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Food-gardens and nutrition: Three Southern African case studies

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OPSOMMING

'n Groot deel van die literatuur wat oor voedseltuine [food-gardens] handel, beweer dat daar 'n noue verwantskap tussen groenteproduksie en voeding bestaan. Op grond van 'n kort literatuurbeskouing en 'n beoordeling van drie gevallestudies, word die bogenoemde verwantskap bevraagteken.

Die eerste gevallestudie, wat beweer het dat daar 'n beduidende verwantskap tussen stedelike landbou en huishoudelike voeding bestaan, is as analities swak beskou. Spesifieke swakhede sluit die volgende in: die grootte en die samestelling van die steekproef, die hoë waarskynlikheid dat eksterne faktore die bevindinge beïnvloed het en die swak formulering van die verbande tussen voeding en groenteverbruik. In die bespreking van die tweede gevallestudie word die geldigheid van die positiewe beskouings (uitgespreek deur die betrokke kwekers) oor die rol van groente in 'n gesonde dieet bevraagteken. Groenteverbruik was onreëlmatig en die gemiddelde groenteverbruiksvlakke laag. Die bevindinge van die derde gevallestudie het aangedui dat daar onbeduiende verskille is tussen die voedingstatus van kinders van groentekwekers en diegene wat nie groente kweek nie. Die hoof bydraende faktor tot hierdie bevinding was die lae groenteverbruik van albei groepe.

Die doel van hierdie artikel is nie om die moontlike rol van groentekwekery by die verbetering van voedingstatus te minimaliseer nie. Dit dring eerder daarop aan dat hierdie rol duidelik vasgestel moet word.

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INTRODUCTION

The link between food-gardens and nutrition seems obvious and the promotion of vegetable gardening is often undertaken on nutritional grounds. In fact, most of the works advocating food-gardens (in rural and urban environments) use the need for improved nutrition as a major part of their arguments. Examples of general surveys which use such arguments are works by Sachs (1985), Yeung (1987), Sachs and Silk (1988), Smit and Nasr (1992), Rogerson (1996) and United Nations Development Programme (1996). These arguments are also basic to the understanding of health officials, development practitioners and NGOs (Schmidt, 1993). Furthermore, at a local level, clinics are encouraged to develop "demonstration plots" to complement their instruction on nutrition (Laza, 1992).

In contrast to the above discourse, the purpose of this paper is to question the close links that are assumed to exist between food-gardens and higher nutritional levels, especially in Southern Africa. In order to do this, three case studies dealing with these links will receive attention. Firstly, Chiapa and King's (1998) study, which asserted that a significant correlation between urban agriculture (UA) and household nutrition existed amongst urban cultivators in Zimbabwe, is analysed. Secondly, findings are drawn from Webb's (1996) study undertaken in the Eastern Cape. In this case, the link between food-gardens and nutrition was shown to be tenuous. Thirdly, Schmidt and Vorster's (1995) investigation in Slough, North West Province, which reinforces Webb's (1996) findings, is outlined. This discussion of the case studies does not seek to minimise food-gardens as a source of food security and increased nutrition. On the contrary, it calls for research of much greater depth and rigour in order to demonstrate that cultivation is indeed an activity that warrants attention.

LINKS BETWEEN FOOD-GARDENS AND NUTRITION: SOUTHERN AFRICAN CASE STUDIES

In-depth research on the link between food-gardens and nutrition is very scarce. United Nations Development Programme (1996), in its global survey, despite being categorical about the nutritional benefits of food-gardens, can point to only one review which seeks to relate increased Vitamin A levels to food-gardens. In southern Africa, the situation is little better - documented studies, other than those conducted in the North West Province, South Africa, (Schmidt, 1993 and Schmidt and Vorster, 1995), the Eastern Cape, South Africa (Webb, 1996) and Zimbabwe (Chiapa

and King 1998), are difficult to find. These Southern African studies deserve more detailed comment.

The Zimbabwean Investigation

A major thrust of Chiapa and King's (1998) investigation was to determine the nutritional significance of UA. In order to do this, they sought significant differences in weight and height between two sets of children – those of cultivating households and those of non-cultivating households. Eighty-five children were monitored on a monthly basis for eight months. Forty–seven children (53%) were from cultivating households while the remainder were from non-cultivating households. All of the children in the sample were under five years of age because a major assumption of the study was "that children under the age of five years are more susceptible to nutritional changes," (Chiapa and King, 15). Furthermore, the two sets of children were grouped into four age categories: 1 - 1.9, 2 - 2.9, 3 - 3.9 and 4 - 5 years respectively.

