Conserving plant genetic resources at community level

RASHAL MD IQBAL KHAN

The climate of this country is sub-tropical monsoon and the seasons are favourable for agriculture. So field conservation at community level can be suitable all over the country. A few partner organizations of Palli Karma-Sahayak Foundation (PKSF) are recently using in-house PGR conservation process for preserving seeds or other planting materials successfully.

A good part of villagers in Bangladesh invest considerable time and energy in subsidiary economic gardening. This is often in the form of a vegetable garden and tree orchard on whatever household land is available to them. In fact this has been the mainstay both for the basic nutrition balance and the homestead forestry contribution of which in the rural economy and its well-being is well recognised. However, the practitioners of such gardening usually follow traditional technologies, and the absence of better seeds has been one of their acute problems. The extent of support services for farmers during the last decade in Bangladesh has proved efficacious.

But Bangladesh agriculture is losing yield at an alarming rate due to lack of agricultural inputs particularly quality seeds and other planting materials called Plant Genetic Resources (PGR) considered most potential for satisfactory production.

Two farmer families live adjacent to one another. One has a good quality mango tree and the other a similar kind jackfruit tree. Both mutually exchange their variety and become owner of two good quality trees. This is an example, which can tremendously change our agriculture sector. For improvement of the agriculture sector, it is necessary to accumulate a huge number of treasured Plant Genetic Resources (PGR) scattered over the country and conserve these in a maximum convenient area that is "PGR conservation at community level". It will be the extremely large source of available planting materials.

Field conservation is a rational doing to improve and strengthen our national ability in PGR conservation and use, thereby contributing to food security and sustainable economic development now and for future generations. Whereas in Bangladesh, existing 'Gene Banks' are not enough for PGR conservation, as a result day after day we are losing our valuable fundamental PGR. Now it is time to give attention to PGR conservation widely.

The Agricultural Extension Policy-1996, in its short and mid term objectives has stated to improve the quality and availability of planting materials and to reduce environmental degradation. The Agricultural Policy of Bangladesh also focused primarily on food security, self reliant economy, development of agro-based industries and value added products, crop diversification, export augmentation and employment generation. Community level PGR activities can contribute vitally to such government policies.

Rainbow Nari o Shishu Kallayan Foundation conducted a study among 81.04% people of Iswarganj upazila of Mymensingh and critically observed that people of this locality need only quality planting materials, eco-friendly technologies, cost effective inputs and equipment, updated information and value added marketing chain. In fact these are potential for our agriculture sector as a basic economic source, for ensuring sustainable daily income of the common people.

A master plan is required as a unique model for locating source of better seeds and planting materials having desired genetic quality, sustainable agricultural growth, improvement of declining bio-diversity within the local ecosystem, reducing environmental degradation as well as introducing eco-friendly technology at the very farmer level. Trained and motivated farmers, technical persons of GO's and NGO's, students, researchers all should be engaged from their own context to locate and collect PGR across the country.

In this case participatory approach with local leader and experienced people may help properly. The contributions of farm families, communities and indigenous peoples are also critical to find out, conserve, use and enhance PGR activities and biological diversity. Technologies for identification of source of PGR and conservation method of seeds and other planting materials including field conservation technologies will be transferred through hands-on training and training on easy, cost-effective and successful technologies of reproduction system.

The climate of this country is sub-tropical monsoon and the seasons are favourable for agriculture. So field conservation at community level can be suitable all over the country. A few partner organizations of Palli Karma-Sahayak Foundation (PKSF) are recently using in-house PGR conservation process for preserving seeds or other planting materials successfully. Now it is needed to expand to whole of the country.

People want profit for improving livelihood. With the help of PGR activities the local people can earn extra money by selling their expertise, technologies, PGR products and finally yield. On the other hand, locality can be affluent with quality crops, fruits, vegetables as well as different kinds of consumable products. Social degradations like mixing low-quality products, stealing fruits, telling lie, giving under-weight products etc have been protected through marketing increased volume of produce. The common people will achieve expertise on plant breeding process and then on different technical endeavours likely sowing, planting, intercultural operations, harvesting, post harvesting activities, conservation of both PGR and consumable crops and finally marketing their products which will make them self-sufficient as well as self-reliant.

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Disposing of solid waste with prudence

MAHFUJUR RAHMAN

Different parts of solid waste have their own physical, chemical and biological properties. They separately demand distinctive disposal. It will not be wise to burn the waste that can be composted to produce environment friendly biofertilizer and biogas through anaerobic decomposition in a digester.

GENERATION of solid waste in voluminous amount in modern cities has multifarious environmental implications. So its management is one of major environmental concerns. Municipal solid waste not only contains solid phase waste but also many semisolid or liquid, at times volatile substances. Over time it degrades with action of microbes and creates nuisance to the citizens if not properly handled and disposed of. Solid waste containing organic substances may pollute surface and ground water, air and soil, but can be very useful resource if properly managed.

Two principles

- Virgin materials vs recycled materials: Virgin materials used in production must be very minor in comparison with recycled materials.
- Action for economic prosperity and environmental protection should be balanced.

