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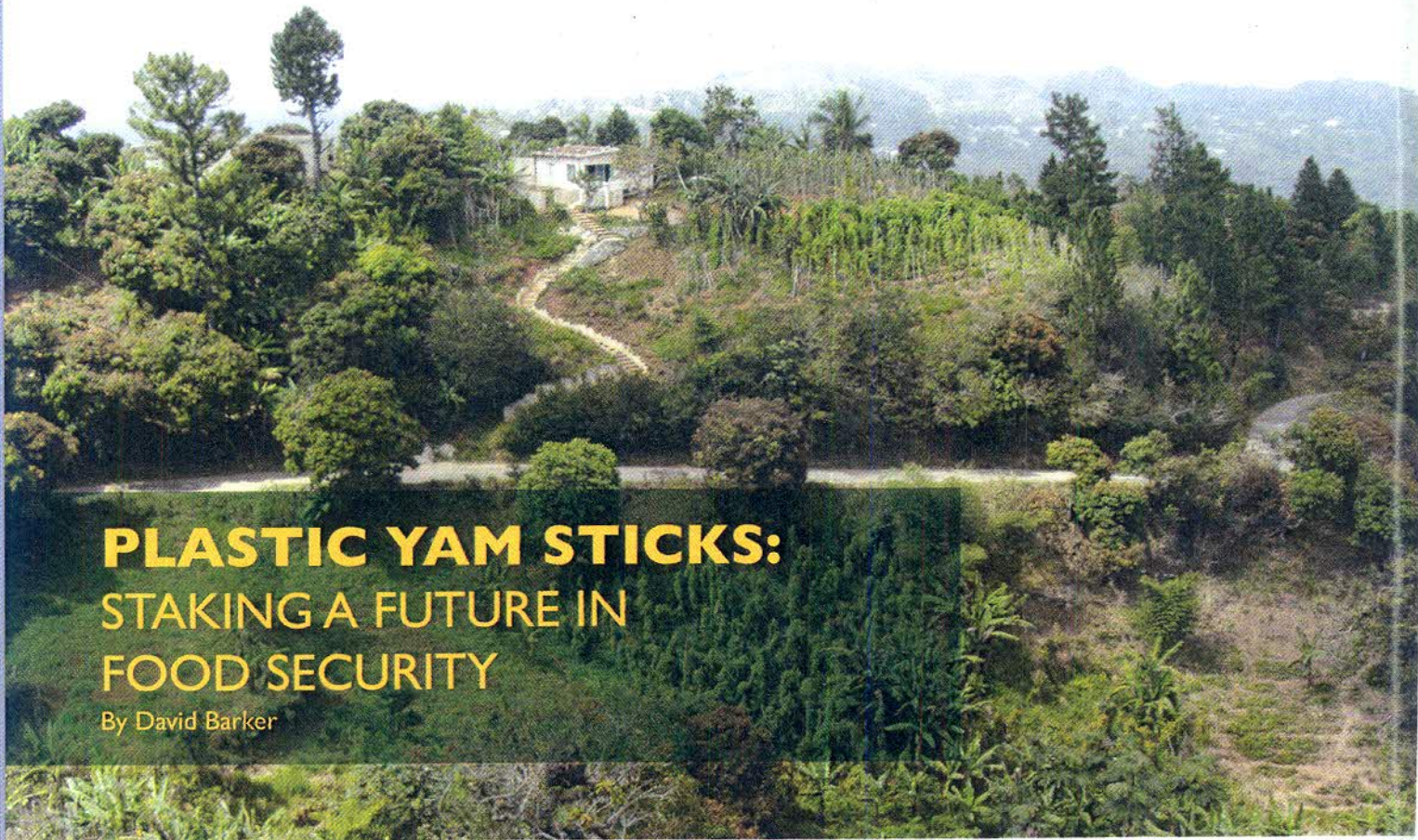
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## PLASTIC YAM STICKS: STAKING A FUTURE IN FOOD SECURITY

By David Barker

If you travel on the road from Christiana to Albert Town, deep in the heart of Jamaica's 'yam country', you may be struck by the beautiful and impressive agricultural landscape: a patchwork quilt of yam fields at different stages of the cultivation cycle.