For various reasons, doubts must be cast on their conclusion, which is stated as follows: "Nevertheless, the collected data suggests that there is a significant relationship between urban agriculture household nutrition and growth rate of children," (Chiapa and King, 1998, 15). Firstly, the size of the sample is inadequate. The total number of children forming part of the study (47 for cultivating households and 38 for non-cultivating households) needs to be reduced to 24 and 19 respectively because the findings involve only females – see Figures 1 and 2. This reduction assumes that the ratio between cultivating and non-cultivating households remains constant (47vs 38: 24 vs 19) and that female children comprise a half of the total sample. These assumptions have to be made in the absence of more detailed information. The reduced figures (24 and 19) have then to be spread over the four age categories, specified above, giving a maximum of six responses per category. Reliable conclusions simply cannot be based on such low frequencies.

There are further problems associated with the data that is presented. For example, figures for non-farming, female children are omitted from the two highest age categories in Figure 2. However, the point has been made – conclusions drawn from the above data sample are questionable.

Secondly, as far as the composition of the sample is concerned, the inclusion of the first age category (1 - 1.9 years) is problematical. For much of this age bracket, children do not take solid food, and thus a direct link between nutrition and vegetable production (and consumption) cannot be established. If indirect links are being alluded to - mothers enhancing the development of their children as a result of their own superior nutritional status (as the result of consuming home-grown produce and through breastfeeding) or because the sale of crops enables them to buy commercially prepared milk formula – these are not explored by the study. In any event, such indirect links would be extremely difficult to establish. For example, the superior nutritional status of mothers with food-gardens would have to be demonstrated, as would the earmarking of cash returns from cultivation for baby foods.

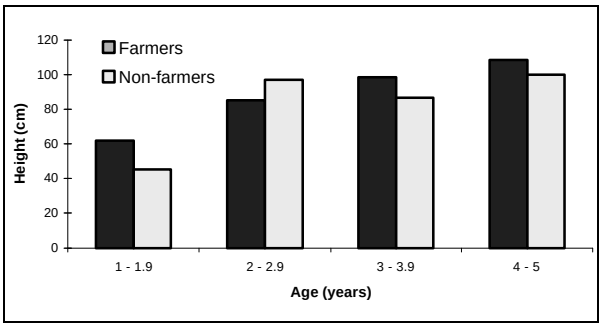

FIGURE 1: AVERAGE AGE AND HEIGHT OF FEMALE CHILDREN (Chiapa & King, 1998:16)

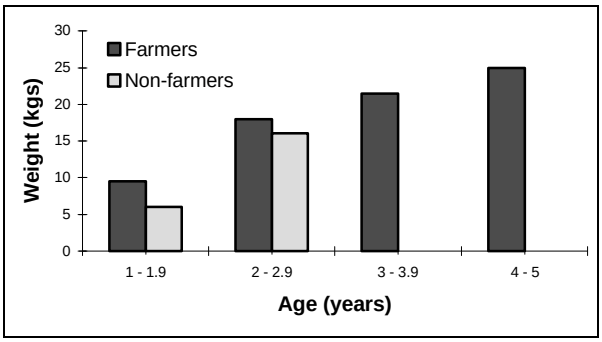

FIGURE 2: AVERAGE AGE AND WEIGHT OF FEMALE CHILDREN (Chiapa & King, 1998:16)

Thirdly, external influences (apart from vegetable production) on the development of children at this level of analysis must be considerable. While the authors admit to external factors influencing the findings, they make little attempt to limit these influences. For example, no attention is drawn to employment history, wage history, changing family size and other household circumstances such as the space available for cultivation of vegetables.

Fourthly, a surprising finding of this study, which casts further doubt on the direct links between food production and child development, is that "Despite the positive nutritional benefits of urban agriculture, some households tend to depend entirely on field produce and therefore may run the risk of an unbalanced diet" (Chiapa and King, 1998,15).

