Small-scale processing of cooking oil in rural Zimbabwe and Burkina Faso

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Niels Fold

Abstract

Small-scale processing of agricultural goods within rural areas has potentially a number of benefits for rural communities: income generation, upgrading of technological knowledge, and a direct supply of processed food. The aim of this paper is to outline the constraints for small-scale processing of cooking oil in two African countries, Zimbabwe and Burkina Faso. Cooking oil is important in the diet of the rural poor and is also used in small-scale processing of soap, candles and other essential goods. Small-scale processing of cooking oil in both Zimbabwe and Burkina Faso is based on imported semi-industrial plants and manual presses, which are mainly manufactured within the respective countries. Semi-industrial plants are too expensive and the technology too advanced, though, for the majority of operators in rural communities. Despite a number of operational problems, manual presses are the most promising means of strengthening local small-scale processing. However, the institutional framework for the introduction and dissemination of the presses into rural communities needs to be improved.

Keywords

Rural development, small-scale processing, cooking oil, Zimbabwe, Burkina Faso.

Niels Fold: Institute of Geography, University of Copenhagen, Øster Voldgade 10, 1350 Copenhagen K., Denmark. E-mail: nf@geogr.ku.dk.

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About twenty years ago, I followed an undergraduate course entitled 'The Geography of Global Food Supplies' conducted by Professor Sofus Christiansen. The aim of the course was to provide students with knowledge of the basic production systems and international trade flows related to some of the world's most important food crops. My own efforts were rather modest; little did I imagine that two decades later I would be involved in research on commodity chain dynamics. Even though the theory and methodology applied today differ considerably (Fold, 1998), the theme is similar.

This paper reflects on results from research I have carried out in Africa on the vegetable oil industry. My aim is to discuss the constraints for rural small-scale processing of cooking oil, a basic element in the diet of the rural poor. The expansion of small-scale processing, local exchange and consumption of food within rural areas would counter the usual priority given to urban middle-class consumers in many sub-Saharan African countries. The empirical basis of the paper is commodity chain research on the vegetable oil industries of two African countries, Zimbabwe and Burkina Faso. Fieldwork in Zimbabwe was carried out in 1991 and included interviews with press owners, press manufacturers and NGO personnel. The data from Burkina Faso are from 1998 and are based on secondary literature and interviews with representatives of 'Projet Filière Karité', a development agency financed by the Canadian International Development Agency. Despite the time difference, useful lessons can be learnt and can add to results from other observations of rural small-scale processing of food in sub-Saharan Africa.

I begin the paper with a discussion of the development impact of oil crop processing in rural areas, particularly from the perspective of basic consumption by the rural poor. Next, I briefly outline the differences and similarities between the two national industries in terms of the cultivated oil crops and their importance in the diet, and the nature of agro-industrial organisation. I then discuss the changing regulatory framework of the nation state and previous experiences with rural small-scale processing of

oil crops. In conclusion, I discuss some policy implications of the findings.

Oil crops and basic consumption

There are many varieties of crops with a significant fatty acid content. Most important in terms of production on a global scale are soybeans, rape seed, and sunflower seed in temperate agriculture, and groundnuts, oil palm fruits and coconuts in tropical agriculture. Cottonseed is also important even though it is considered as a residual product to cotton lint. The milling of oil crops results in two different products. Usually, the primary product is vegetable oil which can then be further processed, i.e. refined, by changing the odour, taste and colour of the oil. The refining process is carried out in industrial plants whereas the milling can be carried out in a number of different ways ranging from using simple manual tools to semi-industrial small-scale factories to large-scale agro-industrial plants (Carr, 1989). The secondary product, oil cake, is used for animal feed, often in a mixture with other crops to get the most suitable content of protein and starch. The oil can be used for a number of purposes, primarily as a frying medium, but vegetable oil is also the basic ingredient in products such as soap and candles. Vegetable oil can also be used in more advanced industrial processing of paint and various oleochemical products used in the chemical industry (eg. detergents, food additives, lubricants, etc.). Hence, oil crops are basic ingredients in the processing of at least three important items used by the poorer sections of the population in developing countries, namely food, soap and candles.

