

## *In-situ* Green Manuring in Dry land Crops

AMEF Foundation is born out of a concern for ecological agriculture. Embedded in this concern are the livelihood improvements and ecological balances. Choosing to work with resource poor families in fragile ecosystems of dry farming, AMEF seeks to enable them to generate and adopt alternative farming practices, that are acceptable and affordable.

Sustainable agriculture (SA) in dry lands requires adoption of a bunch of practices pertaining to rainwater conservation, soil fertility improvement, diversified crop production systems, along with rebuilding of environmental support.

Over the years, AMEF has found certain alternative farming practices highly accepted by farmers. Such practices are considered here as Good Agriculture Practices eligible to be widely disseminated. **This good agricultural practice pertains to soil fertility improvement through green manuring in-situ.**

AMEF firmly believes that while farmers alone are the practitioners of these options, as end users, there are several agencies working with them as enablers. This brief seeks to help the enablers to promote SA in their specific context.

Dry lands of Southern India are fragile ecosystems, signified by depleted farmlands, degraded farm environment and de-motivated farm population. The soils, in particular, have become shallow and coarse with depleted soil fertility and organic matter, resulting in low productivity and water holding capacity. Eroding organic matter of these soils is adding to the degradation of soil biology also.

With the traditional practices like application of organic manures slowly disappearing and chemical fertilizers becoming the sources of nutrients to the crops, the fertility is further getting eroded and cost of production is increasing for resource poor farmers in these regions. Further, degrading ecology and decreasing vegetative cover in and around the farms are depriving the soils of manurial biomass.

Therefore, in the process of stabilizing dry land farm yields, improving soil organic matter is an important means in managing limiting factors such as moisture stress and nutrition during critical stages of crop growth. Biomass availability and its effective recycling are the major issues in improving organic matter in dry lands (Lal R, 1990). Among the various practices of generating plant biomass, *in-situ* green manuring is becoming quite popular among the farmers.

One system of *in-situ* green manuring is growing short duration leguminous crops such as

sunnhemp (*Crotalaria juncea*), dhaincha (*Sesbania aculeata*, *S. rostrata*), mung (*Phaseolus aureus*), horse gram and *Thephrosia*. In Northern Karnataka, land preparation is done during summer followed by broadcasting of green manure seeds like sunnhemp or dhaincha @ 16 kg per acre soon after the receipt of early rains (April-May). After 35 - 40 days of sowing or when the crop is in pre-flowering stage, it is incorporated in to the soil by ploughing. The field is left for 20 days for decomposition of biomass before sowing operation is taken up.

In Tamil Nadu state, farmers broadcast green manure seeds @ 30 kg per ha during the second ploughing (about 65 - 70 days prior to the sowing of maize) and incorporate at 40 - 45 days after sowing. *In-situ* green manuring is also followed in the standing crop of maize systems, where seeds are sown 15 days prior to maize and incorporated later during the first weeding (35 - 40 days).

### Catch crop

Farmers grow short duration crops like green gram (Var. *Pusa baisaki*) as a catch crop when they get early summer rains. Resource poor farmers get subsidiary income by harvesting the green gram grains, which also contributes to the nutritional security of the family. The left over crop residues is incorporated in to the soil as green manure.

In Northern Karnataka, the farmers have experienced increase in yield of groundnut by 1.0 quintal per hectare in case sun hemp is used as green manure (Ratnam N N, 1979). Farmers have harvested green gram grain yield of 1.0 qt per hectare with catch crop.

In Tamil Nadu, farmers have recorded the biomass generated by *Sesbania* and *Thephrosia* as 1500 kg and by *Crotalaria* 8000 kg per hectare. Incorporation of green manure before the sowing of maize is considered a better option than as a mixed crop and incorporating in the standing crop. It also meets the fodder requirement of 10 to 12 goats for a period of 30 days during the off-season. *Sesbania* was found to be more amenable for grazing by goats than the other two green manuring crops.

*In-situ* green manuring is a cost effective practice to enhance the organic matter, which helps improving the moisture holding capacity and fertility status of the soil. Benefits like contribution to nutritional security when used as catch crop and fodder utility when species like *Sesbania* are used have significant impact on livelihoods of resource poor farmers of dry land regions.

**AME Foundation is promoting in-situ green manuring as an ecofriendly practice to improve soil fertility in dry lands.**

### Limitations

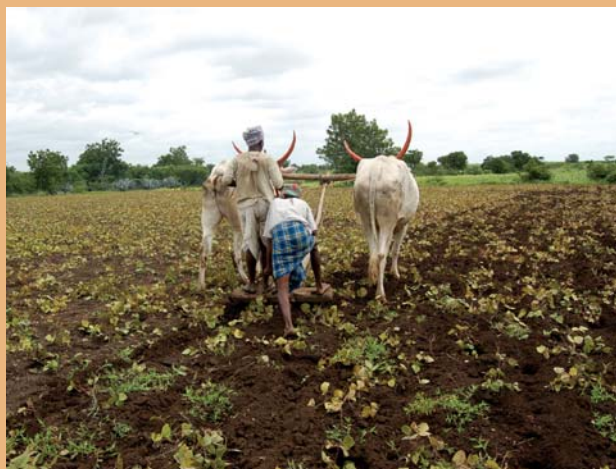
Moisture in the soil and timely rainfall are crucial for *in-situ* green manuring practice as decomposition of biomass takes at least twenty days, which gets slowed down in the absence of soil moisture affecting the main crop. In such cases, farmers use the biomass for composting instead of *in-situ* practice.

### References

1. Lal R, 1990. Low-Resource Agriculture Alternatives in Sub Saharan Africa. Journal of Soil and Water Conservation. 45 (4): p 437-445.
2. Ratnam N N, 1979. Dry matter production and harvest index trends in groundnut (*Arachis hypogaea* L.). Madras Agricultural Journal. 66 (4): p 218-221.



Sunhemp as *in-situ* green manure



Incorporation of green gram residues

Over 800 farmers, involved in FFS under the AMEF-FAO Partnership Project in Andhra Pradesh, Karnataka and Tamil Nadu states of Southern India, have adopted *in situ* green manuring. It has been particularly found useful in Tiruchi of Tamil Nadu in maize farming system, and an innovative farmer in Bellary, Karnataka, practiced it on 6 acres with green gram preceding groundnut cultivation under dry farming situation.