The above finding equates UA with vegetable production, and "field produce" with the cultivation of cereals such as maize. A similar distinction is made between "on-plot" vegetable cultivation and "off-plot" cultivation

where cereals are important (Sanyal, 1987: 198, Freeman, 1991,51). Thus certain cultivating households opt for maize production and forgo the superior nutritional benefits of vegetables. These findings raise the important question of the relative importance of different kinds of foodstuffs to cultivating households. Thus a further complicating factor clouds the major objective of the study.

Fifthly, no attempt is made to link the nutritional findings with levels of food consumption as a result of household cultivation. The cultivation of food does not automatically imply consumption or consumption at significant levels, as will be demonstrated below.

It could be argued that this critique is insisting on too close a relationship between actual food consumption (as a result of cultivation) and nutrition. However, if the significance of food-gardens to nutrition is not couched in these terms, then there is little use in singling out cultivation rather than one of the other income-generating activities available to households. The only motivation for promoting a link between cultivation and nutrition would be if cultivation were of greater or equal importance to these other activities as far as nutrition is concerned. This, however, would need to be clearly established, and remains an important area of research into the significance of food-gardens.

Chiapa and King (1998) assert that the relationship between UA and nutrition (especially in terms of child development) is significant. This assertion is questioned for the reasons given above. The findings from the following two case studies reinforce the doubts surrounding the efficacy of UA in improving nutritional levels, because the consumption of vegetables takes place sporadically and at low levels.

Findings from the Eastern Cape

The findings in this section are based on a sample of cultivators of home vegetable gardens drawn from the Eastern Cape (Webb, 1996) as follows: of the 73 cultivators interviewed, 53 worked home plots in Port Elizabeth and Port Alfred, while the remaining 20 cultivators worked irrigated, quarter- and half-hectare plots on the former *Isithatha Scheme* on the Uitenhage urban fringe. Three aspects form the core of this discussion, namely, the views of the cultivators on the constituents of nutritionally sound and nutritionally deficient diets, the consistency of vegetable consumption, and the levels and frequency of crop consumption. In each case, the findings that follow reveal anomalies with regard to the links between cultivation and nutrition.

Of the four most important categories of response (Table 1), vegetables are considered to be the crux of a "good" diet by the highest number of informants. Implicit in the second highest response, which singled out "variety", is also an emphasis on vegetables, since the variety referred to involves the use of vegetables (among other foodstuffs) to add flavour to a bland maize-meal diet. If all the responses that mentioned vegetables, either singly or in combination with other foodstuffs, are added, then the total percentage is 56. Given the perceived importance of vegetables in the diet, the potential for cultivation appears to be considerable.

This potential, however, is eroded by the following findings which concentrate on the informants' views of nutritionally deficient diets and on the actual consumption of vegetables in the diet. The views that were expressed about what constituted a nutritionally deficient diet are summarised in Table 2.
Starch, mainly maize meal, eaten without milk or fat ("dry" starch) is considered the epitome of a bad meal. More important for the purpose of this study is the finding that 38 % of the informants did not know what constituted a deficient diet. For many, food that was not "good" or "healthy" was that which was thrown away because it had begun to rot. This finding seriously undermines the validity of the previous one, which emphasises the value of vegetables, and suggests one of two possibilities. Firstly, informants "do not know " what a nutritionally deficient diet is because they have always had ready access to vegetables and a variety of foodstuffs. Thus, because they have never really had to consume food that is deficient in any way, they have had little experience of it. This situation is absurd given the low–income levels of 81%

TABLE 1: EASTERN CAPE INFORMANTS: CONSTITUENTS OF A NUTRITIONALLY SOUND DIET (Webb, 1996: 262)

Constituents of a nutritionally sound diet	Percentage response (n=73)
Vegetables	28
Variety	16
Vegetables and Starch	12
Unsure	10
Other	34
Total	**100**

TABLE 2: EASTERN CAPE INFORMANTS: CONSTITUENTS OF A NUTRITIONALLY DEFICIENT DIET (Webb, 1996: 263)

Constituents of a nutritionally deficient diet	Percentage response (n=73)
"Dry" starch	46
Do not know	38
Fat	5
Other	10
Total	**99**[1]

[1] *Total does not equal 100 because of rounding*

of the informants. Secondly, the finding suggests that, although vegetables are known to enhance the quality of the diet, households face conditions under which most foods must be eaten whether nutritionally beneficial or not. This argument will be developed below.

