarly, with low glucosinolates, oilseed cake makes a more desirable animal and poultry feed. Also the low glucosinolate level results in less pungent processed oil of canola compared to the traditional rapeseed/mustard oils. In addition to these qualities, canola contains no cholesterol. Compared to soybean meal, canola meal is a better source of calcium, iron, manganese, phosphorus, and selenium. It also contains more choline, biotin, folic acid, riboflavin, and thiamine and has a higher content of the essential amino acid methionine but a lower content of lysine. These qualities make edible oil extracted from the canola type of rapeseed more popular among consumers. On the other hand, the traditional rapeseed/mustard meal has high levels of glucosinolates, can cause goiter and also adversely affects growth and reproduction of animals. Keeping in view all the qualities of canola, the potential exists to replace traditional rapeseed/mustard with canola varieties. It would help to improve the edible oil deficit in Pakistan and would save a considerable amount of foreign exchange.

Table 1 Area, production and yield of rapeseed/mustard in Pakistan.

Year	Area ('000 ha)	Production ('000 tons)	Yield (kg/ha)
1970/71	519.9	263.3	526
1975/76	470.1	267.3	569
1980/81	417.0	252.5	606
1985/86	350.6	249.9	713
1986/87	302.8	213.2	701
1987/88	268.9	204.2	759
1988/89	333.6	249.0	746
1989/90	307.1	233.1	759
1990/91	303.5	228.3	752
1991/92	286.5	219.7	767
1992/93	284.6	206.9	727
1993/94	268.5	197.4	735
1994/95	300.6	229.4	763

Source: Agricultural Statistics of Pakistan 1994/95.

Canola is well known in North America and in Europe, where it is called Zero-Zero or Double Zero rapeseed for its low sulfur compounds and non-odorous characteristics. Presently canola is also cultivated in Australia, China, India and USA. The improved varieties of canola were originally developed in Canada, Sweden, Australia and Poland. In Pakistan, these varieties were introduced by the Barani Agricultural Research and Development Project (BARD) of PARC during the late 1980s with the cooperation of the Canadian International Development Agency (CIDA). Initially, these varieties were only planted in rainfed areas around Islamabad and NWFP. Later on these crops were also grown for commercial purposes in irrigated areas of the Punjab. Presently canola type varieties are planted throughout the Punjab and NWFP.

In Pakistan, canola varieties of rapeseed exist in two species, namely *Brassica napus* and *Brassica campestris*. During the first few years of canola introduction, the *Brassica napus* variety, which is a Canadian variety named 'Westar', was very popular and mostly tested and successful in rainfed areas. Later on, an Australian variety, 'Shiralee' (*Brassica campestris*), a short duration variety, was introduced by the BARD program. Compared to Westar, Shiralee is a higher yielding variety as tested by the BARD program on various locations. Both these major varieties are successfully grown in both rainfed and irrigated areas. The BARD program has demonstrated on various locations during the last five years that these two varieties are hardy, drought resistance and high yielding compared to traditional

Message from the Director

Agriculture in the Asia and Pacific region has been noticeably affected by the rapid change of socio-economic conditions. In particular, recent change of food consumption patterns and commodity trade regimes has influenced the agricultural structure in these countries to become more commercialized. Accordingly, the role of agriculture has become more diversified and widened in socio-economic stability and development in these countries.

This situation led the Centre to revise the current "Strategic Plan for the CGPRT Centre in the 1990's and Beyond". The revision was undertaken principally to rationalize the future directions of programme activities to meet current demands and movements in agricultural development in the region. Simplification of the chapter structure and clarification were also considered.

Taking into account the above and advice provided by the Governing Board and the Technical Advisory Committee of the Centre, the revision was completed in March 1998 under a new tittle "Strategic Plan for the CGPRT Centre towards the 21st Century" with the following five themes:

Theme 1. Consumption and production
Theme 2. Market development
Theme 3. Sustainable agriculture and resource management
Theme 4. Socio-economic policy analysis
Theme 5. Rural development and poverty alleviation.

I heartily hope that this new strategic plan will guide the CGPRT Centre in its future programme activities for the development of CGPRT crops and related agriculture in Asia and the Pacific region towards the 21st century.

HARUO INAGAKI

P.S I am pleased to inform you that the CGPRT Centre has been operating normally after social unrest in Jakarta last May. I sincerely thank those who expressed concern to the Centre during and after the period.

varieties, and profitable compared to all competing crops including wheat.

In 1990/91, the area under canola type rapeseed was only 5,000 acres. In 1994, the Economic Coordination Committee of the Cabinet approved a three year development project entitled "Intensive and Extensive Development of canola" to considerably increase the area under canola and to reduce the deficit of edible oil in Pakistan. The project was implemented during the 1995/96 season and a massive campaign was launched throughout the country by the Pakistan Oilseed Development Board (PODB) and BARD Program. The Board claimed that in 1995/96, area under canola increased to 100,000 acres in Pakistan due to their campaign through provincial extension departments, newspapers, radio, TV, etc. The project has also involved the private sector in procurement and processing. The private sector is already procuring the canola crop and extracting edible oil for human consumption. Presently, canola oil is available in various Utility Stores Corporation (USC) stores and other general sales outlets. The oil is getting very popular especially among the health conscious consumers of Islamabad and Rawalpindi. Due to the high quality edible oil and meal, the private sector is very interested in involvement in its procurement and extraction of edible oil for human consumption. The interest and involvement of the private sector in this enterprise is a good sign for promotion of canola production in the country.

It is claimed by PODB and BARD Program that canola was planted on 100,000 acres during 1995/96. It is expected that this landmark development will produce 50,000 to 60,000 tons of canola oilseed (worth around Rs 700 million) and at least 16,000 to 20,000 tons of high quality edible oil (worth around Rs 500 million). In addition, it will also produce 33,000 to 40,000 tons of canola meal (worth around Rs 150 million) for livestock and poultry feed. However, some in private industry believe that the estimates of area under canola during 1995/96 are too optimistic.

