

EM in agriculture



Spray application on a paddy field

Farming with EM implies the following practices:

- Always supply organic material to the soil – mulch or compost – to provide a habitat for the micro-organisms of EM and for naturally occurring organisms.
- Cover the soil with organic matter – mulch and compost – to provide moisture for soil organisms and EM.
- Supply EM bokashi and work it into the topsoil, in particularly prior to a crop season.
- Apply the EM solutions – i.e. activated EM solution (AEM), EM5, and EM-FPE – regularly during the growing stage of your crops.
- Harvest only those parts of the plant that are for use and consumption. Return all crop residues to the fields.

For the preparation of AEM, EM5, EM-FPE and EM bokashi, please refer to other information leaflets and to the websites of EMRO and APNAN.

Nursery management

(1) EM for seed bath:

To achieve a high germination rate and provide protection against diseases, soak seeds – or pods – in AEM (diluted 1:1,000): small seeds (e.g. mustard) for 20 to 30 minutes, medium-size seeds (e.g. cucumber) for 30 to 60 minutes, and large seeds (e.g. pumpkin) for 2 to 3 hours.

Exceeding these times for a seed bath may result in complete fermentation and composting of seeds instead of germination.

After soaking, the seeds or pods may be left to dry in shade for 30 minutes.

(2) In case of vegetative propagation, soak cuttings or tubers etc. for five minutes in the seed bath.

(3) After sowing or planting spray AEM. If seedlings are brought in from outside sources, apply EM prior to planting.

Soil fertility and crop management

- (1) Do not cut down on input of manure and compost. Give recommended amounts of compost in dependence of existing soil properties and needs of the crop.
- (2) Prepare EM bokashi as a compost bokashi (mixtures of cereal bran, animal manure, oil cake) and apply it at a dosage of 200 gr per sq.m. Work the bokashi into the top two to three inches of soil, two to three weeks prior to crop establishment. If possible apply a thick layer of mulch to retain moisture and thus provide ideal conditions for soil microorganisms and for EM. – If bokashi application is not feasible before crop establishment, apply it with the seeds or around seedlings, but not in direct contact with them.
- (3) During the growing period of an annual crop apply AEM at the rate of 20-40 liter per acre diluted at 1:1,000, once a fortnight. For perennial crops spray AEM regularly every two weeks initially. Later decrease application frequency according to effects and results, i.e. once when healthy growth is established. Avoid spraying during the flowering season.
- (4) Combine AEM with EM5 and EM-FPE.

AEM is introduced into an irrigation system



Using AEM as a drip into the flush irrigation system of paddy



Pest and disease control

As a preventative measure against pest and diseases apply regularly – along with AEM – sprays of EM5 and EM-FPE on your crop, especially in the early growth stages of annual crops (e.g. once every two weeks). In case of actual pest attack and disease apply both preparations daily or every second day until the disease or the pest recede.

Dilutions for EM5 and EM-FPE are between 1:500 and 1:1,000; volumes are as required by the foliage to be covered.



a) Mixing of EM5 with neem cake and cow dung, for pest and disease control



b) Application of the above mixture in a paddy field

Weed control

During the preparation of the land provoke germination of all weed seeds in the soil with a thorough application of AEM. After a week (if moisture is maintained as in a paddy field), when most weed seeds have germinated, plough the seedlings under and follow with the sowing of the crop. After three to four cycles of this practice, the amount of weed seeds reduces and becomes negligible. Once the crop saplings have grown to 4 to 6 inches, use thick mulch covers to suppress weed growth.

Other EM preparations

In the preparation of EM bokashi and EM-FPE, the farmer should become creative and combine traditional and regional knowledge with EM. The use of EM-fermented mulch and EM-fermented compost is recommended, also the use of EM-soaked charcoal around root systems of trees and other perennials.

Other inputs

The use of agrochemicals such as chemical fertilizers and pesticides reduces the efficacy of EM. All biocides (pesticides, fungicides, weedicides, antibiotics, disinfectants, chlorine etc.) are counteractive to the effect of EM.

Other organic farming inputs such as composts and manures, vermicompost, cow urine or panchkavya, biodynamic preparations, and other microbial preparations may be combined with EM.

EM can be ideally combined with all practices of organic and sustainable farming. To some extent it can also be successfully combined with chemical fertilizers. EM can be made a great tool for a stepwise conversion from chemical farming to full and certifiable organic farming.

Post-harvest management

Return all crop residues to the field and apply EM bokashi and AEM to prepare soils for the next crop.