

AN ASSESSMENT OF THE MARKETS
FOR RICE IN THE NORTHERN TERRITORY

No. 133

SUSTAINABLE AGRICULTURE

THE DEPARTMENT OF PRIMARY INDUSTRY AND FISHERIES IS COMMITTED TO THE PRINCIPLES AND PRACTICES OF SUSTAINABLE AGRICULTURE

Definition:

Sustainable agriculture is the use of practices and systems which maintain or enhance:

- the economic viability of agricultural production;
- the natural resource base; and
- other ecosystems which are influenced by agricultural activities.

Principles:

1. Agricultural productivity is sustained or enhanced over the long term.
2. Adverse impacts on the natural resource base of agricultural and associated ecosystems are ameliorated, minimised or avoided.
3. Harmful residues resulting from the use of chemicals for agriculture are minimised.
4. The nett social benefit (in both dollar and non-dollar terms) derived from agriculture is maximised.
5. Agricultural systems are sufficiently flexible to manage risks associated with the vagaries of climate and markets.

SUSTAINABLE AGRICULTURE IN THE NORTHERN TERRITORY

**AN ASSESSMENT OF THE MARKETS
FOR RICE IN THE NORTHERN TERRITORY**

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January 1989

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1 INTRODUCTION

1.1 Background

Since the 1984/85 season, the NT rice industry has had the potential to oversupply known local markets. Poor yields have prevented this situation from occurring. In 1986 growers raised concern about the potential for oversupply and uncertainty about the size of markets for rice.

Consequently, it was decided that an assessment of the market for NT rice should be conducted to clarify the situation. Except for the section on the stockfeed market the contents of the report have been written for sometime and have been presented at meetings of rice growers.

The study concentrated on the three market aspects:

1. The feasibility of growing speciality rices and their markets.
2. The feasibility of a rice mill/The local market for NT human consumption rice.
3. The demand for rice as a feed grain.

Each of these aspects is discussed in turn but first some background to the Northern Territory, Australian and World rice markets is necessary to understand the future of rice in the Northern Territory.

1.2 World Market Rice

World production of rice in 1986/87 was estimated at 470 million tonnes. World trade in rice in the same year was 12 million tonnes. In comparison to other grains, world trade in rice is a very small percentage of world production. This makes the export rice market relatively unstable compared to other export grain markets.

Government policies have a major influence on the world rice market. In developing countries, where most of the world's rice is consumed, governments generally have policies designed to encourage self sufficiency. These include setting domestic prices above world market prices, limiting imports, holding large stocks, encouraging the adoption of high yielding varieties and subsidising fertiliser prices. In 1983, direct imports by government agencies account for 60 percent of world trade in rice. International trade in rice is treated as a residual market. If self sufficiency objectives are not achieved in a particular year then rice must be imported. Consequently, the quantity of rice imported by a given country can vary sharply from year to year.

In recent years the United States has played an increasingly important role in the world market. In 1986 the United States accounted for only 1.9 percent of production but 20 percent of exports. In 1981 the US Farm Act was formulated with the expectation that agricultural commodity prices would be on a rising trend for several years. Commodity prices on export markets subsequently fell. US farmers began receiving prices well above export returns, thus insulating them from supply and demand pressures. This intervention resulted in a build-up in the amount of rice in storage. In 1985 a number of changes were made to US agricultural policy. Decreases in the level of support given to farmers are expected to result in a slowing in the rate of accumulation of grains in storage initially, followed by a decline in stocks over several years. In addition, approximately \$US2 billion was set aside over the first three years of the new program to subsidise exports of grain. This resulted in even lower prices for rice on the export market.

In the last year two positive factors have affected the rice market. Firstly there was a failure in the 1987 northern monsoon and in mid 1988 a severe drought in the US. Both factors have had a positive effect on rice prices but their effects are largely short term. In the longer term price levels are more dependent on trade policies and policies on agricultural subsidies. While progress appears to be occurring in the US and EEC this is not the case in South East Asian countries. Therefore it is expected that international rice prices will remain depressed except in short term instances of climatic failure. The effect on NT growers will only be felt once they start producing for the human consumption market.

1.3 Australian Rice Industry

The rice industry in Australia is an important grain industry though small in comparison to the wheat industry. The industry is estimated to be worth \$72.9m in 1986/87 (ABARE). Production of paddy rice in 1986/87 was estimated to be 549 000 tonnes from 96 000 hectares (BAE). Just over 65.4 percent of this rice was sold on the export market.

