



## Genetic Use Restriction Technologies

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### Background

In the past few years several public and private plant-breeding organizations have been engaged in research on regulating the expression of genes in plants. These technologies, such as the one developed jointly by Delta and Pine Land Company (D&PL) and the United States Department of Agriculture (USDA) have many potential applications. They are, however, still in development and there is some time before they can be tested in the field.

The so-called Genetic Use Restriction Technologies (GURTs) have been split into two categories by the CBD team of consultants:

- V-GURTs: restriction technologies at the variety level where seed produced from the crop is sterile
- T-GURTs: restriction technologies at the trait level where seed produced from the crop is fertile and only expression of a high added-value trait requires a special treatment.

The discussion in this paper is confined to V-GURTs. V-GURTs come about through modifications in the genetic make-up of a plant involving complex arrays of genes and gene promoters that in their normal state are inactive. This means the plants are normal and produce seeds that germinate when planted. Seeds carrying V-GURTs produced for sale to farmers will undergo a special treatment that triggers an irreversible series of events rendering seeds, produced on farmers' fields, non-viable for replanting.

### Why V-GURTs

While V-GURTs are still in development, it is difficult to say with certainty what the potential benefits of this new technology are. However, research suggests the following:

#### i. An Incentive to Plant Breeding and the Development of New Varieties

As countries all over the world increasingly privatize their seed industry and plant breeding activities, intellectual property rights are a means of providing incentives to researchers and entrepreneurs. The UPOV Convention or other similar *sui generis* systems, and patent rights are some of the ways through which plant breeders are able to establish time-limited ownership rights to their work. Where effective intellectual property protection systems don't exist or are not enforced, GURTs could be an interesting technical alternative to stimulate plant-breeding activities. This is particularly true in the case of self-pollinated crops, cash crops (e.g. cotton, tobacco) and some food crops in countries where plant varieties and/or biotechnological inventions are not protected.

#### ii. New Traits

A possible benefit of particular interest in wheat and other small grains is the prevention of grain sprouting in the head under wet, warm conditions during some harvest seasons.

Sprouting in the head can be a primary cause of poor grain quality and causes substantial economic losses to the farmers. It is believed that V-GURT could prevent this condition from occurring.

### iii. Improved Farm Management

Non-viable seed produced on V-GURT plants will prevent the possibility of volunteer plants, a major problem in areas where rotation is practiced.

### iv. Alternate Use of Crops

In restricted and well-managed environments, V-GURTs have the potential to be used in the development of entirely new uses for plants and animals, which will enable the farmer to address new markets. These products do not affect the food chain but have specific value-added traits of use in the pharmaceutical sector (also known as biopharmaceuticals) or as industrial products (such as enzymes and polymers). Potentially the biggest development in this field could be the development of plants growing biodegradable plastics.

### v. Biosafety

V-GURTs can be regarded as a possible technical solution to concerns about the possible adverse effect of Living Modified Organisms (LMOs) on the conservation and sustainable use of biological diversity. If all transgenic varieties were V-GURTs they would not be able to spread into the environment and, therefore, biosafety would be ensured without cumbersome administrative procedures, such as those proposed in the framework of the Biosafety Protocol. The mixing of specialized products could be avoided.

## **Biodiversity and Food Security**

The induced sterility in seed using GURTs cannot spread. By its very nature, sterile seed cannot reproduce and thereby produce pollen necessary for propagation. Biodiversity is not threatened.

GURTs target modern varieties, in particular transgenic varieties of self-pollinated crops. They are not at all aimed at being introduced in landraces and local varieties used by small-scale subsistence farmers. The level of cross-pollination between V-GURT varieties and local varieties or landraces should be very low, even in the case of cross-pollinated crops. Therefore, impact on germination of seed saved by farmers would remain very low and utilization of GURTs in modern varieties would have a very limited impact on wild relatives.

## **GURTs and 'Farmers Rights'**

The choice available to farmers of a large range of varieties, including landraces, local varieties, modern non-transgenic varieties and transgenic varieties (some varieties of this last category, perhaps, with GURTs) will not change with the introduction of GURTs. Farmers will continue to select those varieties, which offer them the highest returns and benefits. If varieties protected by GURTs don't provide a significant financial benefit, farmers will remain free to use varieties that are not protected by GURTs and subject to national legislation, farm-saved seed of these varieties. In areas where farmers, and particularly subsistence farmers, alternate between the use of farm saved and commercial seed, they must be advised on using more than one variety of the same crop at the household level. At least one of these varieties should be non V-GURT so that, in the event that the farmer is unable to buy commercial seed in the next season, (s)he is in a position to keep and use farm-saved seeds.

As in all aspects of farming, ensuring information about GURTs is imparted to farmers remains important and any broad application of GURTs should take into consideration, prior to its introduction to the market, its potential impact on smallholders, indigenous and local

communities. When GURT varieties are ready for commercialization the seed industry will have to commit itself to appropriately labelling seed, subject to national legislation.

**Are 'GURT' Varieties Safe?**

As any other transgenic varieties, 'GURT' varieties will be assessed for environment and food safety according to National biosecurity regulations and relevant bodies. Only varieties that have been considered as safe during the assessment process will be released.