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Crop Post-Harvest Research Programme Zimbabwe

*Oilseeds in Zimbabwe: A
Review of Current
Knowledge and Issues*

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1. Introduction and Background

As part of the current programme of needs assessment and research proposal development for post-harvest research on oilseed and small grain crops, a review of current knowledge in Zimbabwe in this area was conducted. This programme is confined to oilseed and small grain production in communal lands of Natural Regions III, IV and V. Only knowledge relevant to research in this area was sought.

2. The Terms of Reference

At this stage the tasks involved contacting relevant institutions in Zimbabwe and enquire as to the recent work on, or involving oilseed and small grain crops, following up on past work and obtaining copies of published and unpublished outputs.

Specifically, the task involved consolidation of secondary information on:

- production systems (seasonality, cropping systems, place in farming systems and gender roles.
- current processing systems
- quality of processed products
- marketing systems

3. Overview

The production of oilseed crops in Zimbabwe has been erratic in the last few years due to a combination of factors among which are the recurrent drought and poor pricing policies. Only two oilseed crops, cotton and sunflower, have retained high production figures with cotton having remained consistent throughout. Sunflower seed production has been on the increase due to its minimal requirements in terms of labour and other essential inputs. It also enjoys good market prices relative to other oil crops. Cottonseed on the other hand has remained high due to the ever increasing demand and good prices for cotton lint. The crop is also favourable to local conditions due to its high tolerance to droughts. Although cottonseed accounts for over 50% of total oil production, it is largely grown for its lint. The seed is just a by-product.

Processing technology development and application has largely been confined to a few oil seeds, notably, sunflower and soyabean. Due to the low production trends for other oil crops, the pace of technology development for their processing has been also low. High production trends are not always associated with financial returns since other oil crops are grown more for their food than their oil. A classic example are the groundnuts, which tend to be used as important food substitutes in both the communal and small holder farms. Where the production of an oilseed interferes with the production of food crops such as during a drought, food production is given priority.

It is important for all these factors to be considered in the current efforts to widen the menu of oilseed processing technologies in Zimbabwe.

information contained in this report is based on based on discussions and interviews held with various officials of organisations dealing with the production of and processing of oil seed crops. Less attention has been given to document review and analysis, since they constitute the submission to NRI.

4. Contacts made during the Research

INSTITUTION	CONTACT PERSON
AGRITEX	Mr I POMPI
ZIMBABWE FARMERS UNION	Mr MAONERA
TRINIDAD INDUSTRIES	Mr B. MUMBA, Mr TSVARAI, Mr CHAKRAS
ZIMBABWE OIL SEEDS COUNCIL	Mr A RUKOVO
APPROPRIATE TECHNOLOGY INTERNATIONAL - ZOPP	Mr MUPUNGA, Mr KANJANDA
UNIVERSITY OF ZIMBABWE - TECHNOLOGY DEVELOPMENT CENTRE	Mr T. RUKUNI

INFORMATION/DOCUMENTS COLLECTED

1. Handbook on oil seed production - AGRITEX
2. Seed Co-op handbooks on the production of oil seed crops
3. Pamphlets on the processing of oil seed crops
4. Sub-sector report on the status of oil seed production and processing in Zimbabwe (1995).
5. Handbook on oil seed crops in the developing world
6. Z.F.U oil seed production trends statistics
7. Trinidad industries castor oil production trends - figures and statistics
8. Castor bean growing instructions

5 Oil seed production in Zimbabwe: Production systems

5.1 Groundnuts

Groundnuts are grown between the months of November and April. They can be grown throughout the country with different varieties being suitable for different regions. About 80% of all groundnuts produced in the country is grown in the communal and small holder farms. Of this less than 10% is sold either to the GMB or used for oil processing. The rest is either sold on the parallel market or consumed within the family as relish or peanut butter. It is therefore grown as a food crop in the communal and small holder farms. All the commercially produced crop is however used for oil production and commercial peanut butter production. As a result of this groundnuts account for less than 3% of oil produced in the country. This is largely due to the pricing regime which does not recognise the relatively high labour input required for groundnut production. Thus poor pricing is further compounded by the failure of the crop to hit the lucrative export market due to its high toxicity levels.

