CROP POST-HARVEST PROGRAMME

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Population, migration and rural diversification; the implications for the crop post harvest sector

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A developing world growing economically, with higher populations, more migration and increasingly urban, has implications for the rural non-farm economy in general and the crop post-harvest sector in particular. This paper re views these, drawing upon a review of population data, the literature on population movement and the rural non-farm economy, and case studies from Kenya.

Conclusions and research needs

- Urbanisation leads to a rising demand for catering and for convenience foods; economic growth to increased demand for higher value foods. A greater proportion of the final price paid is likely to be spent on value added off the farm. But it is not clear what this may mean for the number, location and accessibility of jobs for the poor in the crop post-harvest sector.
- The rural non-farm sector already makes up between one quarter and one half of all rural economic activity. Its importance is likely to increase in the future, although much depends on the demand for its goods and services from agriculture and the urban economy.
- Although some activities, most obviously farming and other primary industry, are tied to the land, urban location confers substantial advantages on most industry— in reduced costs of transport, information, including that about markets, and other economies of agglomeration. For industry to locate rurally, there usually have to be special conditions, such as low wages, to attract it. Infrastructure, access to capital, information, ancillary services and labour skills are other necessary elements.
- A growing crop post-harvest sector does not necessarily mean more rural jobs: processing, storage and distribution could all locate in urban areas. Nor does this necessarily mean more jobs for the poor. Much depends on the nature of the products being processed—those in demand, and on the scale and technology of processing.
- Relatively little is known about specific changes in urban food demand in developing countries, although some data has been collected for a few particular cities and systematically for a handful of countries (China, India, Indonesia). Existing sources could be reviewed and findings synthesised.
- There are few studies of commodity chains in the developing world. Unknowns include: the extent of value-added at different points and locations in the chain; the technology, scale, operation and ownership of enterprises; and the employment implications of these two sets of factors. Increasing knowledge would require primary data collection, starting with example cases.

Population growth, urbanisation and migration

Population growth

The second half of the twentieth century has seen the fastest rates of population growth in recorded history. Most of that growth has been in the developing world. Growth rates, however, are slowing down—to rates of just under 1.5% a year in the early 1990s. Nevertheless, it will take until 2200 before the world population ceases to grow at an eventual size of 10.73G (UN central projection, 1996). In the medium term, the current world population of just over 6G is likely to reach 8G by the year 2020. Population growth rates vary regionally. Currently Sub-Saharan Africa and the Middle East and North Africa are growing most rapidly, Latin American and South Asian populations are increasing at more modest rates, while the rates for much of East Asia are quite low and little in excess of those seen in the industrialised world. Regional differences in growth rates will mean the future composition of the world's population will change. Above all Africa will come to have much greater weight in the world's population.

Economic growth and *urbanisation*

At the same time, it is expected that most economies in the world will grow. If, for example, economies can sustain rates of growth incomes per capita of 2% a year (the rate recorded for 1996-97 was 1.8%), then by 2015 incomes would have risen by more than one third. Although, following Engel's Law, increases in spending

on food are likely to be less great, higher incomes will ensure that the demand for foodstuffs increases by more than the rise in population. More importantly, the composition of food demand will change, as poorer consumers switch some of their consumption from staples to higher-value foods—such as fruit, vegetables, and livestock products. Consumers may also be prepared to pay for food of higher quality as well as for food that passes more stringent forms of hygiene and ignore safety. Changes in diet owing in large part to rising incomes can be striking, as seen in Box 1 for the case of Taiwan.

Box 1: Taiwan's changing diet
(kg/person/year)

Period	Rice	Wheat	Sweet Potato	Meat	Fish	Fruit
1949-1951	133	7	66	13	12	16
1969-1971	136	25	24	25	33	43
1989-1991	68	29	2	62	45	108

Between the early 1970s and the 1990s, Taiwan saw rapid economic growth, so that incomes a head rose by more than five times in twenty years. As this took place, average annual per capita consumption of staples such as rice and sweet potato fell to half or less of previous levels, whilst intakes of meat and fruit more than doubled and fish consumption rose by one third.