Some questions might be raised about the ability of the informants to distinguish a nutritionally sound diet from a diet that may be generally satisfying, or one with which the informants were familiar. Fifteen per cent of the informants (the high-income, professional group) were able to respond accurately. That some overlap could exist in the views expressed by the other informants is not detrimental to the argument. Hypothetically, nutritious (satisfying or familiar) diets included vegetables (Table 1). Practically, the responses in Table 2 introduce an element of doubt in terms of the actual consumption levels of vegetables. Thus, the role of food-gardens in nutritionally sound (satisfying or familiar) diets remains to be established.

Table 3 summarises responses to questions eliciting the frequency of vegetable consumption. It is notable that only 42% of cultivators were consistently able to include vegetables in their diets, and that 58% were not able to, or chose not to do so. An anomaly that needs explanation is that of cultivating households either consuming vegetables only at the beginning of the month, or seldom consuming them at all.
The fact that cultivators themselves would admit to very low consumption levels, pointed to two interlinked phenomena. The first was simply that very little produce was actually harvested. The second was an emphasis on cash income at the expense of home consumption. Specific examples will be used to illustrate both situations.

Those who consumed vegetables at the beginning of the month only seemed to have low yields in absolute terms. For example, the average annual value of the produce of this group was R155 in 1991, with the lowest recorded value being R32. Mr X and Mr Ngo were part of the group of cultivators who stated that they seldom consumed vegetables. In 1991, the value of home consumption of vegetables of the two households was R55 and R149 respectively. By contrast, their respective annual crops sales figures were R263 and R1165. While these last two figures pointed to the importance of crop sales, yields for this group were also low in absolute terms – the average annual value of its produce was R173.

This section has demonstrated that the majority of urban cultivators in the Eastern Cape study did not consistently include vegetables in their diets. The findings point to a need for cash and to low crop yields as two important reasons for this low consumption. However, vegetables have been discussed only in generic terms as one abstract class of foods. A more grounded discussion focussing on the actual consumption of types of vegetables, together with their consumption over specific time periods, would strengthen the argument. Such a discussion appears below.

At face value, the consumption levels of home-grown produce seem adequate (Table 4).

However, a number of points must be borne in mind. Firstly, for crops such as potatoes, maize, tomatoes and onions, quantities refer to individual tubers, cobs, fruit and bulbs. Thus, while potatoes, tomatoes and onions are consumed almost every day; they are consumed at a level of one or two per household. Further questioning reveals that potatoes are simply used to add bulk to the meal, while tomatoes and onions are used as flavourants only. Secondly, the remaining vegetables (apart from cabbage) have the bunch as their basic unit. The potential of increased nutrition as a result of the greater volumes used is undercut by their low consumption frequency. In addition, the cultivators revealed that this set of vegetables was seldom consumed in combination. Rather, variety was achieved by substituting carrots for greens. Thirdly, apart from spinach, onions and carrots, the duration of the harvest of each crop is relatively short.

These findings reveal that cultivators consume vegetables in small amounts and face considerable periods of time in which crops are not produced. While some crops, particularly spinach and onions, have the po-

TABLE 3: EASTERN CAPE CULTIVATORS: THE CONSUMPTION OF VEGETABLES AS PART OF THE DIET (Webb, 1996: 263)

Consumption of vegetables	Percentage response (n=73)
Consistently	42
Beginning of the month	39
Seldom	19
Total	100

TABLE 4: EASTERN CAPE CULTIVATORS: AVERAGE CONSUMPTION LEVELS AND DURATION OF HARVEST

Crop	Units consumed (per week)	Length of harvest (no of weeks)
Potatoes	14	6
Maize	12	4
Tomatoes	9	6
Onions	6	16
Cabbage	3	9
Carrots	3	12
Spinach	3	25
Beans	2	6
Beetroot	2	8

tential to induce greater levels of cultivation, consumption and nutrition, it is the practice that is being emphasised, not the potential. It has been stressed elsewhere (Webb, 1998), that advocacy of a practice such as UA because of its potential benefits, without any reference to current practice, is misguided. Once again, the role of UA in nutrition is untested.

