

Advancing smallholder vegetable production systems in Vietnam and Tanzania

Rapid population growth and changing consumption patterns in response to healthier eating habits and rising incomes have been fuelling the demand for vegetables and fruits in many developing countries. Juxtaposed to this has been the loss of prime agricultural lands to sprawling urbanisation and land degradation consequent on deforestation in highland areas to satisfy fuel needs and expansion of agricultural land. Innovative ways to raise productivity on existing agricultural lands and to improve rural livelihoods are therefore necessary to continue to adequately feed local populations and stem the flow of people to the urban centres.



Experts from Wageningen UR have been working with researchers and smallholder farmers in two very different regions of the world, South East Asia and East Africa, to develop innovative ways to increase vegetable production. Project sites were set up in Vietnam and Tanzania and various scenarios considered using actual data gathered from the two countries to support their analyses. In Vietnam, they looked for the best way to improve yields taking into consideration local conditions such as the limited availability of suitable lands close to urban areas (because of the perishability of vegetables), labour, planting materials, yields and profitability. Alternatively, in Tanzania they monitored the way farmers produce seedlings and the profitability of growing vegetables there.

Vietnam: year-round supply of vegetables

In Vietnam, as in many other South East Asian countries, vegetables are often produced in rotation with two crops of flooded rice (i.e., rice grown in fields temporarily flooded with water) annually. This system has two main disadvantages – after the rice crop has been harvested, raised beds are constructed for vegetable production, and then flattened again for rice production; this practice makes the soil compact and less suited to vegetable production.

To overcome these problems, the team set about designing and testing for a sustainable year-round vegetable production system in the Red River Delta. It should be mentioned here that the proportion of land area cropped with vegetables is minor

compared with that cropped with rice. The results of the study were very encouraging and the initial reaction of farmers has been enthusiastic. Results showed that yields went up and that farmers could get good returns from growing vegetables. The returns would even be higher when the vegetables would be directly sold to city wholesale markets. The amount of labour needed to grow the vegetables also increased (Table 1). Planting vegetables year-round is therefore not only an effective way to increase farmers' income, it also leads to more employment opportunities in rural areas.



Land preparation in the Red River Delta, Vietnam

Tanzania: seedling and vegetable production

The use of high-yielding vegetable cultivars in Africa is a recent phenomenon and the use of many modern production methods is still considered too expensive by the average African vegetable producer. This is in contrast to South East Asia where the use of high-yielding vegetable cultivars and production technology, such as mulching and water-saving drip irrigation equipment, is increasingly the norm.

Tanzanian vegetable growers in the Arusha region currently produce seedlings in open field nurseries. Seedlings are later transplanted into the fields. Often the percentage of seedlings that can be used in these fields for production is low. With farm-saved seeds or other low-cost seeds, the cost implications of this practice are not so high, but when expensive high-yielding varieties are used, it is important that all or most of these seeds result in a productive plant.

Results of the 'African vegetables' project showed that it would be very difficult to increase the percentage of seedlings produced in open field nurseries. However, for seedlings that were first produced in trays in a small plastic house nursery constructed from locally available material, the percentage of seedlings that could be used in the fields increased dramatically. Calculations showed, for example, that if tomato was grown in this way using conventional seeds, around €40 per hectare



Testing the new systems in the field, Red River Delta, Vietnam



Nursery built from locally available materials

Table 1 Profitability of vegetable production in the Red River Delta, Vietnam

Vegetable production system	Profit per hectare per day at local prices (kVND)	Profit per hectare per day at city wholesale market prices (kVND)	Labour needed per hectare per day (hours)	Income for one day of work (kVND)	Potential income for one of day work (kVND)
'Profitability'	321	797	78	33	83
'Labour'	277	877	52	42	135
'Traditional'	168	406	40	34	82

Exchange rate: kVND = 1,000 Vietnamese Dong; 1 € = 23 kVND

Table 2 Profitability of vegetable production in the Arusha region, Tanzania

Crop	Profit per hectare per day at local prices (kTZS)	Labour spent per hectare per day (hours)	Income for one hour of work (TZS)
Eggplant	2.8	4.6	797
Cabbage	16.3	6.0	695
Carrot	17.0	6.4	619
Potato	15.2	5.6	601
Sukuma wiki	18.9	6.3	897
Tomatoes (non-staked)	27.4	9.3	583
Tomatoes (staked)	23.4	12.7	615
Average	17.7	7.1	681

Exchange rate: kTZS = 1,000 Tanzanian Shilling; 1 € = 2.2 kTZS

could be saved. The savings were even bigger for hybrid seeds – about €800 per hectare.

Production and profitability

At first it was difficult to get the farmers to record the data such as time spent in the fields, the amount and type of fertilisers used and planting materials. However, once they started recording the data and an analysis was made of the production costs and the returns, the farmers were amazed at the results (Table 2). The average earnings for

a farmer (per hectare) on a daily basis can be up to three times the local daily wage for work done in the vegetable fields, suggesting that if farmers budgeted properly, they could possibly invest in modern production methods if they wanted to.

The worthwhileness of doing this was even further underscored by the results from a collaborative project that showed that the yield of a traditional African eggplant cultivar could be increased from 8 metric tonnes per hectare to just under 30 metric tonnes per hectare by using only modern production methods. A spin-off of the project has been the changing attitudes of farmers towards keeping records, with many resolving to continue monitoring their activities.

Potential of the vegetable sectors in Vietnam and Tanzania

The case studies demonstrated the excellent opportunities for increasing the productivity either by increasing yield per hectare and by increasing the number of vegetable crops in rotation annually, or by doing both. Vegetable production therefore, has the potential to provide smallholder farmers with increased income and employment opportunities as well as to help stimulate rural development. However, to ensure future vegetable production capacity and the livelihood of farmers, attention must also be paid to the preservation of good vegetable production land in places close to sprawling urban areas and to proper soil and water management, especially in the mountainous areas.

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Harvesting tomatoes



Land being prepared for planting by a smallholder farmer