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Food security and sustainable agriculture

by **Atlant Bieri**
science journalist, www.atlant.ch

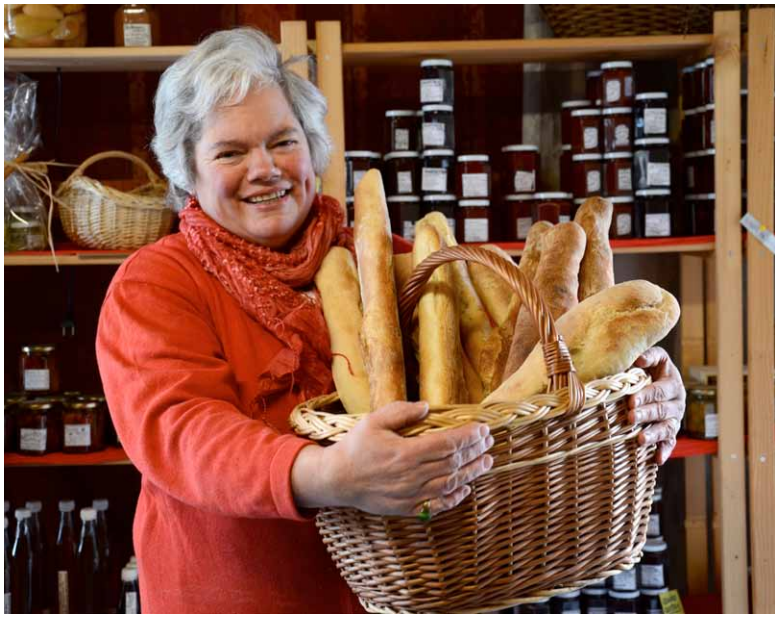
Jean-Daniel Charrière
ecologist at Agroscope, (Center for Agricultural Research in Switzerland)

and **Felix Herzog**
agricultural engineer, Bee Research Centre, Agroscope

The key facts in brief
Agriculture needs resources to produce food. If resources are scarce or are used unsustainably, food security is put at risk. Honey bees and other pollinators are particularly sensitive to environmental imbalances. Man must therefore ensure a strong presence of these insects so that they can fully do their job. Farmers are in turn sensitive to economic and social change, so in the future, small farming businesses in particular will survive only if they are able to come up with innovative ideas and projects

To better understand: a few basic concepts

If we think that food comes from supermarkets, bakeries or pizzerias, we're wrong. In reality spaghetti and carbonara sauce originates from cultivated fields and meadows. The pasta is a derivative of wheat growing in the fields; milk and meat come instead from the grass and cereals that the cows and pigs eat, and that, once ingested, are converted into steaks, chops and minced meat. However, the meadows and fields alone are not sufficient to fill the shelves of our supermarkets. To do this, agriculture needs other resources such as water, fertilizers and petroleum. Just consider that to every liter of milk up to a hundred liters of water is added.



Farmer
© K. Schaffter

In order to always produce enough food, all of the resources must be available in sufficient quantities. Only in this case can the so-called "food security" be guaranteed. If not, if agricultural land, water and fertilizers are scarce, food security is at risk.

The problem is that many resources are finite. Switzerland, for example, has an agricultural area of about 14,000 square kilometers and with this it is barely able to feed half its population. In fact, to guarantee food supplies, Switzerland imports food and animal feed from abroad. This means that to feed the entire Swiss population agricultural land abroad is needed.

Italy is one of the largest agricultural countries in Europe and has nearly ten times more agricultural land than Switzerland. Its level of self-sufficiency is greater, with cereals, for example, amounting to around 80%. Even Italy, however, is forced to import food to feed its population.

For today, tomorrow and the day after

The depletion of resources is closely related to sustainability. Sustainable means that we produce food so that in a hundred years we will still have as many resources available as today, that farmers receive an adequate income and that also in the future their profession will be attractive to young people.

Unfortunately there is still a long way to go concerning sustainability. If everyone in the world lived like the Swiss, we would need 2.8 planets to meet the demand for food, clothing and goods.

In addition, our resources are not used with much care. Here's an example: on a global level we lose around 75 billion tons of soil each year due to erosion, a quantity equal to a freight wagon reaching around the earth six hundred times. For this reason, in the last forty years, 30% of agricultural land worldwide has become unproductive.

Nevertheless, agriculture must produce more and more. In fact, according to data provided by the FAO (Food and Agriculture Organization of the United Nations), in the

next forty years food production will need to increase by 70%. The main reasons for this are global population growth and greater purchasing power of emerging countries such as China and India.

The increase in demand and lack of sustainability pose a threat to our food security, and to illustrate this point, think of the pollinating insects and the farmers.

Small, hardworking and irreplaceable

Pollinating insects fly from flower to flower and help local plants to sexually reproduce. Many plants, such as the cherry tree, produce fruit only when pollinated by the pollen of another plant of the same species. Three-quarters of all edible plants such as those bearing fruits, berries and vegetables, share the same fate.

