

Annam bahu kurvita

Annadana

Soil and Seed Savers

*A network of seed-production, nutrition education,
organic farming and protection of genetic resources in India*

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The most essential foundation of the "Annadana" network is the development of home gardening, which is the ultimate fortress against malnutrition and the erosion of biodiversity. Open-pollinated seeds of traditional varieties are naturally calling for agricultural practices totally sustainable and respectful of the environment.

Annadana has been impulsed in India by the Europe based international seed savers association, "Kokopelli ". Kokopelli hold a planetary collection of heirloom varieties.

- To help the farmers regain access to genetic resources and to regain control of their own seeds
- To increase biodiversity in home gardens, to eradicate malnutrition, specifically the prevailing micro-nutrient deficiencies: vitamin A, calcium, iron, selenium, & zinc. (For example, in orange tomatoes there is 12 times more B carotene than in red tomatoes!)

Progress 2000 to 2003:

- **Donation of 80,000 seed packets to 40 different NGO's in India, as well as all the Tibetan refugee villages in India**
- **Construction of a center in Auroville for the conservation and packaging of seeds**
- **Setting up of gardens for seed production**
- **Workshops given in Auroville to initiate home gardens for the production of food**
- **Conference in March 2002: South Asian Network of Soil & Seed Savers, with 70 participants from India, Sri Lanka & Bangladesh, to form active collaboration in promotion of seed saving and nutritional education**

- **Training program for Indian NGO**

1. Bio-intensive mini-farming demonstrating 2 to 6 times increased productivity per area over conventional agriculture, while consuming 6 to 8 times less water and utilizing 50 to 100 % less purchased organic manures.
2. Vegetables seed conservation, propagation, pollination, extraction, and dissemination techniques and know how, as well as origin and history of vegetables, hybrid seed versus heritage traditional seed, productivity with sustainability and income generation models.
3. Home gardens, food production gardens, seed production gardens, practical design in situ, species selection, management through the year and going toward a real efficient sustainability.

Why are heirloom varieties so special?

(All Annadana seed are heirloom varieties)

Since the origin of cultivation, 12,000 years ago, food plants have traveled all around the globe.

Dr Choudhury, formerly head of the division of vegetables crops, Indian agricultural research institute, has said the following:

The tomato has originated in Peruvian and Mexican regions. It was introduced into Europe by Spanish explorer in the early sixteenth century. It was perhaps introduced in India by the Portuguese through there is not definite record of when and how it came to India.

Chili is one of the most valuable crops of India...the crop is grown practically all over India... The cultivated chilies are undoubtedly of American origin. They are known from pre-historic remain in Peru. They were widely cultivated in Central and South America, and were unknown in Europe prior to discovery of America.

Now, since 30 years, we are blessed by the advent of modern hybrid seed.

Hybrid seed:

- Hybrid seed are designed to fit modern agriculture parameters, like uniform ripening times, uniform size and thick skin, all which for transportation and mass market facilities.
- Hybrid seed are also design to respond to high chemical fertilizer input and are showing poor result if the inputs are not provided.
- The hybrid vegetables cannot reproduce themselves true to type, so for creating a captive market, the farmers must buy seeds every year, as they are either degenerative or sterile in second generation.
- Hybrid seed have also brought the eradication of our heritage ancients' varieties.

- Furthermore, there is no concern of nutritional value in the engineering of hybrid vegetables seeds.
- This international business is worth 1 billion dollars a year.
- 10 multinational companies control 40% of the seed market, and those same 10 multinationals control 60 % of the agro- chemical business worldwide.

Open pollinated seed:

- Heritage traditional open-pollinated organic seed of Annadana, have been feeding our forefathers for generations.
- They reproduce true to type, ensuring the farmer of seeds for the next season, and so on, as it has been for thousands of years.
- These traditional varieties are very tasty and nutritious. Actually, most people, who encounter them for the first time, are very much impressed by the rich diversity of taste in these varieties.

About nutrition, lets us look at a few figures:

Worldwide, the largest numbers of people suffering from micronutrient malnutrition live in South Asia.

- *vitamin A deficiency (VAD),*
- *iodine deficiency disorders (IDD)*
- *iron deficiency anemia (IDA) are serious public health problems in these countries.*

(Hussain, FAO, 1997)

An increase in the daily consumption of polished white rice is not the solution to this problem.

A real nutritional balance can only be provided through the use of a diversity of cultivated species (pulses, cereals, vegetables, fruits) and, what is more, through a web of species of great genetic diversity.

For example, certain varieties of tomatoes contain more vitamin C than oranges, while other varieties of tomatoes have more vitamin A than carrots.

Seeds are the ultimate symbol of security and nutritional health.