However, they feel that this year the overall rapeseed/mustard/canola crop was good. Also they fully agreed with the qualities of the edible oil and meal from canola and they are very interested in procuring canola oilseed from the growers. It may be hoped that with these efforts by the public and private sectors during the past few years, the edible oil deficit can be considerably decreased during the next 3 to 4 years.

The available evidence shows that the existing canola type rapeseed varieties in Pakistan can effectively replace conventional varieties. The complete replacement can surely increase the production of edible oil production in the country. The available evidence indicates that this is not a difficult task since proven technology of its cultivation is available; acceptability among consumers is established; the high quality of the edible oil and meal has been determined; there is a visible economic edge over other conventional rapeseed varieties and competing crops; the private sector has willingly accepted it for further processing; the marketing system has been developed; and conventional methods can be used for crushing in the villages to meet the edible oil needs of the rural masses. However, this can only happen if growers of traditional rapeseed/mustard varieties are well informed, motivated and educated through extensive extension services about the available technology and qualities of canola. In addition, to promote canola in Pakistan, farmers also require good quality canola seed, inputs, credit, threshers, ensured marketing, guaranteed prices, etc. Also, authentic and reliable data on acreage and production are required to evaluate its adoption and share in the total domestic production of oilseed in Pakistan. Of course, it also requires a political will and effective research and development in the country to save foreign exchange by reducing the edible oil deficit.

Strawberry

Strawberry is a highly nutritive, soft and delicious fruit recently introduced at the farm level in Pakistan. During the 1980s, it was demonstrated at various research stations and a few years ago it was adopted by a few innovative growers around Islamabad, Lahore, and Malakand division in NWFP. The main markets of strawberry are only Islamabad and Lahore. However, very little is known about its area, supply schedule, volume, price, etc. In Islamabad, the local producers and producers from other areas mainly supply strawberry directly to retail supermarkets, big hotels and to local assemblers-cum-processors. The local wholesale market in Islamabad generally does not deal with such perishable commodities. However, in Lahore, strawberry is traded in the wholesale fruit and vegetable market through commission agents. However, producers also supply directly to retailers and processors. The supply of strawberry starts at the end of January and continues until the end of May each year. The consumers of strawberry are generally rich people, foreigners, processors, hotel kitchens, etc.

Many varieties of strawberries are grown in Pakistan. Toro and Douglas obtained from USA are suitable for southern areas of Pakistan. Tufts, Chandler, Cruz and Pocahontas are recommended for Islamabad. Chandler, Corona, Tufts, Honeyo and Gorella are suitable for Swat. Strawberry is an early maturing fruit and can be planted around the year; hence, it brings a high and quick economic return to its cultivators. Winter planting is common in Pakistan. However, due to diverse agro-ecological zones in Pakistan, summer, autumn and spring plantings have also been successfully demonstrated by different agricultural research institutes.

In Pakistan, strawberry has a great potential due to the diverse climatic conditions which are conducive to its growth. It can be successfully grown in the central and northern Punjab, and hilly areas of NWFP province, where the plants can be sustained for two to three years. Besides meeting local demand, the fruit can be successfully exported to earn foreign exchange. For the 1995/96 strawberry crop, retail prices were Rs 40 to 70 per kg and farmers on average earned a net income of Rs 75,000 to 110,000 per hectare in Islamabad. Farmers around Islamabad generally plant less than one hectare and get a yield of 2.5 tons to 10 tons per hectare in the first year. With the correct post harvest technology, strawberry can easily be marketed fresh throughout Pakistan and also can be exported to other countries. The introduction of new varieties that have a longer shelf life would increase the potential of this crop.

For strawberries, different types and sizes of packaging material are used. In Islamabad, 250 and 500 gm cardboard boxes and 500 gm cane baskets are usually used. On the other hand, in the Lahore market, the produce is traded in cane baskets containing 8 to 9 kg and also in 250 gm capacity hard paper packets.

Pakistan has only exported around 4 tons of strawberries (worth Rs 1.1) to India in 1993/94. The superior size of the European market indicates that it may be the prime potential market for Pakistani strawberry and it has a sufficient seasonal edge to be a viable competitor. In the European market, Germany is the largest single potential market which can absorb approximately 6,000 metric tons of fresh strawberries per week and still maintain prices which would be profitable to a reasonably efficient Pakistani exporter of strawberry. In addition to Germany, UK, France and Japan are other potential markets and all four markets can absorb roughly 10,000 metric tons per week at prices profitable to a Pakistani producer. The market "window of opportunity" for Pakistani exporters in these markets is from July to March. However, quality is the key in penetrating these potential markets. Pakistani strawberry can easily be air freighted to European markets with high efficiency cooling facilities from farm to air transport.

Strawberry is a new emerging commodity in Pakistan. It was only introduced during the 1980s and, except for a few innovative growers, most farmers are not familiar with its husbandry. The consumer base is restricted to those who have been abroad or have a wide exposure to the outside world especially Europe. The other main users of this commodity in Pakistan are processors of ice cream, jam and cake, marmalade and drinks. It is also used in different medicines and cosmetics. It can be used in both fresh and frozen form around the year. Moreover, a growing awareness regarding the nutritional value of strawberry and overall changing tastes and preferences of urban society suggest that it has bright growth prospects. Also, the available evidence shows that due to the low cost of production and conducive agro-climatic conditions in Pakistan, the export potential of strawberry is substantial. Also, it has potential benefits for small farmers in terms of generating rural income and employment.