This case study has attempted to demonstrate that the link between cultivation and nutrition is not necessarily a strong one. Evidence has been given which shows that, while vegetables are perceived to be important in a general view of a nutritionally-sound diet, questions attempting to round out the views and probe actual practice, elicit responses that undermine earlier ones. Thus there is simply not enough evidence to promote food-gardens on nutritional grounds. Food-gardens might prove to be important nutritionally, but this has yet to be demonstrated.

The Slough Study, North-West Province

This study, first outlined in Schmidt (1993) and further developed in Schmidt and Vorster (1995), provides another example that runs contrary to the broad advocacy of cultivation for nutritional purposes. It concerns the impact of cultivation on the nutritional status of the inhabitants of a village in the former Bophuthatswana. The method adopted was to test whether the children of households practising cultivation consumed more vegetables than non-cultivating households, and whether the nutritional status of the former was superior to the latter group as a result. Children were chosen as participants for a number of reasons, the chief of which was the fact that they, unlike adults, would not have built up reserves of certain vitamins that could mask the effect of vegetables on their nutritional status.

The findings showed that vegetables were eaten more frequently by children of the cultivators than those of the non-cultivators, but frequencies were so low that the differences were considered to be insignificant. For example, the children of cultivators ate a portion of vegetables as relish twice a week, while the frequency of the other group was a portion three times in two weeks. The only differences in nutritional status between the two groups (based on biochemical analyses) were higher vitamin E and cholesterol levels in favour of the cultivators' children, associated with a higher fat intake.

A comparison of consumption levels between the Eastern Cape and Slough studies reveal that they are strikingly similar - most vegetables were consumed twice to three times a week as a relish. Given this similarity, Schmidt's (1993) conclusions may have broader significance. Firstly, because of the deteriorating conditions in cities experienced by the urban poor (Devas and Rakodi, 1993: 9; Potter and Lloyd-Evans, 1998: 112), both the poor in rural and urban areas face similar problems in terms of food security. This narrowing of the rural-urban welfare gap has attracted considerable attention from Sanyal (1987), Jamal and Weeks (1988) and Rogerson (1993). Secondly, consumption levels of home grown vegetables (and their associated benefits) are not solely determined by the fact that the household practises cultivation. Other aspects such as general dietary norms and practices also play an important part and deserve investigation. Schmidt's conclusions are as sobering as her findings:

"The results showed that health workers and development practitioners might need to scale down their expectations about the possible nutritional benefits of food plots. Households who grow their own vegetables do not necessarily consume more vegetables than households who do not grow vegetables. It is also clear that if vegetable gardens are to produce enough vegetables for all the requirements of participating households, quite big food plots would be needed. The question would be whether the average rural household have [*sic*] the labour resources, water and land to produce enough for their [*sic*] own needs.

Another factor that has to be considered when expectations about nutritional benefits of vegetable gardens are set, is the fact that vegetable gardens do not directly address the main nutritional problems in rural areas. It is well known that insufficient intake of protein and energy, and not necessarily vitamins and minerals, is at the root of most nutritional disorders in the developing areas of Southern Africa. Vegetable gardens cannot make a significant contribution to the energy and protein requirements of rural dwellers unless crops such as potatoes and sweet potatoes are grown on a large scale" (Schmidt, 1993, 5).

CONCLUSION

However unpalatable the idea, this paper has questioned claims linking cultivation to the improved nutritional status of cultivators in general. These claims are found in both the general literature and in a few case studies. Promotional material might be excused for extravagant claims; case studies need to be taken far more seriously. Of the three case studies under consideration, two suggest that the links in question cannot be established. The positive claims made by one of them have been shown to be problematical.
The fact that links between cultivation and nutrition have not been established does not mean that they do not exist or that they should not be sought. Given the exigencies of the urban and rural poor, it seems logical to view cultivation as an important element of household welfare of which nutrition is a key factor. Whether cultivation does indeed play a role needs to be clearly established by means of rigorous investigations. It is at this precise point where the problems emerge - documented investigations are few in number.

One area that deserves far more attention is that of the actual consumption patterns of households in terms of home produce. This involves not only simple consumption levels and the frequency with which cer-

tain crops are consumed, it would also need to link these to the following: the cultivation cycle, dietary norms and practices, and methods of food preparation and preservation.

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