The role and value of local knowledge in Jamaican agriculture: adaptation and change in small-scale farming

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Local knowledge has played an active role in the lives of rural communities in virtually every part of the world. In Jamaica, traditional cropping systems based on local informal knowledge have been practiced since the days of slavery and play a vital role in meeting food security. Yet, some negative attitudes remain about the legitimacy and relevance of small-scale farmers’ local and traditional knowledge. This paper discusses some conceptual and empirical issues related to the application of local knowledge among small-scale food farmers in central Jamaica. The paper argues that contextually speaking, local and traditional knowledge is valuable, adaptable and necessary in coping with risk and uncertainty in a changing world, while cautioning against a misguided notion of traditional knowledge as a panacea to all the ills of local agriculture.

KEY WORDS: Jamaica, local knowledge, agricultural dualism, small-scale farming, farmer innovation

Local knowledge

Local knowledge may be defined as dynamic and complex bodies of know-how, practices and skills that are developed and sustained by peoples/communities with shared histories and experiences. This knowledge provides a framework for decision-making in a plethora of social, economic and environmental activities and livelihoods among rural peoples. Local knowledge, therefore, facilitates dynamic information systems critical in decision-making (Scoones and Thompson 1994). It is knowledge which is developed and used over time by local people and is influenced by environmental and socio-economic realities. It is based on experience which has been empirically tested and proven often over many generations and is adapted to local culture (Netherlands Organization for International Cooperation in Higher Education – NUFFIC 2003).

In Jamaica, as elsewhere, such knowledge has been shaped and modified by continuous farm level experimentation over many generations. Local knowledge, and its associated skills, has been developed outside the formal educational system and is embedded in culture and steeped in tradition. It is the basis for decision-making in rural communities with respect to food security, human and animal health, education and natural resource management. Several interrelated issues characterize the nature of local knowledge. Firstly, it is localized in nature and, more often than not, traditional in context. Secondly, it is unique to specific environmental and cultural conditions. Thirdly, it is knowledge constructed in informal settings, it is orally transmitted and rarely documented. It is dynamic, adaptive and holistic in nature and is a significant part of the way of life and subsistence of rural peoples everywhere.

An important issue is the importance of geographical scale in the definition of ‘local’. The term can be applied at different spatial scales ranging from the village to the national level. In this paper, we use the term ‘local knowledge’ to describe knowledge and practices within a particular study area in central Jamaica. The term ‘local’ does not mean that knowledge and practices originated in the study area, although this probably is true in at
The value of local knowledge among small-scale tropical farmers

Independent researchers working in diverse geographical areas of the world have long recognized the validity and value of traditional skills and knowledge in small-scale agricultural systems (see Chambers 1983; Chambers et al. 1989; Richards 1985; Hills and Iton 1983). Local traditional knowledge is dynamic as it allows people to carry out their daily tasks, and also to adapt and cope with new problems in the face of environmental and economic uncertainties and hardships (Richards 1985). More recent research has confirmed scientific validity of such knowledge (Agrawal 1995; Carswell and Jones 2004; Pretty et al. 1999). Traditional small-scale tropical agriculture is dependent on local traditional knowledge, both at the level of the individual farmer and within the wider rural community. Local knowledge underpins the choice of farming techniques, allowing farmers (among other things) to manage soil fertility, to rotate crops effectively, to select appropriate crops, and crop combinations, for local conditions and specialized environmental niches, and to use traditional methods of pest control.

Careful and detailed research has forced a reappraisal of the validity and value of local knowledge in tropical small farming systems (Richards 1985; Chambers 1983 1997), opening up new avenues of applied research in farming systems in Africa, Asia, Central America and the Caribbean and South America, highlighting the significance of traditional knowledge. Farmers experiment constantly and are capable of formulating their own innovations to solve problems (Scoones and Thompson 1994; Chambers 1989 1990; Chambers et al. 1989). Many traditional food production systems are complex, reflecting generations of careful observations of the agro-ecological and socio-cultural environment (Eyzaquirre 2001; Shepherd 2001), and producing food from diversified agro-ecological environments to meet the nutritional needs of local peoples. There is a growing recognition that such food production systems are far more sophisticated than they are given credit for, and that they can contribute significantly to food security at the household level.