The major constraint to strawberry export is the lack of post harvest technology in packing, grading standards and cool chain distribution. Refrigerated transport for such fruit is a vital part of any successful marketing operation under the prevailing climatic conditions in Pakistan. Since this is a new commodity for Pakistani farmers, it requires a well planned training programme for farmers regarding husbandry, available technology, and post-harvest technology. In addition, farmers will also require inputs especially good quality runners, credit, asssured marketing, etc. Of course, this can be done though very effective research and development in potential areas of Pakistan. Contract farming is suggested for speedy adoption of existing strawberry technologies and to considerably increase its production. The government should inform private exporters of the opportunity to exploit strawberry. In this regard, the Export Promotion Bureau of Pakistan can play an important role in the identification of potential export markets, the required standards, and the provision of air freight from Pakistan.

Mushroom

In Pakistan, mushrooms can be widely observed on the rural plains during the rainy season growing on manure heaps and damp places with a lot of humus. Also, different species of mushroom can be found in places such as fields, woods, forests, water channels, bunds, grassy grounds, etc. All these types of mushroom belong to a natural group of mushrooms which is found in different parts of Pakistan. In this group, the white umbrella mushroom *Agaricus redamine, Folare nigerians* and *Podaxis pistillaris* are most common and they are consumed by the locals. Black morel, a wild variety, is rarely available and it is only supplied for export purposes by some contractors from Kashmir and northern hilly areas. There are about 30 types of mushroom cultivated in Pakistan. However, button and oyster still account for around two-thirds of total production in Pakistan. The other quite successful varieties which have commercial value in Pakistan and the international market are Chinese and Shiitake varieties. However, mushroom in Pakistan is produced on a commercial basis on only a limited scale. Almost all the mushrooms produced in the organized sector are of the white button type. Nature has gifted Pakistan with most suitable environmental conditions of temperature and humidity from sea level to the high mountains. Thus, different kinds of mushroom can be easily grown throughout Pakistan around the year. Apart from this, there is also a lot of crop, livestock, textile, and industrial waste which could be utilized for cultivation of mushroom. Complete and reliable information regarding its total production in Pakistan is not available.

Major markets of mushroom in Pakistan are Karachi, Lahore and Islamabad. The mushroom exporters are also located in these cities. Oyster type mushroom is only supplied in the Islamabad market by small cultivators who generally produce under natural conditions. These producers around Islamabad are not full time organized cultivators but grow mushroom part time for high pay. The button type mushroom is supplied by the National Logistic Cell which is a public sector company and it is produced in a controlled environment. This company supplies all three major markets in fresh form as well as in canned form to meat and vegetable dealers, hotel kitchens, etc. In addition to these producers, different types of mushroom are also produced at different agricultural research stations for research purposes and distributed directly to consumers. Some wild type mushrooms, which grow at different times of the year, are collected by the local people in the hilly areas and they are usually sold to local contractors of different exporters. Mushroom exporters usually collect from these contractors and export to European countries in the processed form as desired by importers. More than 90% of the mushroom export from Pakistan is in the processed form. However, in the local market, it is supplied in the fresh form. During recent years, mushrooms almost occupied the first position amongst fresh vegetables exported from Pakistan.

Mushroom cultivation is a highly profitable enterprise. In Pakistan, a lot of crop straw (rice and wheat) is available, which could be utilized to grow mushrooms for local purposes as well as for export. The spent compost would provide additional organic fertilizer to small farmers, which would save expenditure on chemical fertilizers. Also, cultivation of mushroom will diversify the rural economy and will provide new income and employment opportunities in rural areas. It will further increase mushroom exports from Pakistan and it will help bring more foreign exchange into the country.

In 1981/82, only 25.5 tons of mushrooms worth Rs 20 million were exported from Pakistan, but after 1985/86, the export was considerably increased. Mushroom export from Pakistan increased by 241% from 1981/82 to 1993/94 (Table 2).

Although the natural conditions in Pakistan are ideal for mushroom cultivation, mushroom export from Pakistan is not as high as it should be. This is due to the fact that mushroom production in Pakistan is still a new enterprise and its export is an even more recent development. The major importing countries of Pakistan mushroom are France (73%), Switzerland (17%) and Germany (4%). Other countries including the Netherlands, UK, Finland, Sweden and Singapore imported only a small quantity (Table 3).

Table 2 Mushroom export from Pakistan.

Year	Quantity (tons)	Value ('000 Rs)	Unit Value ('000 Rs/ton)
1981/82	25.495	20,059	787
1982/83	37.828	25,965	686
1983/84	42.592	31,245	734
1984/85	52.297	49,282	942
1985/86	55.385	62,597	1,130
1986/87	63.455	94,589	1,491
1987/88	53.247	80,968	1,521
1988/89	66.797		1,477
1989/90	86.833	132,548	1,526
1990/91	66.879	98,416	1,471
1991/92	75.356	127,630	1,694
1992/93	78.570	142,299	1,811
1993/94	87.035	202,760	2,330

Source: Federal Bureau of Statistics, Islamabad.

Table 3 Export destination and quantity of mushroom exported from Pakistan in 1992/93 and 1993/94.

Country	1992/93		1993/94	
	Quantity ('000 tons)	Share (%)	Quantity ('000 tons)	Share (%)
France	53.102	67.59	63.796	73.28
Germany	2.255	2.87	3.927	4.40
Switzerland	20.303	25.84	15.219	17.48
U.K.	0.060	.08	0.612	0.70
Finland	-	-	0.900	1.03
Austria	0.020	.02	0.120	0.14
Belgium	-	-	0.328	0.38
Netherlands	-	-	1.560	1.79
Singapore	-	-	0.700	0.80
Czechoslovakia	2.520	3.21	-	-
Sweden	0.310	0.39	-	-
Total	78.570	100	87.062	100

Source: Federal Bureau of Statistics, Islamabad.

Per capita consumption of mushrooms in developed countries has increased many fold during the last two decades and is expected to increase more during the 1990s (Table 4). Also, with the opening up of the global economy, rapid industrialization, trade liberalization, global improvement in per capita income and living standards, and health consciousness among the people, the demand for nutritionally rich vegetables such as mushroom is likely to improve in developed and underdeveloped countries in the near future. Therefore, it is very important for countries like Pakistan with diverse agro-ecological conditions to know the potential export markets if they are to fully benefit from the trade opportunities and decrease their trade deficits to some extent.

