

IFC SADI Agri Sectors

**Value Chain Analysis for
The NTB Peanut Industry**

May 2007

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Executive Summary

NTB Peanut:

Peanuts are a short term, restorative crop grown within intensive farming rotations of rice and other crops. They have a ready market within Indonesia but seasonal peaks in supply and lack of local ability to adequately dry / process and store limits smallholder earning potential. Research is required into improved seed varieties and best operational practices including cultivation vs direct planting, irrigation, fertiliser, weed and pest control. Cash flow problems with inputs (after the rice harvest) may well be reduced / eliminated with farmer business management training, and co-operative groupings of farmers would provide the potential to develop access to finance, processing, storage, markets etc.

Garuda foods have established a processing facility in Lombok and seek a greater supply of quality peanuts. There is an opportunity for SADI to assist farm groups to link with Garuda and to develop their co-operative activities with an assured market.

An Overview of Agribusiness in West Nusa Tenggara (Nusa Tenggara Barat/NTB)

West Nusa Tenggara comprises the islands of Lombok and Sumbawa to the east of Bali. Lombok, like Bali with its volcanic highlands, attracts a high rainfall in the west and southern areas. The high rainfall coupled with fertile volcanic soils has led to the development of intensive terraced paddy farming systems, where rice rotations are interspersed with crops such as soybean, corn, mung beans and peanuts. Fruit trees and other crops such as Vanilla can be grown on the higher slopes which are more difficult to intensively cultivate, while the drier north eastern side is more suitable for grazing livestock.

Sumbawa Island is larger than Lombok, but of lower overall elevation and attracting less rainfall. Soils vary, but lower fertility and the longer dry seasons inhibit agricultural expansion. The Bima area has the most intensively farmed area, with irrigated paddy fields where shallots have been developed as a profitable, niche option, planted after wet season rice. The balance of the island is relatively lowly populated by subsistence farmers, production being limited by variable soil quality and low rainfall. Sumbawa provides scope for increased grazing livestock production.

Agriculture is the dominant sector in NTB, contributing Rp 3.65trillion (27.04 percent) to the GDP in 2005 where rice production predominates ahead of soybean, corn and mung beans. Tobacco is an established primary estate crop, with 16,766 hectares in production and a potential land area of 170,000 hectares reported to be suitable for tobacco expansion.

Most agricultural products are destined for local domestic consumption, with the local government promoted livestock industry dominating the inter-regional trade. The non agriculture sector which dominates the inter-regional and export trade has

been increasing over the past five years, while the fluctuating / declining prices of agriculture commodities in NTB presents challenges to ongoing development.

Fisheries are an important business sector in both islands. Lombok Island with its heavier rainfall has a lot of water resources for fresh water prawn farming activities as an alternative to marine fisheries. Sumbawa Island with its low rainfall is more suited to brackish fishpond development.

The three highest priority commodities in West Nusa Tenggara (based on Analytical Hierarchy Process analysis - AHP -) are soybean, beef cattle and shallot. Following IFC/SADI selection processes, this report has analyzed the value chains for three commodities; Peanut, Shallots and Vanilla. The field study was conducted in Lombok Island for Peanut and Vanilla, and Bima Sub District in Sumbawa Island for Shallots.

NTB Peanut

1. Peanut – Attributes

The peanut (*Arachis hypogaea*), known also as groundnut and to lesser extent as earthnut, monkeynut, and goobers is not a true nut but rather a short rotation (100 day) leguminous crop much like the bean or a pea. The peanut plant is unusual because it flowers above ground and pods containing one to five seeds are produced underground.

Peanuts require a well drained, moist, fertile silt loam soil of moderate pH with appropriate fertiliser inputs (eg phosphate), for maximum production. There are many varieties available to suit different soils and markets.

Uneven maturity requires careful management as price, particularly for consumption grades, favour high yields of mature : immature kernels, & taste.

Peanut seeds are a rich source of edible oils, containing 40 to 50 percent fat, 20 to 50 percent protein, and 10 to 20 percent carbohydrate. The seeds are nutritious and contain vitamin E, niacin, folacin, calcium, phosphorus, magnesium, zinc, iron, riboflavin, thiamine, potassium etc.

Peanuts, peanut oil and peanut protein meals constitute an important segment of world trade in oilseeds and products. Peanut is the fifth most important oilseed in the world.

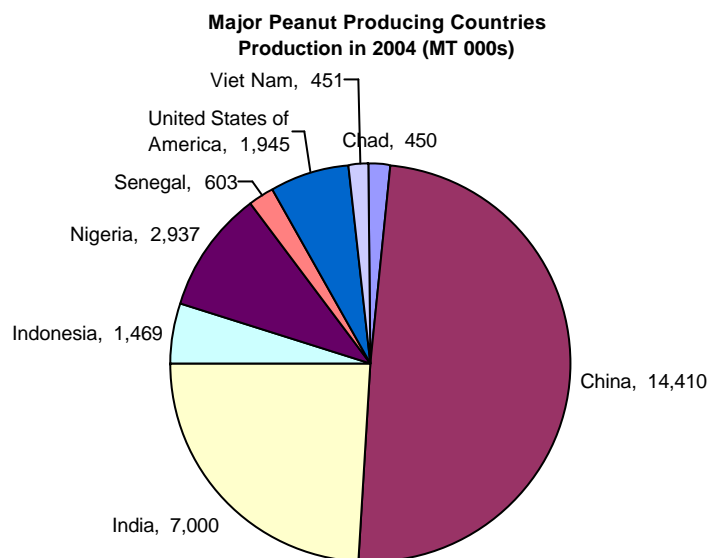
Peanut is used for different purposes: food (raw, roasted or boiled, cooking oil), animal feed (pressings, seeds, green material, straw), and industrial raw material.

2. The Global Peanut Sector

The peanut is one of the world's most popular and universal crops, cultivated in more than 100 countries in all six continents. China and India are the largest producers and a substantial proportion of total production is consumed by growers, without ever being recorded.

While Indonesia has the third largest crop area, after India and China, this area represents only three percent of the global crop area of around 21 million hectares. Global peanut production is concentrated in India and China with planted areas of nine million and 2.2 million hectares respectively.

On a total volume basis Indonesia produced a total of 1.4 million tonnes in 2004 (FAO) and ranks seventh largest producer behind India, China, Nigeria and the USA.