The cultivation and processing of oil crops are, therefore, important elements in national development strategies in the Third World, particularly in poorer countries including most of Africa. Neo-liberal points of view stress the need to exploit the comparative advantages in the specific country and argue for specialisation in other crops if necessary, leaving the supply of oil crops to be covered by imports. However, I will argue that there are important dynamic effects to gain from the vegetable oil industry, both at national and local levels. The spin-off effects are numerous including income generation, learning by doing and product diversification. The ability to cover demand for basic consumer goods is also important for social and political reasons as locally supplied goods are independent of the foreign exchange situation or price fluctuations on the world market. Finally, the strengthening of the local commercial circulation of oil crops and their derivatives can enhance the flexibility and resilience of marginal groups, particularly in rural areas.

The structure of the vegetable oil industry in Zimbabwe and Burkina Faso

The national vegetable oil industries of Zimbabwe and Burkina Faso are both primarily oriented towards their internal markets. In both countries, commercial production of vegetable oil is carried out by large-scale industrial plants located in the major urban centres. There are two industrial milling and refining companies in Burkina Faso, both located in the old French administrative centre of Bobo Dialoussou, while in Zimbabwe there are two factories in each of the major cities of Harare and Bulawayo.

Due to the substantial production of cotton in both countries, cottonseed is the major raw material for commercial oil production. In Burkina Faso, cottonseed is processed and the oil is sold in pure form or blended with other oils, primarily imported palm oil from the Ivory Coast. In Zimbabwe, cottonseed oil is never sold in pure form but always mixed with soya oil. Soya beans, the other major raw material for the Zimbabwean vegetable oil industry, are produced by (white) large-scale farmers with modern farming equipment. Sunflower seed is of relatively less importance in the overall supply of raw materials for the vegetable oil industry. Sunflowers are primarily produced by (black) small-scale farmers on communal lands, and the oil is bottled and sold in pure form at a premium price.

Even though groundnuts are widely grown in both countries, groundnut oil is scarcely traded commercially. In both cases this is due to the high market value of both whole nuts and fried products (a kind of snack) made of oily peanut butter. Moreover, the nuts are important elements in the sauce which accompanies the staple food in the diet (maize in Zimbabwe and millet in Burkina Faso).

In both countries, however, vegetable oil, in fluid or solid form, is produced outside the sphere of large-scale manufacturing production. Substantial volumes of sheanut butter are sold in local markets in Burkina Faso. Sheanut butter is the processed product of kernels located inside the sheanut, which itself is found in a green plum-size fruit.The fruits are collected from the ground beneath the karité trees (*Vitellaria Paradoxa*), which grow in scattered clusters in the southern part of Burkina Faso. Karité trees are found

in the bush and fields throughout the Sudan-Sahelian zone of West Africa. Both the butter and kernels are sold in local markets and supplement the domestically produced and consumed sheanut butter. The butter is widely used as a frying medium in the preparation of daily food and is also processed into soap at the household level. Most butter is processed manually (*barattage*) by pounding the kernels into a mush and then successively washing out colouring impurities (Fig. 1). The result is a white to yellowish solid substance which is kept in small pots. Women's groups have also started to use manual presses and small-scale entrepreneurs have invested in semi-industrial plants in order to increase the production, and improve the quality, of the butter.

In Zimbabwe, the importance of vegetable oil in the rural diet has traditionally been limited. During the 1980s, consumption has increased rapidly among the lower income groups due to increased income after the transition to a black majority led government. The industrial production of vegetable oil, however, has not been able to cover potential demand at current consumer price levels resulting in occasional shortages. As a result, rural-based small-scale processing of sunflower seed, both semi-industrial and manual, started to develop in the early 1990s. The quantities processed by these methods are as yet insignificant compared to the volumes of vegetable oil processed by large-scale factories. It is, however, notable that contrary to oil processed by large-scale factories, supplies of oil based on locally cultivated sunflower seed are produced, circulated and consumed within rural areas.