There were also differences by location. In 1991, urban households consumed 18 kg less rice per person than those living in rural areas. However, they ate 14 kg more meat, 10 kg more fish, and 30 kg more fruit. Even more marked contrasts could be found between farm households and those not engaged in agriculture. Farm households ate 28 kg per person more rice, but consumed 11 kg less meat, 12 kg less fish, and 43 kg less fruit than their non-farm counterparts

Source: Huang and Bouis,1996

As striking as overall population growth will be urbanisation. In 1999 just under half the world's population were living in urban areas: by 2025 that is projected to rise to almost 60%. Most of the increase in urban populations and the growth of new cities will be found in the developing world. It is also likely that much of this urban growth will take place in secondary cities, rather than the very largest, primate cities. Box 2 illustrates the recent urban growth rate in Kenya.

Urbanisation and the crop post-harvest sector

Urbanisation is likely to mean an increase in the proportion of meals taken outside of the home, as those at work are unable to return for midday meals. It may lead to more food being eaten as snacks. Urban households are likely to be smaller than their rural equivalents, based around the nuclear family. A higher percentage of women will be in full-time work, and have correspondingly less time to spend preparing foodstuffs. Consequently, convenience or processed foods are likely to be preferred. In Nigeria for example, less cassava may be bought, but *gari* (ground, pre-cooked cassava) may be substituted for this. Other examples of changing food habits are highlighted in Box 3.

Box 2: Kenya's recent urban growth

Analysis of migration and urbanisation trends in Kenya relies largely on census data, the last being in 1989, as seen in the Table.

Degree of Urbanisation

Year	% of population
1948	5
1962	9
1969	10
1979	15
1989	18
1999* (est.)	27

The proportion of the total population resident in urban areas has been increasing over the years. Between 1962 and 1989, the average national population growth rate was 3.4%. Whereas during the period rural population growth rate remained below the national average, the urban population grew at 7.2%. The rapid growth rate of urban population is attributable to three factors:

- natural growth as the urban population reproduces;
- rural to urban migration; and,
- redefinition of previously rural centres as urban—this accounted for just over 10% of the increase in urban population between 1979 and 1989.

Similarly, the number of urban centres has increased in the past three decades, from 34 in 1962 to 139 in 1989. Cities with more than 100k inhabitants have grown from just two in 1962 to six in 1989.

Source: Government of Kenya, 1996

Box 3: Urbanisation and changing food habits

Studies from Kenya indicate that urban households consume more wheat in the form of bread than their rural based counterparts. Evidence from a field survey in Machakos supports the argument about a shift to convenience foodstuffs in urban households. There is a strong preference for semi-processed (ready to cook) vegetables among the low-income urban households.

In the same vein studies from Burkina Faso indicate preference for prepared food in consumption of non-traditional cereals. Thus, urbanisation and the attendant shift in the opportunity cost of female labour used to prepare such foodstuffs has an effect on demand for convenience food.

Source: Kennedy and Reardon 1994, Otieno, 1999

Similarly, households may be prepared to pay for foods that once they prepared entirely at home—*tortillas* in Mexico would be an example (Box 4).

Box 4: Externalising household work: The case of tortilla preparation in Mexico

The *tortilla*[1] forms an important part of the Mexican diet, especially for rural households who have traditionally cultivated maize for subsistence needs

Traditionally the *tortilla* was prepared within the home by female members of the household. The process involved graining the maize from the cob, which was then left to soak overnight in lime and water to soften the kernels. The resultant mixture (*nixtamal)* was then rinsed with water before being ground by hand on a stone slab (*metate)*. The women then kneaded the mixture into a dough which was formed into pancakes and cooked over an open fire.

This arduous task took up several hours of female labour each day. More recently, however, the time taken for grinding of maize flour has been greatly reduced, first, by the use of hand-operated table-top mills. These are now only seen among the poorest households in rural areas. In most rural communities, small-scale powered mills are operated as businesses, to which women take the *nixtamal* to have it ground.