Women's role

Groundnut production in both the communal and small holder farms as with most food crops is predominantly a preserve of women who do not grow it for its oil but for its protein hence its predominant use as a food supplement.

5.2 Soyabeans

Soyabean is a cash crop capable of being cultivated throughout the country provided irrigation is provided in the ultra dry regions, soyabeans is largely a commercial crop with the bulk of it being grown in commercial farms. Suitable growing season is between the months of November and February/March. Soyabeans is relatively short season crop which can be interchanged with winter crops. Harvesting of soyabeans where it is not done by combine harvesters is mostly done by women and children. Although small quantities are being Tyntech pressed for oil where the Tyntech is available, there is not much on-farm processing beyond shelling and packaging at the moment. It seems not a cost effective crop as a source of either ram press or Tyntech oil due to its very high cost compared to sunflower and its low oil content although it is useful as either a human or animal feed supplement due to its high protein content.

5.3 Sunflower

Sunflower is the most common oil seed crop in Zimbabwe with the bulk of it being grown in the small holder farms. It is regarded as a cash crop and is used mostly for its oil with its cake, a by-product, used a stock feed ingredient. The major buyers are the GMB who stock it thus ensuring enough supplies throughout the year to oil processors and the commercial oil companies. Like soyabean, sunflower is a short season crop with most varieties maturing between 90 and 120 days. Mostly open pollinated varieties are grown in the communal and small holder farms however and these are not very suitable for oil pressing using the current technologies.

Women's role

Not much information on gender balance in the production and processing of sunflower is available although observations indicate that like with other rural produced crops, sunflower production is predominantly a women's preserve. Most of the ram presses located in the rural areas are operated by women while all the Tyntechs observed were owned and operated by men. In terms of volumes of sunflower or oil processed, this represents an evenly gender balanced situation although in terms of numbers of people participating, women are more represented.

5.4 Cotton seed

Cotton is a cash crop grown for its lint not its seed although the seed accounts for over 50% of oil processing in the country. As a result of the lint focus of farmers, there is no known on-farm/local processing of the cotton seed oil at the moment. This is probably also due to the labour costs that would go with lint-seed separation. Cotton seed however remains a very important source of edible oil due to the cotton plant's special drought resistance qualities.

Women's role

Observations in the rural areas show that women do much of the production work and they provide much of the labour in the commercial farms although there seems to be an even participation of men in the small holder farming areas.

5.5 Castor bean

Castor bean production is a relatively recent development. The varieties that are currently available in Zimbabwe range from one season to seven season varieties. Castor bean is grown mainly for its oil throughout the country and is not edible. There is no on-farm processing beyond shelling at the moment due to quality problems and also, the technology to efficiently do this seems unavailable. Castor bean is sold raw mostly to Trinidad industries where it is used as a basic ingredient in the manufacture of glues and polymers.

Women's role

Trinidad industries estimate that about 70% of castor bean farmers are women representing a very high degree of women involvement in the production of a cash crop.

6. Physic nut (*Jatropha*)

Jatropha is a castor bean like shrub which produces a similar seed. It is similar in a number of ways to the castor bean. Very few people grow it in Zimbabwe, mainly in the Mutoko/Murewa areas. Currently it grows in the wild with no special care as it has very little cash returns. Its uses are largely not known hence people's lack of interest in the crop.

7. Current Processing Systems

Currently, processing of oil seed crops is done for the production of edible oils and peanut butter. The available technologies at the moment are the ram press for the production of cooking oil, the Tyntech for the same and the manual and mechanised peanut butter machines. While the ram press and the Tyntech can be used to express castor oil, this is not being done at the moment because information on the suitability of such oil for current uses is not available. Trinidad fear that the castor oil made in such way may contain too much moisture which is not suitable at all for their purpose. There is also no knowledge on storage of such oils. The University of Zimbabwe Development Technology Centre is currently in the process of adapting the available technologies and developing others for use with various oil yielding crops. The emphasis now seems to be the adaptability of technology for different uses so that it does not lie dormant in times of raw material shortage in one area. For instance the manual and mechanised peanut butter machines are being used at the university to process sorghum and millet as well. A spindle press in the mould of the tyntech which can be used with a variety of oil crops including avocado pears is also being tried. The only problem at the moment is that manual machines such as the ram press, it seems are fast becoming unpopular due to their physical requirements and the mechanised ones are expensive for their target group. While electricity powered machines present less maintenance problems, electricity is not that available in the rural areas. The diesel and petrol powered ones have maintenance problems and besides the fuels themselves are significantly expensive for these groups.