Dark and light green hues are intermixed with patches of brown or reddish earth. Splashes of colour are places where people live. If stop your car and get out to take a closer look, you will see the yam fields are really lines of yam sticks, each jammed into a yam hill. The stick supports the yam vine, the leafy part of the yam plant. You may even be impressed by the colossal effort that farmers in this part of Jamaica have expended to get their yam fields into this advanced state of cultivation. But you are less likely to wonder how many yam hills and yam sticks the eye can see; or to ponder the problems faced by farmers in trying to making a living out of yam farming, or in trying to find enough yam sticks to stake all these yam hills. But these

are exactly the kinds of questions asked by geographer Clinton Beckford when he began his UWI PhD research on the yam stick problem in southern Trelawny.

The rapid increase in yam production in central Jamaica in the 1980s had a number of interconnected effects. First, increased output increased the demand for yam sticks. Farmers once cut most of their own yam sticks from trees and bushes close to their homes. This is still the norm in many areas of Jamaica, such as the rural community of Coxheath where Usain Bolt was 'born and raised'. But in southern Trelawny, Jamaica's principal yam growing area, nearby sources of good tree saplings were soon depleted. As farmers began to concentrate their productive effort on the business on digging more yam hills and growing more yams, they had less time to search for and cut their own yam sticks. In the face of a soaring demand and a desperate scarcity of yam sticks, along came the smart, streetwise Jamaican entrepreneur. Happily oblivious to academic qualifications but imbued with a talent for smelling out a good economic opportunity, a supply

of yam sticks soon started to appear in these farming communities, sold from the back of large trucks and small pick-ups.

Beckford discovered that this informal sector trade in yam sticks began to expand from the mid-1980s as yam output increased. Commercial yam stick dealers link up with yam stick cutters whom they informally sub-contract. Together, they go into forests and woodlands and cut tree saplings as yam sticks, and transport them back into 'yam country'. The demand for yam sticks was and still is, insatiable. By the mid-1990s, most farmers in southern Trelawny found it necessary to purchase the majority of their yam sticks from commercial dealers. The combination of an insatiable demand and scarce supply created a high price for yam sticks; twelve years ago, at the time of his initial farm surveys, yam sticks were selling at J\$1200 (US\$25) per hundred.

Beckford's seminal research documented 'the yam stick problem' faced by farmers. Not only was the price high and supply insufficient, but sticks purchased from trad-



ers were of such poor quality that many yam hills needed to be staked with several yam sticks. Farmers universally complained about the poor quality of yam sticks, some of which did not last a full season before breaking under the weight of the yam vine's biomass. When recycling yam sticks after harvesting, some sticks are discarded while others are retained. But multiple staking is necessary with many of the recycled sticks because of their uncertain sturdiness a second time around. In one of Beckford's surveys, he counted 162,000 yam hills in some 360 yam plots. Only 75,000 hills (less than 50%) had a single stick, while 60,000 yam hills had two sticks and 22,000 hills had three sticks. As many as 86 yam hills had 6 yam sticks. In effect, the poor quality of yam sticks has a multiplier effect on the number of sticks in use.

Our research also explored farmers' attitudes towards alternative solutions to traditional methods of staking yams. Jamaican farmers have an impressive and remarkable repertoire of skills and environmental knowledge about yam farming. It guides their decision making and helps solve practical problems on the farm, often through informal experimentation. Traditional native hardwoods like 'burn eye' (*Sapium jamaicense*) and 'cantoo' (*Peltostigma pteleoides*) are consistently identified by farmers as tree species whose saplings make the best sticks, because they are durable and long-lasting. Older farmers can point to individual yam sticks they have been using for 20 years. But these hardy species have become increasingly scarce. Through long and detailed interviews among the yam hills, we were able to document cognitive information about farmers' perceptions, attitudes and ideas regarding alternative ways of cultivating yams.