In urban areas however, households usually purchase *tortillas* from their local tortilla shop (*tortillería)* where it is prepared fresh daily (sometimes even twice a day). Pre-packaged *tortillas* with longer shelf-life, manufactured by large food-processing industries, can be found in grocery stores and supermarkets. These are particularly popular among the urban middle classes as a convenience food, overcoming the need to make daily trips to the local *tortillería*.

The specialised processing of *tortilla* has externalised the work in an activity traditionally performed by unpaid female domestic labour. The opportunity cost of such labour is important as this can now be allocated to more remunerative tasks within or without the household.

Although industrial food-processing involves specialised labour and increased monetary costs, a local *tortillería* uses less total labour time to prepare tortillas since the operation is mechanised.

Some higher-value foodstuffs require less processing than staples, for example fresh meat, fish, fruit and vegetables. In such cases, refrigeration and swift transport are the requirements in the post-harvesting sector. Dairy products, however, are an exception.

While the direction of changes in food consumption and the implications for the food chain downstream of the farm can be predicted with reasonable confidence, it is less easy to be specific about changes in value-added, employment and technology. There are remarkably few studies and even less data that describe in detail the food chain in developing countries.

[1] A flat pancake made from maize flour. The *tortilla* is traditionally eaten as the main staple (and source of carbohydrate) with all meals. Among the urban middle-class, however, diet patterns have changed and become more 'westernised': for example, boxed cereals have become a substitute at breakfast for *tortilla*-based meals.

Migration

Surveys of rural communities across the developing world - (see literature review by Wiggins and Proctor, 1999) - consistently show one quarter or more households have a member absent as a migrant. Perhaps surprisingly, the majority of migration is regarded as temporary, either seasonal or circular.

The decision to move being as much a household decision as an individual one, links to the rest of the household and the community of origin remain strong in many cases. Indeed, migration is blurring distinctions based on location. Some households construct their livelihoods in several locations ('bi- or multi-locality households'), taking advantage of diverse opportunities and reducing risks of income failure (Afsar, 1999).

Thus although urban areas may contain many migrants, not all of these regard the city as their 'home'. The age pyramid for Nairobi shows a marked lack of men and women over 60 years old, compared to the national pyramid. Kenyans, it seems, may migrate to Nairobi for work, but they retire back to their villages.

Rural-rural migration can be equally or more important than rural-urban flows (see Box 5 for the case of Kenya) as migrants seek land and rural jobs.

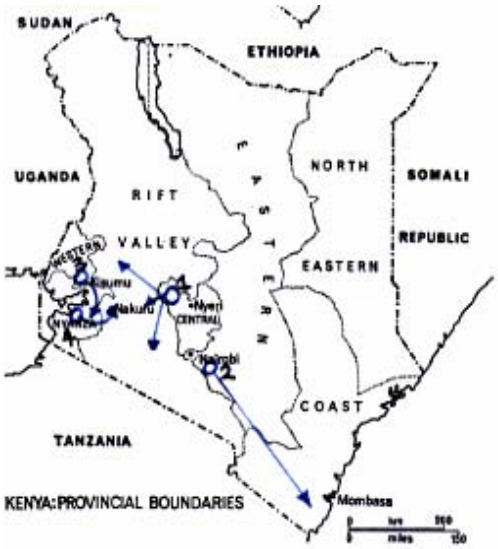
Evidence from Swaziland, north-eastern Ghana, parts of China, and north-east Thailand suggests that migration may reduce the labour supply for working the land in the community of origin, leading both to fewer fields being tilled and to less intensity of cultivation. But this depends on the movements being longer than the off-season for farming. It also tends to arise when the returns to farming are modest or poor.

Remittances from migrants can be substantial, especially when the moves are international. Most studies report remittances being used for consumption: only a small fraction of remittances go into investments (Wiggins and Proctor, 1999).

Although governments and observers sometimes see migration as an evil to be discouraged or even actively controlled, the literature suggests there is less cause for concern. Some moves are indeed motivated by desperation. Witness the movement of men from the valleys of southern Cochabamba, Bolivia in search of land and work in the Chapare (Gisbert *et al.,* 1994). Or the emigration of Mixtec men from the southern highlands of Mexico, leaving lands where marginal rainfed fields can barely support the current population (Zabin and Hughes, 1995). Some of these moves echo the mass emigrations of the 18th and 19th centuries from Ireland and the highlands of Scotland.