The vast majority of rice produced in Australia is grown in New South Wales in the Murrumbidgee Irrigation Area and the Murray Valley. Queensland has produced between 1.9 and 4.1 percent of Australian production during the 1980's and this has been grown in the Burdekin District. Production in the Burdekin District is considered to have the greatest potential for expansion due to recent completion of the Burdekin Falls Dam. Production of rice in New South Wales is likely to be limited by area limitations, and limitations on water usage and increased charges for water. Queensland sells 80-100 percent of its rice on the domestic market compared to approximately 30 percent at present for New South Wales. The return to rice growers in Queensland was \$210/t in 1986/87 while in New South Wales it was \$130/t (preliminary estimates, ABARE November 1987). The reason for this difference is a rice industry pricing policy which holds domestic prices higher than exporting prices.

1.4 Northern Territory Rice Industry

Despite the fiasco of Humpty Doo which is documented by Mollah (1982) the rice industry in the NT bounced back in the early 1980's to become a small industry with much potential. The main ingredients behind the industry's comeback have been:

- a switch in growing area predominantly to the duplex soils of the Upper Adelaide River area as opposed to the "Bottomless" black soil of the sub-coastal plains.
- a research program conducted by DPP which has identified suitable cultivars which grow well in the Adelaide River area.
- the ease of getting into rice cropping on a low input basis.
- the tenacity of farmers to have a go and persist with rice growing.

Commercial rice growing in the NT started again in the 1983/84 season. Statistics for the rice industry from 1983/84 are shown in Table 1.

Table 1. Statistics for the NT Rice Industry

Season	No. of Growers	Area (ha)	Production (tonnes)	Average Yields (tonnes/ha)
1983/84	5	63	195	3.10
1984/85	8	194	350	1.80
1985/86	9	315	526	1.67
1986/87	9	294	133	0.45
1987/88	8	401	201	0.50

The first three columns in Table 1 show that the rice industry, although small expanded in area quickly between 1983 and 1987/88. The apparent decline in yields over the three years following the 1983/84 season is mainly due to adverse seasonal conditions between 1984/85 and 1986/87 and exceptionally good rainfall along with good distribution in 1983/84. It is now apparent that poor yields following 1983/84 are due in part to late sowing and inadequate water control structures.

The industry is based mainly on one variety (IRR 661) though small areas of an upland rice variety (IRR 426) were first grown commercially in 1985/86.

Rice has been grown principally for stockfeed though a small tonnage has been milled for human consumption. The outlook for human consumption rice does not look bright while the present rice mill is the only one available. At this stage most stock feed rice is used in horse rations. Some stockfeed rice is retained on farm for feeding horses and cattle.

The value of the 1985/86 crop based on a price of \$180/tonne was approximately \$95 000. A predicted market of 1 000 tonnes at current price levels would be worth \$185 000. If rice could be profitably grown for a price of \$130-170/tonne and if rice could capture around one third of the market for coarse grains in the NT, the market would be worth \$500 000 - \$700 000.

2 RICE MILLING

2.1 Background

The need for a commercial rice mill to process rice for human consumption has been mooted since commercial growing of rice re-emerged in the early 1980's. One grower has milled rice for the local market using a small mill which DPIF owns and uses for experimental purposes.

Only one grower is set up to produce rice suitable for the human consumption market. Rice for human consumption must be harvested at a high moisture content and then dried by forced air ventilation. To harvest at high moisture content and to achieve the level of uniformity required for the human consumption market rice must be grown in laser levelled bays.

The grower milled 25 tonnes in 1985 but none since. Rice was packed in 2kg plastic bags for retail market and 25kg sacks for the catering trade.

The problems encountered include the high labour requirement to mill and package the rice, the quality of the milled rice and the high costs of marketing small quantities of rice. The high labour requirement is due to the small scale of the mill and manual filling of bags. The problems with rice quality is that the milled rice has a covering of rice dust which tends to make the cooked rice "gluggy". The latter problem makes the rice unsuitable for the catering/restaurant trade. It is thought that this problem can be overcome even with the existing mill.

2.2 Commercial Mill

The expansion of rice marketing into a large (relatively speaking) human consumption market relies on the purchase of a commercial scale mill, and associated plant, equipment and buildings. The viability of such a mill is a major issue for the NT rice industry.

In the NSW rice growing areas it is generally accepted that a 600 000 tonne crop is necessary for the 12 mills to achieve economies of scale. This averages out at 50 000 tonnes per mill. In the NT we cannot hope to get anywhere near this level. The best we can hope for is to have enough rice to make the smallest size commercial mill viable.

