

Vegetables sustain farmers

Vegetable production is an important component of agriculture and also an essential part of a balanced human diet. In recent years, vegetable production has also become an income generating enterprise for those farmers who are located close to markets and road sides (Budathoki, 1991). Vegetables are a valuable source of essential vitamins, minerals and dietary fibre. In addition, some are also capable of providing additional calories and protein and have numerous medicinal values. However, the average daily consumption of fresh vegetables by Nepalese people at the end of the government's 7th Five Year Plan was insufficient (Hort. Master Plan, 1990). People living in the hills, particularly of low income groups, consume lower quantities of fresh vegetables than the higher income groups living in the urban and Terai areas. Kedar Budathoki describes how research and extension can and should be sensitive to farmers' needs when promoting new vegetable growing technologies.

Kedar Budathoki

In the hills of Nepal, there are two systems of vegetable production, namely at subsistence and at semi-commercial level. In the first system, most of the vegetables that are produced are utilised for domestic consumption, and it is estimated that about 84% of the farmers belong to this group. Sixteen percent of the farmers are semi-commercial, producing for the market (Morris, 1990).

Subsistence farmers generally grow vegetable crops in small areas, mostly mixed with staple food crops. Traditional and indigenous knowledge and practices prevail. Little seed of improved varieties, or introduced practices and inputs are adopted, and a very small fraction of time or labour is devoted to vegetable farming. Production and productivity are both below that of semi-commercial farming.

Poor productivity

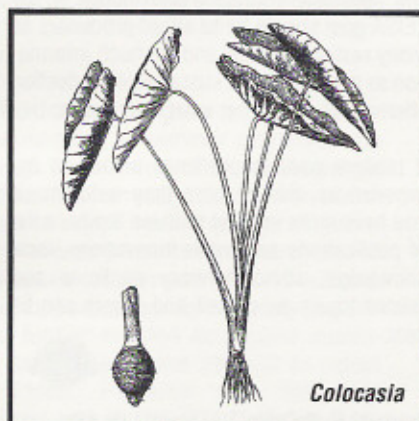
Many factors have been identified causing poor productivity of vegetable crops under home gardening conditions. In the past, the government's efforts on research, extension

management, high inputs, and ideal environment conditions. Performance has been found very poor under various stress conditions, which are common in subsistence hill farming. Although many good local and wild varieties and appropriate local farmers' practices have been reported as being available and practised in the hills of Nepal (Budathoki, 1992), very little attention has been paid to collection, identification, evaluation, multiplication, extension, and training activities on these crops, varieties and practices.

Another reason for failure is that farmers' needs, problems, their socio-economic conditions, access to inputs, markets, and resources are rarely considered while planning and executing improvement programmes.

Indigenous technologies

Local varieties and practices may be of low productivity but their production is stable. They produce some yield, instead of complete failure. They are not so prone to diseases, pests, high or low moisture levels, high or low



Colocasia

and training were concentrated on introduced and modern technologies with the assumption that these technologies would address the needs of all farmers. However, these technologies were not accepted by the resource poor hill farmers, because most of the technologies had been developed for good

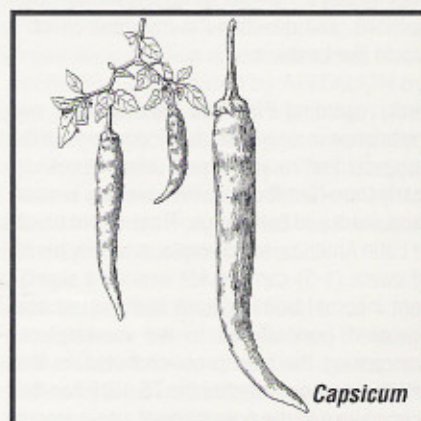


Sechium edule

temperature, and poor soil fertility. They are suitable for local farming systems and practices, e.g. mixed cropping with staple crops. Seed or planting materials are often locally available and these varieties can be reproduced locally under the farmers' own management conditions.



Lady's Fingers



Capsicum

Experience has shown that there are numerous indigenous technologies used by farmers in the hills. Describing and listing all of them is beyond the capacity of this article. I will mention a few of them that have been found promising and are widely used by the farmers.

Perennial local vegetables need minimal care or cultivation but produce satisfactory yields for many years once they are established. Maintaining a few of these plants supports the family needs for vegetables to some extent. Some of the common perennial vegetables are chyote (*Sechium edule*), kurilo (asparagus), tree tomato, banlasun (wild garlic), leafy onion (wild onion), Banmare (wild buckwheat), Halhale (wild spinach), cherry tomato (*Lycopersicon pimpillifolium*), hot chillies (*Capsicum*), drumstick (*Moringa oleifera*), tarul (*Dioscorea* sp.), bhyakur (*Dioscorea* sp), pindalu (*Colocasia* sp), tusa (*Arundinaria*), neuro (*Thelyopteris* sp), jaringo (*Phytolacca alinosa*)

Application of cattle urine is a traditional practice used by farmers to manure vegetable crops in the form of a top dressing. The diluted mixture (1:1) fresh (preferably 7-10 days old) animal urine, is applied at the rate of 50 ml per plant. This practice, when verified at Lumle Regional Agricultural Research Centre (Budathoki et al, 1989), was found to be as good as application of urea or Ammonium Sulphate. Similarly, diluted urine when sprayed onto plants, controls diseases (Peties, 1986) and it is very effective in controlling Powdery mildew on broad leaf mustard in Lumle (Lohar, 1992).

It has been noted that some vegetable growers use 'cow dung water' to manure vegetable crops. For this process, fresh animal dung is collected, and put in a used bag. After closing the bag, it is placed in a container of water twice the volume of the dung. After 10-15 days, when the colour of the water becomes dark blue, it is poured around plants as a top dressing (50-100 ml per plant).

