

Upland crops can be irrigated -- efficiently and cheaply

Written by Florante Cruz

Wednesday, 04 March 2009 22:24

Letting faucets drip at home is wasteful. What more if you have more than a few small faucets trickling water simultaneously. But for farmers, this is not at all wasteful. These “small faucets” spread out over a parcel of land planted with vegetable crops would save a lot of them time and labor in watering.

Drip irrigation, anyone?

Drip irrigation technology is another option for farmers when watering their high-value crops. Drip irrigation, also known as micro-irrigation, is simply a system that brings and distributes water via flexible plastic pipes by slowly discharging it through ‘drippers’ near the plants. Areas where there is very limited supply of water can benefit from this irrigation method. It can be even used in delivering liquid fertilizer directly into the soil.

Irrigation done this way is convenient and efficient, in the long term. Drip irrigation is suitable to a wide variety of crops, soil, topography and climate, according to Dr. Victor B. Ella, Professor at the Land and Water Resources Division – Institute of Agricultural Engineering at UP Los Baños.

“It can be used even under limited water supply condition and its water use efficiency is relatively high. The drip system only applies what is needed to meet the evapotranspiration requirement of the crop , hence eliminating runoff and percolation losses,” Dr. Ella pointed out.

Applicable in upland areas

Vegetable farmers in areas where irrigation service is absent and used to wait for rains to water their crops have something to thank for. But does it work also in the upland areas? “One of the main uses of drip irrigation is to conserve water in hilly areas. In sloping areas, water would just run off on top of the soil when it is delivered,” Prof. Moises A. Dorado, another expert in Institute explained.

“The idea is to impound water fetched manually or pumped and then release it gradually. This saves limited water from just drying up and not being used by the plants,” he added.

Cheap setup

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Although there are many types of drip irrigation and most of them a bit pricey for the common farmer, there exists an IDE “easy drip” kit that makes use of microtubes and is relatively cheaper than the conventional types. The said kit costs around P 23,000 per hectare. Conventional drip systems would cost P50,000 to 135,000 per hectare.

A typical 100 sqm IDE “easy drip” system would require a 200-liter tank positioned on top of a platform sufficient to generate an appreciable water-level height called the “operating head”. Water flows through a 16-mm diameter polyethylene pipe and filter and is then distributed to 10 lateral pipes made of thin-wall lay-flat tubing. These pipes have several microtubes with ends near the plant’s base.

“All the farmer has to do is fill the tank with water and open the valve,” Dr. Ella explained. The water would be automatically delivered to the plants.

Aside from cheap initial investment, its operating cost is also low since unlike the conventional types, the IDE “easy drip” kit does not require pumping units to generate the necessary operating pressure.

Install the system right

One problem farmers may face when using drip irrigation in upland areas is the uniformity of water distribution. “Since the farms in upland watershed areas are rolling, the height of water level in the tank relative to the emitters, and the slope of the land affect the distribution,” Dr. Ella said. Thus, some of the drippers would quickly release water than the others. Thus, it is important to set up the system right.

Research shows set up requirements

To determine the operating head at various slopes of the land, Dr. Ella in his experiments set up a 10 m x 10 m IDE “easy drip” system. He measured and analyzed the discharged water in varying operating heads and sloping conditions.

The results indicated that from both hydraulic and practical standpoints, an operating head of 3 m is recommended for mild slopes, Dr. Ella reported.

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His findings also showed that this particular drip system does not work well in areas with a slope of greater than 30%. However, he said this problem may be addressed using pressure regulators.

Comparing crop yield: drip vs no drip

Outright, using drip irrigation gives remarkable results as compared to relying on rains: higher crop yield, higher plant height and relatively larger size of produce.

“In one of our field experiments, a drip irrigated field produced 4.5 kg/sqm of cabbage, whereas the field without the system only produced 2.4 kg/sqm. We also produced 6 kg/ sqm of Chinese cabbage using drip method.

The ‘without drip’ field produced only about 3 kg/ sqm,” Dr. Ella added.

Research on drip irrigation technology being conducted by Dr. Ella is part of his USAID-funded SANREM project on “Agroforestry and Sustainable Vegetable Production Systems in Southeast Asian Watersheds” in collaboration with partner scientists from North Carolina A&T State University, Virginia Tech, International Development Enterprises among others.

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