

## Plastic: From Single use to Re-use in Indian Horticulture

**Plastic is most common choice of today's developing economy and market, due to its light weight, long durability and low cost. Single use plastic is a serious hazard for ecology and environment and recycling of single use plastic is a challenge in hand to save environment. For this reason, recycling could be substituted to some extent by reusing the discarded and obsolete single use plastic in homes and gardens. This article discusses some indigenous innovations vis-à-vis reuse of single use plastic, especially in context of Indian horticultural practices.**

**P**LASTIC waste is an unavoidable menace in today's world, and with advancement in urbanization, the problem is accumulating cumulatively, further population pressure is also a leading factor in consistent utilization of plastic. Undoubtedly, various mechanisms and schemes were adopted since last many years to combat plastic waste, which is approximately 8% of the total solid waste, and its reuse in innovative approach. With current Union Government's target to lower down the utilization of single use plastic by 2020 *via* incorporating the motto in *Swaccha Bharat Abhiyan*, entire government agencies along with private organizations are donating their best efforts to achieve the set target. The implementation of this initiative was initiated on the occasion of 150<sup>th</sup> birth anniversary of Mahatma Gandhi on 2<sup>nd</sup> October, 2019. Various mega campaigns were launched by myriad organisations throughout the nation with target to get rid of 10,000 tonnes of single use plastic, by recycling and reusing the same wherever possible.

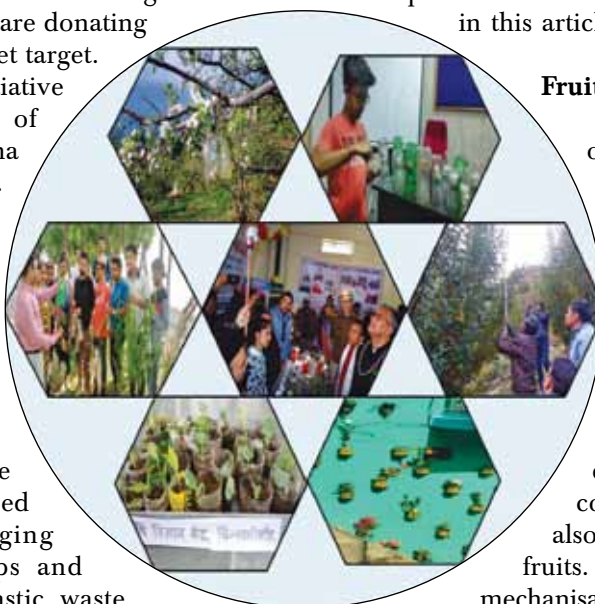
A single-use plastic is a disposable plastic which include items that are intended to be used only once, like bags, packaging material, bottles, cutlery, cups and plastic jars. The impact of plastic waste could be seen in major river systems of the country and also the landfills can not be ignored. Consumers' behaviour and affordability is one of the driving factors for the demand of single use plastic. In this regard, some eco-friendly innovations must be introduced to re-use the single use plastic. Though provisional and interim solution is not available, but the challenge could be worked out by introducing some affordable, low cost, less maintenance requirement innovations plastic for

quite a long term utility of single use disposable plastic in agriculture sector.

From Polyolefin to Poly-vinyl chloride, plastic is used in agriculture and horticulture like in greenhouse, tunnelling, plastic mulching, silages, and irrigation systems. Introduction of plastic in agriculture has undoubtedly led to high and efficient productivity by reducing losses, especially in transportation and storage. Whatever the season may be, fruits and vegetables could be grown in greenhouse nurseries and extend the thanks to plastic. To name a few such methods are enlisted in this article and discussed in brief.

### Fruit Plucker/Harvester

India is 2<sup>nd</sup> largest producer of fruit and vegetables and mechanical harvesting in fruit crops is a cumbersome process due to factors like, variability in shape and size, detachment, synchronicity in maturity and tress heights. Special skills are required in climbing the fruit trees and hand picking of every fruit makes the process much difficult. Branch shaking is most common practice, nevertheless this also causes mechanical damage to the fruits. Even after high advancement in mechanisation in agriculture, fruit harvesting still lags behind. For this reason mechanisation in fruit harvesting is desirable, mainly due to lack of seasonal labour availability. Though some technologies exist for fruit harvesting, but not much in vogue, especially because of risk of mechanical damage to the soft and fresh fruits. Use of plastic beverage bottles as fruit picker could be an alternative especially for small farmers, home orchards and trees which bear prickles. This simple, handmade and economically sound gadget is a good implement for





Harvesting of Apple by Reused plastic fruit harvester



Single use Plastic bottle handmade Fruit plucker/harvester

plucking fruits like berries, peaches, nectarines, apples, guava, pomegranate and many more. Fruit picker reduces drudgery and harvesting time, and can be used by people of every gender and age group with ease.