Table 4 **Consumption of mushrooms (gr/capita/year) in selected developed countries.**

Country	1970	1980	1990
USA	560	750	1,600
UK	900	1,000	1,800
Germany	1,000	2,000	2,400
France	970	1,200	2,300
the Netherlands	600	800	2,700
Switzerland	650	850	2,100
Belgium	600	800	2,700
Denmark	1,000	2,000	2,400
Italy	500	700	900

Source: FAO Yearbook 1990.

In addition to creating more export opportunities, mushroom cultivation will also benefit the rural landless and small farmers by:

- improving the present nutritional status of the poor masses, especially the rural poor;
- creating new income and employment opportunities;
- solving the problem of organic wastes by using them as raw material in mushroom cultivation;
- efficiently using crop straw to produce organic fertilizer;
- improving the purchasing power of the rural poor;
- furthermore, mushroom cultivation is ecologically sustainable; highly profitable compared to many other agricultural commodities; and export earnings could be substantially increased.

Based on discussion with mushrooms growers, traders, and researchers, the following suggestions and recommendations for improving the production of mushrooms in Pakistan are proposed:

- create awareness about mushroom uses, benefits, and nutritional value among the rural and urban masses;
- disseminate technical information regarding husbandry and markets among growers through electronic media;
- fund research and development to improve productivity for local as well as for export purposes;
- provide spawn of those varieties for which there is more demand in the foreign markets;
- provide adequate credit facilities to growers;
- train both growers and traders regarding post harvest technology of grading, packaging, etc.;
- create linkages among growers;
- improve extension services;
- arrange cold chains for distribution to urban areas; and
- stimulate the Export Promotion Bureau the look for new foreign markets and disseminate information to its exporters and producers.

Increasing urbanization, rising per capita income, changing tastes and preferences, high growth rate of the population, nutritional awareness, and developments in the electronic media are surely the indicators of improving local demand for mushrooms. Since mushroom is a rich source of protein, with the changing tastes of urban society, it has a great market growth potential. Therefore, the special attention of both public and private sectors is required to fully benefit from this new emerging enterprise. So far most mushroom production is in the informal sector, except the National Logistic Cell which is a public company, and only the button type mushroom is produced for local consumption. Therefore, there is a dire need to take up mushroom production in the organized sector to boost its production in Pakistan.

In this analysis, only three new emerging commodities have been considered. There are, of course, market opportunities for many other new Pakistani commodities.

Market Prospects for Three Emerging Commodities- Cabbage, Mango and Potato- in Indonesia

Memed Gunawan[*]

Cabbage

Production potential

Cabbage has good prospects for the export market for several reasons: (a) a considerable potential area suitable for cabbage growing exists in Indonesia; (b) there is increasing demand for cabbage and Indonesia is close to importing countries such as Singapore, Malaysia, and Hong Kong; and (c) the government strongly supports

[*] Centre for Investment Development and Environmental Impact, Jakarta, Indonesia. This paper is taken from Market Prospects for Upland Crops in Indonesia, Working Paper No. 25, Bogor: CGPRT Centre.

horticulture development. Cabbage grows in many parts of Indonesia, such as Brastagi (North Sumatra), Bogor and Bandung area (West Java), Dieng area (Central Java), Malang area (East Java), and North Sulawesi. A new production area was established in South Sulawesi a few years ago and it has changed South Sulawesi from a vegetable importer to an exporter.

The harvested area increased more than two-fold from 30,000 ha in 1982 to 61,000 ha in 1993. In the same period, yield increased from 11.0 tons/ha to 21.0 tons/ha, and production increased from 349 thousand tons to 1,282 thousand tons. Domestic consumption increased about 1.5 times from 2.25 to 3.49 kg/capita/year.

Cabbage is a high risk commodity because of its sensitivity to climatic change, pests and diseases, besides its perishable and bulky characteristics. Long rainy periods stimulate mold diseases and pests. Farmers also tend to use a large amount of insecticides, which could be a disadvantage in the long run.

The yield of intensively-cultivated cabbage is 22-40 tons per ha, the total production cost Rp 6.0 million per ha (not including land rent), and the sale price Rp 200 to 250 per kg. Profit varies between Rp 0.5 and 1.2 million per hectare of harvested area depending upon the sale price of the product. The high production cost is the primary constraint, due to farmer's limited capital.

The handling cost is usually high and there is a large price difference between production and consumer areas. The price at the production area (the farm gate price) ranged between Rp 196 and 393/kg in 1994, and the consumer market price was Rp 197-993/kg. Product damaged during transportation is around 20% at the village market, and 20% at the consumer market due to poor handling, packaging and transportation facilities.

Regardless of its physical features and price risk, cabbage is a highly profitable crop. On average, it generates Rp 2.3 million/ha (Table 1). Although this amount is lower than profit for tomato, cauliflower and green beans, its production and price risk are also lower.

Post harvest handling needs immediate improvement. There is very little incentive for better handling. However, farmers could obtain more income from vegetables like cabbage compared to traditional secondary crops.

Table 1 Average cost and revenue per hectare in vegetable cultivation in Lembang, 1993.

Commodity	Production Cost (Rp '000/ha)	Revenue (Rp '000/ha)
Cabbage	4,178	6,375
Tomato	8,478	11,550
Cauliflower	3,616	6,300
Green beans	4,456	7,715

Source: Computed from field data from *Gabungan Kelompok Tani Lembang Segar, L*embang, 1995.