Source: FAOSTAT

At 1.0 tonne per hectare, average peanut yields in Indonesia are lower than the global average of 1.1 tonnes per hectare (unshelled). The highest average per hectare yields are achieved in the major producing countries of USA, China and Argentina (2.0 tonnes per hectare). Although USA had been third largest producer in the world until mid - 1990s, Nigeria is the third largest producer in the world now.

Israel ranked the top in yield per unit area with an average yield of 5,401 Kg/Ha in 2003

3. The Domestic Peanut Sector

Indonesian peanut production is dominated by smallholders growing small areas in rotation with other crops. It is estimated that 30 percent (220,000 hectares) of the national crop area is grown in irrigated paddy fields, usually following rice. As a legume, peanut is used to restore soil structure and fertility through nitrogen fixation

Indonesian yields range from 0.8 – 2.6 tonnes from dryland to irrigated paddy fields. The large range in yields reflects a range of farming techniques, soil and climate types and access to technology, irrigation and quality seed. Lower yields are mainly caused by poor crop husbandry and low technology farming systems, premature harvesting and difficulties in controlling pest and disease.

Smaller subsistence farmers consume an unknown but possible significant proportion of their own peanuts.

Parts of Indonesia (including NTB), possess fertile volcanic soils where national agricultural research trials have shown that with improved crop management 3.0 – 4.0 tonnes per hectare is achievable.

Java is the main peanut growing region in Indonesia with just over two thirds of the national production. The table below shows the main peanut producing regions in Indonesia.

NTB, with a harvested area of 41,020 hectares produced 49,226 tonnes (in 2004) is a relatively minor producer on a national basis with approximately six percent of national production and a recent annual production growth rate of 16.82 percent per year. (Second best after Maluku & Nort Maluku with around growth 31 percent a year). Productivity has grown at two percent per year, (behind Java at three percent).

Table 1
Indonesian Peanut Harvested Area, Production and Productivity by Region, 2001-2004

No	Province	2001	2002	2003	2004	%(2004)	Trend(%/year)
A Harvested Area (ha)							
1	Jawa	450,704	444,959	459,014	486,354	67.23%	2.63
2	Sumatera	62,948	62,247	73,679	74,710	10.33%	6.83
3	Sulawesi	57,792	60,369	65,160	60,915	8.42%	2.32
4	Nusa Tenggara Barat	27,350	28,175	34,039	41,020	5.67%	14.36
5	Bali & NTT	24,665	26,688	27,274	32,404	4.48%	8.58
6	Kalimantan	20,692	20,325	19,073	20,560	2.84%	(0.82)
7	Maluku & Nort Maluku	2,404	972	2,907	4,451	0.62%	30.10
8	Papua	8,283	3,218	2,391	3,020	0.42%	(39.30)
B Production (tonnes)							
1	Jawa	487,803	497,636	529,219	569,189	67.96%	5.29
2	Sumatera	68,032	67,249	81,227	84,039	10.03%	8.25
3	Sulawesi	63,094	62,956	74,442	66,614	7.95%	3.30
4	Nusa Tenggara Barat	30,595	32,225	40,489	49,226	5.88%	16.82
5	Bali & NTT	27,698	29,866	32,089	36,936	4.41%	9.46
6	Kalimantan	22,462	23,648	22,650	23,348	2.79%	0.72
7	Maluku & Nort Maluku	2,681	1,117	3,240	5,139	0.61%	31.20
8	Papua	7,405	3,374	2,170	3,004	0.36%	(36.12)
C Productivity (tonnes/ha)							
1	Jawa	108.23	111.84	115.29	117.03	-	2.64
2	Nusa Tenggara Barat	111.86	114.37	118.95	120.00	-	2.49
3	Papua	89.40	104.85	90.76	99.47	-	1.68
4	Kalimantan	108.55	116.35	118.75	113.56	-	1.52
5	Sumatera	108.08	108.04	110.24	112.49	-	1.41
6	Sulawesi	109.17	104.29	114.24	109.36	-	0.96
7	Bali & NTT	112.30	111.91	117.65	113.99	-	0.95
8	Maluku & Nort Maluku	111.52	114.92	111.46	115.46	-	0.74

Source : Central Biro of Statistic and Directorate General of Foodcrop, 2001-2004

The most common use for peanut worldwide is for peanut oil (40 percent), mainly in the Asian region followed by peanut paste and butter, cosmetics, pharmaceuticals with increasing interest in its use as on oil substitute for diesel motors.

Peanut is an important source of protein for Indonesians and is used in traditional cooking. With a national annual planted area of around 840,000 hectares, peanut is an important crop for Indonesian farmers and is the fourth largest crop grown by area. Annual national consumption was estimated at over 700,000 tonnes or 3.20kg per capita in 2002 per head and has been steadily increasing.

The most common uses for peanut and peanut derived products in Indonesia are as a traditional cooking ingredient, peanut oil and butter and increasingly as an ingredient in processed snack foods such as chocolate bars. Indonesia's growing processed snack foods market reached a value of USD 450 million in 2002, 35 percent of this market is made from peanut and other nut products. The value of Indonesia's processed snack food market is expected to reach USD 723 million by 2007 or the equivalent of USD 253 million for peanut and nut products (FAO).

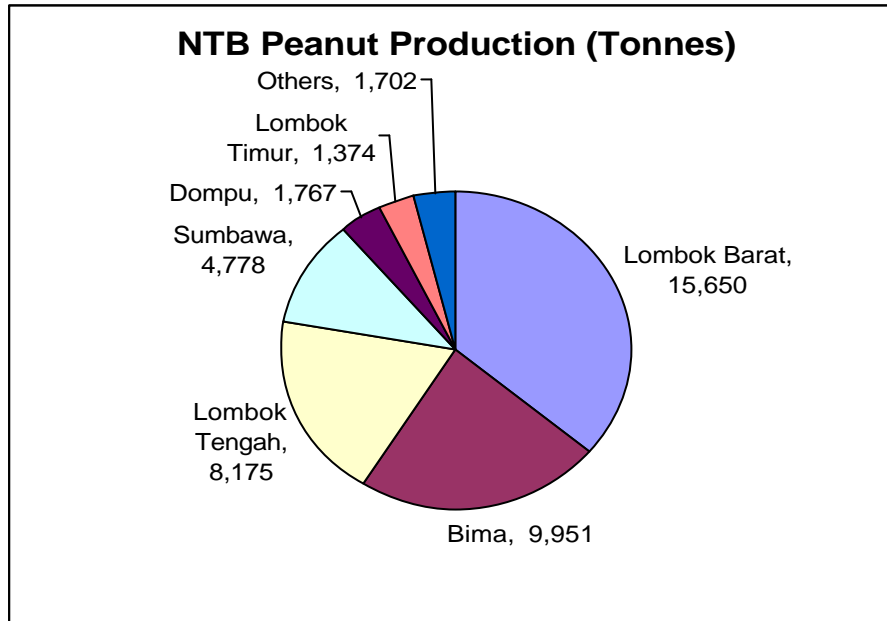
Indonesia is a net importer of peanut. Indonesian peanut production is not able to meet the growing national demand, and significant volumes of peanut are imported each year. In 2004 Indonesia imported a total of 160,000 tonnes of peanut at an average value of USD285 per tonne. Despite this situation, Indonesia is able to export a small volume (15 – 20,000 tonnes) for comparatively higher prices. Imported product volumes fluctuate to cover seasonal supply lows and are used mainly by the snack foods industry. The main exporting countries to the Indonesian market are China, India, Vietnam and more recently Australia. The government of Indonesia imposes a 5 percent import duty and 10 percent VAT on all peanut imports in an effort to protect domestic producers.

