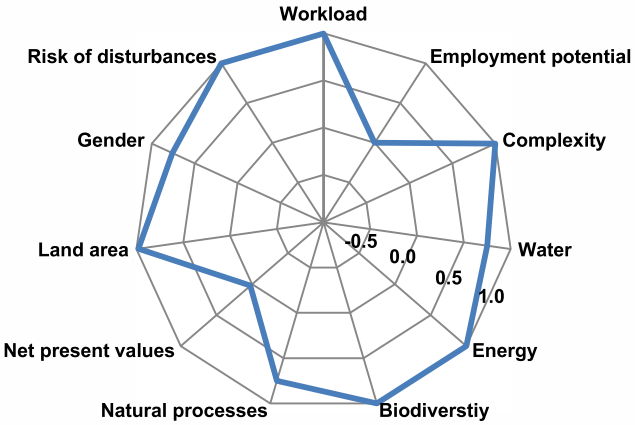
SATNET ASIA
Innovation network for food security and poverty reduction

Vegetable Pool

Technology fact sheet | 12 / March 2015

Key facts

- Little land and capital investment required; particularly suitable for poor households and women.
- Contributes to year-round availability of vegetables and a healthy diet.
- Suitable for areas with little rainfall and saline soils.
- Makes it possible to recycle wastewater, kitchen and farmyard waste.



This graph summarizes the results of a sustainability assessment conducted for this technology. The closer the line is to the outer edge of the diagram, the better the technology performs in terms of the particular criterion.

What is vegetable pool?

- A small, circular and elevated plot of land close to the homestead with a bag in which vegetables are grown (see Figure 1). The vegetables are watered through a bamboo pipe located in the centre of the bag and directing the water flow to the lower parts of the bag. Depending on the soil, the water will also moisten the surrounding vegetable patch. If not, it can be irrigated from the sides.
- Creeper vegetables like bottle gourd, bitter gourd, ridge gourd, country bean, long yard bean and snake gourd are grown on top of the bag; cabbage, lettuce and Indian spinach are grown in holes on the side of the bag while tomato, cauliflower, onion, chilly, garlic, red amaranth, stem amaranth, eggplant, okra, carrot and radish are planted on the land around the bag. Vegetables with a higher water requirement can be cultivated in the bag and vegetables needing less water can be planted on the land around the bag.
- The purpose of the vegetable pool is to increase the production of toxin-free vegetables near the homestead and to diversify the household diet, thereby enhancing its food and nutrition security.
- The vegetable pool is a simple technology used in Bangladesh, especially in drought-prone and saline areas and needs a limited amount of locally available material.

History

The vegetable pool was introduced to Bangladesh in 2009 in the country's drought-prone northern areas by the non-governmental organization (NGO) Caritas Bangladesh. The NGO came to know of the technology's application during a field visit by staff members to Sri Lanka in 2007.

Where it works

- The technology suits water-scarce environments.
- The vegetable pool was specifically developed for terrace topography, but also works well in other topographic conditions.
- The ideal soil is sandy loam.
- Typical adopters in Bangadesh are women from poor and vulnerable households.
- The technology is typically explained during village meetings, training workshops and field days, through observation and discussion and/or by distribution of leaflets in the community.

Figure 1. Woman irrigating vegetable pool

Photo: Md. Mizanur Rahaman, Caritas Bangladesh

Technological aspects

- The optimal land size for a vegetable pool is 4.1 m² (the circular area should have a diameter of 2.30 m = 7.5 feet = 90 inch).
- The construction requires a jute bag[1], farmyard manure, rope, a bamboo pole or stick[2], rice straw or other organic material. Fencing material is also required to protect the vegetables from roaming animals in the courtyard.

Construction

1. Pile up sandy loam soil and farmyard manure, mixed in a 2:1 ratio, up to a height of 30 cm (one foot) in a circle which is approximately 4.1 m² in area with a diameter of 2.3 m.
2. Place a bamboo pole, of at least the same length, in the centre of a 1 m-long jute bag.
3. Place the jute bag with the bamboo pole inside, in the centre of the elevated circular plot and fill it with sandy loam soil and farm yard manure, mixed in a 2:1 ratio. Rice straw and/ or vegetable residue can be added to the soil-manure mixture.

Figure 2. Woman preparing a vegetable pool

4. Little holes can be cut into the sides of the jute bag to grow vegetables.
5. Creeper vegetables should be put on top of the jute bag and other seeds and seedlings should be placed in the holes in the sides of the bag and on the elevated area around the bag.
   - It takes about 4-5 hours to set up the vegetable pool. Vegetable cultivation requires little attention except for regular watering that needs 5 to 10 minutes per day.
   - Even wastewater from the washing of kitchen utensils can be used to irrigate the vegetable pool if it does not contain soap.