The research reported here is part of a long-term project in central Jamaica on yam farming. In the mid-1990s, as many as 216 farmers were interviewed in the southern section of the parish of Trelawny, in the communities of Lowe River, Litchfield, Wait-a-Bit, Allsides and Troy (Figure 1) (Beckford 2002). The second phase of the project involved another survey of 100 farmers in 2001 in the same study area, many of whom had been interviewed in the earlier work. This part of central Jamaica is the principal yam-producing area of the country, and yams are produced entirely by small farmers, on holdings being larger than 5 ha. In the project’s second phase, a variety of complementary field techniques was employed, including questionnaires, in-depth interviews, participant observation, manual discriminant analysis and visually aided dialogue. Manual discriminant analysis is used in group discussions among farmers and researchers about farming practices and constraints. The general aim is to have farmers compare and contrast agronomic practices by different farmers in the area to identify how these converge and diverge. Farmers are asked to compare their own practices with those of their colleagues (Gupta 1987a, cited by Richards 1985). Visual-aided dialogue involves discussing items and farming practices that are in view or in progress. Richards (1985) suggested that this strategy is particularly useful at the beginning of a research process to break the ice and to establish rapport with farmers. We also worked closely with a small group of farmers in field trials over a period of 9 months (2001–2). The collaborative and participatory aspect of the work was particularly informative and endorses Chambers’ (1997) advocacy of greater use of participatory techniques in designing agricultural development projects. Our experiences support the central role of such fieldwork methodologies in rural development research. The paper also draws on findings from studies undertaken elsewhere in Jamaica by local researchers.
Situating local and traditional knowledge in small-scale food production systems

Much of the research on local or traditional knowledge has tended to focus on its empirical and practical elements, but this emphasis perhaps undermines a more comprehensive understanding of the epistemology of indigenous knowledge (Briggs 2005). Briggs argues that the overwhelmingly empiricist approach often disconnects local knowledge from its context and, while conceding the importance of the empirical, he astutely bemoaned the neglect of the economic and socio-cultural contexts in which such knowledge is used. Kapoor (2002) argued that the empiricist focus has hindered a more rigorous theorization and politicization of local knowledge. Further, reservations have been expressed about the usefulness of local knowledge outside the spatial locales in which it was developed (Briggs 2005; Briggs and Sharpe 2004), and its advocacy as a replacement for western science has been questioned (Cleaver 1999). Given these critiques, it is important first to position local knowledge in the socio-cultural, economic, political and environmental contexts of Jamaica, and so provide a framework within which the value of local traditional knowledge and farming practices in Jamaica and in our study area may be evaluated.

The intention here is not to present local knowledge as a panacea to pressing agricultural problems. Neither do we suggest it is superior to or should be seen as a replacement for scientific research on cropping systems. We are cognizant of the dangers of romanticizing or idealizing traditional knowledge (Briggs 2005; Forsyth 1996; Sillitoe 1998), but we argue strongly that much is to be gained by seeing traditional knowledge as a complementary knowledge system to scientific research which, despite its limitations, has evolved as a sound adaptation to local realities, and is the single most important variable that keeps the domestic food production sector in Jamaica alive. We regard local knowledge as a necessary adaptation to well-recognized resource constraints in a physical, economic and political environment rife with risks and uncertainties. In the next section, we contextualize the relevance of local knowledge in

Figure 1 General location map of the study area: Trelawny, Jamaica
terms of the historically based, structural dualism that persists in Jamaican agriculture, and the consequential institutionalized structural biases against the domestic food production sector.

Dualism in Jamaican agriculture and biases against the domestic food production

There is a deep-rooted structural dualism which characterizes the island’s agricultural sector and pervades and influences the direction of agricultural policy. This dualism is characterized by a large-scale ‘commercial’ sector, predominantly geared towards traditional export crops like sugar cane, bananas, citrus and coffee; and a small-scale sector of relatively marginalized and resource-poor small farmers who mainly produce food for the domestic market (Barker 1993). There have been persistent and chronic problems in large-scale export sugar and banana production throughout the second half of the twentieth century, even before the onset of globalization. On the other hand, the sub-sector classified as ‘non-traditional’ exports has fared less badly than traditional commercial export crops, recording long-term increases in farm output. This sector is dominated by small farmers. The structural dichotomy in the island’s agricultural sector has led to institutional biases against small-scale farming. These biases are manifested in several ways. First and most fundamental is that the historical and colonial implant effectively banished small-scale farming to the most marginal agricultural lands in the hilly interior, while the large-scale export sector still occupies the best arable lands in the fertile interior valleys and coastal alluvial plains (Barker 1993).

