

Mapping Tree Cover and Conservation Practices for the Resilience in the Sahel Enhanced (RISE) Programs: Land suitability for scaling-up practices

In order to support the U.S. Agency for International Development (USAID) RISE Program and to help USAID geographically target investments, the U.S. Geological Survey Earth Resources Observation and Science Center is mapping and monitoring land use, tree cover, and soil, water, and vegetation conservation practices across two RISE Focus Zones in Burkina Faso and Niger. In July, the first maps of land use/land cover, agriculture conservation practices, and on-farm tree cover density were completed and presented to the USAID Sahel Regional Office in Dakar.

All the conservation practices mapped in this initial study contribute to improved land management. To have decisive gains in agricultural production and productivity, however, there is a need to accelerate and scale-up the implementation of practices that have been adopted by farmers and proven effective in reclaiming degraded cropland and in boosting the agricultural productivity of the land. Agroforestry and soil and water conservation practices, often combined, are not only the most common conservation practices in the RISE Focus Zones but also the most useful methods to help sustain these goals, and therefore

should be the focus of the scaling-up recommendations. Based on the current uptake of soil and water conservation practices and agroforestry in the RISE Focus Zones, as well as the available spatial data, we will evaluate the landscapes most suitable for additional implementation of these practices. This infosheet describes our approach to define land suitability for scaling-up practices.

Land suitability evaluation entails the collection and interpretation of soil, vegetation, climatic data, and other aspects of land so that constraints for specified practices can be identified.

To evaluate land suitability, four factors are taken into consideration:

- **Soil texture:** Using high resolution imagery, we correlated conservation practices and soil texture. Then, based on the literature and our observations, we assign a suitability rating (from 0 to 3) to each conservation practice/soil texture combination (Table 1);
- **Topography:** Conservation practices are not suitable on all ranges of slopes. From satellite based radar data that provide detailed models of elevation, we can calculate the slope

range on which each practice has already been implemented and thus is suitable for future practices implementation;

- **Population density:** Implementing practices requires resources and labor. As a result, suitable areas for practices implementation have to be located near villages. We recently completed a detailed and comprehensive map of all settlements. We will define a 20km buffer around the villages as a proxy for populated areas;
- **Land cover:** Whereas agroforestry only occurs on cropland, soil and water conservation practices are suitable on various land cover classes, such as steppe, degraded rocky land or bare soils that can be rehabilitated for cultivation. Therefore, all land cover classes are considered suitable for soil and water conservation practices implementation.

By combining these four factors, we can assess where each of the conservation practices could be implemented within the RISE Focus Zones.

Table 1. Soil texture classes and practices suitability (0= not suitable, 1= low suitability, 2= moderate suitability, 3= high suitability).

| Soil Texture | Rocklines | Demi-lunes | Banquettes | Trenches | Agroforestry |
|---------------------|-----------|------------|------------|----------|--------------|
| Sandy | 0 | 2 | 0 | 0 | 3 |
| Shallow or gravelly | 3 | 3 | 3 | 3 | 0 |
| Sandy - clayey | 1 | 2 | 0 | 0 | 2 |
| Clayey | 2 | 1 | 0 | 0 | 1 |
| Clayey - sandy | 2 | 1 | 1 | 1 | 1 |
| Alluvial | 0 | 0 | 0 | 0 | 0 |