Volume 29, No.3 September 2002

Appropriate Technology

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International Agricultural Development
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Revitalising traditional systems

Soil conditioner helps to sustain yields

Water harvesting, through various means, has been the effective way to halt desertification and reduce the effects of low rainfall. Another way is to treat soils with a conditioner which helps to retain small volumes of rainwater for a long period and release it to the roots when necessary. Dharamvir Singh, Rural Centre for Human Interests (RUCHI) in India, and Willem van Cotthem, TC-Dialogue Foundation in Belgium, describe recent trials in India.

A villager from Karzanoo shows off his tomato crop grown with the soil conditioner TerraCottem.
Credit: Dharamvir Singh

RUCHI set up a demonstration project for water conservation and healthy growth of plants in the Indian state of Himachal Pradesh. The main objective of the project was to show the effect of the soil conditioner TerraCottem on vegetable production.

TerraCottem (TC) is a granular compound developed by Prof. Willem Van Cotthem at the University of Ghent, Belgium. TC is easily mixed into the upper part of the rootzone, and consists of more than 20 substances, belonging to 5 different groups (water stocking and releasing polymers, mineral fertilizers, organic substances, natural root growth activators and volcanic rock).

All these substances, applied in extremely small dosages, work together in synergy to keep the soil moistened; to limit leaching of nutrients; to improve biomass production; to stimulate micro-biological activities and root growth; and to aerate the soil, whilst limiting its possible compaction. It also helps to reduce the run-off rate of fertilizers.

The effect of this method on plant production is amazing.

The demonstration project was set up in July 2001 in the villages of Sanaura and Karganoo in Chambidhar, Himachal Pradesh. The soil is loamy clay, and the climate temperate, with hot summers and cold winters.

Drought is prevalent between the rainy seasons of July to September and October to November. The average annual rainfall is around 1300 mm, of which 60 percent is received during monsoon-months. Most of the cultivated area relies on rainfall.

Tomato plants were used in the trials. In the treated plots TC was applied around the roots of the young tomatoes when they were transplanted, approximately at a depth of six inches (15 cm) at a dosage of 10 g per plant. As is the normal practice, all plants were watered immediately after planting to activate the ploymers.

The cropping period was 12 weeks, during which the growth was monitored on a fortnightly basis. No supplementary fertilizer or pesticide was used. In the adjacent control plot chemical fertilizer was used and pesticide was sprayed as a traditional routine.

The difference in growth between the control plants and the TC-treated plants was noticeable from the second week onwards. The control plants were light green and weak, whereas the TC-treated plants were dark green and stronger. In the fourth week, the small control plants got curled leaves due to water scarcity (it had not rained during that period), whereas the TC-treated plants were taller and healthier. The survival rate was 90 percent for the treated plants, as against 65 percent for the control ones.

After 12 weeks, the average production of tomatoes from each TC-treated plant was 8 kg, as against 5 kg per control plant. Moreover, the size of the tomatoes was bigger in case of the treated plants (an average of 110-120 g per tomato).

Presuming a general survival rate of 90 percent of the treated plants, there would be 30,000 producing plants on a hectare of TC-treated area, as against 22,000 plants per hectare of untreated area. At an average of 8 kg production per treated plant, total tomato production would be 242,000 kg per hectare, as against 110,000 kg (at an average of 5 kg per control plant).

Taking the average price of tomatoes as Rs.5/kg (or 0,1 US $), the gross income is Rs. 1,211,000 (24 US $) per hectare for the TC-treated area and Rs. 555,000 (11 US $) per hectare for the control.

In the area, two crops of tomatoes are grown per year.

The cost of using TC put production costs up by 56 per cent, from $3800 per hectare to $6000. Gross income, however, improved after one growing season from $11,000 to $24,000, an increase of 118 percent. The net income is then improved from $7,300 to $18,300 if the cost of TC is taken into consideration.

As the TC-soil conditioner has to be applied to the soil only once in a period of several years, the subsequent crops can be grown without any further application. Moreover, there is a gradual improvement of soil quality due to better water and fertiliser retention, better microbiological activity and larger root growth, which all leads to higher production and more annual income. Of course, every year a certain amount of nutrients have to be added to the soil after every harvest, but only about half the

amount that would normally have been applied.

In the second season, therefore, production costs are reduced, and a better net income can be expected - $21,000/hectare from the TC treated crop against $7,300 from an untreated area. Similar results can be expected in the following season, but a further application of TC may be neccessary in year four.

For more information contact Mr. Dharamvir Singh, Executive Director RUCHI, Technology Complex, Bandhbhaguri - 173 233, Distt. Solan, Himachal Pradesh, India. E-mail: ruchin@del3.vsnl.net.in

Prof. Dr. Willem Van Cotthem, President TC-Dialogue Foundation, Beeweg 36, B-9080 ZAFFELARE, Belgium. Fax: +32 9 356 72 85; E-mail: vancotthem@tcdialogue.org Websites: www.users.telenet.be/ tcdialogue/ or www.tcdialogue.org or www.terracottem.com

Villagers from Sanaura show the growth of tomato plants growing in soil treated with the soil conditioner TerraCottem.

Credit: Dharamvir Singh

World Bank panel to assess GM risks

The World Bank is setting up a panel to assess the risks and opportunities of using science to reduce hunger and improve rural livelihoods in the developing world.

The panel will be co-chaired by Robert Watson, chief scientist at the bank, and former head of the Intergovernmental Panel on Climate Change (IPCC). The aim, says the World Bank, is to provide decision makers with the information and guidance they need to answer the questions surrounding issues like genetically-modified crops.

The four other co-chairs will be: Claudia Martinez Zuleta, former Colombian deputy minister of environment; Rita Sharma, the joint secretary and land resources commissioner of India's agriculture ministry; Louise Fresco, assistant director general of the Food and Agriculture Organisation; and Seyfu Ketema, executive secretary of the Association for Strengthening Agricultural Research in Eastern and Central Africa.

The panel will consult with consumers, farmers, scientists, non-governmental organisations (NGOs), governments, and the private sector. It will work in much the same way as the assessment carried out on climate change and ozone. It hopes to complete its assessment by mid-2003.

The World Bank hopes that the initiative will help to defuse the growing and widespread controversy over the use of GM crops in developing countries.

"Nearly 800 million people go to bed hungry every night and over the next 50 years, food production will have to double to meet growing demands," said Ian Johnson, the World Bank's vice-president for sustainable development.

"This will involve both productivity and environmental management challenges. As we move forward, the application of science to agriculture needs to be fully assessed in terms of its contribution to enabling farmers to be more productive. But equally, the environmental and social risks, as well as ethical issues, need to be discussed in an open and transparent manner. By discussing and examining the issues with everyone from farmers and consumers, to NGOs and governments, we can contribute to the informed dialogue among them."

The panel will look at the risks and opportunities of a broad range of issues, such as organic agriculture, traditional plant breeding techniques, new farming technologies, and biotechnology.

The consultative process will try to maximize input through a number of ways, including meetings in various parts of the world, videoconferences, and an interactive website at *www.agassessment.org.*

More details from The World Bank, 1818 H Street, N.W., Washington, DC 20433 U.S.A. Fax: +01 202 477-6391 E-mail: Web Page: www.worldbank.org