This distribution of farm types can be traced back to the slave era and the period immediately afterwards following emancipation in 1838. To reduce the cost of importing food to feed their slave populations, plantations allowed slaves to grow some of their food on plots of estate land. There were two different kinds of slave plots. The first was small gardens established on land around the slave huts, which are considered to be the forerunners of today’s kitchen gardens and food forests in the region (Brierly 1991; Hills and Iton 1983). The second were larger plots of land established on marginal estate land (rocky hillsides and poor soils), which were unsuitable for growing sugar cane and other plantation crops on the fringes of the estate. In 1834, slavery was abolished but the slaves had to serve a period of apprenticeship with their owners, which was supposed to prepare them for full freedom in 1840. Full emancipation came two years early in 1838, and, instead of working for wages for their former masters, the majority of ex-slaves left the plantations in a mass exodus. Their desire to distance themselves from the plantations and their former lives took them into remote areas and led to the development of hundreds of new settlements called free villages in the hilly interior. The former slaves turned to farming as their major economic activity and developed the small-scale farming sector. With virtually all the interior valleys and alluvial plains occupied by sugar plantations, the peasants were forced to occupy some of the most infertile lands on hilly terrain. Small fragmented hillside farming systems, characterized by a limited resource base, developed. The local peasantry and the small-scale farming sector have become vital cogs in the economic wheel of the nation.

The small-scale farming sector absorbs surplus labour and makes an important contribution to foreign exchange earnings (Table 1). Further, its contribution to foreign exchange savings is more difficult to quantify, but perhaps its most significant role is its contribution to national food security (Table 2). This has been achieved in spite of certain perceived biases against the sector and, in the last decade, a number of devastating hurricanes which have contributed to the decline in production since the halcyon days in the mid-1990s. Since the turn of the century the domestic agricultural sector has been ravaged by storms such as Ivan, Emily, Dennis and Katrina to name a few, as well as several debilitating droughts.

The domestic food production sector has traditionally suffered from certain biases which constitute major constraints to progress. These biases are largely related to resource allocation and inadequate resources, and include lack of access to funding, unavailability of land, little extension support and lack of research into domestic food crops. In addition, there are several problematic infrastructural deficiencies.

The inadequate resource base is related to certain key issues. One of the most fundamental is access to land from a qualitative as well as a quantitative perspective. As we discussed in the preceding section, land that is generally available to domestic food producers is marginal hillside land often on steep slopes. The small size of the island is a further constraint on land availability. Poor access to land is also related to insecure tenure and high incidences of farm fragmentation, which are ubiquitous features of small-scale farming in Jamaica. In addition, only a limited amount of operational capital is available to small-scale producers of domestic food crops because of the general unwillingness of financial institutions to extend loans to them. Loans are available mainly to large-scale producers of export crops who are
considered less of a risk and who are more likely to be able to provide collateral. An illustration of this lack of funding is the inability of small farmers to install proper irrigation systems. Thus, most small-scale farming Jamaica relies mainly on rain-fed conditions and rain shadow farming areas, such as southern parts of the island, are particularly susceptible to the ravages of drought.

The loan allocation to the agricultural sector from the Development Bank of Jamaica shows a similar bias. In 2001, around J$12 million was loaned to the domestic crop sector and J$115 million to the export sector, and in 2005 the figures were J$2 million and J$57 million, respectively (Planning Institute of Jamaica 2005) (see Table 3).

Farmers consider farm inputs to be extremely expensive and farm subsidies are insignificant. In addition, agricultural trade policy brings cheap subsidized foreign grown produce into the island, with which local producers cannot compete. There is also a lack of scientific research into domestic food crops. The lion’s share of research resources in Jamaica has gone towards traditional export crops, especially sugarcane. Very little research is done on domestic food crops and the diseases and pests that affect them. In addition, the general perception among older farmers in Table 1 Value of non-traditional exports 1997–2001 (US$ '000)