Home gardening, kitchen gardens :

- Home gardening contributes to household food security by providing direct access to food that can be harvested, prepared and fed to the family, often on a daily basis.
- Even very poor, landless or near landless people practice gardening on small patches or homestead land, vacant lots, roadsides or edges of a field, or in containers.
- Gardening may be done with virtually no economic resources using locally available planting materials, green manure, "live" fencing and indigenous methods of pest controls.

- *Home gardening at some level is a production system that the poor can easily enter.*
- *Gardening provides a diversity of fresh food that improves the quantity and quality of nutrients available to the family.*
- *Households with gardens typically obtain from them more than 50% of their supply of vegetables and fruits (including such secondary staples as plantains, cassava, taro and sweet potato), medicinal plants and herbs.*

(Soleri, Cleveland and Frankenberger, 1991; Marsh and Talukder, 1994; UNDP, 1996).

Very small mixed vegetable gardens can provide:

- *a significant percentage of the recommended allowance for protein (10 to 20%)*
- *iron (20%)*
- *calcium (20%)*
- *vitamin A (80%)*
- *vitamin C (100%).*

(Marsh and Talukder, 1994, AVRDC, 1983-1989)

Nutrition of some vegetables:

Tomatoes:

The variety called "double rich" contains 2 times more C vitamin than most of oranges!

The variety called "Caro" and "Caro rich", have a very high contain of A vitamin and "caro rich" contain 10 to 12 times more beta-carotene than other tomatoes!

The tomatoes have in average from 15 to 17 amino acids among the 20 essential ones for the elaboration of protein in human metabolism!

Chilies:

Green chilies contain a high percentage of C vitamins, 2 times more than most Citrus family! For 100 grams of fresh chilies there is 369 milli grams of C vitamin! Only 154 milligrams are left when the chilies are dried and only 10 milligrams in chili powder!

Chilies contain also another essential vitamin, A vitamin, which has a different behavior than C vitamin. For instance, for 100 gr of fresh chilies, there is 770 unit of A vitamin which become 77,000 units when we dry the chilies, 100 times more than in green chilies and much more than in carrots!

Amaranths

In amaranth leaves there is 3 times more C vitamin, 10 times more carotene, 15 times more iron and 40 times more calcium than in tomatoes!

Amaranth leaves contain 3 times more calcium, 3 times more C vitamin, and 3 times more niacin than spinach leaves!

Waste is Wealth

At the level of village dwellers we can try to conceive how best **waste water and waste bio mass** could be utilize to create productive backyard kitchen garden.

If bathroom and clothe washing platforms are provided with a basic cement flooring, a bit raised of the ground level, waste water can be collected daily in a 20 liters bucket.

Then, a simple 200 liters drum, put on a 3 to 4 feet high brick work can be use as a container to store the waste water. The villager has to manually empty daily the small 20 liters bucket in the 200 liters drum.

EM is then added in the drum. (Efficient Microorganisms)

A hose pipe is connected at the bottom of the drum and by simple gravity, the back yard garden can be watered using waste water purify by EM.

To create vegetables beds and to manage the soil fertility, the villager can take advantage of **waste Bio mass** to create a rich medium for vegetables growing.

Vegetable bed

Layering Bio- mass method

It uses materials which are available for free, disregarded or growing on the side of the roads

It requires hardly any physical work or strain, can be easily apply by kids, ladies and old people.

- Marking with a rope the dimension (width and length) of the bed. Width should be in between 3 to 4 feet and length up to 60 feet.
- **The first layer:** to spread on the marked surface one-inch tick of Dry Matter. Dry matter can be **forest leaves, straw, coconut fiber waste, dry weeds, seed pods, old roof materials, wood shaving, saw dust, sugar cane waste, rice usk, millet usk, tamarind pods, ground nuts pods... ideally a mixture of different dry matter.**
- To sprinkle old compost or top soil or soil @ one chetty (7.5 liter) for 5 linear meter of bed.
- To sprinkle ashes @ one chetty for 10 linear meters of bed
- Other materials can be sprinkled on the dry matter layer like lime, bone meals, fish meals, neem cake, crashed egg shell, feathers, chicken or sheep manure, dolomite, Bore well soil, Kolam soil @ half chetty for 10 meters.
- To water the dry layer @ 40 liter water for 10 linear meters of bed.

- **The second layer:** to spread one inch thick of Green Matter. Green matter can be, **fresh weeds, fresh leaves, and fresh grasses, kitchen waste, water plants... ideally a mixture of green mater.**
- No water is needed on the green layer
- To repeat operation 3 to 8 up to the obtainment of one foot high, which represent 12 layers of one inch thick.

• **Notes:** Our experience have shown that such bed of one foot high will diminish up to half foot high within 2 weeks.