Box 5: Kenyan rural-rural flows

In addition to the well-documented rural-urban migration in Kenya, significant levels of rural-rural migration have occurred. This process is in part a consequence of Kenya's colonial legacy. The opening up of the former white highlands after independence led to the movement of the Kikuyu Diaspora from Central Province to the Rift valley (1). Population pressure on the land in communities of origin have also led to Akamba migration from Machakos and Kitui Districts into the Coastal Lowlands (2) and to the Maragoli migration from Western Province to South Nyanza (3).



Also linked to colonial policies is the Luo migration into the plantation areas of Kericho District (4) in search of paid employment. More recently however, the motivational factors associated with the rural-rural migration into plantations are similar to those for rural-urban migration.

The benefits arising from the observed migration patterns in Kenya include a positive influence on rural incomes, rural capital formation and modes of production. Remittances raise rural incomes, increase levels of consumption and, by encouraging technological change, have improved returns to farming and also to rural non-farm enterprises. Remittances have also encouraged investment in human capital.

Source: Migot Adholla, 1977; Obudho, 1989; Reardon *et al.,* 1998

But many more migrants seem to take advantage of opportunities to enhance livelihoods and make them more secure. Governments should consider supporting such a widening of options, by providing information on opportunities, helping to make remittances simple, and by encouraging the use of such funds for productive investment (de Haan, 1999).

Although migration can have strong effects on farming in both communities of origin and destinations, there are few if any reports of it affecting post-harvest operations. In as much as households with migrants receive remittances and can spend more on food, it can encourage the kinds of changes in diet described earlier.

Rural jobs: labour in agriculture

Clear patterns emerge across countries with respect to the creation of jobs on the land. In OECD countries it is common to find that the agricultural labour force is in absolute decline—for example by 5.5% a year in Japan and 2.5% a year for Canada in the period 1995-97. The same pattern also applies to some of the upper middle-income countries: Mexico, Poland, and South Africa all show declining farm labour force over this period. Elsewhere, the agricultural labour force is generally growing, but more slowly than the rural population.

Consequently, the number of the rural dwellers not engaged in farming is increasing. The decline in farm workers in the more industrialised countries and the slow growth of farming jobs in the developing world has only been possible without reducing aggregate food production per person owing to increased labour productivity.

Rural diversification and the non-farm sector

The nature and extent of the rural non-farm sector

The rural non-farm sector (RNFS) embraces a great variety of activities carried out in rural areas, other than farming—provision of services, manufacturing, and some primary industry other than agriculture (Box 6).

Box 6: Non-farm occupations in India, Kenya and Mexico

The RNFS in **India** generates as much as a quarter of all rural employment (Fisher *et al.,* 1997). This varies widely across states however, from 44% in Kerala to 26% in the Punjab and 12% in Bihar. Income from non-farm activities contributes between 25% and 35% of the total income of rural households. It has been estimated that one third of RNFS jobs are in manufacturing, 60% are in services, the remainder (7%) in construction and mining.
Most non-farm activities are undertaken in small rural enterprises, which number at least 13 million. On average, however, each provides work to only two people.

Source: Fisher *et al.,* 1997

Kenya, Machakos District

Over the past two decades, there has been a significant decline in the traditional job opportunities available for rural-urban migrants. Consequently, the rural non-farm sector has increasingly gained importance as a source of employment and income.

In Machakos district for example, rural handicrafts in the form of woodcarvings and sisal baskets (*kyondo)* are a major rural non-farm activity. In addition, Machakos district is the main source of sand for the construction industry in Nairobi, making sand harvesting a major rural form of non-farm self-employment. Being an exclusively male activity and physically arduous, the majority of sand harvesters are youths and middle aged adults. Daily earnings from sand harvesting range from US$2 to 8 per day.