<table>
<thead>
<tr>
<th>Commodity</th>
<th>1997</th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
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<tbody>
<tr>
<td>Cucumbers</td>
<td>72</td>
<td>42</td>
<td>78</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>Pumpkins</td>
<td>787</td>
<td>1036</td>
<td>1079</td>
<td>820</td>
<td>755</td>
</tr>
<tr>
<td>Dasheens</td>
<td>1170</td>
<td>1503</td>
<td>1496</td>
<td>808</td>
<td>1201</td>
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<tr>
<td>Sweet potatoes</td>
<td>1456</td>
<td>1757</td>
<td>2058</td>
<td>1447</td>
<td>1677</td>
</tr>
<tr>
<td>Yams</td>
<td>11 612</td>
<td>12 925</td>
<td>12 779</td>
<td>11 810</td>
<td>14 072</td>
</tr>
<tr>
<td>Avocados</td>
<td>115</td>
<td>204</td>
<td>214</td>
<td>813</td>
<td>1031</td>
</tr>
<tr>
<td>Mangoes</td>
<td>892</td>
<td>497</td>
<td>895</td>
<td>3395</td>
<td>3832</td>
</tr>
<tr>
<td>Papayas</td>
<td>6233</td>
<td>6388</td>
<td>4868</td>
<td>5074</td>
<td>9093</td>
</tr>
<tr>
<td>Fish</td>
<td>15 854</td>
<td>14 458</td>
<td>14 624</td>
<td>9917</td>
<td>11 801</td>
</tr>
<tr>
<td>Cut flowers</td>
<td>652</td>
<td>443</td>
<td>339</td>
<td>202</td>
<td>173</td>
</tr>
<tr>
<td>Foliage</td>
<td>562</td>
<td>273</td>
<td>353</td>
<td>136</td>
<td>92</td>
</tr>
<tr>
<td>Other foods</td>
<td>37 087</td>
<td>40 368</td>
<td>43 116</td>
<td>42 283</td>
<td>51 167</td>
</tr>
<tr>
<td>Total</td>
<td>76 481</td>
<td>79 874</td>
<td>81 899</td>
<td>76 775</td>
<td>94 964</td>
</tr>
</tbody>
</table>

Source: Based on data from the Planning Institute of Jamaica (2002)
Note: The first eight items in the table are major crops grown by domestic food farmers while the category ‘other food’ includes other important crops, mainly condiments like thyme and peppers.

Table 2 Estimates of domestic crop production in Jamaica 1995–2004 (tonnes)

<table>
<thead>
<tr>
<th>Year</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>662 952</td>
</tr>
<tr>
<td>1996</td>
<td>695 050</td>
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<tr>
<td>1997</td>
<td>550 928</td>
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<tr>
<td>1998</td>
<td>538 585</td>
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<tr>
<td>1999</td>
<td>553 157</td>
</tr>
<tr>
<td>2000</td>
<td>450 530</td>
</tr>
<tr>
<td>2001</td>
<td>490 296</td>
</tr>
<tr>
<td>2002</td>
<td>431 579</td>
</tr>
<tr>
<td>2003</td>
<td>491 473</td>
</tr>
<tr>
<td>2004</td>
<td>414 790</td>
</tr>
<tr>
<td>2005</td>
<td>391 708</td>
</tr>
</tbody>
</table>

Source: Compiled from Statistical Institute of Jamaica data

Table 3 Loan allocation by the Agricultural Credit Bank to traditional export crops and domestic crops 1986–94 ($J)

<table>
<thead>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic crops</td>
<td>12 808</td>
<td>14 239</td>
<td>7099</td>
<td>8536</td>
<td>25 683</td>
<td>7452</td>
<td>7305</td>
<td>15 695</td>
<td>12 880</td>
<td>111 697</td>
</tr>
<tr>
<td>Export crops</td>
<td>56 115</td>
<td>77 290</td>
<td>85 753</td>
<td>75 695</td>
<td>171 238</td>
<td>77 673</td>
<td>79 673</td>
<td>153 434</td>
<td>82 570</td>
<td>859 401</td>
</tr>
</tbody>
</table>

Source: Planning Institute of Jamaica (1990 1994)
Jamaica is that the provision of agricultural extension services has been steadily declining over the last two and half decades. Indeed our field experience in rural Jamaica seems to confirm that this is the case. Anecdotal evidence is that in one community visited in July 2006, the agricultural extension office was still without its roof three years after it was blown off by Hurricane Ivan in 2003. We argue that in this context of relative neglect, self-help and community-based solutions are absolutely imperative. Herein lays the epistemological foundations of local traditional farming knowledge.