After 5 weeks the different aggregates will have been transformed into a rich fertile medium ideal for seedlings and plants grown, which can so be transplanted on the 6 Th weeks.

The more various and diverse are the elements that we will put in the bed, the more rich, balanced soil will be created within 6 weeks!

To add EM (efficient micro organisms) @ 20 ml by 10 litter of water, speed up the decomposition process and help specially in breaking down woody elements such as **wood ships or coconut waste.**

Using a diversity of forest leaves as the dry matter creates the richest medium

The Layering Bio mass Method to create Veg Bed, can be use by the poorest and the less fit as it involved no purchase and no physical strain, it is just about collecting disregarded bio mass and to layer it properly.

I always have that vision of a old lady preparing her bed slowly along the months just with a basket ...as a symbol of how wisdom, quietness and regularity can materialize the marvel of a productive back yard kitchen garden.

It is true to say that the method relies on Bio mass and then that make us think of how valuable trees, grove and forest are.

Very fair yield can be achieved by that method with no financial input.

Perennial vegetable gardens can be maintained as the waste water source will be available through the year.

In that case the cropping system should be well thought.

In Tamil Nadu plains the *winter main season* from December to April, will see flourishing:

- Tomatoes
- Brinjals
- Chilies
- Lady fingers
- Pumpkins
- Bottle gourds & others gourds
- Water melons
- Cucumbers
- Beans

- Radishes
- Amanranthus
- Spinach

From April to June, the soil should be given a rest and a revitalization by using cover cropping and green manure plants: Sorghum, cow pea and Sun hemp
Waste bio mass should be added on top of the bed.

The summer season form June to September will be served by:

- Brinjals
- Summer squashes
- Oignons
- Gourds
- Summer Beans
- Water melons
- Corn
- Amaranths
- Spinach

During the monsoon from October to December, heavy rain can be utilized at our advantages by growing again a good crop of pump plant, cover crop and green manure to boost or soil for the main Winter season.

Wish to all of you, inspirations and visions.

Thanking you for the visit.

Warm regards

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. Vegetables Raised Bed

Using Plant as Soil Builders, method

The method of creating Raised Vegetables Beds by using plants as soil builders

- Is directly derived of the working of the tropical forest
- Does not require a lot of physical labors but some.
- Need to be plane before hand
- Could need some purchase of Plants seeds, even if some of them can be harvested free in the forest or roadside.
- Could need some input like weekly watering, depending on Species used.

In nature: *The earth cultivates itself naturally by means of the penetration of plant roots and the activity of microorganisms, small animals, and earthworms.*

Let's look at the height of the vegetation over the Globe: On the pole there is no vegetation. Then the virgin forests of temperate countries are about 40 m high. Lastly you reach the equatorial forests where you have the highest forests of the world, about 80 m high.

Let's look at the chemical composition of the soil: In temperate regions, the soils have a high cation exchange capacity but if you go towards the south, in tropical countries, the cation exchange capacity is very low. It is very surprising so, that *the poorest soil of the world support the tallest vegetation!*

Instead of maintaining its nutrients within the soil, the tropical forest channels them into the trees. Such an efficient system is absolutely essential in order to prevent loss of elements by lixiviation, leaching, and mineralization.

Let's look at how the soil creates HUMUS(an exchange capacity): To create an exchange capacity you must have two things – clay and humic acid. Clays comes from the transformation of rocks by plants. Insects and animals attack leaves and the rest of the vegetation and produce humic acid. It is the blending of clay and humic acid that produces cation exchange capacity (which means HUMUS)

The general problem with tropical soils is the low level of humification. To remedy this you have to bring in organic matter with a very high Carbon – nitrogen ratio. With an increase of carbon- nitrogen ration, lignin increases and this is important as lignin decomposition produce humus.

The trees, grasses, earthworms and moles in the ground, are acting the part of the plow, completely rearranging and renewing the soil.

- Plant roots reach to the lower soil strata and draw the nutrients back up to the surface
 - Trees: their deep root systems will bring up nutrients from deep down in the subsoil, and even further, into the tree leaves. These materials would not otherwise become available for use as plant food.
 - The grasses plow the topsoil and the trees work the deeper layers.
4. The deep penetration of grass roots into the earth loosens the soil

5. When the roots die:

- A worm eats its own weight everyday. It eats the dead roots, replace them with air, thus creating porosity and enabling water to percolate.
- Roots are also broken down by microbial activities. Their cavities left after decomposition, help rainwater percolates through the soil, air is carried deep down.
- Their decomposition or their digestion by the soil fauna adds to the humus, allowing soil microbes to proliferate and enrich the soil.

How will we use these functioning of nature into our cultivated system?

We have to use what is called a PUMP Plant.