Source: (pers comm)

Box 6 continued

In **Mexico**, surveys of 187 households in four rural communities during 1997 revealed a large non-farm sector. All told, the median proportion of household incomes coming directly from agriculture was just 14%, despite more than 80% of the households having access to land.

More than half of the households had a waged job, and almost one in five had salaried work. These jobs included agricultural labouring, artisan crafts, teaching, domestic service, construction work, trading, carpentry, soldiers and police and drivers.

Just over half the households had one or more non-farm business. Almost all were of small and micro scale. A great variety of enterprises were recorded, including trading of coffee, vegetables and cleaning items; manufacturing of furniture, foodstuffs, coffee, and clothes; and services in transport, ploughing and traditional medicines.

Of equal note to the importance of these activities were the very large differences in the returns to non-farm work—largely depending on the capital deployed, and the education and skills of those employed.

Source: Wiggins *et al.,* 1999

Some of the non-farm sector arises from farming households diversifying their portfolio of livelihoods. (Box 7). Other enterprises are carried out by those with neither land nor direct links to farming, but who cater to demands originating in part from farmers. Still other businesses look to urban areas for their market, or even to export markets. It is of no surprise to find evidence that large fractions of rural incomes come from diversified enterprises, especially in the RNFS. Field studies reveal between one quarter and one half of rural incomes coming from non-farm work and businesses (Wiggins and Proctor, 1999).

Box 7: Why diversify rural occupations?

Specialisation should offer greater productivity and efficiency, assuming that goods and services can readily be exchanged. First, the seasonality of most farm enterprises means that there are times of the year when labour, land, buildings and equipment, can be put to other uses at little or no marginal cost. Not only does this generate additional income, but it also generates extra earnings at times when those from the main farm enterprises are little or nil, thereby helping to smooth consumption. Moreover, some farm enterprises generate complementarities and economies of scope—as, for example, when livestock manure helps fertilise crops and crop stover is used to feed livestock. Second, diversifying activities reduces the risk of income failure arising from physical or market calamities.

Third, some non-farm activities may be undertaken to generate capital for agricultural and other enterprises—that is, they are ways to overcome shortcomings in insurance and credit markets.

Source: Ellis, 1998

Demand for the products of the rural non-farm sector

Despite the impressive range of non-farm activities typically carried out in rural areas, both the extent of non-farm activity and the returns to such work, depend critically on demand from other sectors. The farm economy can generate strong multipliers to the rest of the rural economy.

For example, in North Arcot district, Tamil Nadu, India, studies in the early 1980s showed how modest increases in the production of rice through the application of green revolution technology had stimulated the wider village economy (Hazell *et al.,*. 1991). Greater farm output had generated demand for the supply of inputs, including the provision and servicing of irrigation pumps, and for the processing, storage and transport of output. Moreover increased farm incomes were spent in part on local products and services. All told, for every extra rupee of farm output, another 0.87 rupees of output was generated off the farms.

Seasonal variations in local demand driven by farm earnings can strongly affect village industry and indeed the location of food processing (Box 8).

Other rural activities, particularly the production of crafts, and the extraction of construction materials and minerals, respond to demand from the industrial and urban economies.

Box 8: The demand for food processing: baking bread in a Mexican village

Pueblo Viejo is a rural community in eastern Mexico. The local economy depends heavily upon the cultivation, processing and marketing of coffee, supplemented by subsistence production of maize and beans. For most households, sales of coffee (unprocessed or semi-processed in parchment) are their only access to cash within their community. The seasonality of coffee production however, has far-reaching effects upon the local economy. Demand for processed, convenience and luxury food items (e.g. fresh fruit and vegetables, livestock products, alcohol, soft drinks and *pan dulce*[2]) depends on households' purchasing power; ultimately a reflection of the seasonal availability of cash incomes linked to coffee.

During the coffee harvest and for a couple of months after, demand for bread is high. Bread is considered a luxury item in rural Mexico where the staple is the *tortilla*; bread is not considered a convenience food, nor does it act as a substitute for *tortilla*. As the coffee harvest ends and cash income declines—especially for those who sell their coffee as cherry immediately after harvest, consumption of bread also falls.