One such alternative is minisett yam. It is a method of cultivating yam that does not require yam sticks and is much touted by the Ministry of Agriculture and RADA. But virtually every single one of the hundreds of farmers we interviewed had negative views about minisett. Many scoffed at and derided it as "plastic yam" because the original technology package used expensive imported plastic sheeting as artificial mulch. Minisett does have a one or two advantages over traditional methods, but it is problematic to small farmers for a number of sound and sensible economic, environmental and cultural reasons. Even the absence of expensive yam sticks could not convince farmers it is a viable solution for them. We have docu-

mented farmers' robust views about this innovation elsewhere, and concluded it is unlikely to be adopted widely by farmers in the near future.

Another possible method of cultivation is common in Barbados and a few other Caribbean islands where yam vines are not staked, but left to trail on the ground. A few farmers have tried this in their struggle to solve the yam stick problem. Other farmers reasoned that strong winds occasionally topple yam sticks, so yams are reaped after the vines have been left on the ground for an extended period. Generally, farmers were not impressed with yields in either scenario.

By far the most promising solution to the yam stick problem was the idea of using a plastic yam stick rather than a wooden stick. Indeed, not only was this idea enthusiastically endorsed by almost all the farmers in one of our surveys, but we found farmers who had thought of the same idea, and discussed its merits among fellow farmers (no doubt during cook-ups

in yam grounds and in rum bars). During our interviews, a few farmers spontaneously started to sketch in the dirt what they thought a plastic yam stick should look like. Based on this feedback, we have compiled an ideal profile for a plastic yam stick. For example, one feature suggested by farmers was that it should be manufactured with a sharp point to make it easier to jam into the yam hill; presently they sometimes need to fashion a point with a machete. Others suggested the pole have several hooks interspaced about 12 inches apart, so the yam tendril could snag and attach itself to the pole. Another farmer cautioned that the pole should be made of a material that did not become too hot in the sun otherwise it would 'burn' the yam vine – suggesting design engineers ought to factor in heat conductivity as a desirable property.

We concluded that field trials with prototype plastic yam sticks were the logical next step, under real farming conditions and with small farmers. Nearly two-thirds of our sample were enthusiastic about the



Multiple yam sticks in yam hills



## Yams and their ladders to the sun

Yams cultivated in the West Indies were originally domesticated in West Africa around 5,000 years ago. Remarkably, there is scientific evidence that, even today in places like Benin, African farmers still actively conduct their own informal experiments with wild Guinea yam and are domesticating new cultivars. Wild yams are climbing forest plants. During their botanical evolution they adapted to a dry season, which suggests they may have evolved in the border regions in West Africa, in the ecotone between the rainforest and savanna. In their natural environments, wild yam vines climb forest trees in their search for sunlight. Cultivated yams similarly need elevated support for their aerial biomass. This is done in many Caribbean islands by staking each yam hill with a sapling, some 3 or 4 metres in height though in Jamaica, on more shaded 'back ridge' slopes, yam sticks may be 6 metres in height. Farmers throughout West Africa also use yam sticks in their cultivation systems.

idea but wanted to see other farmers using it first. A few years ago, a potentially innovative project by a Kingston-based NGO envisaged manufacturing plastic yam sticks from recycled plastic PET bottles. Unfortunately, the project foundered prematurely. Based on our research, there seems to be a significant market for plastic yam sticks in Jamaica, once they can be demonstrated as an economically viable proposition. Whether manufactured from recycled material or factory fresh, we concluded that an affordable, durable and reusable plastic yam stick was the best solution to the yam stick problem.