The large volume of imported and exported peanut traded in Indonesia reflects that local producers are not able to produce sufficient quantities at the quality specification demanded in the domestic markets.

4. Size and Structure of NTB Peanut Production

Peanut in NTB is grown by smallholders on both dry land and within a paddy farming system. Peanut is used as a beneficial crop to include in rotation with rice, maize and other horticulture crops, as being a legume, peanut helps to restore soil fertility (through nitrogen fixation) and restore soil structure after depletive crops such as paddy rice.

Around 34 - 36,000 hectares of peanut is harvested in NTB annually, of which the planted area in 2005 was 5000 hectares on irrigated land and 30,200 ha (85 percent) on dry land. There are 14,300 hectares of additional land area suitable for peanut production according to local government statistics. Government statistics indicate that NTB production fluctuates around 45,000 tonnes per year representing approximately six percent of total national production.



Most NTB peanuts are grown on Lombok Island, the Western side containing the traditional peanut growing areas for NTB with its fertile volcanic soils and more regular rainfall. Peanut can also be successfully grown in un-irrigated sandy soils, although yields and nut size are generally lower than from crops grown in heavier soils.

5. Peanut production and farm productivity

The intensively farmed, irrigated paddy areas on Lombok Island are capable of growing a wide range of crops such as maize, soy bean, shallots etc as well as peanuts. Peanuts are a good choice for integration within the paddy cycle as they are a leguminous (restorative) crop where reasonable crop yields and quality can be obtained with relatively low inputs.

As a short term (3 month) crop, farmers appear not to apply the same level of crop husbandry to peanut as other staple or commercial crops. This situation, amongst others factors, leads to a relatively low use of agricultural inputs and best practice farm techniques, (ie many do not cultivate, planting directly into the ground after the rice harvest and use little fertiliser).

While irrigation is not essential for successful peanut crops, farmers using peanut in rotation with rice coincide planting and crop growth with the wet season, ensuring higher levels of seed germination and larger nut size than crops grown in the dry season without irrigation. Farmers growing only one crop of peanut per year reduce the risk of disease build-up. Recommended best practice to reduce pest and disease problems is to grow peanut in rotation with rice and other crops such as maize and soybean and a number of farmers are doing this.

While higher returns can be achieved on irrigated fields, dryland peanut production still represents a commercially viable crop. Most smallholder peanut farmers in

Lombok are reportedly growing 1-2 peanut crops per year, or one crop between 2 rice crops, and also other crops, so the situation is variable.

Rainfall patterns on Lombok vary from the wetter South West to the drier North East, affecting rotations and planting /harvesting patterns, district by district. Production also varies according to soil type / topography to the extent that any program needs to consider district needs and attributes.

The table Section 8 shows the improved returns that can be achieved for farmers growing peanut in rotation with irrigated rice over dry land. The gross margins per hectare per crop from the section 8 analysis is summarised as follows

- Dryland peanut IDR 3.86 m
- Irrigated following rice (higher yield, higher price) IDR 7.51 m

There are around 56,500 farm households involved with peanut farming in NTB, as detailed in the following table.

Table 2
Total Households Cultivating Peanut in NTB by District and Harvested Area, 2003

NO.	District	Harvested Area / Year (m ²)					Total Household	
		< 2,500	2,500 - 4,999	5,000 - 7,499	7,500 - 9,999	10,000 - 12,499		> 12,499
1	LOMBOK BARAT	6,222	4,390	2,831	781	973	775	15,972
2	LOMBOK TENGAH	13,369	4,354	1,599	407	316	296	20,341
3	LOMBOK TIMUR	3,418	762	338	75	100	57	4,750
4	SUMBAWA	861	756	772	174	342	168	3,073
5	DOMPU	453	406	441	145	266	177	1,888
6	BIMA	3,370	2,038	1,775	595	716	393	8,887
7	SUMBAWA BARAT	185	127	235	27	67	51	692
8	KOTA MATARAM	83	21	15	3	4	4	130
9	KOTA BIMA	309	201	199	72	23	21	825
Total Households		28,270	13,055	8,205	2,279	2,807	1,942	56,558
Percentage		49.98%	23.08%	14.51%	4.03%	4.96%	3.43%	100.00%

Source : National Centre Biro of Statistic (CBS), Agricultural Census, 2003

The critical success factors affecting crop returns are:

- Higher yields through good management ie, timely inputs, irrigation, cultivation.
- Improved price for higher grading samples – (higher ratio of large to small nuts)
- Timing of sale, (for those not on fixed contract to Garuda, the local market prices are lower at peak harvest and few are able to hold their crop to spread the supply to the market.)

There is potential to significantly increase smallholder yields and peanut quality from both irrigated and dryland fields with the application of improved crop management knowledge and access to agri-inputs, especially improved seeds.

The benefits of land cultivation over direct planting needs research as most growers prefer direct planting into unprepared ground after rice to save the cost of cultivation. Normal best agronomic practice is to cultivate the ground to kill weeds and aerate the soil for improved root penetration and seed development.

NTB farmers typically have access only to the local seed varieties which while more resistant to pest and disease than introduced/improved varieties, are also lower yielding.

Following harvest, it appears that only a few farmers dry their crop in the open for two to three days to a moisture level of around 20 percent. (At this level peanut can be stored for up to three months unshelled). Many farmers sell their crop either in the ground or wet ex harvest to traders who will dry, shell and grade the product prior to shipping to the markets in Java. While selling the crop in the ground results in faster payment and saves the effort or cost of harvest labour, it is likely to be the poorest way to market a crop, as astute traders / contractors who purchase in this manner are likely to pass the risk of the unknown actual yield and quality onto the farmer by way of a conservative price and estimation / measurement of yield.