This has an impact upon local small-scale food processing. During the coffee harvest when demand is high, bread is baked daily in a small bakery using basic technology and little capital. Consumer demand is sufficient to cover input and labour costs, and still allow profits. As the coffee season ends and demand dwindles, bread is no longer baked on the premises but is transported daily by bus from the nearest market centre, Misantla and sold by local corner shops. When demand is at its lowest (during the *guayaba*[3]), bread is requested only every other day from Misantla.

In this case, seasonal demand effectively limits the operation of the village bakery. The urban plant in Misantla enjoys both economies of scale and access to a larger market that allows it to function year-round.

Source: Proctor, 1997

[2] A sweetened bread, in this region this is typically consumed at suppertime with coffee. The consumption of bread is related to socio-economic status of the household.

[3] The period of the year when rainfall is low, no coffee is harvested or sold, and when there is little work available locally, and local households have little or no cash income.

Studies suggest that only when there is growth in other sectors, does the rural non-farm sector flourish. Otherwise, when farming stagnates the rural non-farm sector swells with one-person business start-ups, but all too often these are the most petty of enterprises with very poor returns. (Saith, 1992, Haggblade and Liedholm, 1991, Leidholm *et al.,* 1994, Mead, 1994).

How much of the rural non-farm sector concerns activities downstream of the farm? Evidence is thin. The Mexican study mentioned in Box 6 showed that only 31 of 187 households had occupations in post-harvest operations: trading vegetables (11); preparing food for local sale (14); milling (2); coffee processing and trading (3); and trading in milk, butchery (6). With the exception of the vegetables that were sold in nearby cities and the coffee trade, the rest of these enterprises serviced the local rural economy.

Location of rural non-farm activities

The bulk of activity in most economies is made up of non-farm activities. But how much of this will locate in rural areas? There are formidable advantages to locating in towns and cities. The availability of physical infrastructure and services is usually better than in the countryside, having similar plants close to hand generates economies in supplies of inputs, and being close to the large urban market reduces transport costs and facilitates information about the market. These advantages usually outweigh the costs of congestion. (Hite, 1997). The main exceptions to this include:

- activities that are necessarily tied to a physical resource—for example, agriculture, mining, forestry, fisheries, recreation and tourism;
- some agricultural (and mineral) processing, as discussed below; and,
- where a rural industry can take advantage of the often cheaper labour rates in the countryside. Lower wages stem primarily from the 'by-employment' of farming: in the off-season, farm labour may be prepared to work for low rates rather than be under-employed with little or no cash income. Rural living costs may also be lower, so that lower nominal wages do not necessarily imply lower real wages.

The wage advantage of rural areas explains why early industrialisation often involves a 'putting-out' system. But such activities often later face devastating competition from factory products turned out at lower unit costs, owing to economies of scale. Examples of advanced industries seeking rural locations are few. One of the best known is the success of Taiwan (Box 9) but this does depend on special conditions.

Box 9: Rural industrialisation in Taiwan

Taiwan has enjoyed notable success in rural industrialisation, including in consumer electronics. These plants have taken advantage of rural wages being 20% lower than in the cities. But in addition they have taken advantage of certain, special conditions, thus:

- government has invested in a dense rural road network, reducing isolation and transport costs;
- rural entrepreneurs have been largely drawn from the ranks of migrants returning from the cities who came back with not just capital but also knowledge and business contacts; and,
- contacts have facilitated the setting up of rural industrial plants as sub-contractors to large corporations with export markets. Sub-contracting has effectively provided working capital to rural industry as well as information on products and technology.

Source: Otsuka and Reardon, 1998; Saith, 1992

Post-harvest industries: the importance of scale and *technology*

Agricultural processing might be considered the most likely of industries to be located rurally. But not necessarily so. Indeed, processing may only take place in the countryside when:

- initial processing of farm output significantly reduces bulk and saves transport costs; or,
- when processing has to be prompt to avoid spoilage or loss of quality, so that long journeys cannot be contemplated— for example, tea, sugar cane, tobacco, oil palm, and any product that requires refrigeration.