The smallest "commercial" mill processes around 1 tonne/hour of paddy rice. On a single shift basis the mill would have a capacity of around 1 200-1 500 tonnes per year. A price quote for a mill of this size in early 1987 was \$50 000. Additional structures and plant required for the mill would probably bring the cost up to \$150 000 but this is assuming that a suitable site such as a rice receival depot is available to put the mill and associated structures.

2.3 Cost of Milling

The costs of milling rice is obviously important to the viability of a mill. The margin for milling and packaging rice is set at the retail level by the price of competing milled rice and at the farm gate by the price of paddy rice for stock feed. The viability of a mill depends on being able to mill and package rice for less than the margin between stock feed rice prices and the value of milled rice plus by-products.

A rough costing of the ownership and operating costs for a 1 tonne/hour mill are provided below. The costing shows that the cost of milling varies greatly with the quantity milled. It would normally be expected that the lowest cost would be achieved by using a machine at full capacity. The major costs are ownership costs and the material costs for packaging.

The cost of milling is obviously prohibitive if 200 tonnes or less is milled while the cost of 21-24 cents/kg for throughputs of 1 000 tonnes or more appears low enough to make the mill viable.

It should be stressed that little data is available to allow an accurate costing of a mill for the NT situation. The budgets below are unlikely to be an overestimate but could underestimate the cost of a mill.

Table 2. Estimated Costs of a 1 tonne/hour Rice Mill

Ownership Costs

- Interest or opportunity cost average value \$75 000	@	18%	13 500
- Depreciation - mill \$50 000	@	10%	5 000
- other \$100 000	@	5%	<u>5 000</u>
			\$23 500

Operating Costs

- Repairs & Maintenance \$150 000	@	5%	7 500
- Labour - milling 500t (paddy)	@	\$12/t	6 000
- packing 250t (milled)	@	\$36/t	9 000
- Packaging @ 10¢/kg (milled)			25 000
- Cool Storage			5 000
- Other			<u>2 500</u>
			\$55 000

= 32¢/kg (milled at capacity
of 500t (paddy) per year)

Throughput vs Cost of Milling

Throughput (tonnes)		Milling Cost (¢/kg)	
Paddy	Milled	Paddy	Milled
100	50	47	93
200	100	28	55
500	250	16	32
1 000	500	12	24
1 500	750	11	21

3 RICE MARKETS

3.1 Human Consumption Market

The NT now has a population of around 160 000. The average per capita consumption of rice in Australia in 1985/86 was 4.7kg. This gives an NT market of 725 tonnes milled or 1 504 tonnes of paddy. Several factors combine to reduce this figure to the market size which might be expected for rice grown in the Top End. These are:

- . the local product might only be able to penetrate part of the NT market, say a population of 100 000 people.
- . 30 percent of rice is consumed as processed products with which the NT could not compete.
- . NT rice could only gain a share of the market it penetrates as supermarkets presently stock around 8 different brands or types of rice. The share of the market might be expected to be between 20 and 30 percent.

This would give a local market of 66-100 tonnes of milled rice or 132-200 tonnes of paddy rice. Some observers have suggested that rice consumption in the NT could be higher than the national average due to a high portion of the population being of Asian extraction.

In any case the market is well below the capacity of a one tonne/hour mill which is estimated at 1 200-1 500 tonnes of paddy per year. Full utilisation may be possible if the mill is used to dehusk rice for the stock feed market or speciality rices are produced and milled in the NT.

3.2 Speciality Rice

Speciality rices have been suggested as another potential market for NT rice producers and one which might justify the purchase of a rice mill. There are a number of types of speciality rices but the main ones are Basmati rices, fragrant rices and glutinous rices. These types of rices can only be grown in a tropical environment so the Burdekin and Ord regions are our likely competitors. It has been suggested that the NT might find a market niche with speciality rices because the quantities involved would be too small for Burdekin millers to worry about.

Australia imports around 10 000 tonnes of milled rice per year which is equivalent to 13% of domestic consumption. Of this over 86.6% was from Thailand and around 3.9% was from Pakistan in 1986/87. These countries are the major exporters of speciality rices. In earlier years Thailand accounted for around 70% of imports and Pakistan 12%. The quantity of rice imported is large in relation to the present size of the NT rice industry but we do not know what percentage is speciality rice.