Exporters and some processors generally require peanut to be dried below 10 percent moisture, requiring five to six days sun drying (or faster in artificial drying facilities). NTB farmers do not appear to have the facilities to dry peanut to this level.

6. Market Conditions

Approximately 10 percent of the crop is contracted to Garuda Foods who supply seed and take the crop wet, for processing at their factory on the outskirts of Mataram. Garuda buys wet peanuts within 24 hours of harvest so that it can maintain quality by control.

Buying wet enables the factory to capture the full processing margin, leaving little opportunity for the farmer to share in any value added activity. In a monopoly situation, this would disadvantage farmers, however the competitive market forces which currently exist, appears to provide relatively fine margins to all players in the processing / marketing chain. So long as Garuda has to compete for its crop, it offers farmers a worthwhile market alternative.

Garuda Foods pays no more for peanuts than it has to, but provides incentives in the form of quality seed supply (the cost of which is deducted from harvest proceeds), technical advice and surety of market for the contracted crop. Theoretically, the additional production of higher grading peanuts achievable (with good management practices) should provide additional returns to the farmer as compared with buying inferior seed for other markets. This is demonstrated in the economic analysis tabled.

For the 90 percent of NTB farmers who do not sell to Garuda, local processing capacity appears under-developed with most product sold to traders via collectors in unshelled form where they are graded into three main grades before being shipped generally to Java via Surabaya for final grading. Traders interviewed state that they receive insufficient reward for more complete grading at the NTB level. The reasons

for this require further investigation of the wider market requirements and structure in Java.

To minimise the cost of labour inputs and speed up receipt of payment, many farmers sell their crop prior to harvest and let the buyer organise and undertake the harvest with contract labour. This provides the weakest of all trading positions for smallholders as buyers will naturally discount for the many risks involved in estimating the quantity and quality of a crop grown beneath the soil surface, leaving opportunity for more unscrupulous buyers to take advantage of their superior knowledge and financial strength.

Farmers typically sell to local collectors or traders who either sell to larger consolidators or sell directly to local markets in dried shelled or unshelled form. Depending on the proximity to markets and access to peanut shelling equipment, farmers may sell peanut in the following forms:

- Unshelled wet form (50 percent moisture content) to Garuda Foods and some traders
- Unshelled dried form (15-20 percent) to local traders or directly to local markets
- Unshelled roasted on farm (usually in a drum over a fire)
- Shelled & dried to local traders, or directly to local or small scale local processors.

Table 3

Current Peanut Prices ex Lombok Traders/Buyers
(March 2007).

Product Type (Moisture %)	IRD per Kg
Unshelled, Wet (50%), to Garuda Factory	1,500
Unshelled, Wet (50%) to other traders	1,600
Unshelled Farmer / Small Collector Dried (20%)	3,750
Unshelled Farmer / Small Collector Dried (15%)	4,250
Shelled (<12%)	6,500

The preferred method of marketing peanut ex Lombok to Java is in the shelled dried form. The price for dried unshelled peanut is heavily dependent on the supply of peanut from growers. The peak supply period occurs from July to November from the irrigated areas and from Feb - May from the dry land areas. Prices to farmers are generally lowest at this time.

Peanuts are primarily graded on size. Immature peanuts as a result of premature harvest and inadequate inputs results in small sized nuts, lighter yields, poorer grading and price. The following table shows the price difference between the three grades of peanut and the average percentage of each grade that growers can achieve.

Table 4

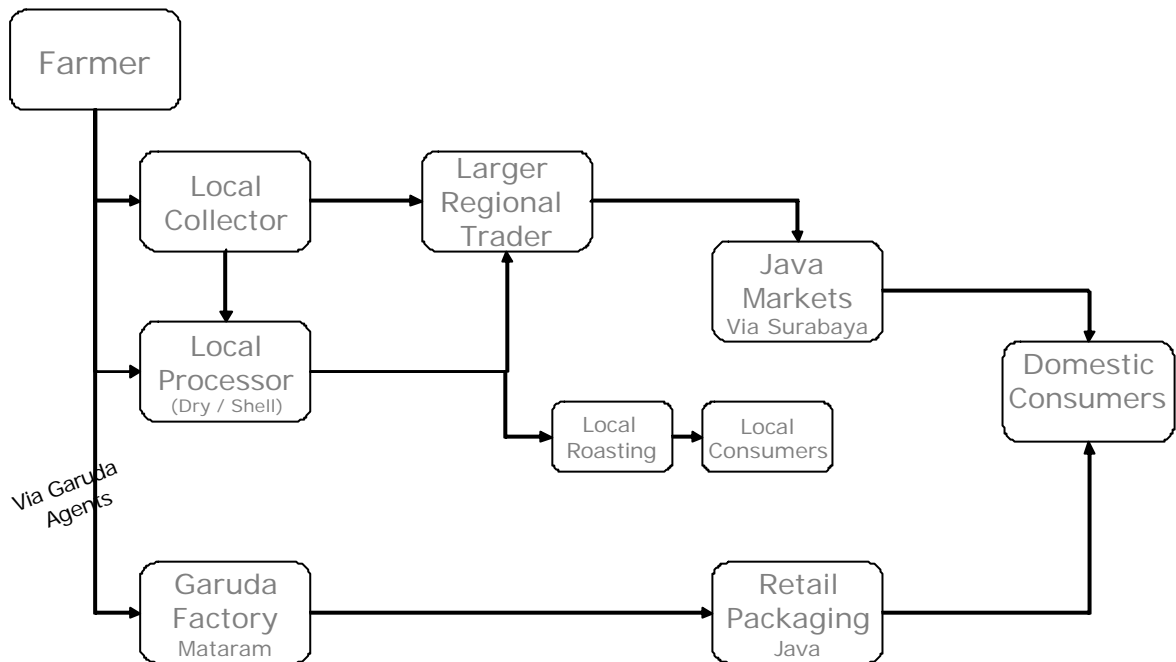
Indicative Grade Prices for NTB Shelled Peanuts (15% moisture)

Grade		IRD/Kg	Average	Best Practice
			Sample	Sample
1 – Best	(Large nut)	9,000	20%	60%
2 – Better	(Medium size)	8,750	60%	30%
3 - Fair	(Small Nut)	8,500	15%	8%
Reject	(For local Lombok trade)	3,000	5%	2%

The current selling arrangement between farmers and local traders reduces the flow of price and quality signals to farmers who have little incentive to meet the higher quality specifications.