Applications of local knowledge in Jamaican small-scale agriculture

Crop combinations and soils knowledge
The use of local knowledge by small-scale cultivators in the selection of symbiotic crop combinations is well documented for the Caribbean region. Certain crops combine well together; common examples are cassava and gungo peas (pigeon peas) to provide shade, ground cover and nutrients. Other crops, like sweet potatoes, tend to be planted alone. Knowledge of good farming practices is accumulated continuously, and transmitted over time by careful observations and local-level experimentation. There are examples of the use of sophisticated agronomic cultivation methods like mixed cropping by small-scale cultivators from all periods of the region’s settlement history; the pre-Colombian period (Sauer 1966), food production by plantation slaves (Mintz 1985), and in the post-emancipation period (Satchell 1990). The classic agronomic research on crop combinations in Jamaica was undertaken in the Christiana area of northern Manchester, between the 1950s and 1980s (Innis 1997). Further evidence of sophistication in regional tropical polyculture is to be found in the Caribbean variant of highly productive, agrobiodiverse, multi-tier tropical home gardens, called ‘kitchen gardens’ and ‘food forests’ (Hills and Iton 1983; Hills 1988; Brierley 1976 1991).

There are several documented examples of farmers’ extensive reliance on local knowledge of soils in crop production in Jamaica. The island’s complex geological history and geomorphologic settings have resulted in highly variable and differentiated soil types on the island. Local farmers are acutely aware of variation in soil type and the physical characteristics of soils, even within localized areas. In a sample of 134 farmers (97% of the farming population) in the Millbank area of the upper Rio Grande Valley, farmers differentiated and classified soils on the basis of crop yield, soil texture and colour (Davis-Morrison and Barker 1997). Crop yield, as might be expected, is a ubiquitous, though somewhat tautological, category used by farmers to identify soil type. But farmers also use characteristics like smell and an absence of earthworms to indicate infertile, possibly acidic soils. Seven separate descriptive categories were identified in the Rio Grande study – farmers using terminology like clayey, sandy, gravelly, ‘oily’, ‘stiff’, ‘soil’ and ‘flint’ to describe soil texture. In other parts of Jamaica, ‘gummy’ and ‘tough’ are used, and ‘red mould’ and ‘black mould’ are widely invoked to differentiate red clays and black clays. Interestingly, in the Rio Grande valley, farmers use very localized descriptors, red ‘habbu’ and black ‘habbu’ (Davis-Morrison and Barker 1997).

Another interesting example of farmers’ use of local soil knowledge comes from the Pindars River watershed, in northern Clarendon. Bailey (2003), in a survey of 86 small farmers cultivating steep hillsides, reported that farmers were able to identify and classify 10 types of soil using colour, texture, productivity, moisture content, and susceptibility to erosion to describe categories. Farmers could also rank soils based on susceptibility to soil erosion, and soil conditions were seen by them as important indicators of land quality and land degradation. Farmers were knowledgeable about land degradation and could identify subtle signs of its onset and presence. Key indicators included declining yields, the formation of rills, cracks in the soil and increased stoniness of the surface layer of the soil (Bailey 2003).

Another example of good soil management practices in farming is to be found among small-scale vegetable cultivators on the southern coast of Jamaica in St Elizabeth parish. This region is a significant producer of domestic vegetables [like carrots, tomatoes, lettuce, cauliflower and cucumber, locally produced condiments (especially escalion, thyme and sweet peppers), melons and legumes, especially red peas (kidney beans)]. The farming system is geared towards the environmental challenge of moisture deficiency and low rainfall. Small farmers keep fields planted and prepared under a permanent cover of dried grass. In a recent survey, all 50 farmers interviewed used a mulch of dried Guinea Grass throughout their farm plots (McGregor and Barker 2006). The grass cover reduces soil moisture loss while keeping down weeds and may help to reduce soil erosion on sloping land. The grass mulch cover is an integral part of the cultural ecology of farming in the area, and the deliberate use of fields of Guinea Grass in the farming system has become a lucrative agro-activity in the region.
Local environmental knowledge, experimentation and innovation in yam farming