Economic aspects

- A vegetable pool of approximately 4.1 m² size (diameter 2.3 m = 7.5 feet) can produce approximately 120 kg of vegetables per year.
- The production cycle depends on climatic conditions. In Bangladesh, two cycles per year are possible, including four months in winter and eight months in summer.
- Initial investment cost for a production unit defined above is Tk 450 ($5.70). Production costs vary for seeds, seedlings and the jute bag that has to be replaced approximately every year.
- Assuming that a household sells all vegetables at an average price of approximately Tk 20 ($0.25) per kg, a gross margin of about Tk 1,940 ($24) per year can be achieved. On the other hand, a household would save Tk 1,940 ($24) per year by not purchasing vegetables that can be obtained from the vegetable pool. However, total sales or savings will depend on vegetables grown or purchased. It also has to be pointed out that these calculations are theoretical.
- The vegetable pool will improve community nutrition by enabling dietary diversification in the household owning the pool as well as its neighbours. In Bangladesh, it is customary to gift surplus household food production to neighbours and friends.

Environmental aspects

- The technology requires little water and even kitchen wastewater can be used for irrigation. Fresh water can thus be recycled and saved.
- The soil in the elevated circular land plot and the jute bag is less saline compared to plain land.

[1] A jute bag degrades naturally while a woven plastic bag will leave unwanted particles in the soil. Farmers also use woven baskets made of natural material like straw of hard grass.

[2] Bamboo poles are used for irrigation in Bangladesh. In other countries, and depending on availability, gravel can be placed inside the jute bag.

- As mineral fertilizer and chemical pesticides are not required, the technology is benign for to biodiversity, including beneficial insects. It also prevents pesticide contamination which can be a health hazard.
- The vegetables are safe for human consumption.
- The technology allows recycling of kitchen and farmyard waste, using the nutrients these contain.

Social aspects

- Given the little land and capital investment required, the technology is particularly suitable for poor households. Most requirements can be sourced from natural surroundings or purchased cheaply.
- Women are main adopters as it is easy to produce a regular supply of fresh vegetables for family meals without diverting too much of their time.
- Vegetables, especially green leafy vegetables contain important micronutrients and minerals lacking in rice-based diets. Regular consumption of vegetables enhances household nutrition and in combination with good hygiene, leads to improved household health.
- Sale of vegetables can generate additional income.
- Sharing of the vegetables produced and information about the technology with neighbours, friends and relatives, increases community social bonding.

Recommendations and issues for replication

- Farmers need land and additional soil to adopt the technology.
- As the seeds used are mostly high-yielding varieties, farmers have to buy new seeds every year, which might be costly.
- Vegetable production is difficult in summer while in the cooler season, vegetable prices are very low. This may prevent adopting households from earning adequate income (Weinberger, 2005).
- Depending on the source of the soil and irrigation water, care is needed to ensure that evaporation at the outer ends does not increase soil salinity.

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Reference

Weinberger, Katinka (2005). *Vegetable Production in Bangladesh*. Taiwan: AVRDC - The World Vegetable Center, ISBN 92-9058-142-5.

SATNET Asia agriculture technology fact sheets

This fact sheet provides information of a sustainable agriculture technology or good practice that has shown its potential to enhance resource efficiency, provide economic benefits, and has a low risk of societal disturbance. The fact sheet is a result of the analytical work conducted by the Network for Knowledge Transfer on Sustainable Agricultural Technologies and Improved Market Linkages in South and South-East Asia (SATNET Asia). In consultation with SATNET Asia participants, the Food Security Center (FSC) of the University of Hohenheim in Germany has led the development of an analytical framework to assess the sustainability- and productivity- enhancing potential of agricultural technology options based on an extensive review of scientific literature. Examples of technology options are collected from various sources, including SATNET participants, experts from outside the region and online knowledge portals and literature. For technologies where sufficient information is available, the analytical framework is used to calculate a sustainability indicator for the technology.

About SATNET Asia

SATNET Asia is a network funded by the European Union. It is implemented by the Centre for Alleviation of Poverty through Sustainable Agriculture (CAPSA) of the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) in collaboration with the Asian and Pacific Centre for Transfer of Technology (APCTT), AVRDC - The World Vegetable Center, the Food Security Center of the University of Hohenheim and the Trade and Investment Division of UNESCAP.

SATNET Asia was launched in 2012 to support innovation for sustainable agriculture by strengthening South-South dialogue and intraregional learning. Operating in 10 countries of South and South-East Asia, SATNET facilitates knowledge transfer through the development of a portfolio of best practices on sustainable agriculture, trade facilitation and innovative knowledge sharing. Based on this documented knowledge, it delivers a range of capacity-building programmes to network participants who play roles as change agents and innovators, such as farmer organizations, traders, the private sector, the public sector and policymakers. This will enable network participants to transfer this knowledge to those who need it most – smallholder farmers and small-scale entrepreneurs.

Because the public sector no longer predominates agricultural development, SATNET explicitly aims to include the following groups in the innovation process: universities, private companies that develop and sell technology products or provide trade facilitation services, agricultural foundations, farmer organizations and NGOs. For, and together with, these target groups, the project aims to create a knowledge environment that is focused on poverty reduction and conducive to continuous and sustainable innovation.

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