The peanut supply chain includes the following stakeholders.

NTB Peanut Supply Chain



The cost analysis in Section 8 demonstrates that NTB traders achieve slim profit margins by buying wet and semi dried peanut from farmers at the farm gate. Traders that dry and de-shell this form of peanut can make profit margins of around IDR 260 /kg sold.

A simple de-shelling machine that can process 1.5 tonnes per day with only two people can be purchased for IDR 10 million. On this basis, a two-man team could easily process 500 tonnes per year returning IDR 130 million per year net of wages (over USD 15,000).

7. Peanut Sector Supporting Structures and Organisations

Peanut production is well established in the intensively farmed areas of NTB, particularly on Lombok Island. Smallholder road access to markets is generally good to satisfactory.

Barriers to the further development of the peanut sector in NTB include:

- A lack of supply and access to improved seed varieties to improve crop yields and quality
- A lack of access for farmers to seasonal finance for the purchase and timely application of agriculture-inputs
- A lack of access to finance for farmers to engage in small-scale post harvest processing
- Poor support from government research and extension services with regards to best production practices to improve the supply and quality of local production.

Garuda Foods is keen to increase production from its under utilised factory. It will do this through local agents working with farmers, and by providing a preferred, higher yielding seed variety, the cost of which is taken from farmer's proceeds.

Garuda Foods does not pay extra per kg for peanuts supplied, but relies on farmers appreciating the extra production from the seed supplied, support with harvest timing decisions, organisation of transport to factory immediately and prompt payment. It is not easy for Garuda Foods to convince farmers of the extra income and benefits that could accrue through the services supplied. This could be assisted from the support of a credible third party such as one sponsored by the SADI program.

Garuda Foods pays its agent in accordance with each farmer's graded samples, from which the intermediary /collector takes a margin of around Rp 200/kg. The collector may or may not pass on any extra cash to farmers for improved quality.

Garuda Foods advises that the prices paid at the factory door for fresh, wet peanuts within 24hrs of harvest to the intermediaries are as follows:

Table 5

Grade	Rp/Kg	Kernel Brightness/Fatness	Mature : Immature Kernel Ratio
1	2,230	86%	6:1
2	2,110	83%	5:1
3	2,000	80%	4:1
4	1,900	75%	3:1
5	1,800	67%	2:1
6	1,700	50%	1:1

8. Peanut Sector Value Chain Costs Analysis

Table 6

Smallholder - Supplying Garuda Factory - Return per 1 ha - Irrigated, planted directly into ground after rice					
	Unit	Volume	IRD/Unit	IRD	USD
Income:					
Wet Peanuts (50%) direct to factory	kg	4,000	1,500	6,000,000	667
Total Income				6,000,000	667
					100%
Production Costs					
Land Preparation	days	20	30,000	-	-
Seed	kg	150	6,000	900,000	100
Fertiliser - SP36	kg	100	1,500	150,000	17
Pesticides				100,000	11
Fuel for water pump				500,000	
Labour - weeding twice	m.days	80	10,000	800,000	89
Spraying (Family Labour)	m.days	12	1,000	12,000	1
Labour - Harvesting	kgs	4,000	75	300,000	33
Total Production Costs				2,762,000	307
					46%
Gross Profit / Margin per hectare				3,238,000	360
Gross Profit / Margin per Kg Sold				810	0.09
					54%
Smallholder - Supplying Regular Market - Return per 1ha Crop - Irrigated					
	Unit	Volume	IRD/Unit	IRD	USD
Income:					
Peanuts sold wet ex harvest to trader	kg	2,500	1,500	3,750,000	417
Total Income				3,750,000	417
					100%
Production Costs					
Land Preparation	days	20	30,000	-	-
Seed	kg	150	5,000	750,000	83
Fertiliser - SP36	kg	100	1,500	150,000	17
Pesticides				100,000	11
Fuel for water pump				500,000	
Labour - weeding twice	m.days	80	10,000	800,000	89
Spraying (Family Labour)	m.days	12	1,000	12,000	1
Labour - Harvesting	kgs	2,500	150	375,000	42
Total Production Costs				2,687,000	299
					72%
Gross Profit / Margin per hectare				1,063,000	118
Gross Profit / Margin per Kg Sold				425	0.05
					28%
Smallholder - Supplying Regular Market - Return per 1ha Crop - Non Irrigated					
	Unit	Volume	IRD/Unit	IRD	USD
Income:					
Peanuts sold wet ex harvest to trader	kg	1,900	1,500	2,850,000	317
Total Income				2,850,000	317
					100%
Production Costs					
Land Preparation	days	20	30,000	600,000	67
Seed	kg	125	5,000	625,000	69
Fertiliser - SP36	kg	50	1,500	75,000	8
Pesticides				100,000	11
Fuel for water pump				-	
Labour - weeding once	m.days	40	10,000	400,000	44
Spraying (Family Labour)	m.days	12	1,000	12,000	1
Labour - Harvesting	kgs	1,900	150	285,000	32
Total Production Costs				2,097,000	233
					74%
Gross Profit / Margin per hectare				753,000	84
Gross Profit / Margin per Kg Sold				396	0.04
					26%

Good crop management practices will increase yields and improve peanut quality (nut size). Those farmers producing the best crops are sowing peanut in rotation with paddy irrigated rice. Planting into moist ground after irrigated rice has the following benefits:

- Higher seed germination (higher moisture content in soils)
- Less disease build up (from a change in crop)
- Improved pod filling and larger nut size

When considering the annual farming income, at current NTB prices, farmers using good management practices are achieving returns of Rp10 – Rp13 million per hectare, per rice crop. Two rice crops can be sown per year (100 day cycle). Two crops of rice and one crop of peanuts can potentially return an annual gross farm income in excess of Rp 27m (USD 3,100) per hectare.

With a 1 – 2 hectare farm potentially returning Rp 45m per year (USD5,000+), from three harvest cycles, it is difficult without further investigation, to understand the constant complaint of insufficient working capital to fund inputs such as fertiliser, cultivation and seed etc. There would seem to be a need to break farmers out of any debt dependent cycle that they may be currently held to ransom to, and with co-operative groupings of willing farmers, to provide them and their families with basic farm business / cash flow management training and seek to establish group micro-finance savings and loans facilities where seasonal cash surpluses can be retained to finance ongoing farm inputs, so reducing the need for external working capital borrowings.