Our main examples about the validity of local knowledge are taken from the research on yam farming in central Jamaica. The island’s yam crop is produced entirely by small farmers. Food yams were brought to Jamaica from Africa and slaves cultivated yams on their provision grounds and kitchen gardens. After emancipation in 1838, yams became a favoured crop among the independent peasantry and remain a staple food crop among the rural population. Data collected during the 1990s revealed detailed ethno-botanical knowledge of the best types of traditional native hardwoods for use as yam sticks (Beckford 2002; Barker and Beckford 2003). The initial research was mainly concerned with the ‘yam stick problem’, caused by the scarcity, high price and poor quality of yam sticks supplied by an informal sector commercial yam stick trade in Jamaica. However, in the course of this research, the widespread rejection by farmers of an innovation promoted by agricultural planners, minisett yam, was reported.

Minisett yam was introduced by the Ministry of Agriculture in 1985 and promoted as a superior method of cultivation to the traditional yam cultivation systems in several important ways (Campbell-Chin-Sue 1989; Beckford 2000 2002; Beckford and Barker 2001). In the traditional system, yams are planted in individual hills or mounds and staked with a stick cut from a sapling once the yam sprouts begin to grow. The yam vines climb the yam stick to form a significant aerial biomass due to exposure to sunlight which enhances tuber growth. Minisett, however, does not require the use of stakes. Although the innovation was intended to help address several alleged economic and environmental limitations of the traditional system, it has other differentiating characteristics, such as cultivation in continuous mounds rather than yam hills, and the use of plastic sheeting as a mulch (Barker and Beckford 2006).

The yam farmer survey in 2001 was designed to assess possible ways of addressing the yam stick problem by investigating farmers’ attitudes to a number of alternatives to traditional yam staking, one of which was minisett yam (Barker and Beckford 2006). As in the earlier research, farmers again forcefully rejected minisett as an alternative. An important line of reasoning was based on farmers’ knowledge of local topography. The study area is an upland limestone region with ridge and valley topography and some hillsides have fairly steep slopes. Farmers cited slope and aspect as a major reason why they felt minisett yam was inappropriate to their local circumstances.

A major difference is that in traditional methods the yam plant is a climber (running up yam sticks), while in minisett the plant is a low creeper because there are no stakes. Farmers argued that minisett yams could not be successfully cultivated on certain types of slopes presently used for yam production. They distinguish between front ridges and back ridges. Front ridges are slopes that face generally south and receive more sunlight for longer periods of the day than north-facing back ridges (Beckford 2002). On back ridges minisett would not receive enough sunlight and so yields would be poor because of what farmers call chilling (low soil temperature). Farmers use field experience to support their reasoning – low creeper plants like sweet potatoes are never planted on back ridges (Barker and Beckford 2006).

Interestingly, we have not encountered any other yam farming areas in Jamaica where farmers make this topographic distinction between front and back ridges. Our study area in south Trelawny is part of the agricultural extension district which regularly reports the island’s highest yam output. Here, farmers have expanded yam production over the last 20 years to such an extent that they have learnt to utilize the more shaded back ridges for yam production by using a longer yam stick; the sticks on back ridge slopes are typically 6 m in height compared to the normal 3–4 m. Thus, awareness of the importance of aspect, slope and sunlight in yam cultivation is highly developed among farmers in this part of Jamaica, and has quickly found its way into their store of local useful knowledge. It is conceptualized and operationalized by using the landscape categories ‘front ridge’ and ‘back ridge’. This distinction may be seen as a local tropical variant of the better known adret and ubac slopes in European Alpine farming. The incorporation of a new element of environmental knowledge into the local farming folklore among these resource-poor farmers further underscores the fact that local knowledge is dynamic and can seamlessly incorporate new and useful elements. Beckford (2002) has commented on other aspects of local knowledge regarding clayey soils and rocky terrain which also informed farmers’ negative views on minisett.

Our last example shows how individual farmers are quite capable of successful experimentation and innovation on their own account, and are able to combine their own local knowledge with scientific knowledge. We encountered a rastafarian farmer on the remote northern borders of Cockpit Country who, contrary to the general negative views among Jamaican yam farmers, prefers minisett yam to traditional methods and claims better results with certain yam varieties. After his early introduction to minisett through Ministry of Agriculture
extension officers, he conducted his own informal experiments and has independently modified aspects of minisett. He uses minisett methods primarily with sweet yams and has tried it successfully with white yam, renta and St Vincent yam. He is, however, adamant that minisett is not suitable for yellow yam (the main target in the Ministry of Agriculture’s initiatives to promote minisett). He claims to produce sweet yams of 4 or 5 pounds in weight (larger than yellow yam minisets reported and recommended by the Ministry of Agriculture). This is itself worthy of a note since the small size of minisett, compared to normal yams produced by traditional methods, is part of the cultural antipathy towards the innovation (Beckford 2002).