Marketing

Cabbage and other vegetable markets are competitive. There is no government intervention in horticultural markets and, since the buyers are relatively small in number compared to the number of farmers, the market structure tends to be oligopsonic. The market institution is generally very poor, and puts farmers in a weak bargaining position. In production areas, if there is no contract farming between farmers and buyers, farmers always sell the standing crop. Transactions and bargaining are made under uncertain conditions because both farmer and buyer do not possess accurate information on yield and quality. The market structure tends to be very concentrated, which discourages farmers from producing a high quantity and quality product due to the following reasons:

- The distribution of marketing margin is biased to traders.
- Farmers have to carry all production and marketing risks.
- Price fluctuation may cause a loss to farmers, but traders always gain a profit.

The government has attempted to improve the horticultural market by developing marketing arrangements which create mutual benefits between farmers and buyers. Supermarkets, hotels, restaurants, and exporters are among the potential private businesses that can establish marketing arrangements with farmers. This marketing scheme is in the initial phase of development but is already showing an increasing adoption.

The per capita availability (FBS data) increased from 2.01 kg/capita/year in 1981 to 3.49 kg/capita/year in 1990, although the average contribution to daily calorie consumption is very low (2 calories/capita/day). The prospects for cabbage in domestic and international markets are mostly due to general increasing trends of vegetable consumption in almost all parts of the country. The price in consumption areas varies considerably. In Bandung and Medan the cabbage price in 1994 was Rp 295/kg, but in Pontianak and Banjarmasin it was around Rp 429-793/kg. Cabbage has to be exported from production areas in West Java, Central Java and North Sumatra to East Nusa Tenggara, Kalimantan, Sulawesi, Maluku and Irian Jaya. North Sulawesi has been an important production area, and South Sulawesi is becoming a new production center to supply eastern Indonesia.

External trade

Cabbage has been exported in large quantity especially from Medan (North Sumatra) to Singapore and Malaysia. The rich soil and suitable climate in the highlands of North Sumatra have made this area a production center of vegetables, fruits, and flowers. Exports have increased consistently as shown in Table 2. In 1985 the export of cabbage was 34,802 tons with total FOB value of $ 3.756 million. It declined until a recovery in 1988. Since then the volume of export has more than doubled and its value multiplied almost three times, which indicates an increase in unit price, probably due to increase in quality or short supply of cabbage in Singapore and Malaysia. With the current domestic market structure, farmers receive a small portion of the profit margin. It is also reported that the quality of Indonesian cabbage in the Singapore market is low compared to other imported cabbage. More than 1/3 of the product is wasted and unsold due to improper packaging and transportation.

North Sumatra supplies 97% of the cabbage export. Its potential could be further improved since Indonesia can produce horticultural crops all year around and Indonesia exports cabbage all year round with a peak season in June and July. The current export destinations of Indonesian vegetables are Malaysia, Singapore and Hongkong. In 1985-1986 Singapore was the only importer of Indonesian cabbage. Since 1987 Malaysia and Hongkong also became important importers. Malaysia was the largest importer in 1987 (67.1%), and Singapore the second (35.5%).

Strategy to improve cabbage exports and horticultural crops in general should emphasize the improvement of cultivation technology and marketing institutions. The main constraints to this vegetable market are:

- Limited capital hampers cabbage farmers from using the best technology available, and does not allow farmers to escape the detrimental system of illegal financial markets.
- Seed and planting materials are expensive and not easily available at the production areas.
- The market structure tends to be oligopsonic and gives farmers little bargaining power in the produce market. This condition discourages farmers from improving both quantity and quality of the product.
- The supporting facilities such as transportation, packaging industries and cold storage facilities are inefficient.

Table 2 Export of cabbage 1985-1993.

Year	Net Weight (tons)	Value FOB (US $)
1985	34,802	3,758,666
1986	24,937	2,560,390
1987	16,106	1,778,253
1988	29,170	3,857,798
1989	32,111	3,898,000
1990	27,066	3,737,563
1991	28,175	3,811,467
1992	56,988	7,265,482
1993	70,295	9,294,400

Source: CBS 1994.

Mango

Production potential

Mango is a promising fruit to cultivate for several reasons. Besides Indonesia's suitable climatic conditions, the market for exotic tropical fruits is increasing. The large number of mango varieties in Indonesia has been an advantage as well as a disadvantage. Some varieties are highly respected as exotic tropical fruit, while others are more suitable for juice. The sweetness, aroma and the color of the fruit also vary. Consumer preferences also differ considerably. However, the fruit's genetic characteristics developed in research have not been focused for a particular market, which usually demands standardized size, sweetness, color, and performance. Mango is usually not commercially grown but is grown in home yards. Mango production is very seasonal with the peak season varying between Java (July-September) and South Sulawesi (August-January).

Demand for mango is increasing rapidly. Except for occasional and location specific peculiarities, demand outstrips supply, resulting in high prices, particularly at the beginning and the end of the season. In the near future, demand for high quality mango will increase and consumers will be willing to pay a premium for quality fruit. Good varieties such as *golek, harummanis, gedong, and manalagi* are highly demanded in the domestic market. Most of the genetic improvement has focused on improving the sweetness and aroma to meet domestic consumer preference. Most varieties have a green peel and off white meat which is not preferred in the world market. Some have red and yellow colored skin and meat (such as *gedong* and other low quality mangoes which are good for juice) with potential for further improvement for the world market.

Mango production doubled in 10 years from 325 thousand tons in 1980 to 620 thousand tons in 1992 (Tables 3 and 4). However, there is no single key responsible for the market expansion. The dominant characteristic of the mango sector in Indonesia is its diversity. Production areas are scattered throughout a large area, often with difficult access to the markets, transport networks, and the existing infrastructure.

Java is the largest producer, accounting for more than 86% of the total production in 1991. East Java contributed almost one half of the national production that year. The pattern of production in Java, Sumatra and Kalimantan is similar, but Sulawesi shows a different pattern (Table 5). In general Indonesia has an advantage in supplying the world market because of its different mango season from Thailand, the Philippines and Australia. During the slack season in those three countries, Indonesia supplies the Singapore market.

Table 3 Production of mango 1980-1992.