A Pump plant is a plant able to grow at the speed of 5cm per day of roots, and 3 meter in 60 days for the stem. Afterward the pump plant is destroyed and in its organic matter we start cultivation.

For example:

Deep rooting alfalfa as deep as 125 feet and comfrey up to 8 feet, help bring up leached out and newly released nutrients in the form of roots, root hairs, and microbial life which remain and decay beneath the surface of the soil after harvesting.

If you take just one wheat plant, the area that is exposed to the sun – the area of stem and leaves- is 5 m², but If you measure the area of roots, it is 1000 m²!

Roots are a fantastic phenomenon. We tend to overlook the importance of roots.

Using green manure & cover crop as Pump plant.

The growing of Cover Crops and Green Manures such as leguminous and Carbon, C4 plants until just before maturity, after the flowering stage but before fruit set, will enable us to use this plant as soil builders.

This is an excellent way to bring un-worked soil into a reasonable condition. These cover crops are rich in nitrogen and ligneous mater so they boost the nutrient level and bio mass of the soil without one's having to resort to the purchase of fertilizers. Their stems and leaves contain a lot of nitrogen and their roots support nitrogen-fixing bacteria. These bacteria take nitrogen from the air and fix it in nodules on the roots, which you can see when you pull the plants up. They also help you dig. Their roots loosen the soil and eventually decay and turn into humus beneath the earth. Due to the right combination of leguminous and Bio mass plant, cover crops decompose rapidly. Planting can usually follow 2 to 4 weeks after the plants are cut (not up rotted) and mulched. Another important part of a soil is air. A well-structured soil has adequate air and so roots can easily penetrate it. The use of deep-rooted plants, earthworms and termites, all macro and micro fauna and flora will help to improve the air circulation of a soil.

How to create a vegetables bed using plants as soil builders

- Cleaning the ground where the vegetable bed will be establish with a spade from bushes, weeds, thorns.
- Marking with a rope the dimension (width and length) of the bed. Width should be in between 3 to 4 feet (better 3 feet) and length up to 60 feet.
- One trench on each side of the bed is needed to provide the soil to create a raised bed of 15 cm high. The trench becomes a drain (for water logging) or an irrigation canal in case of flood irrigation. The depth of the trench is in relation to the amount of soil needed to created the raised bed (in average around one spade deep, 20 cm)
- Digging the drain is made with a local tool to a depth of 20 cm; the soil will be equally spread over the full width (3 feet) of the bed.
- Digging is best done after some rain when the soil is soft, or after watering the land.
- **Sowing the PUMP plant, cover crop, green manure:**
- It is essential to keep a high Carbon-nitrogen ration in our choice of pump plant, cover crop combination.
- The concept will be to mix one plant with a high Carbon contempt and one leguminous. Many combination are available, depending if we want to irrigate or not, if we are in a hurry or not.
- We can also use forest seeds and roadside tree seeds, which are plenty and free. In that particular case the seedlings should be cut before the stem become too woody
- The seeds should be scattered relatively dense on the surface of the bed and covered by one cm of soil or dry matter to protect them from birds until germination.
- After several months (2 to 6 months, depending of the species used) the pump plant is cut off, not uprooted, and the bed is mulched with its residue.
- The profit for us is plenty of bio mass in the form of plant roots, and plenty of litter in the form of mulch.

- It is best to sow our crops 2 to 4 weeks after the pump plant has been cut.

Cultivated plant to be use as pump plant:

Carbonaceous plant(carbon)	Proteinaceous plant (nitrogen)	Watering	C/N Ratio
Solam (Sorghum)	Cow pea	Once a week	Very high
Solam	Horse gram (kullu)	Once a week	High
Indigo sp	Grass pea (caramani)	Once every 2 week	High
	Velvet beans (Mucuna sp)	None	Low
Sun hemp (Crotalaria)	Cow pea	Once a week	Low
Sun hemp	Horse gram	Once a week	Medium
Pigeon pea (Cajanus cajan)	Velvet beans	None	High

Note: Watering for pump plant is needed at the sprouting stage but not necessities during their growth.

Road side Trees seedlings to be use as pump plant:

Neem tree, Rain tree(Samanea Saman), Tespesia Populnea, Erythrina Indica, Acacia species, Cacia species, Albizia species, Pongamia pinnata, Delonix regia, Butea monosperma, Cassia fistula, Bombax ceiba, Bhauhinia species, Peltaforum ferruginum, Caesalpinia species, Dalbergia species, Gliricidia sp, Leucaena leucocephala, Prosopis species...

Note: Watering is not necessary after the germination stage. All those trees are commonly seen on roadside.

The Pump Plant method is taking advantage of the wise use of plant growth for building up soil.

Annadana.