



## Reclaiming Land through De-Rocking

**In Syria, large areas of degraded land have been turned into arable land thanks to several IFAD projects that managed to combine the sheer power of bulldozers with the long-term commitment of farmers.**

**S**hallow soils and very rocky terrain (an average of 2,000 m<sup>3</sup> of rocks per hectare) are major constraints to agricultural production in Syria. De-rocking, in fact, is a long-standing land reclamation practice that Syrian farmers have used for thousands of years, although with little effect since it was carried out by hand. Real progress started to be made when the government and some international agencies promoted mechanical de-rocking activities. Since 1982, IFAD has supported seven projects in Syria: five of them had a major component of land improvement through de-rocking, representing almost two-thirds of the total cost of the projects. IFAD's de-rocking operations were informed by a holistic approach integrating the use of heavy equipment with complementary activities such as adaptive research, extension and training, in order to have the highest impact on productivity and farmers' earnings. Farmers' participation – before, during and after de-rocking operations – turned out to be essential to the long-term sustainability of the land reclamation efforts.

### Country:

Syria

### Direct Beneficiaries:

Small farmers

### Results:

- To date, the total area reclaimed through de-rocking is about 700,000 hectares, or 12 per cent of total cultivable area. IFAD-supported projects contributed to de-rocking 180,000 hectares.
- IFAD-supported de-rocking activities directly benefited 70,652 households, and more than doubled the size of arable land in the project areas.

### Main Lessons:

- A realistic and flexible approach to project management helps beneficiaries participate gradually and paves the way for the development of appropriate technical solutions.
- Land reclamation has a positive and sustainable impact on farmers' incomes and livelihoods only when the reclaimed land is effectively used.
- Land reclamation, if conducted as prescribed, has a positive impact on the environment and biodiversity.



### BASIC INFO

#### Sources:

Syrian Arab Republic – *Thematic Study on Land Reclamation through De-Rocking Main Report (Draft)*, (IFAD, 2009)

#### Project Names:

Southern Regional Agricultural Development Project (I & II)  
Jebel al-Hoss Agricultural Development Project  
Coastal/Midlands Agricultural Development Project  
Idleb Rural Development Project

#### Project Starting Dates:

1982, 1992, 1995, 1996 and 2003

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### WEB PAGES

#### IFAD operations in NENA and CEN:

<http://www.ifad.org/operations/projects/regions/pn/index.htm>

#### IFAD learning notes:

<http://www.ifad.org/rural/learningnotes/index.htm>

## Background

In Syria, the abundance of mountainous or hilly lands with shallow soils and bare rock is the result of processes of severe water and wind erosion. It is estimated that more than 17 per cent of the land area is affected by some form of degradation.

In 1977, the government introduced the first large-scale land reclamation effort through mechanical de-rocking with the National Fruit Tree Project, which is still an ongoing activity. This early effort was followed by a series of other government projects: the Second Quneitra Fruit Tree Project (started in 1978), the Green Belt Project (1980), and the Ali Al Ali Project (1986).

In the meantime, the government and IFAD identified de-rocking as a means of expanding cultivable land and increasing the productivity of small farms, and chose to use it as their main intervention in the following IFAD-supported projects: the Southern Regional Agricultural Development Project I (1982) and II (1992), the Jebel al-Hoss Agricultural Development Project (1995), the Coastal/Midlands Agricultural Development Project (1996) and the Idleb Rural Development Project (2003). The de-rocking component of these five projects accounted for as much as 64 per cent of total project costs.

## De-Rocking Operations

The process developed and used in IFAD-supported projects starts with two preliminary tasks: 1) a land capability and suitability assessment for de-rocking; and 2) a socio-economic feasibility survey.

These preliminary tasks are followed by three major operations:

- *Initial clearing of loose rocks and boulders to a depth of about 20 cm.* If the slope is higher than 15

per cent, the land is terraced and cleared of surface rocks in one operation. Clearing is done using a front-mounted bulldozer blade. In areas with loose surface rocks, wheeled loaders are useful in helping with clearing operations because of their speed.

- *Ripping to about 90 cm depth to bring rocks to the surface.* Bulldozers are fitted with rear-mounted three-shank rippers, operated hydraulically.
- *Raking rocks of over 30 cm in diameter and levelling the land.* This is done using a medium bulldozer with a front-mounted toothed rake blade. This operation removes rocks, but leaves the soil. In most cases, the rake operates at a depth of 30-50 cm.

More than 90 per cent of the volume of rocks is used to construct stone walls around the parcels or is left piled in the middle of the field, while the rest is removed. A feasibility study showed that volcanic rocks can be crushed mechanically and sold as gravel and sand for the construction industry and civil engineering works. However, the high costs of transportation and energy involved have not encouraged this otherwise attractive option.

## An Integrated Approach

All IFAD-supported projects with de-rocking components adopted an “integrated area approach” based on a set of development measures:

- 1) selectively removing surface and subsurface rocks;
- 2) supporting adaptive research;
- 3) strengthening extension services;
- 4) supporting livestock development;
- 5) improving rural water supply;
- 6) providing intensive training programmes to rural women;
- 7) introducing a pest management programme;
- 8) supporting rural women’s groups in designing income-generating

activities; and 9) supporting adapted credit services.

Beneficiaries were heavily involved in the organization of activities, received extension training and were sensitized to the objectives of the project. Farmers’ input was crucial in the trial-and-error process that took place to identify the rake most suited for basaltic and other solid slabs. Also, farmers were responsible for collecting the remaining rocks from the field once the mechanical de-rocking was completed: during the first three to five years, 5 to 10 per cent of all rocks were removed manually. This is why farmers’ firm commitment to future land maintenance is a prerequisite for participation in the most recent projects.

## Replication and Scaling Up

In light of its success, land reclamation through de-rocking has already been replicated in many projects throughout the years, as shown above, and it will very likely be further replicated and scaled up in the future. However, it has been pointed out that future de-rocking operations will be more effective once the methods and knowledge generated in past operations are adequately documented in operational manuals for training purposes. Too often, in fact, most knowledge and innovations are preserved only in the memory of senior members of the local community and field technical staff.

## NOTES

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