



Preparation of rice nursery bed in *Rab*

***Rab*: Cost on Environment, Economy and Society**

Background

Rab is a traditional practice of raising rice nursery in which nursery is established by burning naturally available biomass such as branches and leaves of trees, cow dung, dry grass and crop residues.

The primary perception behind *Rab* is that this practice ensures partial sterilization of soil leading to improved pest and weed management. It is also believed that *Rab* provides nutrients to the seedlings, particularly potassium, which is usually the limiting nutrient. This practice is mostly confined to North Konkan (coastal districts of Maharashtra), the Maval tract of Pune district and southern Gujarat.

Farmers spend significant time and labor for collecting other *Rab* ingredients. They usually start collecting materials from November onwards and start soil burning by mid-February after stacking the ingredients in three layers covered with a thin layer of soil. Soil covering acts as a blanket to ensure slow burning. The type of biomass used is location specific, primarily governed by the access and availability.

On an average, farmers use 204 kg of twigs/branches, 170 kg of dry leaves/grass, and 253 kg of crop residues and 124 kg of dried cow dung to prepare 100 sq. m of *Rab*. In general, rice seedlings for planting 1 acre of land requires 300 sq. m of *Rab*. However, in some cases it can be 400 sq. m also.

Environmental Cost

Rab is an ecologically destructive process. It has enormous negative effects on environment due to destruction of biomass, emission of multiple greenhouse gases, particulate matters and black carbon. The practice usually burns large quantities of parts of different tree species prevalent in Maharashtra such as *Terminalia* sp. (Ain/Kinjal), *Syzygium* sp. (Jambhul), *Casearia* sp. (Bhondaga), *Bridelia* sp. (Asana) along with other dry biomass and cow dung. In the long term, this practice might cause ecological imbalance in a fragile tribal ecosystem and in extreme conditions, may lead to the extinction of some plant species in a particular region. Another major impact of *Rab* is destruction of microbial population in the soil. Though the population regenerates over time, recurrent practice of *Rab* would have adverse impact on soil microflora and in turn on soil quality affecting crop productivity.

***Rab* has substantial negative impact on the environment and is also not economically beneficial to farmers.**



Cost on Society and Economy

Apart from the impacts on the environment, *Rab* has multiple impacts on society and the local economy. Emissions of particulate matters, black carbon and other gases increase the risk of cardiovascular diseases and other health hazards. In a tribal dominated area, where majority of the population is economically fragile, the risk of PM related health hazards is much higher. Moreover, to collect raw material, the participation of family members, who are mostly female, creates extra burden of work at the cost of neglect of children in the family. In general, average cost on collecting *Rab* materials for 100 sq. m of *Rab* area is approx. INR 1,600. With additional cost on preparing and burning *Rab*, the cost could be INR 2,100 or even more.



Loss of soil microflora leading to soil degradation



GHGs and particulate matter emissions



Loss of green cover and biodiversity

Strategy for Eradication

To eradicate the practice of *Rab*, farmers need to be educated about the negative impacts of this practice along with availability of alternate approaches for nursery raising and rice cultivation. A large number of farmers are not aware of alternate modern practices. Scientific nursery raising is an established method for rice transplanting. Likewise, Direct Seeded Rice (DSR) is another option. Use of pre and post emergence herbicides are established methods for weed control. Liasoning with local government agencies, village knowledge centers, NGOs and progressive farmers is important to promote the campaign against *Rab*. At present, BISA is promoting awareness through regular village meetings. Additionally, experiences of farmers who have already shifted from *Rab*, are being disseminated to inspire other farmers



Women collecting chopped portions of trees for *Rab* in Maharashtra

Impact

The campaign through the local workforce of BISA and Tribal Development Department, engaging tribal farmers, forest and agriculture departments in Maharashtra to discourage the practice of *Rab* is paying rich dividends. More than 600 farmers have moved away from *Rab* in 2017 and about half of them have adopted DSR technologies. Many more farmers in Palghar and Pune districts are adopting *Rab*-free nurseries for growing rice seedlings. Further momentum of this campaign is expected in coming years.

About BISA

The Borlaug Institute for South Asia (BISA) (www.bisa.org) is a non-profit research institute through a collaborative effort between the ICAR, Government of India and CIMMYT to serve as a regional platform with a vision of "Food, Nutrition, Livelihood and Environmentally Secure South Asia".

About CIMMYT

The International Maize and Wheat Improvement Center, known by its Spanish acronym, CIMMYT (www.cimmyt.org), is one of the 15 CGIAR centers and a not-for-profit research and training organization with partners in over 100 countries. CIMMYT works with a mission of "Maize and Wheat Science for Improved Livelihoods."



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