### Fruit fly traps

Old discarded plastic bottles/ containers could be reused in making fruit fly traps. Though such traps are available in market with a selling price ranging from 300 to 500 INR, however they can also be prepared in home with nearly no cost using waste plastic. Some liquid bait like juice, cider vinegar, or simply sugar solution could be used to lure the flies and once they are inside the bottle they can't get back their way out. Such traps are good to use in kitchen gardens and home gardens. On another level, annihilation could also be performed using Methyl eugenol solution by which fly population drastically falls within a single generation. Further, insecticide dipped



Demonstration of Reused Plastic made fruit harvester to Hon'ble Chief Minister of Uttarakhand



Making of Fruit fly Traps



Installation of Fruit Fly trap in tomato field

cotton also controls the flies by killing and collecting them inside the bottle. A single bottle could be reused many times, and also prevents pesticides consumption which is a risk in kitchen gardens and ecologically unsafe practice.

### Vertical gardens and nursery pots

Scrap and disposed off plastic bottles and jars may be used to add aesthetics in homes and office surroundings. Grown in plastic containers, fastened to the walls or other standing structure brings living and breathing greenery. It needs only waste plastic bottles, viable living material viz seed or seedling and some compost and a cheap wall garden is ready. Such plastic vertical gardens look trendy, save fortune and add life to the wall. A wall garden is energy efficient as it also helps in maintaining temperature, thus influencing micro-climate of rooms and surroundings by cooling the atmosphere and purifying the air. Such methods can divert the plastic from waste to green. Further, installing a wall garden can also provide cover and privacy to the building. A proper installation and regular care is needed to avoid wall damping and staining.



Installation of Fruit Fly trap in the Orchard



Demonstration of seedlings production in Waste bottles



Use of plastic bottles in vertical gardening

Small water and beverage bottles could be used to grow seedlings in nursery instead of using pro trays and are efficient while using expensive hybrid seed.

### Pollinizer bouquets

Pollinators play important role in all tree fruit crops, whether cultivars are self-fertile or cross-pollinated. Honey bees are by far the most important group of pollinators,

branches from trees can be hung in the orchard, in the vicinity of fruit-bearing trees. For that, homemade bouquets could be made by utilizing old and obsolete plastic bottles and containers. Cut flowering branches of the pollinizers could be placed in such discarded bottles and could be hung anywhere in the orchard. The only care required is replenishing the flower cuttings by regular water supply. This is a cheap and homemade method to increase the pollination efficiency in fruit trees especially when there is limited room to plant pollinizer trees in the yard.



Use of Plastic bottles and polythene as pollinizer bouquet

others may be mason bees, flies (such as syrphids), some beetles, and to a lesser degree some thrips. Pollination must occur within 2 to 4 days after the flowers open; and pollinizer and pollinator must be present in the fruit orchard at the time of flower boom.

Cross-pollination is must in most of the apple cultivars to ensure commercial fruit quality, better-shaped fruit and high yields, as most apple cultivars are self-incompatible. The pollinizer cultivar (a plant that provides the pollen) must be located near the fruit-bearing tree. More the number of pollinizer trees, better the potential for cross-pollination. The placement of pollinizers is important. To increase the chance of pollination and introduce more pollinizers in a limited land area, bouquets of flowering

an effective step in reducing pollution due to landfills and health hazards to fauna. Role of extension services can't be underestimated in creating awareness regarding avoiding use of single-use plastic and encouraging re-use of discarded and scrap plastic in agriculture by mode of such home-made innovations.

### SUMMARY

To indemnify the hazards due to plastic pollution, especially single use plastic, some relief could be expected by introducing some innovative and sustainable gadgets, which are not only easy to operate and nearly zero cost but also home-made and could be used by people of all ages and sex. Beverage bottles and discarded plastic jars could be used as fruit harvesters, fly traps, pollinizer bouquets and in vertical gardens. Such implements not only reduce unnecessary farm drudgery but also save time and money. Re-utilising waste plastic material would be

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