Nutritive vegetable crops

Vegetable crops are rated as cheap and good sources of natural vitamins, minerals, and fibres (Kale et al. 1980). However, deficiency in these nutritious elements is very common in Nepal and more particularly with women and children. Inclusion of the following vegetable crops in kitchen gardens (in some countries they are called 'nutritional gardens') will certainly improve the health of the family members.

Vitamin A crops: Amaranthus twigs, spinach, coriander leaves, ripen pumpkin yellow fruit, colocasia leaves, drumstick leaves, broccoli, buckwheat twigs, mustard leaves etc.

Vitamin B crops: Colocasia leaves, green pea, turnip and radish leaves (tops), tomato root, spinach, fenugreek etc.

Vitamin C crops: Coriander leaves, cabbage, amaranthus, drumstick pod, leaves and flowers, tomato, tree tomato, chilly etc.

Mineral crops: Amaranthus twig, pea twigs, spinach, colocasia green tender leaves, drumstick leaves, lady's finger, swisschard, mint, mustard leaves, green onion, garlic, radish leaves, turnip leaves, buckwheat, rayo, cauliflower tender leaves, broccoli, cucurbits tendrils and other dark green coloured leafy vegetables etc.

Protein crops: Drumstick leaves, pea, bean, broad bean, cowpea (green pod and grain), amaranthus leaves etc.

Medicinal crops: Onion, garlic, shallot, cabbage, broccoli, cucurbitaceous seed, carrot, tomato, cucumber, fenugreek, bitter gourd etc. (National Institute of Nutrition, 1980)

Seed availability

Seeds are the basic input for vegetable farming and outside sources for quality seed are not always reliable. In many cases, farmers are discouraged when they do not get the seeds of the variety they want to grow. This is mostly the case with introduced crops but sometimes with local varieties as well. One of the reasons for shortage of suitable seed is the fact that farmers lack sufficient information on seed production aspects despite their keen interests and desperate needs. Another reason is the introduction and extension of vegetable crops with very difficult seed production methods. Many farmers have difficulties in producing genetically pure seed.

Improving vegetable farming

The following points are suggested to improve the existing situation so that the vegetable farming with subsistence farmers will increase and expand in a sustainable manner.

- Promote those vegetable crops, the seed production of which is possible, simple and easy to operate for common farmers. Self-pollinated crops should be preferred when starting. This should then be gradually followed by often-cross pollinated and highly-cross pollinated crops. Priority should be given to indigenous vegetable crops.
- Impart training on production, post-production and post-harvest activities related to seed. If possible, establish small seed or plant producer groups. Develop a system so that produced seeds are distributed or exchanged or bartered on cash or kind within the given command area.

The plant 'sajiwon', which is found in the Nepalese hills and traditionally used by the author's ancestors, has great value. Like other plant and animal species it is important because of its medicinal and religious uses. From conversations with hill farmers, Giri Raj Kattel learned about sajiwon. In discussions, the farmers came up with some questions to researchers.

Sajiwon, or Hattikane is commonly known as physic nut (*Jatropha carcas L.*). It is a deciduous shrub to small tree, found in the subtropical Himalayas and cultivated also in South India. Its seed oil is used as soap, lubricant, illuminant and also as purgative. The tender leaves are eaten as a vegetable. The old leaves are generally used in vegetable and fruit nurseries. After burning, the dried leaves are used as fertilizer.

Most of the Nepalese farmers, especially in the hills, use this plant as a hedge row to control any enemies that attack crops, livestock and any man made preservations. The juice of this plant is very good for gum protection for human teeth. Therefore, young twigs can be used as a tooth brush. It is said that 'the juice has strong power to kill teeth worm'. The fruits, when ripe, are a good replacement for lamps in the villages in periods of kerosene and candle scarcity. They burn very well.

One of the most important and most curious uses, however, is that Nepalese hill farmers use the young shoot of this plant to control crab infestation in their 'khet' (cultivated low land). In the hills of Nepal, the land for rice cultivation is made by small terraces in cliffs or slopes, which are either irrigated from streams or swampy by nature. These terraces are dammed by small bunds ('aall') of mud. The muddy 'aall' are easily damaged by crabs and rats. If frequent damaging happens, there is no water kept in the rice lands and eventually production will decrease. When they realized this, the farmers came to use young shoots of sajiwon. They cut small pieces of sajiwon shoot and they press it in the mud where they see crab or rat holes. It is believed that crabs are thus chased away. The reason for this, however, is not yet clear. The Nepalese farmers would like to see this traditional method researched, so that they may improve their technologies.

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This may be extended to inter-command areas as well if surplus seed is available.

Conclusion

Hill farmers in general are small scale, resource poor and they farm at subsistence level. Modern technologies offered by various governmental and non-governmental organizations are often inappropriate for them and therefore they cannot reap the harvest of these technologies. Most of these technologies need high external inputs, ideal environmental conditions and good and timely crop management, which is not within the capacity of resource poor hill farmers.

However, the hills of Nepal are a good source of local, traditional and indigenous vegetable crops and varieties. These may not be superior, but they are appropriate for the local conditions. Therefore, it is suggested that programmes of collection, identification and evaluation of these crops be started. Part of these activities have already been initiated by Lumle Regional Agricultural Research Centre. However, there are some varieties and technologies that need further research. These activities could be done jointly by research stations, farmers and concerned Agriculture Development District Offices for fast expansion of the appropriate technologies.



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The drawings are taken from *Vegetables of the Dutch East Indies* by JJ Ochse and RC Bakhuizen van den Brink. Amsterdam: A. Asher & Co. BV, 1980.

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