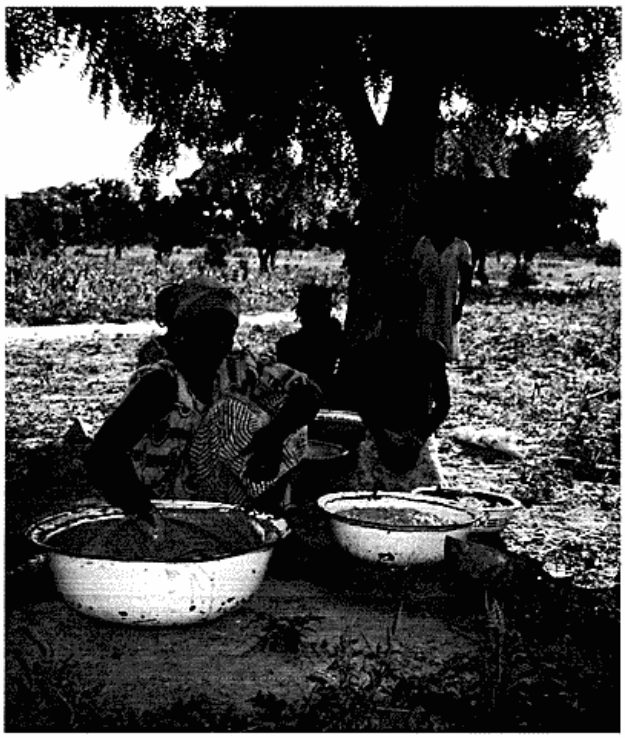

***Figure 1:** Manual processing (barattage) of sheanut butter, Burkina Faso*

Small-scale processing and changes in the regulation of the vegetable oil industries

Both the traditional local circulation of sheanut butter and the recent growth of the local circulation of sunflower oil have experienced dramatic changes in the regulatory framework set by the two nation states. Liberalization and privatization are key words in the structural adjustment programmes implemented in both countries since the early 1990s.

Zimbabwe

Before liberalization started in Zimbabwe, the purchase and storage of oil seeds were strictly controlled by state marketing boards, notably the Grain Marketing Board (GMB), which also sold the seeds at fixed prices to industrial processors (Fold, 1996). Sale was based on allocations which in turn were based on the past performance and capacity of the individual company. Market prices of cooking oil were also controlled by the state as maximum prices were listed for various volumes and brands (factory prices of oil cake were also fixed by the state). Hence, intra-industry competition was severely restricted and profits could only be increased by improvements in the efficiency of the production process.

Since the early 1990s, some of the operations of the marketing boards have been liberalised. For instance, the monopsony power of the marketing boards is gradually being reduced allowing for the development of new direct commercial relations between private sellers, buyers and processors. As a result, a modest number of small-scale mills have begun to operate in rural centres, so-called 'growth points'. The gradual abolition of the allocation system has enabled small-scale processors to obtain local raw materials which were previously purchased by the marketing boards, i.e. direct purchases from local producers of sunflower seed have replaced deliveries from the marketing board. Avoiding transport and handling costs

related to board activities reduces the price of raw materials and supplies can circulate more rapidly.

Despite the somewhat rosy picture of potential benefits, numerous problems have been encountered by the small-scale mills (Fold, 1994). All their equipment has been imported (from India and Japan) and as spare parts are difficult to obtain, breakdowns result in production being halted and profits severely reduced. Other operational problems are related to organizational aspects of general production planning and to the marketing of the residual product (oil cake). Mills that are part of NGO supported rural development projects appear to be less profitable than privately owned mills, possibly due to a general lack of organizational experience and technical skills among the operators.

Besides the semi-industrial mills, a manual oil press for sunflower seed was introduced in the late 1980s within the framework of a northern NGO development aid project. The press is particularly suited to relatively remote rural areas due to its simple construction. More than 100 presses have been sold to different small-scale processors in Zimbabwe, including individuals, groups of households, cooperatives, etc. The press offers the opportunity to produce cooking oil and poultry feed (oil cake) at the village or household level with reasonable returns (Fig. 2).

The developmental impact of the press, however, is closely related to the steady supply of hybrid sunflower seed and presses. Hybrid sunflower seed is best suited for manual pressing but the seed is difficult to obtain due to the organisation of the seed industry in Zimbabwe (Friis-Hansen, 1991). Moreover, the profits are not great enough for the presses to be produced by established metal manufacturers as the demand is still too small and only a few of the metal workshops in Zimbabwe have the technological capacity to produce it at present. If, however, the hybrid seed were to be produced in sufficient quantities and the demand for the press increased substantially, new commercial relations between press owners and peasants could solve the problems of insufficient supplies of oil and stockfeed in the villages.