Year	Production (tons)
1980	325,225
1981	308,601
1982	423,139
1983	444,534
1984	442,244
1985	416,444
1986	415,041
1987	515,949
1988	531,968
1989	445,042
1990	508,889
1991	640,457
1992	615,653

Source: DGFCH 1995.

Beginning in the early 1990s the government designed a special program to establish mango and fruit production centers throughout the country. The production centers are expected to produce a sufficient amount of fruit in a large contiguous area for processing and marketing in an agribusiness scheme. At the same time, some small and medium (150-600 ha) orchard type mango plantations started growing especially in East Java. The export of mango is beginning to increase. Grading, quality standards and processing are given intensive support by the government.

Table 4 Fluctuation of mango production by region (ton), 1991.

Region	Quarter I	Quarter II	Quarter III	Quarter IV	Total
East Java	7,053	7,046	124,358	152,679	291,136
West Java	16,871	3,171	47,543	109,568	177,153
Central Java	2,550	1,532	45,956	33,422	83,460
Sumatra	4,443	3,912	4,013	7,098	19,466
Kalimantan	792	149	410	3,006	4,357
Sulawesi	6,869	1,105	101,797	7,880	17,651
Indonesia	43,031	18,408	232,102	346,916	640,457

Source: Central Bureau of Statistics, Agricultural Survey: Fruit Production in Indonesia, 1991.

Domestic market

In East Java the marketing channel includes: farmers, village collectors, intervillage large traders, wholesalers, exporters, and retailers.

Individually, mango farmers are usually weak in terms of bargaining, marketing, information, and access to the consumer market. With limited access, the best approach for farmers is to sell the produce to village collectors who are frequently hired by wholesalers. Most farmers sell their mango in *tebasan* or bulk system when the fruit is still on the trees.

Table 5 Income elasticity of demand for fruit in South Sulawesi and East Java, 1993.

Commodity	South Sulawesi	East Java
Citrus	1.525	4.51
Mango	0.758	3.06
Rambutan	1.445	4.43
Durian	1.560	4.66
Salak	1.093	3.73
Banana	0.423	2.39

Source: ADP 1995.

The domestic market of mango is highly seasonal and mango is only available in the market during the season. Cool storage for mango is not common due to the rapid change in aroma and flavor. The price of high quality mango in Indonesia is higher than the FOB price. Income elasticities of demand for mango in South Sulawesi and East Java in 1993 were 0.76 and 3.06 (Table 5). As indicated by income elasticity, a 1% increase in real income in East Java will increase mango consumption by more than 3%. Inelastic income elasticity in South Sulawesi may be related to low quality mango in this area.

External trade

Over 1987-1993 exports of mango fluctuated with an increasing trend. In 1987 export of mango was 307 tons with a total value of $ 231,665. In 1992 the export reached 966 tons, then declined slightly in 1993 to 929 tons (Table 6). The value, however, increased from $ 1,221,773 in 1992 to $ 1,417,291 in 1993. There was a large increase in price of mango in 1993 (Table 7).

The unstable export of mango is related to several factors. The primary factor is that the mango export destination relies on one country. Singapore so far absorbs more than 80% of Indonesia's mango export. In Singapore the demand for sub tropical fruit such as apple, pears, and tangerine is far larger that for mango. In addition, the Philippines and Thailand have dominated the mango market in Singapore. The second factor is that genetic, processing and other product development of mango in Indonesia began just recently. Genetic improvement of Indonesian mango has not been directed to the world market preference which demands good color, flavor and performance. Third, mango production has relied on small scattered production areas resulting in low quality, and high transport and collection cost and time. Non continuous production of mango has constrained the establishment of processing and marketing industries.

Table 6 Export of mangoes, 1985-1993.

Year	Net Weight (tons)	Value FOB (US $)
1987	306.583	231,665
1988	738.066	552,041
1989	301.193	402,203
1990	572.649	579,465
1991	722.820	613,474
1992	965.958	1,221,773
1993	929.061	1,417,291

Source: Calculated from Central Bureau of Statistics, 1987-1994.

The market prospects of mango are also related to the increasing orchard type plantation using high quality varieties and professional cultivation. A significant improvement in mango exports is due to:

- high quality orchards which have been developed in East Java;
- establishment of new production centers all over the country;
- new marketing arrangements being developed by these orchards with farmers; and
- new marketing methods such as mail order, which have also been developed in East Java.

Table 7 Average FOB price of East Java mango, 1985-1993.

Year	FOB, Juanda (US $/kg)
1985	0.32
1986	0.17
1987	2.07
1988	0.55
1989	1.16
1990	1.04
1991	1.00
1992	1.72
1993	1.98

Source: *Statistik Jawa Timur* 1994.

Potato

Production potential

Potato is an important vegetable in Indonesia and in the export market. Potato production increased at a rate of 4% annually during 1988-1993. In 1981 the harvested area was 30,278 ha, production 216,713 tons, and yield 7.16 ton/ha. In 1984 demand for potato grew 17.6% per year, while production growth was 13.2%. Potato market prospects have received sufficient response from farmers. The harvested area increased, and planted area expanded not only on the highland plateau but also at lower altitudes. The harvested area remained around 30-32 thousand ha until it increased rapidly in 1988. In 1988 the harvest area was 38,983 ha and production 418,154 tons, almost double than in 1981. In 1993 harvested area was 54,802 ha, production 866,840 tons and yield 15.8 ton/ha (Table 8). The largest potato producers in 1993 were West Java (12,339 ha), Central Java (12,991 ha), and North Sumatra (11,766 ha).

During the last decade potato production multiplied as much as four times due to the increase in harvested area (almost doubled) and yield (more than doubled). This large increase in production is just about parallel with the increase in demand of about 20% per year. The government has actively supported this market expansion. In general the government's intention to support the development of horticultural crops is due to:

- The development of horticultural crops has been far left behind compared to cereal crops.
- Horticultural development has a large potential because of the area availability, climatic condition and market prospects.
- Horticultural crops have potential as new sources of agricultural growth as rice and traditional crops approach the leveling off stage.

