

# Complementary crops in the sugarcane industry



Queensland Government

*Information kindly provided by the Department of Agriculture, Fisheries and Forestry.*

Breaking the sugarcane monoculture by growing other crops in rotation with sugarcane has proven environmental and productivity benefits. Some farmers also choose to grow rotation crops that generate income. A range of crops have been tried or suggested as possibilities and this information gives a realistic idea of their likely success.

Complementary crops are crops grown within a cane farming system. Crops that use the same land as cane crops are also known as break crops, green manure crops, green fallow and rotational crops. Some crops have a short growing season and are grown in the traditional fallow period of sugarcane. Other crops provide a full season break and yet others occupy the land permanently, not producing an income for four to 10 years.

Some cane farms have areas less suited to cane production that may be under-utilised. If these areas are not suited to regular cultivation due to slope, shape or size of the block, they may suit permanent production systems such as agro-forestry or fruit trees. Bringing such areas into production may have financial benefits and will contribute to the biodiversity of the farm.

## Benefits of complementary crops

The main benefit of complementary cropping is associated with the break in the sugarcane monoculture. A farming system that incorporates complementary crops will have significant impacts on the soil physical, chemical and biological health.

Complementary crops may also provide an opportunity for cane farmers to diversify their income streams. If this is an important outcome for you, then careful research will help to assess the risks involved with the new crop.

## Common problems and concerns

Due to the wide climatic variation between the northern, central and southern cane-growing regions and distance from traditional markets, many possible crops are district-

dependant. Your work program will also impact on which crops have potential on your farm. Be sure to assess any potential clashes with labour and machinery resources.

Your knowledge of the new crop will also be an important factor. If the crop is completely new to you it may be wise to assume that the first few seasons will give less than optimal results. Be sure you have sufficient cash flow to handle this delay. You may need additional machinery and this requires additional outlay.

Research the market to determine whether you will be able to supply the necessary quality and quantity of produce profitably. Try to avoid crops that are already well supplied as produce gluts do not benefit producers. If, after researching the crop thoroughly, assessing the technical, marketing, logistical, cash flow, capital and labour requirements, you still feel confident to proceed, you do so in the full knowledge of all the possible risks.

## Potential complementary crops

Different complementary crops will suit each of the three main sugarcane regions in Queensland. Growing crops in regions other than those outlined below will require additional management or other resource inputs.

Crop	North Coast	Central	South
Peanuts	Not ideal	Suitable	Suitable
Navy bean	Not ideal	Suitable	Not ideal
Mung bean	Not ideal	Suitable	Not ideal
Soybean (for grain)	Not ideal	Suitable	Suitable
Kenaf	Suitable	Suitable	Suitable
Industrial hemp	Not ideal	Suitable	Suitable
Pumpkin	Suitable	Suitable	Suitable
Watermelon	Suitable	Suitable	Suitable
Rockmelon	Suitable	Suitable	Suitable

Crop	North Coast	Central	South
Honeydew	Suitable	Suitable	Suitable
Zucchini	Suitable	Suitable	Suitable
Potato	Not ideal	Not ideal	Suitable
Banana	Suitable	Suitable	Suitable
Pawpaw	Suitable	Suitable	Suitable
Lychee	Suitable	Suitable	Suitable
Other tropical fruit	Suitable	Not ideal	Not ideal
Timber	Suitable	Suitable	Suitable
Bamboo	Suitable	Suitable	Suitable
Forage crops (maize, sorghum etc.)	Suitable	Suitable	Suitable

## Grain legumes

Farmers have tried a number of summer legumes crops along the coast. Legume crops provide many advantages to the sugarcane rotation such as breaking the pest-disease cycle and fixing atmospheric nitrogen. Peanuts, navy beans, mung beans and soybeans show the best potential as complementary crops with sugarcane.

Grain legumes have the common problem of pests and diseases under warm humid conditions. To produce a commercial grain crop, regular spraying is usually necessary. In the wetter districts rain can make harvesting the grain difficult. These problems are less important in the southern cane growing districts however irrigation is usually needed in the drier districts.

If these crops are grown as green manure crops the considerations discussed below are of less consequence.

### Peanuts

Peanuts are currently grown in the Atherton Tablelands, Innisfail and Bundaberg sugarcane areas and have a five-month growing period.

The Peanut Company of Australia (PCA) has intakes in Tolga,

Gayndah and Kingaroy giving southern cane districts good market access, but have high freight costs for other areas. The demand for peanuts is increasing. The economic returns from peanuts can be good provided fungal diseases are minimised.

Peanuts require a range of specialised equipment. The planter and sprayer needed to grow the crop are relatively common. Harvesting equipment includes a puller, thresher, bins and a drier. Growers may have some difficulty accessing this equipment. Peanuts can absorb heavy metals, particularly cadmium, and soil tests are needed to establish the level in the soil.

### Mung beans and navy beans

Mung beans and navy beans are crops with similar requirements although mung beans are hardier. Navy beans are currently grown in the Atherton Tablelands. Mung beans have been tried in the Burdekin and Mackay sugarcane districts. They have a three-month growing period, which makes them well-suited to the sugarcane rotation.