Plastic yam sticks too, in a small way, might help protect Jamaica's precious forests by diminishing pressure on forest resources. Beckford's research identified the principal sources of yam sticks as Cockpit Country and woodland areas of St Ann, Manchester and St Elizabeth. Indeed, organizations like NEPA and the Forestry Department have cautioned that yam stick harvesting may be a contributory factor to deforestation. Plastic yam sticks have the potential to contribute to environmental sustainability.

However, the principal contribution of plastic yam sticks would be towards securing a more sustainable economic future for the 5,000 farmers and their families in southern Trelawny for whom yam is the major cash crop. In Beckford's original survey of 216 farmers, more than 70% reported the cost of yam sticks to be their most significant cost. He calculated the cost of yam sticks at around 53% of operational costs, and that 63% of yam sticks needed to be replaced annually. At planting densities of 1,000 yam hills per acre, even a small farmer may have as many as 5,000 to 10,000 yam hills that

need staking. So the annual replacement demand per farmer is in excess of 3,000 yam sticks.

Since our research was completed, the plight of yam farmers in central Jamaica has progressively worsened. Economic recession and a recent collapse in farm gate yam price have been compounded by lingering concerns about increasing climatic variability, precipitated by successive droughts, hurricanes and tropical storms over the last few years. And the local price of yam sticks has continued to soar, to its current J\$2,500 (US\$25-30) per hundred.

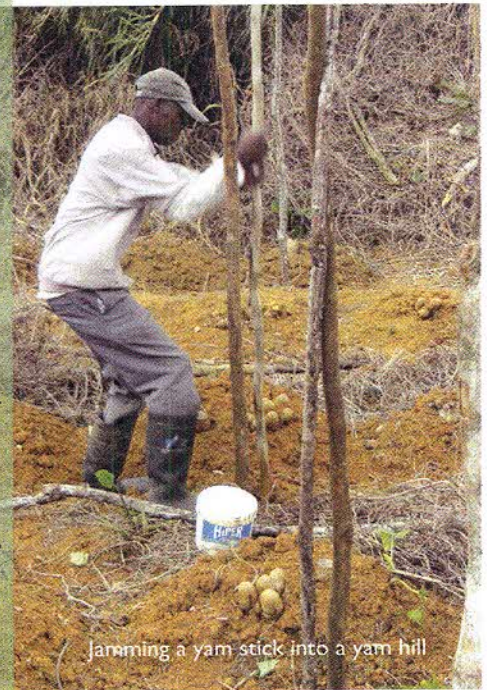
Staple food crops like yams, sweet potatoes and bananas grow easily in Jamaica. They contribute to food security at the scale of individual rural households and at the national level. Jamaica, like all the Caribbean islands, needs to urgently find ways to grow more of the food we eat, and curb the national appetite for imported foodstuff. A secure and sustainable future for yam farming adds one small piece to the national food security jig-saw puzzle, as well as contributing foreign exchange through yam exports.

There are many different routes towards sustainable agriculture and food security. Science and technology, perhaps unwisely, are seen as a magic bullet to solve the country's agricultural problems. However, not all scientific applications in agriculture need to be high tech or laboratory based. In 1973 development economist Fritz Schumacher coined the term intermediate technology. Some solutions to agricultural problems lend themselves

to appropriate technologies – technologies that are relatively modest in ambition, fairly easy and cheap to reproduce and, importantly, readily acceptable to those expected to use and benefit from them most, namely, the small farmers who are the backbone of the country and who produce most of our domestic food crops. The development of a plastic yam stick is an agricultural technology appropriate to Jamaican farmers' needs.

In the previous issue of CaribXplorer, we highlighted the iconic connection between Usain Bolt and yellow yams, and argued that the publicity was good for Jamaican farmers and for Jamaican food security. The plastic yam stick is an innovation poised for action and awaiting a starter's gun.

So what price for the manufacture of a Bolt Pole to go with the yam shoe? **cx**



Jamming a yam stick into a yam hill



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