Local Trader /Processor Buying Wet and Semi-dried Peanut

It is very inefficient to truck wet produce and the volume of waste shell etc from the farm to distant processing facilities, when local small business processing facilities may offer an alternative.

De-shelling and drying is a relatively simple value adding activity with potential to improve smallholder returns through reduced transport charges, improved quality and potential to hold for longer periods to suit market conditions.

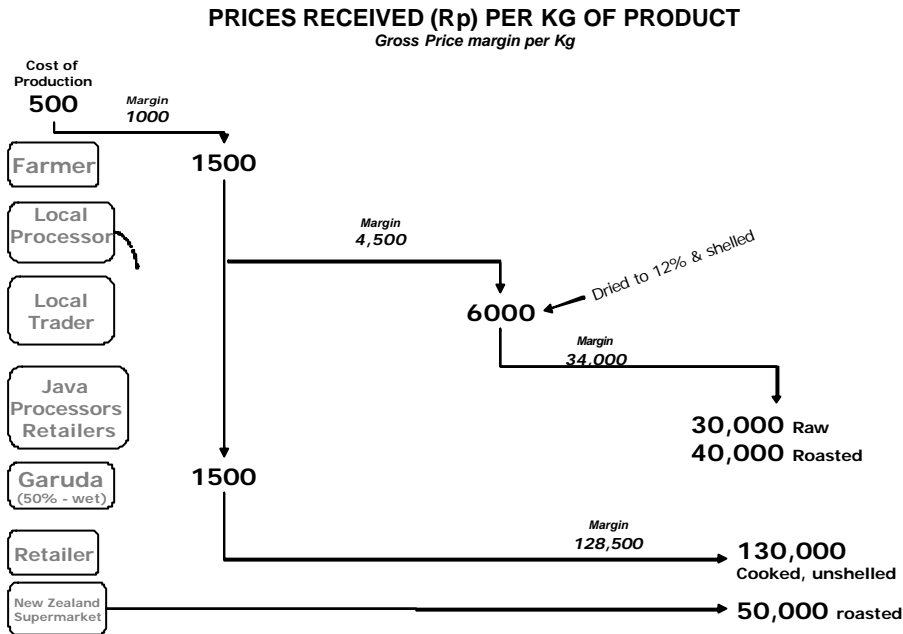
The following is an example of a small local village buying / processing business, supplying shelled and dried peanuts through larger traders to Java or the local market in Lombok. More work is required to quantify the margins between traders.

Table 7

Local Peanut Processor - Dry and shell - daily production 3000kg						
	Unit	Volume	IRD/Unit	IRD	USD	
Income:						
Shelled Peanuts 12% moisture	kg	900	6,000	5,400,000	600	
Less Cost of Raw Nuts:						
Wet Peanuts ex farmer's harvest	Kg	3,000	1,500	4,500,000	500	
Gross Income				900,000	100	17%
Production Costs						
Drying	kg	900	100	90,000	10	
Milling & Sorting	kg	900	150	135,000	15	
Bags (50kg)	#	16	1,500	24,545	3	
Fuel	litres /day	15	7,500	112,500	13	
Oil	per day			2,500	0	
Machine Maintenance @500,000/yr	per day	1	2,000	2,000	0.2	
Transport - Collection costs	kg	3,000	90	270,000	30	
Transport - to Lombok Trader	kg	900	30	27,000	3	
Total Production Costs				663,545	74	74%
Profit per 3000 kg Purchased				236,455	26	26%
Profit per KG purchased.				78.82	0.0	
Profit per KG sold				262.73		
Production Costs per Kg Purchased				221		

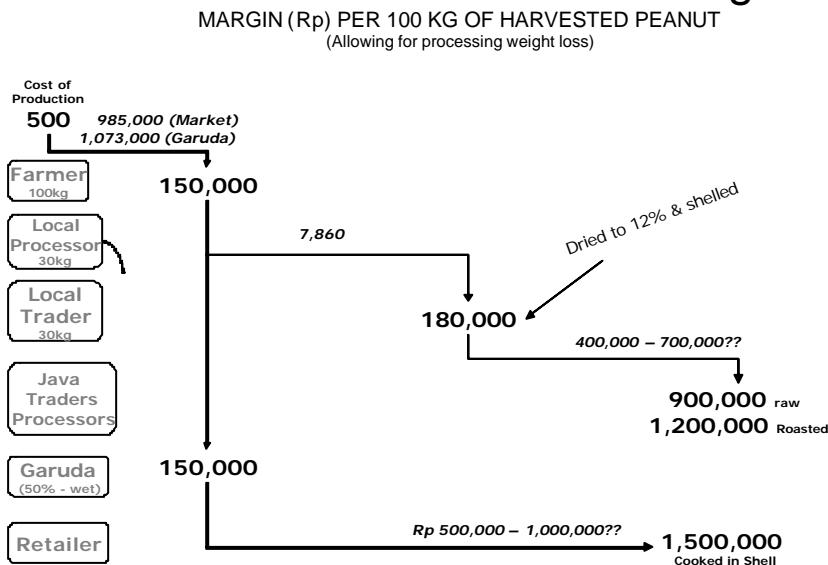
The following diagram demonstrates the market prices received at the various stages of production, and the price margin between each stage as used in the previous economic analysis.

NTB Peanut Value Chain Prices



The following diagram demonstrates the gross margin actually received at each level, based on the net income received for the (reducing) weight of the processed product sold from an original 100kg of peanuts harvested, as per the previous value chain economic analysis.

NTB Peanut Value Chain Margins



9. Peanut Product Value Chain Table

INBOUND LOGISTICS		
Observations	Issues	Recommended Strategies
HUMAN RESOURCE MANAGEMENT		
Small holder technical knowledge of available inputs such as seeds, fertiliser and agri-chemicals could be improved.	Lack of knowledge on the availability and use of improved inputs (e.g., seeds, fertilisers, etc) limit potential yields, and ability to meet market requirements.	Assist /motivate associated industry stakeholders and the extension services of the Department of Agriculture to provide training and to demonstrate best practices.
TECHNOLOGY AND DEVELOPMENT		
Investment and research is required into the need for and optimum use of agri- inputs, esp. the availability of suitable seed and use of fertiliser and chemicals.	Use of inferior seeds and the selection of inadequate inputs limits yield and product quality.	Establish research / demonstration farms to improve region specific knowledge of input use and cultivar selection. Seek opportunities to develop specialist seed production for supply to local areas.
PROCUREMENT		
<p>Peanuts are a short term crop generally grown after the rice harvest, however farmers frequently report that they are unable to finance the inputs of best seed, fertiliser and agri-chemicals when required.</p> <p>Individual farmers have weak bargaining power when purchasing supplies, esp fertiliser.</p>	<p>Insufficient working capital results in reduced and poorly timed inputs with a direct affect on production yield and quality.</p> <p>Many farmers appear unable to retain sufficient cash from the sales of previous crops to provide ongoing inputs, becoming susceptible to advances from traders, which limits market options.</p>	<p>Business training programs focussing on budgeting / cash flow management.</p> <p>Access to Finance program for credible farmer groupings – tripartite lending, savings program / facilities to manage cash income ex harvest.</p> <p>Encourage the formation of co-operative buying groups for competitive pricing.</p>