The farmer successfully experimented and modified the original minisett package in several ways. He first tried minissett cuttings in a nursery located in one of his yam plots, but found that sawdust (recommended by the Ministry) caused the yam setts to rot, so he germinates cuttings in ordinary local soil. After a couple of weeks (shorter than the time period recommended in the Ministry’s guidelines), sprouting minisets are transferred to prepared beds and are covered with a grass mulch combined with ‘bush and bramble’ (an assortment of small sticks and branches). The assemblage is about half a metre high, and the yam vines ‘catch’ and creep along the framework as they grow. Further, the farmer has integrated traditional yam hills and minisett methods on his farm. Since he sells his entire output from minissett, he obtains planting material for his next crop by using cuttings from yams produced by traditional methods. Moreover, he has encouraged neighbours to try his methods, and a group of four farmers in the community currently uses minisett alongside traditional methods, prompted by his advice and guidance.

This example clearly illustrates that individual farmers are quite capable of undertaking their own informal experiments and may arrive at practical solutions not originally anticipated by agricultural officials and scientists. There are obvious lessons here for agricultural planners in a possible re-evaluation of the value of miniset. More generally, the case reinforces the contention that highlighting local knowledge can help identify potential areas of collaboration between small-scale farmers and researchers, and contribute to a genuine two-way flow of information between them, rather than the more normal unidirectional approach of agricultural extension, which is heavily biased towards ‘expert scientific knowledge and opinions’. Recent contacts with the Ministry of Agriculture suggest that other individuals among the original group of farmers exposed to minisett may also have experimented and persisted with minisett of their own accord. Perhaps the lack of recognition of farmer innovation with respect to minisett is another unfortunate manifestation of the bipolar dichotomies between scientific knowledge and local knowledge systems. One may add that, in this case, the dichotomy may reflect a more blinkered view from scientific experts and a lack of flexibility within project-based knowledge systems. Certainly, any farmers who have experimented for themselves with minisett would appear to have a much more pragmatic view of what constitutes ‘useful’ knowledge.

Limits of traditional knowledge

Our research has highlighted the role and value of local knowledge in the context of small-scale yam farming in Jamaica. The examples discussed in the preceding section therefore presented an uncritical view of local and traditional knowledge in the study area. But as Briggs (2005) points out, just because traditional knowledge exists does not mean that it is unproblematic. One of the criticisms of local traditional knowledge and its perceived value is that it tends to be highly contextual and its relevance or usefulness outside the spatial locales where they were created is in doubt (Kalland 2000). Briggs (2005) has raised the question of the transferability and universal value of indigenous knowledge. This is clearly a valid discussion question if the concern is about transferring specific examples of local knowledge to contexts in which they were not developed. We would argue, however, that the aim should not be to transplant specific traditional knowledge and practices to other areas but to transfer the principle of traditional knowledge and try to find local appropriate examples that might be contextually useful. Still, the cautionary note sounded by Briggs is worthy of serious reflection. It is the uniqueness of traditional knowledge and practices to specific contexts which is at the heart of its usefulness. If local and traditional knowledge is de-contextualized, it loses its value. It has also been argued that traditional knowledge could be de-legitimized and devalued in the eyes of local people, or reduced to trivia, if isolated from its cultural context and forced into the framework of western academic epistemology (Jama 1987; Thrupp 1987).

Forsyth (1996) warned about the dangers of romanticizing local knowledge because it may have its own ‘mythology’, as a result of being developed for specific time and space scales (see also Briggs 2005; Sillitoe 1998). Briggs has argued that the perception and presentation of local knowledge as an untainted, pristine knowledge...
system is unhelpful. He argues that it is unrealistic to expect that local knowledge will always provide sustainable solutions to rural problems. Similarly, the notion that local knowledge will always be superior to conventional science, even in local contexts, is perhaps untenable.