Open dumping is risky: Open dumping of solid waste which is practiced in Bangladesh has serious environmental consequences. Dumpsite becomes a pollution site as well with time. Run off of rain water contaminates the surface water system with the decaying organic matters that harbour various types of pathogenic microorganisms and vectors of infectious diseases. Gas coming out of the rotting garbage is also of great environmental concern.

Incineration is not a welcome solution: Incineration of solid waste much of which could be used as raw materials for composting in fact generates loss. Incineration destroys the organic matters along with beneficial microorganisms. The smoke produced by burning waste is particularly potential source of air pollution .Incineration may give rise to chemical process of generating Dioxin and Furan. Incineration of waste also produces particulate matters in the exhaust gas. Waste that have very low water and high cellulose content are suitable for incineration. Unless well equipped air emission control technologies are employed incineration is harmful for the environment.

Sending to the origin: After using/consuming things biodegradable remnants should be discarded to the agricultural fields, remnants of the factory products to the factories and useless earth and construction materials should be utilised for land filling. If the three processes i.e. recycling, composting and landfilling are used simultaneously, virtually there shall be no waste. But there may be some materials that are not suitable for the target process then we may apply burning and burying method.

Resource recovery: Recycle glass, paper and metal.

Produce biofertilizer through biotransformation by composting. Production of various organic compounds based on municipal waste, and energy from dry organic waste materials by burning are far more environment friendly than rendering them to biodegrade in toxic condition. Biogas plant can produce energy and fertilizer at the same time.

Energy recovery: The energy content of waste products can be harnessed directly by using them as a direct combustion fuel, or indirectly by processing them into another type of fuel. Pyrolysis and gasification are two related forms of thermal treatment where waste materials are heated to high temperatures with limited oxygen availability. Pyrolysis of solid waste converts the material into solid, liquid and gas products. The liquid and gas can be burnt to produce energy or refined into other products. The solid residue (char) can be further refined into products such as activated carbon.

Avoidance and reduction: Another important method of waste management is the prevention of waste material being created. Methods of avoidance include reuse of second-hand products, repairing broken items instead of buying new, designing products to be reusable (such as cotton instead of plastic shopping bags), encouraging consumers to avoid using disposable products (such as disposable cutlery), and designing products that use less material to achieve the same purpose (for example, light weight of beverage cans).

Hierarchy of treatment effectiveness: The waste hierarchy refers to "reduce, reuse and recycle," which classify waste management strategies according to desirability in terms of waste minimization. This waste hierarchy remains the cornerstone of most waste minimization strategies. The aim of the waste hierarchy is to extract the maximum practical benefits from products and to generate the minimum amount of waste.

Extended producer responsibility: Extended Producer Responsibility is a strategy designed to promote integration of all costs associated with products throughout their life cycle (including end-of-life disposal costs) into the market price of the product. Extended producer responsibility is meant to impose accountability for the entire lifecycle of products and packaging introduced to the market.

Polluter pays principle: The Polluter Pays Principle is a principle where the polluting party pays for the impact caused to the natural environment. With respect to waste management, this generally refers to the requirement for a waste generator to pay for its appropriate disposal.

New arena of reuse industries: Many reuse industries are booming in the developed countries. They range from ethanol to materials used in various commercial goods. Waste from one industry is utilized as raw material for another industry.

Traditional view vs modern view: In the traditional view waste generated from various sectors are dumped in separate sites away from the locality. In the industrial ecosystem the raw materials are depleted and pile of industrial waste is just heightened. So, the traditional view and associated waste management system is quite unsustainable. In modern view of waste management cycling of material occurs in the industrial ecosystem. Materials travel from one to another via the customer. A product after utilization when becomes waste will be used as raw material for another industry. The basic philosophy is- do not let the material go to the environmental compartment.

Conclusion

Waste management system includes waste collection, processing and disposal mechanism. Various mechanisms are applied for collection, segregation, processing and disposal of solid waste. For environment friendly disposal various components of waste should be carefully segregated. Different parts of solid waste have their own physical, chemical and biological properties. They separately demand distinctive disposal. It will not be wise to burn the waste that can be composted to produce environment friendly biofertilizer and biogas through anaerobic decomposition in a digester. Again, you should not bury the substance you can burn to extract energy and utilize the ash as raw material for certain industry.

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Cost effective, environment friendly boro rice cultivation

DR. M A SATTAR

AWD has been widely adopted in China. It is also a recommended practice in northwest India, and is being tested by farmers in the Philippines. In Bangladesh, AWD technology using PVC pipe in rice field can save estimated Tk. 3 billion during Boro season as the method reduces reasonable fuel consumption.

BORO rice in Bangladesh, either HYV (High Yielding Variety) or traditional variety covering more than 4.5 million ha, is entirely irrigated production, mostly with underground water. Irrigation has become a very costly input in rice production because of increasing cost of fuel. Farmers pay about 25-30% of the price of their harvest for irrigation. For producing 1 kg of paddy, it is estimated that a farmer has to use 3-4 thousand liters of water for maintaining pond water during the growing stage of plants. As a result, besides the increased cost of irrigation, groundwater level is also declining due to excessive withdrawal threatening the environment. Therefore research has been conducted through BRRI-IRRI collaboration for long to develop water saving techniques in rice cultivation by the alternate wetting and drying (AWD) method.