The government's effort to increase production and marketing of horticultural crops including potato has been comprehensive, extending from research to processing and marketing. A significant change in research strategy is the integrated research, beginning from input supports and marketing, production technology, processing and marketing. Studies on fruits, for example, have focused on tropical fruits which have a comparative advantage compared to subtropical fruits such as grape and apple.

Table 8 Harvested area, production and yield of potato in Indonesia, 1981-1993.

Year	Harvested Area ('000 ha)	Production ('000 tons)	Yield (ton/ha)
1981	30.3	216.7	7.16
1982	21.0	164.8	7.85
1983	30.3	250.0	8.25
1984	33.0	371.6	11.25
1985	32.4	372.8	11.53
1986	37.2	446.3	12.01
1987	32.1	369.0	11.52
1988	39.0	418.2	10.73
1989	39.2	559.4	14.26
1990	44.9	628.7	13.99
1991	39.6	525.8	13.27
1992	48.9	702.6	14.38
1993	54.8	866.8	15.82

Source: DGFCH 1995.

Local varieties of potato such as Granola, Cipanas, and Segunung are widely used by farmers. Recently, new varieties from the Netherlands, called Monza and Alpha, have proven to be superior to local varieties in both quality and yield. Cultivation techniques of potato are developed in research stations and disseminated by the extension service of the Ministry of Agriculture.

To improve cultivation techniques, the government should pay more attention to integrated pest management. Although particular types of pesticides and herbicides have been banned in rice cultivation, they are still used on vegetable farms. High application of these chemicals on vegetables is due to the high risk of pest and disease infestation.

The marketing institution is probably the last crucial factor in horticultural growth in Indonesia. Guaranteed price and supply are essential to provide an economic incentive to both farmers and buyers. Cooperatives and contract farming are being implemented in many production centers, with substantial impact on farmers' income and supply continuity. The pioneers of this marketing arrangement have benefited from the cooperation with farmers.

External trade

The current increase in domestic demand comes from the booming food industries and restaurants. For the domestic market, daily supply of potato from production centers in Bandung and Bogor areas to the surrounding areas is quite large. Demand for potato in Singapore, Malaysia, Taiwan, Hongkong, Korea and Japan is large but the Indonesian market share is still small.

The volume of export steadily increased since 1984. In 1993 the volume of export was 126 thousand tons or about 10 times than that in 1984. However, the export has been mainly to Malaysia and Singapore. Other export markets such as Japan, Korea, Hong Kong, and Taiwan are supplied by other countries such as Australia, New Zealand and Thailand.

The current export is not large but it shows prospects for improvement in the future. The volume of export in 1984 was 12,295 tons which was about 3% of the national production of 371,546 tons. In 1993 the total export was 126,584 tons, accounting for 14.6% of the national production of 866,840 tons. Total foreign exchange earning from potato exports in 1993 was $ 19.05 million which was an increase from $ 1.36 million in 1984 (Table 9).

Table 9 Export of potato, 1984-1994.

Year	Production (tons)	Export (tons)	Export ($ '000)
1984	371,546	12,295	1,356
1985	372,825	19,288	2,023
1986	446,295	21,872	2,176
1987	368,961	34,297	2,685
1988	418,154	57,045	6,225
1989	559,396	71,350	10,020
1990	628,727	76,775	10,266
1991	525,839	98,177	13,932
1992	702,584	96,470	15,555
1993	866,840	126,584	19,050

Source: DGFCH 1995.

The potato for export is high quality potato which meets quality standards determined by the importer. However, for a larger export promotion, the marketing system has to be significantly improved. In general there are two models of vegetable exports, namely:

- export that is based on daily order which occurs from Bandung to Singapore. The exporter has to buy and collect potato from farmers, select and grade, clean, pack and ship directly to Singapore. This model of export does not guarantee the quantity, quality and continuity. Therefore, this system should be improved gradually.
- export that is based on contract farming. This trading model is adopted by large companies which also produce or directly cooperate with farmers in contract farming. High quality potato is grown in Central Java (Wonosobo) under the supervision of a large company. High quality seed and sufficient inputs are supplied to farmers who, in turn, supply the company under a legal contract. The product is not for domestic market but only for export.

The import of potato is very small and has continually declined in the period 1984-1993. In 1984 the volume of import was only 625 tons or 5% of the export with value of $ 425 thousand. Import of potato seed is larger than the import of potato and shows an increasing trend. In the 1980s the import of potato seed averaged 240 tons with an average value $ 162 thousand. Beginning in the year 1991 the import of potato seed increased 2-3 times to more than 600 tons with an import value of around $ 600 thousand. This is an indication that potato farms have used better quality seed besides implementing better cultivation techniques. As shown in Table 9, the yield increased from 7.16 t/ha in 1984 to 15.82 t/ha in 1993.

Strategy for further improvement

The weakness in the marketing system which has been identified in many studies can be summarized as: (a) limited capital of farmers, (b) weak marketing institution, and (c) inadequate facilities. Potato cultivation is costly and risky. With limited capital, the application of better farming practices is usually difficult. The production cost per ha is about Rp 6 million which is too much for most farmers. In addition, physical risk such as climatic conditions, pests and diseases, and market risk are important factors the farmers have to face.

Regardless of the absence of government intervention in the vegetable market, the domestic market does not provide sufficient economic incentive to farmers to improve vegetable quality. Post harvest treatment such as cleaning, storing, and packaging is too expensive and does not generate sufficient added value. The market structure which tends to be oligopsonic gives farmers little bargaining power. Pricing is a crucial factor because there is no process to ensure fair and secured pricing.

Potato export has potential and will become a large source of foreign earning. Greater efforts to improve export include: (a) auction markets at production areas, which are important to improve market efficiency; (b) credit provision for farmers to encourage the implementation of cultivation technology; (c) provision of transportation, storage, and packaging facilities at production centers, and (d) improvement of the process and pricing procedure at the central market.