OPERATIONS (Production)		
Observations	Issues	Recommended Strategies
HUMAN RESOURCE MANAGEMENT		
<p>Most small-holders lack skills and understanding of best farm management practices eg:</p> <ul style="list-style-type: none"> • Benefits of good land preparation • Timing of inputs, (fertiliser, sprays, water) • Optimum harvest time • Knowledge of optimum commercial farming systems 	<p>Lack of understanding of improved practices and subsequent benefits, accentuated by inadequate rewards for improved quality limits production and improvements in quality.</p>	<p>Training through demonstration and extension services, supported by suitable leaflets and instructional videos.</p>
TECHNOLOGY AND DEVELOPMENT		
<p>Smallholders lack direct access to new technologies and developments in best practices.</p>	<p>Insufficient local processing increases buyer costs from transport of waste materials – (shells and inferior nuts), leading to lower farm gate prices.</p>	<p>Extension services for smallholders, to include the feasibility of local processing (shelling / grading).</p>
PROCUREMENT		
<p>Farmers lack adequate knowledge of the most suitable and cost effective inputs, and the importance of correct timing.</p> <p>Many families are unable to afford external labour or labour saving tools – ie access to tractors and water pumps for irrigation.</p>	<p>Poorly timed and inadequate inputs directly affect production yield and quality.</p> <p>Labour resources limit the extent of planted areas</p>	<p>Demonstration farms and extension services for smallholders.</p> <p>Business and financial management skill development associated with improved access to finance.</p>

OUTBOUND LOGISTICS		
Observations	Issues	Recommended Strategies
HUMAN RESOURCE MANAGEMENT		
Farmers do little to maintain quality ex harvest, ie they commonly sell peanuts with excessive moisture, unshelled, ungraded and often with excessive dirt and foreign material.	<p>Insufficient local processing increases buyer costs from transport of waste materials – (shells and inferior nuts), leading to lower farm gate prices.</p> <p>Buyers take their margins to meet costs and it is the farmers who miss out.</p>	While Garuda Foods prefers wet product within 24hrs of harvest to preserve quality and capture the processing margin, encouragement of simple local processing / grading businesses to service local farmer groups will assist the improvement of price to all farmers. (Garuda would have to compete)
TECHNOLOGY AND DEVELOPMENT		
For those not contracted to supply Garuda, there is a heavy reliance on immediate post harvest sale to traders through local markets which become depressed at peak harvest periods.	Farmers supplying traders have little flexibility in trading when they are unable to store their product.	Encourage local processing and storage to better match market supply and demand.
PROCUREMENT		
NTB peanut farmers tend to be in reasonably well serviced areas and are able to procure collection of their product.	Inefficient collection systems result in higher costs.	<p>Encourage farmer groups to process product locally to reduce outbound transport requirements and to maintain competition amongst traders through improved ability to hold product and bargain.</p> <p>Investigate options for warehousing.</p>

MARKETING AND SALES		
Observations	Issues	Recommended Strategies
HUMAN RESOURCE MANAGEMENT		
Small-holders lack understanding of linkages between farm practices and market returns. They lack appreciation of market grading requirements and are often forced to sell before optimum maturity to meet financial commitments.	Selling unshelled, immature (small) and insufficiently dried peanuts for quick sale is false economy.	Investigate and demonstrate the benefits of at least drying and sorting locally, then shelling of mature peanuts for maximum returns.
TECHNOLOGY AND DEVELOPMENT		
Smallholders lack access to market information.	Lack of market information leads to unfair advantage of buyers over smallholders who remain in a weak bargaining position.	Improved technology and methods are required to provide appropriate market information to smallholders through extension services.
PROCUREMENT		
Smallholders have difficulty obtaining correct market signals.	Producers supply products relative to the rewards received. Consistent and achievable rewards for quality will encourage quality production.	Work with buyers / end users to improve market signals favouring best practices for the supply of optimum quality product & work to ensure traders / collectors pass on market rewards for quality through encouragement of competitive processes and producer's market knowledge.

SERVICES		
Observations	Issues	Recommended Strategies
HUMAN RESOURCE MANAGEMENT		
<p>Insufficient knowledge of farmer's needs by the wider peanut industry.</p> <p>Farmers have insufficient knowledge of what services are available.</p>	<p>Progress is slowed by lack of access to services.</p>	<p>Extension services to publicise services available and to access and involve industry players.</p>
TECHNOLOGY AND DEVELOPMENT		
<p>R&D providers have no direct outlet to smallholder peanut farmers.</p>	<p>Linkages are required to solve the problems with regard to the lack of knowledge of services available and ability of R&D providers to disseminate research information to farmers.</p>	<p>Demonstration farms, extension services to be enhanced to address this issue. Involve local and national Dept of Agriculture.</p>
PROCUREMENT		
<p>Smallholders have difficulty accessing extension and other services, including finance.</p>	<p>Physical and financial difficulties inhibit participation.</p>	<p>Extension services need adequate resources to take their message to farmers.</p> <p>Access to Finance program to help solve cash flow management issues.</p>

10 Summary of Industry Potential, Issues and Recommendations

10.1 Summary of Industry Potential

- Peanut has been grown for many years in parts of NTB, particularly in the wetter areas of Lombok, where the farmers involved are very familiar with the crop. The sector is currently fairly static and must compete with returns from other crops such as maize, soybean and rice.
- Peanut growing is dominated by smallholders owning 1 – 2 hectares, mostly farmed intensively with other crops. Peanut doesn't necessarily require irrigation and the short rotation (100 day cycle) provides quick benefit and a relatively low capital investment.
- As a legume, peanuts are a desirable crop to have in rotation with other crops due to the beneficial effect on soil fertility
- Farmer returns could be increased through improved crop yields, nut size/quality and co-operative marketing options.
- Garuda Foods has established a peanut processing plant and wishes to increase its share of the market, currently estimated at 10 percent. Its factory is under utilised and capable of expansion when required.
- Garuda Foods states that it has unsatisfied market demand for its products both internally and for export, however it is unwilling to compete on price to expand its supply. Its attraction to farmers is through the financing and access to better quality, higher producing seed, an assured market and technical support, particularly with regard to optimum harvest timing decisions.
- There is a potential IFC investment linkage with the peanut sector and Garuda Foods.