8. Quality of processed products

As with castor oil, the quality of both the ram presses and Tyntech expressed edible oil is not always of good quality due to handling problems during the whole process with the ram press and during the packaging process with the Tyntech. Operators particularly of the ram presses tend to prefer used containers and these are not always cleaned well. People tend to use empty bottles for various uses which further compounds the hygiene problems of used bottles even where there are thoroughly cleaned. Hygiene therefore is a critical consideration in coming up with rural or people based agro-processing technologies.

9. Marketing Systems for processed products

The table below illustrates the levels at which locally processed oils are marketed.

SEED TYPE	MARKET			
	Local/Village	District	Province	National
Groundnuts	-	-	-	-
Sunflower	x	x	x	-
Soyabean	x	x	x	-
Maize	-	-	-	-
Avocado	-	-	-	-
Paprika	-	-	-	-
Castor bean	-	-	-	-
Physic nut (jatropha)	-	-	-	-
Others	-	-	-	-

The table shows that oil processing in the rural and small holder farming areas is limited to only sunflower and soyabean. Marketing of oil is limited province of location for Tyntech expressed oil and to village level for ram pressed oil. This shows that marketing systems are yet to be developed. There is also need to explore the processing of other oil seed crops.

9. Consumption patterns

The table below illustrates the consumption patterns of oil seed processed at the local/farm level. Consumption patterns for village level processed oil seeds showing the level at which the see/product is consumed or marketed.

SEED TYPE CONSUMPTION PATTERN

	Not processed (consumed raw)	oils	other edible product	cake	sold raw
Groundnuts	x	-	x	-	x
Soyabean		x	-	x	x
Sunflower		x	-	x	x
Avocado	x	-	-	-	x
Paprika	x	-	-	-	x
Maize	x	-	x	-	x
Castor	-	-	-	-	x
Physic nut (Jatropha)	-	-	-	-	-
Others	x	-		-	x

The table shows great limitations in terms of processing. Most of the seed crops are being either consumed or sold raw. There is therefore need to develop processing technologies for the various oil seed crops that are grown locally.

10. Conclusions and Recommendations

Production of oil seed crop is crucial to agro-processing. Currently, production is low because of poor pricing both on the commercial and the parallel markets. Poor pricing on the parallel markets is due to under capitalization of the local people as well as low prices of finished agricultural products. In the case of oil, rural ram pressed or Tyntech expressed oil competes with that produced large overcapitalised edible oil giants such as Olivine industries, Lever Brothers etc. The result of this competition is that ram press and tyntech oil end up being priced below profitable levels thus inhibiting the growth of rural agro-processing. This also has negative effects on the ability of rural based agro-processing ventures to acquire raw materials in quantities enough to last the whole production season. There is therefore need to come up with strategies of widening the product base of oil seed crops so as to increase the earning capacities of oil processors. A vigorous education campaign to educate the local people on how to utilise the oil seed cake will greatly improve the cashflow position of processors as they are currently depending on income from oil sales only with the exception of those operating tyntechs who seem to have a well developed market for the cake in the various stock feed companies. Devising diets for various farm animals based on the oil seed cake will increase the popularity of the cake as a marketable product.

Marketing of rural processed oils is also yet to be fully developed. Ram press oil is only sold within the village therefore suffers from seasonal money availability fluctuations i.e people tend to buy more just after the harvesting season when they have the money and stop in the dry and planting season. In fact in our observations with ram presses, we observed that they stopped pressing completely in the planting season. This however could also be a result of non availability of the sunflower seed during this season. This situation could be improved by coming up with storage technologies to enable those who can buy seed in bulk to store it for future use without the risk of losing quality. Strategies for the marketing of the oil nationally without infuriating large scale commercial producers should also be explored as

currently rural based oil producers have a very limited market base. Affordable, quicker and hygienic filtration and packaging technology would help a lot in making ram pressed oil attractive at a national level. Currently ram pressed oil is filtered through a dark cloth and packaged in used containers. One only needs to be told how it is done to stop buying it. These problems are however not common with tyntech operators although affordable more hygienic packaging technology would be welcome by them as well.