Solitary Bee
© R. Ritter

The most important pollinators are honeybees and about 600 varieties of wild bees, including the bumblebee. It should be added that even butterflies, flies, hover flies, ants and beetles provide their contribution to pollination, whose worldwide economic value amounts to 150 billion euro.

However, the most important edible plants in terms of quantity such as wheat, corn and rice do without pollinators: in this case it's the wind that carries the pollen. This means that in a world without bees we would always have enough calories in the form of carbohydrates, but we would be lacking in essential vitamins and minerals.

The honey bee is at high risk of extinction. Each year, in fact, Switzerland, Italy and other European countries lose up to 50% of the colonies of this species. The cause of their death is still unexplained, but an important factor is the Varroa destructor parasite mite that was introduced from Southeast Asia. This parasite sucks the blood of both the adult bees and the larvae, and in doing so is able to transmit viral disease. The widespread use of pesticides in agriculture and in private gardens also contributes to bee mortality.

If the honeybees were subjected to any additional pressures, we would be even more dependent on wild bees for pollination. Already today, these bees carry out 50% of the pollination, but also their survival is in jeopardy. Half of all bee species are considered to be at risk, especially due to loss of suitable habitats. In fact, to feed and reproduce, wild bees need flowering meadows, unmown grassland, woodland and uncultivated land. All these elements are gradually disappearing from our landscape.

Varroa on bee pupa,
Agroscope

Man

In order to meet the needs of a growing population, food production must increase. This forces farmers to make more, but at the same cost. This is especially a problem for the small farms in Switzerland and Italy which, with 20 hectares of land on average, are barely able to afford the expensive equipment and have difficulty competing with the big farms with 100-1,000 hectares. This is the main reason why at this moment Switzerland is losing three farms a day.

Today, to be successful despite the crisis, farmers need to have a good education, demonstrate great versatility and possess a lot of practical experience. Increasingly, women are involved in the management of all the farm's operations.

Example from Switzerland: floral fallow for pollinating insects

To increase the variety of indigenous flowering plants in Switzerland's agricultural land, the federal government provides funds to farmers for the construction of various ecologically effective structures, including floral fallow land. With this technique, farmers sow a mixture of wild plants and wildflowers in land not being utilized, so that the pollinators and honey bees can find food once again on our territory..

Example from Italy: agritourism in Italy

In the mid-80s, the Italian government launched a project to support more than one million small businesses. From that point on, with "agriturismo" (farm tourism), farmers were able to generate additional income. Today, more than 16,000 farms offer food and accommodation, and in many of these guests can, among other things, participate or witness the production process. The local population is supporting this trend: an increasing number of consumers travel directly to the farmer to buy produce, thus saving on the costs of transporting the goods to the nearest supermarket.

Try it yourself and have wild bees in your garden!

With these little bee houses made of recycled material, you can keep and observe different types of wild bee in your garden.

1 • Fold a sheet of paper into two and with scissors cut four equal rectangles.

2 • With the aid of a pencil, from the shorter side roll up the double layer of paper to form tubes and secure each tube with a piece of adhesive tape. In addition to the pencil, use a knitting needle or a large spoon, to create tubes of different diameters. Because each type of wild bee has its preferred diameter, the ideal difference is 2-10 mm. You'll need to create between 40 and 50 tubes.

3 • With scissors or a utility knife, cut the top off a clean and dry plastic milk bottle (or carton). If you like, you can leave a longer edge as a small canopy. Now place together the tubes, wrap them with a piece of newspaper and secure with two pieces of adhesive tape. Apply a little PVA glue to the sides of the bundle and then slide it into the cut bottle so that the tubes don't fall.

4 • With a piece of string or adhesive tape, securely mount (not hang) the artificial nest no higher than two meters above the ground. It is best to choose a covered location to prevent the paper tubes from getting wet. We recommend placing the nests on balconies, on windowsills, in the hollow of a woodpile or under the eaves of a garden shed.

Note: wild bees deposit their larvae in the tubes during the summer. They spend the winter as pupae and hatch the following spring. Therefore, the artificial nest should not be touched during the winter.

Questions and new challenges

Imagine you are the Swiss or Italian Minister of the Environment. What would you do to encourage the reproduction of pollinating insects in your country? For this you have a budget of 6 million euro and three years available.

On no more than two A4 sheets draw up a proposal for a farm of the future in Switzerland or Italy. What products can survive in the market in the long term? What other services could your farm offer? In which region of Switzerland or Italy can your ideas best be used?

Bibliography

Federal Office for Agriculture www.blw.admin.ch

WWF: Living Planet Report 2012

Suggested Reading

Swiss documentary «More Than Honey» www.morethanhoney.ch

"Dirt: The Erosion of Civilizations", David R. Montgomery

The magazine "Salamandre", n° 185 (2008) presents "La Révolution des abeilles," to order go to: www.salamandre.net (in French)

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