The average price of rice imports is around \$500/tonne or 50¢/kg (fob at port of origin). The cost of freight to Australia would be in the order of \$200/t or 20¢/kg and there would be an additional cost of at least \$100/t or 10¢/kg for packaging into retail packs. Quotes from overseas suggest that prices for speciality rices should be much higher. This means that speciality rices are only a proportion of imports. The Australian Bureau of Agriculture and Resource Economics estimates that speciality rice imports account for 69% of imports. The retail prices for fragrant and Basmati rices in Australia also suggest that prices for imported speciality rices should be much higher but high wholesale and retail markups may be part of the cause.

Considering the importance of speciality rices to the viability of a rice mill, research to identify suitable varieties of speciality rices should continue. Suitable varieties will need not only good quality but high enough yields to achieve comparable profitability with existing varieties. Otherwise producers will have no incentive to produce speciality rice instead of current varieties.

3.3 Stockfeed Market

Rice is usually looked upon as a grain for human consumption. However in the NT situation of high stockfeed gain prices and low volume/high cost processing for human consumption it is mainly used as a stock feed grain.

The main market for rice at present is for horse rations. In horse rations rice is 'cooler' (ie generates less heat in digestion), it is said to quieten temperamental horses and impart 'bloom' to horses' condition. The protein fraction of rice is used more efficiently by horses compared to other grains. As the production of rice increases it will find a use as a binder in intensive animal rations replacing bentonite. This would represent only a small percentage of rations.

These two uses are estimated to have a market size of around 1 000 tonnes at current real price levels. Once these markets are filled rice would have to compete with the coarse grains sorghum and maize as an energy and protein source in the least cost formulation of rations for monogastrics (pigs and poultry) and ruminants (cattle and buffalo). In this use the percentage of rice included in the diet depends on the levels of energy and protein, and the composition of protein, among other things, compared to other energy and protein sources.

Paddy rice or rough rice has a few problems in this regard. The rice husk is low in nutrients and high in fibre and silica. In the tropics this is a distinct disadvantage in monogastric diets. High temperatures depress feed intake and to overcome this, diets are formulated with high energy and protein densities. In such diets, however, brown rice would not have problems at a competitive price.

To analyse the place of paddy rice and brown rice in monogastric diets a computer program to calculate least cost rations was used. The results showed that paddy rice has a place, at current price levels, to dilute the energy and protein density in some rations which specify the lower energy and protein levels. Examples are poultry layer and breeder rations, and dry sow rations. In rations requiring high energy and protein densities (eg grower pig rations and broiler rations) paddy rice has no place but brown rice can be the major grain component at prices similar to or below sorghum prices. Even at prices similar to maize, brown rice can still be a significant component of these rations.

The likely limitation to the use of brown rice will be the market for rice husks. Rice husks can be used in potting mixes to provide aeration and some water holding capacity. Testing by the Department have shown rice husks to be a suitable alternative to other materials used for aeration (eg pine bark and peanut shells). Rice husks for potting mix should have a similar value to paddy rice. The main problem will be that once the market for potting mix is satisfied the value of rice husks will fall and the price of paddy rice would have to fall given that the price of brown rice will be fixed in relation to the price of competing grains. The potential market for rice husks is estimated to be around 50 tonnes which equates to 200 tonnes of paddy rice. Beyond this amount rice husks would have to find another market, for example as mulch for home gardens. In this use the rice husks would have a value of between half and two third their value in potting mixes. The lowest value of rice husks would equate to a \$10-20/tonne fall in the value of paddy rice.

For ruminant rations the low nutritive value of rice husks is less of a problem as the costs of roughage for feedlot diets is usually similar to the cost of grain. If ruminants have access to roughage in the paddock then the value of the husk is minimal.

An exception to the above principals is when there is a shortage of other grain in the NT and the alternative is importing. In this situation rice would become more attractive compared to imported grain.

4 CONCLUSION OF RICE MILL VIABILITY

It can be concluded that a mill would not be viable on the basis of the local market unless there is a substantial quantity of rice grown in the NT. On the basis of non-speciality long grain varieties, approximately 1 200-1 500 tonnes of paddy rice would need to be of suitable quality and available for milling. Speciality rice varieties could supplement long grain varieties to reach the requirement but they would need to yield similar economic returns for farmers to consider growing them in place of existing varieties. The required tonnage would be reduced if the mill is used to dehusk rice for livestock feed. The required tonnage would also be reduced if the NT Government contributed toward the capital cost of the mill and associated structures but this would be a matter of Government policy.