One of the biggest impediment of the oil producers in the rural areas is that they tend to regard oil processing as a side business complimenting farming. They do want it to interfere with normal farming operations. This means that to them farming will take precedence over processing which explains why they have to stop during the planting season and why they are not bothered much about acquiring enough seed to last the entire year. There is need therefore to educate the oil processors to take processing as having equal importance to farming. An upward movement in prices of oils and their by-products will positively influence this as well as earnings from oil products sales begin to match those from direct sale of agricultural produce. As it is now processed oil has the advantage of having the potential to bring in income throughout the year.

Despite the impediments to production mentioned above, statistics show that sunflower production has gone up since processing of edible oils as village level started. This shows that rural agro-processing has a lot of potential. Technologies to both improve on the quality of the current processing and to widen the range of oil seed crops that can be processed should be looked at on the basis of successes scored on sunflower seed processing. So far cotton seed processing has a lot of potential in this regard for the following reasons:

1. The crop is grown throughout the country because of the high prices for the lint.
2. Sales of processed oil will offset any losses on weight to the lint.
3. The cake is a basic ingredient in stock feeds therefore can also be sold to offset costs of production.
3. The cotton seed has more oil content than most oil seeds and is ease to extract.

There is however need for an assessment to find out whether farmers would be willing to separate seed from their lint before they sell it or not. Such a study could also go along this to ascertain whether people would accept cotton seed oil if they knew it came from it. Right now we think they do not know that most of the cooking oil they buy form the shops is made from cotton seed. The study would also investigate the use patterns of different types of cooking oil in Rural Zimbabwe.

The other oil seed that has potential for farm based processing is castor bean. The seed is grown throughout the country and is sold unprocessed. Its processing is currently being done using a spindle press similar to the tyntech and this can be adapted to suit the situation in the rural areas. Castor bean is a highly drought resistant crop which could be very important in the rural areas considering the drought proneness of Zimbabwe. All glues and polythene products are made from castor oil and most of it is being imported. It therefore has a lot of potential as an income earner for the rural and small scale farming communities. Village level processing of the oil will definitely

improve the incomes of those farmers as opposed to sales of raw bean. The cake can then be used either as manure or as a fuel thus lessening environmental destruction of trees for fuel purposes.

Very little is known of the Physic nut(jatropha) in terms of its uses but the plant adapts well to local conditions and is easy to extract. It also has a very high oil content. The oil has a lot of potential for use as a fuel and the University of Zimbabwe through the Development Technology Centre is carrying out tests in this regard. We also know that Trinidad Industries are also carrying out tests for its use in the manufacture of polymers and glues. As a fuel, physic nut has the potential of alleviating the environmental problems caused by cutting down of trees for fuel and can also reduce the amount of money spent by rural communities on expensive non-renewable fuels such as paraffin. If current diesel engines can be adapted to run on such fuels as well, this will permanently ease the problems of high costs of processing currently experienced by rural communities. Irrigation schemes as well could be moulded along these lines to compliment agro processing activities by ensuring that raw materials will be there throughout the year. Such a system would go a long way in transforming rural agriculture.

All in all, the potential of rural oil processing is still largely unexploited and there is a lot of scope for improvements. There is need however to collaborate with the relevant agronomy groups such as Agritex so that technological improvement in processing is not done in isolation from improvements in plant varieties and planting systems. Farmers also need to be encouraged to grow crops that can be processed at the local event so as to support agro-processing with the relevant raw materials in the desired quantities. Such a drive is best done through Agritex and associated institutions such as seed companies and agronomy research institutions as they are already working in this field. Assisting processors with the necessary cash so that they can also encourage desired farming practises in their communities through contract cropping will also help.