Developing Countries Farm Radio Network

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**Protect tomatoes from frost**

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You can grow tomatoes even in cold weather. A farmer in Zimbabwe, Mr. Francis Handwa, uses cooking oil or milk bottles filled with water to keep tomato plants warm. This is a good alternative to covering tomatoes if used bottles are easy to get. Here is how he does it.

Francis fills cooking oil or milk bottles with water until they are three‑quarters full. While the plants are still young, he places the bottles upright on the ground among the tomatoes. He places one bottle beside every third plant in every other row. He makes sure that the neck of the bottle appears above the plants. When the plants get taller than the bottles he places stakes beside the tomato plants. He hangs a bottle on each stake with a string. The bottles hang 10 centimetres above the plants.

When the temperature drops below freezing the water in the bottles freezes. The tomatoes stay frost free even though the surrounding grass and shrubs are covered with frost.

Mr. P.R. Makaya, an expert on fruit and vegetable production in Zimbabwe, explains why the water in the bottles freezes while the tomatoes are not attacked by frost: "When water has things dissolved in it, it freezes at a lower temperature than when it is pure. The water in plant cells, tomato cells in this case, contains dissolved salts. But the water in the bottles is pure, or at least has much less dissolved matter. In frost conditions, pure water freezes earlier than water in plant cells. So in the morning you find the water in the bottles is frozen. When water freezes it releases a lot of heat. The heat released when the water in the bottles freezes keeps the air around the tomatoes warmer than the surrounding area".

Here are some other ways to protect tomatoes from frost.

**Select a good site**

Select areas which are not prone to frost. Cold air is denser than warm air, so it moves downhill, settling down the valley, in low lying depressions or hollows. Do not plant crops that are prone to frost in the valley floor. Slopes are good sites for planting crops sensitive to frost because as warm air moves up it warms the area on the slope. And land that slopes towards the morning sun is better in frost prone areas than land facing away from the sun.

**Irrigating**

Sprinkler irrigation also protects plants from frost. The irrigation water freezes in the low night temperatures. As the water freezes it releases heat which warms the plant cells and reduces the chance of plants freezing. However, sprinkler irrigation can increase the incidence of foliar diseases in tomatoes.

**Mulching and grass fences**

Cover plants with grass, newspaper, or plastic to trap warm air around the plant. The covering must be secure so that it is not blown off by wind, and must be removed during the day to allow the sun's rays to reach the soil. A grass fence one metre high erected around individual plants or beds also offers protection against frost.

**Burning**

Burning crop residues, maize cobs or used oil around the field in the late afternoon is another method of frost protection. The smoke forms a screen around the field, trapping warm air inside it and keeping the cold air out. When burning, however, see which side the wind is blowing so that the smoke is blown into and covers the field.

**Notes**

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This script idea came from Takaniso Nyoni, a trainer at the Wensleydale Farmer Training Centre, Zimbabwe, who learned the technique from a farmer during a horticulture course at the centre in 1994.

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