Burkina Faso

Up to the early 1990s, the Caisse de Stabilisation des Prix des Produits Agricoles (Fund for Stabilisation of Agricultural Product Prices - CSPPA) operated as a marketing board with monopsony control over the most important agricultural products in a similar manner to the marketing

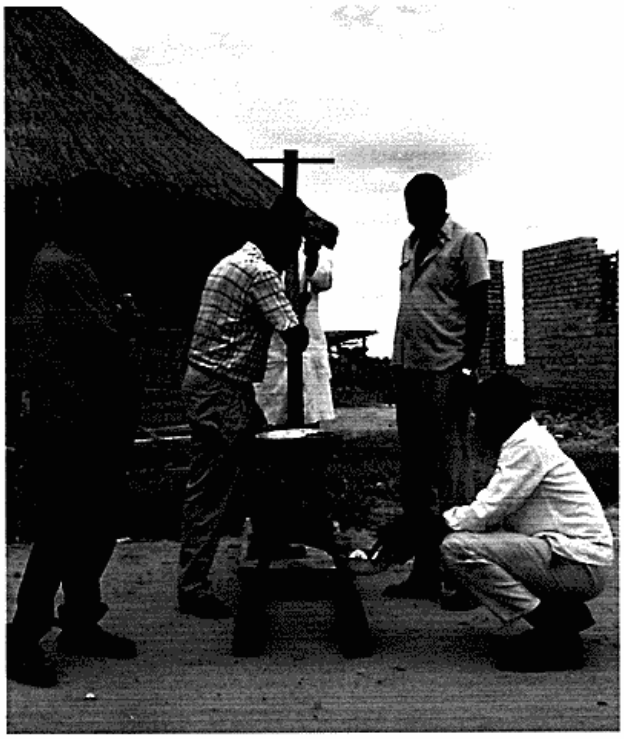

***Figure 2:** A manual press being introduced, Zimbabwe.*

boards in Zimbabwe (APROMA, 1995). As regards sheanuts, however, the operations of the CSPPA have differed in one notable way from the GMB in Zimbabwe that handled the sunflower seeds. Whereas the sunflower seeds have always been purchased for processing and consumption within the national market in Zimbabwe, a substantial quantity of the sheanuts collected and commercialised in Burkina Faso have been exported to northern Europe, particularly to Denmark and the UK. Industrially manufactured sheanut oil is an important element in cocoa butter substitutes, a substance which is added to various chocolate products by confectionary manufacturers in northern Europe. Moreover, a number of local merchants have been licenced and permitted to purchase kernels in rural areas provided that they fulfil individually fixed delivery quotas to the CSPPA.

The CSPPA organised the sale of kernels to northern trading and processing companies. Domestic prices were fixed by the CSPPA on the basis of a complex system of intervention prices, and export prices were negotiated with the relatively few purchasers. In the early 1990s, the system was dramatically changed as part of a structural adjustment programme initiated by the IMF and the World Bank. The

CSPPA has since then gradually been dismantled and presently no state institution in Burkina Faso interferes with market dynamics. Private traders, both national and foreign, are free to purchase kernels in rural areas and sell them to larger foreign trading and processing companies.

Semi-industrial small-scale plants and manual presses are also used in Burkina Faso. According to a recent survey (Nianogo et al., 1997a), about 12 to 15 semi-industrial plants are in operation. The majority of the units are equipped with imported Indian machinery and are located in relatively large towns. However, the presses are designed to process soft seeds, such as groundnuts, and are not hard enough to treat sheanuts. Where they have been used to process sheanuts, numerous breakdowns have occurred and as the supply of spare parts and after-sale services are inadequate, most of the presses in operation have turned to soft seed. Two Japanese produced processing units, similar to those used in Zimbabwe, have been introduced into two villages in Burkina Faso by a northern NGO. The presses are hardy and of much better quality, but a price of approximately 15 million CFA (150.000 FF) makes them almost prohibitively expensive for small-scale entrepreneurs or cooperatives.

More than 160 manual presses of seven different models had been installed in Burkina Faso up to 1997, most of them donated to rural women groups involved in development projects. All of the operations related to sheanuts (collection, preparation, processing and trade) are exclusively the domain of women in Burkina Faso. Income from commercial activities related to sheanuts are crucial for rural women as they provide a kind of autonomous space beyond the control of the male members of the household. At the time of Nianogo et al.'s (1997b) survey, only half of the manual presses were still in operation. Some of the presses had been abandoned because the operators found the workload too heavy. However, most of these presses have broken down and have not been repaired because of the high costs and/or the unavailability of skilled maintenance workers. The presses in operation are only used sporadically for most of the year, particularly in the dry season due to low supplies of kernels, insufficient resources and infrastructure in the villages to build up stocks, and women's devotion of work time to other activities necessary for the reproduction of the household. Some of the older presses are imported from Mali but presently three plants produce manual presses in Burkina Faso. The design of the presses, however, could be much improved in terms of both durability and adaptability to the women's needs and physical capacity (Nianogo et al., 1997b).