There is a consistent demand but freight to buying depots in Kingaroy and Biloela can be a limitation. Global supplies and quality determine the price. Small areas in cane fallows are unlikely to give big returns.

Insect pests such as Bean fly, *Helicoverpa* and Green Vegetable Bugs are potential problems and nematodes destroyed many of the crops in Mackay. It is essential to engage consultants to scout for bugs.

### Soybeans

There has been widespread promotion of soybeans as a fallow crop in sugarcane. Substantial areas have been planted along the coast, primarily as a green manure crop in the wet tropics but there is an established grain industry in Bundaberg. Soybean crops for grain have a growing season of five months.

Distance from the market is restrictive for grain production. There is a crushing plant in Newcastle, and Dalby has markets for animal feed and flour. Food quality soybeans could be exported direct to Japan, which is the major buyer.

There are two main markets for soybeans. Soybeans for human consumption (soymilk, tofu etc.) attract higher returns than those used to produce oil. *White hilum* varieties are being bred for the food market with opportunities in the more suitable central and southern districts.

Growers need to control insect pests and find suitable markets for successful grain production.

## Fibre crops

Kenaf and industrial hemp fibre crops fit well in the fallow period of sugarcane rotation, planted on spring rainfall and harvested in the autumn.

### Kenaf

Kenaf is currently grown in the Mackay and Bundaberg sugarcane districts. The fibre has uses in rope-making, textiles and paper-making with future potential as a bio-plastic. There is currently no processing plant in Australia. There is a large overseas market once a plant is established. The projected gross margins show kenaf to be a good economic option.

As it is a relatively new crop there is limited knowledge about its agronomy and the best harvesting techniques.

### Industrial hemp

Trials of industrial hemp production have been conducted in the Mareeba, Mackay, Bundaberg, and Childers cane-growing districts. There is currently no processing plant but projected gross margins show hemp to be a good economic option.

As it is a relatively new crop the agronomic knowledge is limited. There is no suitable tropical variety currently available and growers must meet legal requirements to grow the crop.

## Vegetables

The summer growing vegetables from the cucurbit family fit well in the fallow period of the sugarcane rotation. Potatoes are also an option.

### Pumpkins, watermelons, rockmelons, honeydew and zucchinis

These crops are grown all along the Queensland coast. The infrastructure for marketing produce is well established with wholesale buyers for independent retailers. A potential buyer should be identified before growing the crop. The profitability of these crops is highly dependant on the market price at the time of sale. With variable prices, large planting areas would be risky.

These crops require continuous monitoring for disease. Most cane farmers would need to do some training to identify the pests and diseases common to these crops. Many farmers move in and out of these crops with little success. If you decide to grow these crops then you must do it regularly to gain the benefits of the occasional high prices.

## Potatoes

Potatoes are grown on the Atherton Tableland and in Bundaberg. The potato market has a stable demand and prices vary depending on supply. Small growers producing a one-off crop are likely to have marketing problems unless they are aligned to a pack-house. The profitability of potato crops is highly dependant on the price at the time of sale. With variable prices and the difficulty of marketing, large planting areas would be very risky.

These crops require continuous monitoring for disease and irrigation is required. In the northern coastal districts the more even day and night temperatures would be marginal for potato production. These conditions tend to give vegetative growth and small tubers. Cooler micro-climates in the north may be suitable. Being an underground crop, soil tests are required for heavy metals and pesticide residues.

## Fruit

Tree crops require high-quality land for a number of years. They provide an opportunity for a long fallow or break crop in a sugarcane rotation.

### Bananas

Bananas are currently grown in the Atherton Tablelands, Mossman, Tully, Innisfail and Bundaberg sugarcane districts.

Bananas are sold only on the domestic market and growers have agents in the major markets to sell their fruit. Increasing areas are already likely to flood the market. The returns have been good from bananas, encouraging more planting; high establishment costs make it risky if prices drop.

Bananas have a high labour requirement and irrigation is essential. The up-front costs are high and there is the threat of imports impacting on the industry. Many farmers have already moved into bananas and the market is flooded at certain times.

### Pawpaws

Pawpaws are grown all along the coast and there are wholesale buyers for independent retailers and agents in the major markets.

Pawpaws are a potentially lucrative crop and a grower would only need a small area to be profitable. As with other crops there is a supply and demand problem and periods of over-supply lead to low prices.

Irrigation is essential and a high level of management skills is required. Growers need to take a long-term view and ride out variations in the market. Cyclones can wipe out established crops.

**Tropical fruits (lychees, rambutans, mangosteens, durians)**

Lychees are suited to all along the coast but rambutans, mangosteens and durians are only suitable for North Queensland.

The returns are good and our counter-seasonal production gives export opportunities. There are wholesale buyers for independent retailers.

Tropical fruit trees have a long lag phase from planting to harvest (4-10 years). They have a high management requirement over a long period of time. The availability and cost of planting material (\$20/plant at 200 plants/ha) is restrictive and most farmers would choose to start with a small area. The additional cost of nets for pest control also restricts the planting area. Trees do not withstand cyclones as well as sugarcane.