10.2 Summary of Key Industry Issues

- There is insufficient knowledge by smallholder farmers of best practices for optimum production, harvest and post harvest management to maximise product quality. Smallholders also lack market knowledge and information which leaves them weak sellers and vulnerable as individuals to well informed (and often unscrupulous) traders.
- Farmers are provided with little incentive to maximise product quality due to insufficient market signals and rewards.
- Although the distances between farming areas and markets are not great, and road conditions reasonably good, improved efficiencies ex farm gate would appear possible if peanuts could be dried and processed at the local level to reduce the transport costs of the heavier and more bulky wet product.
- Pooling / warehousing of processed, dried product would enable farmers to better market their products and reduce the oversupply at peak harvest / lower priced periods although more research is required into the feasibility of doing

this as it is apparent that a competitive trading situation exists and that traders are not making excessive margins, relying on large turnover and astute trading to maximise profit.

- Formation of co-operative buying groups should provide better bargaining power for the bulk purchase of inputs such as seed, fertiliser and agri-chemicals.
- Improved seed varieties should be tested and produced at the local level for distribution (sale) to local farmers.
- Inadequate support from government research and extension services to improve the supply and quality of local production results in research knowledge not reaching smallholders.
- A lack of access to finance is the common reason given for the inability to purchase quality seed and agri-inputs such as fertilizer and pest/weedicides, in spite of the apparently reasonable annual cash flow potential. Lack of working capital encourages the common practice of planting directly into uncultivated ground and the premature sale of the crop, often in the ground to avoid harvest labour expenses. This all contributes to reduced productivity, quality and price. There is a need to investigate how well family enterprises understand and manage their annual cash flow in a commercial, business like manner in order to minimize the need for external working capital.
- There is a need to understand the wider community / family needs in a holistic fashion before embarking on any specific peanut farm management improvement program with farmers.

10.3. Summary and Recommendations for the SADI Program.

The one and a half day field visit to NTB to study the peanut sector did not permit close investigation of all aspects. A number of areas of interest will require further investigation for the formulation of specific SADI activities.

Peanuts are but one of many crops grown by farmers in NTB and while improvements to production, quality and markets within the value chain have the potential to improve net profits to farmers, understanding of the farmer's overall annual farming operation, family and community needs is required if interventions are to be adopted and contribute to overall improvements to smallholder income and welfare.

There is potential to:

- Research the agronomic practices of both dryland and irrigated farming and to establish an improved extension service to disseminate the results of local and national research that may be demonstrated and tried by farmers in the search for increased productivity.

-
- Improve processing and transportation facilities by investigating the feasibility of establishing more local area, commercial drying/processing facilities to reduce the bulk and tonnage of crop currently transported wet to more distant facilities.
 - Improve product supply to the market by spreading the supply of suitably dried and processed product onto the market outside the peak harvest period through warehousing / storage.
 - Investigate the real needs for finance and seek ways to reduce both the need through sound budgeting and cash flow management and through a whole farm program approach. This should include the possibility of establishing group savings and loan (micro-finance) facilities, and where possible, linkages with banks to provide more suitable forms of external finance to that currently offered by traders and other less scrupulous informal lenders.
 - Investigate the possibility of developing a tri-partite program between farmer groups (with group guarantee?), a marketing outlet such as Garuda Foods to guarantee a market (and to deduct loan charges from sale proceeds), and a bank to fund farm inputs.
 - Organise co-operative groups of farmers so that they may:
 - a) Service specific markets – eg Garuda Foods
 - b) Market collectively to other local and national outlets
 - c) Receive extension services,
 - d) Receive farm business and cash flow management training
 - e) Develop bulk buying syndicates to reduce the price of inputs
 - f) Develop micro-savings and loans for working capital
 - g) Develop linkages with banks or other suitable rural financiers where a group guarantee and integrity could reduce the risks faced by banks in lending to individual farmers.

Recommendation:

- 1 As a starting point, explore the possibility of linking Garuda Foods with groups of farmers, under a co-operative development plan to deliver items c) to g) above.
- 2 In order to reach farmers who don't supply Garuda Foods, and to foster competition, investigate the possibilities of linking other Java based buyer/processors so that a co-operative development plan may be developed for them also.
- 3 Utilising a wider participative community development approach:
 - Identify a suitable farming community and farm family participants,
 - Determine the best approach to cluster willing farmer groups.
 - Determine all needs and options available to farmers, on and off farm, their overall level of income and the reasons for their common call for better access to finance.

- 4 Investigate an Access to Finance program.
Explore options for linking identified co-operative groups with:
- Group savings and loans schemes, utilising the services of local micro-finance organisations. Ideally this would run in conjunction with a farm business / cash flow management training program to encourage the deposit of crop sale proceeds into savings accounts and for a commercial management approach to managing its use, in order to minimise the need for working capital.
 - A tripartite lending program between the farm group, marketing organisation and bank / financial intermediary to meet both capital development and working capital requirements, guaranteed if possible by both the group and marketing organisation, with loan payments deducted at source from sale proceeds.
 - A warehouse receipts program, beginning with the secure storage of shelled and dried peanuts (also other suitable crops) for prompt payment on delivery and ultimately seeking to develop this into a mechanism for securing formal group finance for the purchase of crop inputs.

The program should include training programs on basic farm business / cash flow management for the selected farming families and rural finance training (where necessary) for the financial institutions linked to the farmers and or any tri-partite lending program.

- 5 Investigate a possible KDP sub program research project to assess best practices that would include:
- Best suited seed varieties
 - Benefits of cultivation vs direct planting
 - Optimum fertiliser requirements for local situations
 - Optimum weed and pest control
 - Harvest timing
 - Post harvest handling to maintain quality and product value.
- 6 Investigate the possibility of encouraging the development of smaller local peanut processing businesses that would dry, shell and possibly store peanuts for or on behalf of local farmer groups.
- 7 Involve DINAS wherever possible to improve long-term services to farmers.