Food and Agriculture Organization of the United Nations

# Establishing grass barriers along the contour to reduce water runoff and erosion during heavy rainfall, Grenada


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## Summary

The agricultural sector in Caribbean islands such as Grenada is extremely vulnerable to storms and hurricanes. Establishing grass barriers along the contour can help in reducing water runoff and erosion during heavy rainfall.

Grass barriers provide erosion control on croplands and offer a cheaper and more sustainable alternative to terraces in areas where soil degradation is highly likely. This system reduces surface runoff by promoting detention and infiltration, diverts runoff to a stable outlet and helps entrapping sediment-borne and soluble contaminants.

This practice describes how to establish a grass barrier.


## Description

In Grenada, grass barriers are consistently promoted and implemented on approximately 15 to 20 percent of all vegetable and food crop farms to minimize soil loss and associated degradation and conserve the limited water resources, particularly in hilly areas.

Vegetative barriers are narrow, permanent strips of stiff stemmed, erect, tall, dense perennial vegetation established in parallel rows and perpendicular to the dominant slope of the field. They may be grown on croplands, on slopes less than 10 percent, where water and wind erosion are a problem or where water needs to be conserved. The adapted perennial vegetation should be established before the field is attacked by erosion.

## 1. Implementation of the technology

For the implementation of this practice, areas along the contour that need stabilization to reduce soil erosion have to be identified. Thereafter, an appropriate grass species based on farmers' and/or market needs (e.g. Vetiver - *Chrysopogon zizanioides* or Lemon grass - *Cymbopogon marginatus*) should be selected.

### 1.1 Optimal species are those that meet the following minimum criteria:

- Form an erect, stiff and uniformly dense hedge.
- Form an extensive root system.
- Be able to survive stress with quick secondary growth.
- Do not proliferate as a weed, and only require a narrow width to be effective.



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- Have a very narrow leaf base that prevents insects from lodging - very important in disease prevention.

Patches of grass should be planted approximately 1 to 1.5 feet (30 to 45 cm) apart along the contour depending on the species used. Each piece of planting material should be planted at an angle of 45 degrees parallel to the slope of the land in a staggered pattern.

The former ensures effective sprouting of roots, while the latter increases the soil conservation functions of the technology. To maximize the soil conservation effects of this practice, establish barriers approximately 30 to 40 feet apart from top to bottom of the plot.

If livestock is integrated into the farming system, farmers could consider using a high protein grass such as elephant grass (*Pennisetum purpureum*), which can also be used as fodder.

It is important to note though that this specific grass species must be carefully managed to prevent invasion into non-designated areas on the farm. To this end, elephant grass should be maintained at a height of approximately 2 to 3 feet (60 to 91 cm) and harvested at an immature stage prior to flowering.

The establishment of the barriers as a measure to lower the soil losses and minimize erosion is a measure that increases the resilience of farmers in Grenada against natural hazards. It helps to diminish their negative impact and helps to retain soil nutrients, providing conditions for a sustained crop yield or even improve it.

They also provide an improvement in farmers´ livelihoods as grass barriers can be utilized as an economic crop, thus contributing to farmers' income. To maximize the economic value of grass barriers it is recommended to plant species that can be used for a range of purposes outside the farm e.g. domestic, medicinal or raw material for manufacturing.

Collaboration with extension staff, manufacturers, supermarkets or other appropriate clientele can maximize the inherent benefits of this practice.

Figure 1. Grass barriers

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## 2. Validation of the practice

The technology was tested in mixed coastal plantation farming systems in Grenada (agro ecological zone: warm sub humid tropics).

Grass barriers were formally integrated into Grenada's farming system during implementation of an FAO demonstration project in Madigras, St. Georges during the late 1970s to the early 1980s. Currently, this practice is most predominantly used by hillside commercial farmers in areas, such as Ludbur, St. Andrews.

## 3. Further reading


- Vegetative Barriers for Erosion Control, USDA-NRCS Kika de la Garza Plant Materials Center, 1999.
- USDA-NRCS Kika de la Garza Plant Materials Center, Kingsville, Texas. 20p. (ID#1452).

- USDA Natural Resources Conservation Services, Vegetative Barriers Conservation Practice Job Sheet (Interim), April 1997.
- Ministry of Agriculture. 2004. Assessment of damages resulting from Hurricane Ivan.
- OECS. 2004. Grenada macro socio-economic assessment of damages caused by Hurricane Ivan. Accessed July 3, 2007.
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## 4. Agro-ecological zones

- Tropics, warm

## 5. Objectives fulfiiled by the project

### 5.1 Labour-saving technology (LST)

Barriers reduce water runoff and erosion during heavy rainfall and offer a cheaper and more sustainable alternative to terraces in areas where soil degradation is highly likely.

It is labour-saving because it promotes detention and infiltration, diverts runoff to a stable outlet and helps entrapping sediment-borne and soluble contaminants.

### 5.2 Resource use efficiency

Establishing grass barriers is step to conserve the soil from degradation.

### 5.3 Pro-poor technology

To implement this practice no investment or costs are needed.



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