Water resources are becoming scarce worldwide, Bangladesh is of no exception. As surface water supply is decreasing day by day, irrigation pressure is mounting on groundwater resource. But this resource is not unlimited and in intensive tube well areas water level is declining gradually in each dry season. Recently, arsenic contamination is being reported in groundwater as well as in the food chain, which is threatening consumption. So the judicial use of water resources in intensive irrigated area is a crucial need for maintaining both sustainable crop production and accessible water level.

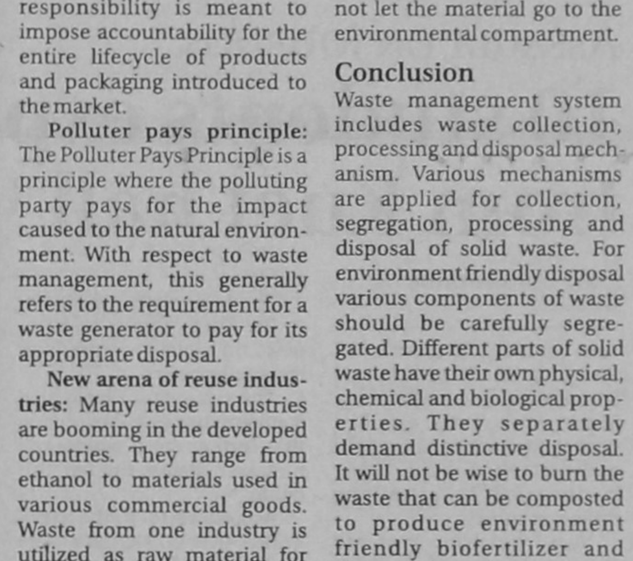
Generally, in Bangladesh, irrigation is applied in dry season. According to the recent estimates, out of 8.4 Mha of cultivable land, about 4.8 Mha has been brought under irrigation. It implies that about 57% of total cultivable lands are irrigated. Both surface and groundwater is used for the purpose. At present more than 70% of the irrigated area is served by groundwater and less than 30% by surface water. Groundwater is being extracted through 11,28,991 shallow tubewells (STWs), 27,117 deep tubewells (DTWs), 826 force mode pumps (FMP), and 1,15,876 un-mechanized (manually operated hand tubewells, treadle and rower) pumps for irrigation and domestic purposes. There are also 99,115 low-lift pumps (LLPs) and 5,01,431 traditional irrigation units in operation for lifting surface water. A huge arrangement, indeed. Therefore practice of irrigation technology like AWD can play a remarkable role in reducing water losses and cost of irrigation for crop production.

This AWD tool is a single device designed to observe water level in rice field for deciding the time of irrigation. It involves installation of a perforated pipe (preferably PVC) in rice field to allow observation of water level. In one part, such pipe of 10 cm diameter and 30 cm long is installed having 10 cm above and 20 cm below the ground surface.

Field practice: A study was conducted by BRRI on AWD technology for water saving in Boro rice cultivation during 2007-08 in the three selected districts near by BRRI regional stations (Rangpur, Kushtia, Feni) under different irrigation systems (DTW, STW,LLP) with 90 sample farmers.

The water management practice in the command area was done as per researcher's recommendation. Water status during the whole season was monitored. Irrigation was provided when water level reached 20 cm below the ground surface. The depth of water supply in each irrigation was 5-7 cm. After transplanting, shallower irrigation depth (2-4 cm) was maintained during the settling period of young seedlings. AWD practice was maintained after 15-20 days of transplanting up to booting stage for a period of 50-60 days depending on rice varieties from booting to milk stages.

Benefits :The study indicates that numbers of irrigation used by AWD technology showed, on an average, short duration variety like BRRI dhan28 received 8 irrigations in AWD practice from vegetative to reproductive stage, whereas in case of farmers' practice it was 12. As a result about 4 irrigations were saved compared to the farmers' practice. Similarly for long duration variety like BRRI dhan29 on an average 5 irrigations were saved during Boro season. Comparative water used under AWD and farmers' practices showed that for short duration variety about 23% water was saved, whereas 25% was saved for long duration variety. On an average the additional financial benefit from water saving and yield in AWD method over farmers' management practice was Tk 7287 /ha for BRRI dhan28, whereas this was Tk 4595 /ha for BRRI dhan29.



Perforated PVC pipe

Scope and strategies: AWD has been widely adopted in China. It is also a recommended practice in northwest India, and is being tested by farmers in the Philippines. The AWD fields had the same yield as with continuous flooding, but this new method saved 16-24% water costs and 20-25% production costs. In Bangladesh, AWD technology using PVC pipe in rice field can save estimated Tk. 3 billion during Boro season as the method reduces reasonable fuel consumption. Also research result indicated that at field level AWD can save 20-30% irrigation cost in terms of water, fuel and time.

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