

Dr. Gabriel Cadena, Director of the National Coffee Research Centre, CENICAFE, Colombia, spoke about “**Sustainable Coffee**”.

Coffee is grown in more than 50 tropical countries sharing some common cultivating practices and each country has slightly different set of technologies according to geographical position and altitude. All coffee producing countries have bio-diversity. There is megadiversity in terms of the species, plants, animals, birds etcetra, *as well as the cultures of the people* growing coffee.

Colombia shares much of the ecosystem biodiversity of the other neighbouring countries in the Andes. In terms of biodiversity, the order for countries having the most endemic superior plants are Brazil, Indonesia, Colombia, Mexico, Madagascar, China, Philippines, India, Colombia. For vertebrate animals, Indonesia, Peru, Mexico and Bolivia. Birds, Colombia, Peru, Brazil, Venezuela India, Kenya and Mexico. Amphibians, Colombia, Brazil, Ecuador, Mexico, and the same countries for the fishes, and there are others for the butterflies. All these countries need to practise sustainable practices in agriculture and coffee prodn. The UN definiton of sustainability is to provide the current needs of the present without comprmising future needs. For this reason environemental protection of of natural resources is vital.

Soil conservation is one of the most important aspects of environmental protection, especially in steep highlands of coffee growing areas. Rainwater run off is one of the most serious causes of soil erosion, and *leaching and drying of open soils the most serious causes of soil degradation*. The main methods of protection are terracing, interplanting other non-competitive competitive plants, and mulching to reduce run off. Soil cover also improves soil infiltration and reduces soil impact and erosion. Organic fertiliser, such as compost from coffee growing material, can be used in the field and nurseries. Shade trees also protect soils by their umbrella and leaf fall. *Shade also increases insect and other species bio-diversity in and on the soil*. There are different species and different coffee shade practices in different growing countries. *Usually the indigenous shade trees prove the most suitable, often shedding leaves during the periods when less shade is required*. Shade trees are also an additional form of fuel and income.

The type of variety plays an important role in sustainability. Arabica varieties of typica, caturra, and bourbon are all susceptible to leaf rust. The variety colombia does not require the use of fungicide against leaf rust and so reduces the cost of production and contamination by use of chemicals. This is a fifth generation from a mixture of progenies, which shows resistance to the fungus causing leaf rust, and yet carries the same important cup quality characteristics of coffee found in the desirable varieties of bourbon, caturra, and two parental colombia varieties. According to international cupping panels, the final colombia progeny shares the same characteristics as the mixture of varieties.

Coffee berry borer is the most important coffee insect pest. New integrated pest management systems have been introduced to combat the borer without the use of insecticides. This is better for the health of the people and results in sustainable practices, environmentally friendly and protective of fishes and other species living in the water. In conjunction with CABI International of UK, biological control methods using entomological, entomo-pathogenic fungi such as *Ovarium fasciana* have been

introduced. Also through UK, parasitoids of african origin, 2 species of wasps that only eat broca have been introduced that control the broca and protect the environment from chemicals.

Another very important issue for sustainability is water. According to the World Bank, water is scarce in many parts of the world with serious shortages looming in others. It is a problem for (70% real problem 70% in agric.) The scarcity is more recent. In the 1950s very few countries had any problems. Today, 29 countries with 400mln people suffer water shortages. By the year 2050, 66 countries and two thirds of the world population will face scarcity. Water quality and the volume of useable water are both important. Today, 1.4bln people live without clean drinking water and 2.3bln lack adequate supply of water. Through pulping and washing systems developed by bicolsu beneficio ecological café, there is 95 percent reduction in water need and 92 percent reduction in the organic pollution of rivers from bio products. The systems also facilitate organic coffee production and the growing of edible fungi or mushrooms. The mucilage is also used for animal feed. The systems developed can cater for 3000kg/hr, 600kg and 300kg per hour, down to 100kg/hr mobile pulpers. These are ideal for small growers and reduce the pollution of river water. The systems are based on recycling the water used for carrying and densimetric selection of fruit prior to pulping. Bicolsu have also developed overhead plastic cover of drying trays as a part of the sustainable post-harvest systems. They avoid rainfall on drying coffee and provide protection from direct sunlight for even drying and better quality. The overhead cover with open sides thus reduce labour requirement for turning or removing the drying coffee, without impeding the ventilation

Lastly, Dr. Vega proposed an initiative to create an international coffee research centre, which should be set up in collaboration with the World Bank, as well as producing and consuming countries, for the development of sustainable and clean technologies for prducers and concumers.