A legitimate question that may be raised is why domestic food production is declining in Jamaica, and, more generally, why do small-scale farming systems face so many challenges if local knowledge is so good? The answer might simply be that there are numerous other factors at play, over which many of these farmers have no control. The flood of imported vegetables, such as carrots, onions and potatoes from North America, as a result of trade liberalization, is a major factor. The ravaging effect of hurricanes Ivan, Dennis and Emily since 2003 is another. However, the question underscores the danger of presenting local knowledge as a panacea and emphasizes the importance of tempering our expectations of what local knowledge can do. The bottom line is that local knowledge is not unproblematic in Jamaica and there are numerous examples of traditional knowledge and practice that are unsustainable. An example of the latter are cropping systems such as escallion and thyme grown on the steep eroded hillsides of the Upper Yallahs Valley for the Kingston markets (Barker and McGregor 1988). Traditional yam farming itself may encourage soil loss on very steep slopes, and, in addition, yam farming in central Jamaica has environmental externalities in the form of unsustainable harvesting of forest saplings for yam sticks, from environmentally sensitive areas like Cockpit Country (Barker and Beckford 2003). The portrayal of soil erosion and land degradation as processes endemic to only the small-scale sector does an injustice to the farmers involved but admittedly, low income and limited scope to plan ahead influence small farmers to engage in bad agricultural practices.

Another salient question is to what extent is any farm practice or item of knowledge purely local and traditional? In other words, is it possible to disentangle the influence of science on some of the examples we have discussed? Our innovative minisset farmer, for example, was exposed to the Ministry of Agriculture’s work through his part-time employment with the Forestry Department, and his system clearly shows the influence of scientific knowledge. Small-scale food producers have contact with the scientific community, and so it should be expected that there has been some scientific influence in their knowledge systems and practices.

Some commentators take the view that scientific knowledge and traditional knowledge are incompatible (Mohan and Stokke 2000) whilst others argue that there can be intersection between them (Emeagwali 2003). Our research shows both the bipolar tensions between the two systems (Briggs 2005) and the potential synergies between them. For example, we have reported elsewhere the clash between scientific knowledge and local knowledge, which, with regard to miniset, found expression through the palpable ridicule directed towards minisset by farmers, some of whom scoffed in good humour at colleagues who tried the innovation, failed to sell their output, and were forced to feed the yams to pigs (Barker and Beckford 2006). Notwithstanding this tension, the same sceptical farmers were keen to try a new staking method involving a plastic yam stick, an innovation clearly associated with science and technology in their minds. Thus, what we refer to as local or traditional might often be a hybridization of different knowledge sources. On a number of occasions in the paper, we have argued that some local practices have a scientific basis. Our point was not to legitimate these practices by associating them with science, but to emphasize that there are intersections between science and local knowledge.

Conclusion and lessons learned

We view local traditional farming knowledge in Jamaica and the wider Caribbean as a valuable cultural capital and a tangible resource. Traditional knowledge is driven by, and is a response to, the everyday demands of farming in a challenging economic, political, environmental and enigmatic socio-cultural context. Knowledge is constructed in real contexts, typically characterized by economic and environmental risks and uncertainties. Knowledge then becomes a type of survival algorithm. Part of the epistemic foundation of traditional knowledge is related to the asymmetrical power structures within which they evolve and exist, and to issues of independence, self-reliance and problem-solving which are fundamental to successful farming and rural development. It is important to re-iterate that local knowledge does not possess the ability to solve all rural problems on its own and should not be implemented as an alternative to conventional scientific knowledge.

We conclude that the individual and collective ingenuity of small-scale farmers is fundamental to the survival of the domestic food production sector, rural development and food security in Jamaica and the wider Caribbean. In the context of the socio-cultural, economic, political, environmental and global realities of small-scale agriculture in Jamaica, local traditional knowledge is indispensable. Small-scale farmers have traditionally operated in an environment where they have had to fend
for themselves. Local solutions based on traditional knowledge and wisdom, and farm level experimentations, are a *sine qua non* in the ability of these farmers to continue to survive. In this context, traditional knowledge is a critical safety valve that has evolved and developed out of necessity. Given the vital role that domestic agriculture plays in employment, food security and foreign exchange earnings and savings, and in the context of the biases against this sector, the continued negative attitudes towards traditional knowledge is an injustice to farmers and is immissible to rural development.

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