CGPRT Centre News and Activities

TRADELIB

The interim review of the project was conducted for the Republic of Korea in April 1998. Dr. Boonjit Titapiwatanakun, the regional advisor, and Dr. Michio Kanai, the project leader, discussed the Korean draft country report for the first term and related matters with Dr. Myung-Hwan Sung, the national expert, and researchers and officers concerned.

The draft report meeting for the first term of the project and the planning meeting for the second term were held 5-8 May 1998 at the CGPRT Centre, Bogor. National experts from nine participating countries, the regional advisor and the project leader discussed the draft country reports in detail.

SUASA-2

A regional seminar on ‘Resource Management and Sustainable Agriculture in Marginal Upland Areas’ was held at the Korea Rural Economic Institute (KREI) in Seoul, Korea, from 20 to 22 May 1998 cosponsored by KREI and CGPRT Centre. The seminar aimed to discuss more broadly agricultural resource management in relation to various sustainability issues at the final phase of the project, “Economic Assessment of Selected Resource Management Techniques in Marginal Upland Agriculture (SUASA-2)”. The national experts of the project, commentators, resource persons and guests from the participating countries of the project (China and India), and other countries in the region were invited to the seminar.

The seminar was successful and useful for understanding various agricultural and resource management situations of different countries in the region for future development of sustainable agriculture in marginal upland areas. The proceedings of the seminar will be prepared soon in the form of a separate publication.

ECOPOL

The ECOPOL project (Economic and Policy Analysis for the Ecoregional Approach in South-east Asia), is a CGPRT-CIRAD joint research and development project. It is funded by CIRAD (International Cooperation Centre in Agricultural Research for Development) and the Government of France (Ministry of Foreign Affairs).

From 1994 to 1997, the CGPRT Centre hosted the DIVAPOL project (Agricultural Diversification and Food Crop Trade: their Implications for Agricultural Policies in south-east Asia, DIVAPOL) which constructed an economic model called MATA (Multi-level Analysis Tool for the Agricultural Sector) for simulation of policy options in order to analyse their possible effects on economic agents and on agricultural production.

ECOPOL will keep on developing the MATA model according to actual needs. However, it will aim more at using and adapting existing tools and methodologies to provide support for economic and institutional policy-making processes, and less at constructing new tools.

The ECOPOL team (Dr. Ir. Robin Bourgeois and Ir. Frank Jésus) is hosted at the ESCAP-CGPRT Centre, in Bogor, and will work with its scientists. Collaboration will also be developed with Indonesian and Vietnamese teams that have already worked with the DIVAPOL project and further extended to new participants.

HRD/IS

From 13-24 April 1998, a two-week regional working seminar on “ Agricultural Planning in Asia” was held at the Centre. The seminar was attended by fifteen participants from eleven countries: Bangladesh, India, Indonesia, Lao PDR, Nepal, Pakistan, Papua New Guinea, Philippines, Sri Lanka, Thailand and Vietnam. Nine resource persons from a number of international as well as national organizations gave special lectures.

Considering the growing importance of database management, in agriculture the seminar included topics ranging from management to appropriate analytical techniques. Specifically, the seminar focused on spatial analysis (GIS) and simulation modelling techniques (linear programming, MATA). The software involved included Access, Excel, Mapinfo and GAMS.

Judging from the interest shown and results achieved in group activities and exercises during the seminar, the impact was substantial.

Announcements

5th JIRCAS International Symposium on Postharvest Technology in Asia - A step forward to stable supply of food products

Tsukuba, Ibaraki, Japan, September 9 - 10, 1998

The Japan International Research Center for Agricultural Sciences (JIRCAS) is implementing collaborative projects in Asian countries and postharvest technology should receive more attention in future research collaboration. Development of postharvest technology could contribute to securing a stable supply of food products in addition to the increase of agricultural income and improvement of the diet in developing regions of Asia.

In this Symposium, the development of the food industry in Asia will be reviewed and the basic technical problems involved for future progress will be outlined.

Session 1: Main priorities and constraints of postharvest technology in Asia.

Session 2: Current development and future orientation of technology of grain storage and presenvation in the tropics.

Session 3: Current situation and future orientation of technology of food industries in Asia.

For further information, contact:
Organizing Committee of the 5th JIRCAS International Symposium
Japan International Research Center for Agricultural Sciences
1-2, Ohwashi Tsukuba, Ibaraki 305, Japan
Fax: +81-298-38-6342
E-mail: sympo@jircas.affrc.go.jp
Web site: http://ss.jircas.affrc.go.jp/sympo/sympo3.htm

European Supported Integrated Pest Management (IPM) Projects Relevant to Developing Countries

The IPMEurope Projects Database is a database which presents information on integrated pest management (IPM) projects relevant to developing countries that are supported by European institutes and organisations. The database is an initiative of IPMEurope, the European Group for Integrated Pest Management in Development Cooperation.

The database provides information on current and recently completed IPM and IPM-supporting research and development projects that are relevant to developing countries. As well as straightforward IPM projects, it aims to include: broader projects (e.g. organic agriculture projects) which have a significant IPM component; IPM-supporting research e.g. pest biology studies for important pests; institutional support to Plant Protection Services and to development of appropriate pesticides legislation; programmes for safe pesticide handling, safe pesticide disposal, and improved efficiency of chemical control.

The database can answer questions like: Is there any research going on on nematodes in yam? Who is working on IPM in low input agriculture? What are the current IPM projects in Zambia? Special reports can be made on request, mostly free of charge, depending on the amount of work involved and the size of the report. These can be thematic reports (e.g IPM in rice, organic agriculture, resistance breeding), or a combination of both.

You can find general information on IPMEurope, search the database online or have a look at the anlysis report at:
http://www.nri.org/IPMEurope/homepage.htm

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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