Conclusion

One of the rather depressing lessons from the experiences of the two African countries is that there are substantial barriers for rural small-scale processing of cooking oil whether it is based on manually operated or semi-industrial equipment. However, it should be stressed that problems related to the installation and running of semi-industrial plants are of a more complex nature than those related to manual equipment. The sheer size of the capital investment challenges the resilience and independence of the owner(s), and the many bureaucratic, technological and marketing barriers for profitable operation make the venture a highly risky one. Furthermore, there are no technological spin-off effects for equipment manufacturers in the local metal industry as all the parts are imported. Hence, the advantages of the Indian compared to the Japanese machines are more related to price than to any kind of adapted or compatible technology. Quality and sturdiness, though, are the competitive edge of the Japanese machinery.

Despite the problems encountered with manual presses, including breakdowns and sporadic utilization due to irregularity of raw material supply, lack of working capital or labour resources, they seem to be a more promising way of strengthening rural small-scale processing. The presses are based on relatively simple technology and could be manufactured locally, although some of the steel has to be imported. Furthermore, there is the potential for the creation of close supplier-customer relations between metal workshops and press owners which in the long run could lead to the development of improved types of presses. In Burkina Faso, for instance, the design of the presses needs to be adapted to the physical capacity of the female operators. It is important for the women to maintain control of their essential source of income from collection and processing of sheanuts.

Considerable resources have to be devoted after presses have been introduced to secure the availability of sufficient repair services and the training of operators in maintenance. These conditions are particularly crucial in Zimbabwe, where there is no tradition for domestic or artisanal processing of cooking oil and, therefore, no real alternative to the presses at the local level. Due to the

existence of alternative manual methods and the modest success of the manual presses in Burkina Faso, it might be a better option in this country to start with widespread dissemination of crushers that reduce the overall workload. Treatment in the crusher splits kernels into smaller pieces which are much easier to pulp. After installation of the crusher, the relatively more advanced presses could be introduced. The use of crushed kernels would reduce the damage to the press caused by too 'violent' operations and the press would mark a manageable step up the technological ladder for the operator.

A related question concerns the most adequate instutional framework for the dissemination of the presses into different social and cultural environments. In both countries, the majority of the presses are distributed through NGO development projects and the degree of accountability and responsibility for the maintenance and utilization of the presses is generally rather low. It is doubtful though, whether the presses can be sold under pure commercial conditions due to the lack of capital and collateral in rural communities and the weak credit system at local and national level. A flexible combination of long-term credit schemes and a system of comprehensive after-sale services and liaison with equipment manufacturers needs to be established. Hence, there seems to be no alternative to some kind of altruistic institution related to development aid.

Changes in the regulatory conditions may have increased private entrepreneurship in the trading sector and thereby created more market channels for rural collectors and producers, however, the effects are not unequivocal. In Burkina Faso, the quality of the kernels has declined severely since the dismantling of the CSPPA. Local traders do not grade the kernels according to quality and often kernels of good quality are mixed with bad quality nuts in the same shipment. This means the overall loss of international competitiveness of the national commodity chain and lower export revenue compared to exports from neighbouring countries. Moreover, no institution regulates the balance between exports and supplies for local consumption. In a situation with periodic high prices on the world market, caused for instance by the successful harmonisation of food regulations for chocolate production and marketing in the EU, exports could drain sheanuts from the local markets and result in an under-supply of this important food ingredient. In Zimbabwe, a liberalised foreign trade regime could potentially result in the country being flooded with cheap vegetable oil from the world market, possibly destroying the existing capacity for vegetable oil production and setting up insurmountable barriers for local small-scale processing activities. Thus, liberalisation of trade, both external and internal, in vegetable oils is certainly not a panacea for all social groups in developing countries. Liberalisation must be considered selectively since it is only under certain conditions and for certain products, that liberalisation can support development strategies that aim to improve living conditions in rural communities.

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