Box 10: Scale and technology

Most **cereals** can have their husks removed or be ground by processes as simple as manual pounding or as sophisticated as passing through power-driven machinery. Powered mills, however, require much less labour and even in areas where wages are low, this can be cheaper than manual processing. But economies of scale in milling are not great. Hence, when Zimbabwe liberalised the marketing of cereals and relaxed regulations restricting milling to industrial plants in the cities, the result was an explosion of small hammer mills opening up in rural areas. As a result not only were new jobs created, but also milled cereal prices fell, despite the measure being accompanied by the removal of subsidies on food prices (Jayne and Jones, 1997).

Green 'French' beans grown on irrigated plots in Matuu, Machakos, Kenya are a high value crop exported by air to European markets. The processing is very simple. Beans are selected, graded, cut and placed into boxes by those harvesting the crop. The boxes are then loaded on to pick-ups and driven to the airport by employees of the urban-based marketing companies. No jobs are created off-field by this crop.

Sugar cane is an example of a crop where prompt extraction of the sugar juice is critical if sucrose levels are not to be lost. Hence commercial cane fields are rarely planted more than two hours drive from a factory. Although sugar can be processed by artisan methods to produce jaggery (coarse brown sugar), most consumers now demand more refined sugars produced in larger, more-mechanised sugar mills. These enjoy economies of scale, so that plants will only be built where there is a minimum supply of cane from fields within a few hours drive. To keep plants operating at capacity throughout the harvest season, it becomes necessary to coordinate harvesting from different fields. This encourages sugar mills to make contracts with growers and to provide harvesting gangs. It can also encourage close cooperation amongst cane farmers if the mill is cooperatively owned and operated

Source: Attwood, 1989

In other cases, it is likely that what gets transformed locally is that part of the harvest destined for village markets. Whether even this is located rurally depends in part on the technology of processing and the extent of economies of scale. (Box 10) It does not necessarily correspond to the unit value of the farm output.

Supply-side limitations and policy

If rural industry, including post-harvest operations, is to succeed, it has to overcome some potentially serious obstacles, including:

- physical infrastructure: a good network of well-maintained roads, reliable electricity supplies, and working telephones are essential if rural industry is to have a chance to compete with urban plants. Rural electrification can be a double-edged sword. In Bangladesh, the arrival of rural electricity led to investment in powered rice mills by local elites, thereby displacing manual pounding of rice by (usually poor) women (Saith, 1992).

- credit: particularly for micro and small-scale enterprises, getting access to capital can be difficult. Some rural businesses have overcome this limitation by use of remittances from urban migrants.

- skilled and disciplined staff may be hard to recruit, notwithstanding the overall availability of labour in some rural areas. Murphy (1999) reports how in Jiangxi, China returned migrants setting up businesses in rural communities prefer to hire fellow returnees who have industrial skills and are accustomed to factory work.

- access to ancillary services—banks, repair shops, etc.—is another advantage of urban location for industry. Rural industries struggle to match this. Clustering rural plants in single locations is one way to generate those services, but this can soon become an urban location, so that for most rural job-seekers industries are inaccessible, and,

- information on techniques, markets: studies of micro enterprises show owners to have little access to the knowledge that might enable to them to produce higher-value output for niche markets.

Relieving these potential supply-side obstacles to rural industry can become a focus for government policy. Providing infrastructure is a central role for government, but given budgetary limits leaves questions about how to prioritise public investment. Should infrastructure and supporting services be provided and encouraged in particular 'growth poles'? This cuts costs and makes it more likely that all services are of a commensurate standard. But it risks creating privileged islands of semi-urban industry.

Making credit more accessible to small-scale entrepreneurs requires skill and determination if the pitfalls of public credit provision are to be avoided.[4] Providing technical assistance and information again sets a demanding agenda in defining how a public agency with budget limits can identify appropriate information and training and transmit it to the world of small business.

These actions, however, may be more efficient than measures to direct the location of industry by licensing, or to encourage it through tax concessions.

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[4] The dangers include setting up credit programmes that are seen by recipients as government grants with consequent poor rates of repayment, and incurring unsustainably high transactions costs in screening applicants.

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