ORGANIC WASTES TO ALTERNATIVE FERTILIZERS: OPPORTUNITIES AND ISSUES FOR COMMERCIAL SCALE OF WASTE RECYCLING AND ITS APPLICATION TO HORTICULTURE INDUSTRY IN NEPAL

Surya P Bhattarai, David J Midmorel, Durga D Dhakal, Til C Bhattarai, K.M, Tripathi

Primary industries produce large quantity of organic wastes globally. These wastes are generated in the farm, and significant amounts transported to the markets and consumers as part of fresh or processed food. Management of organic wastes is costly and also generate significant environmental problems when disposed inappropriately. Recycling of organic wastes to organic fertilizer can potentially value add to the wastes, and therefore, generate market demand for otherwise currently wasted resources. We highlight the nature of property of two streams of waste (fruits and vegetable wastes and poultry wastes) in Nepal. We quantify their volume at national scale, present current state of technologies for recycling, and quality of organic fertilizers developed from these wastes, and finally the effect of fertilizer products developed from these wastes upon the soil application as fertilizer to number of horticultural crops.

We recycled fruits and vegetable wastes for organic fertilizer through the biological process of vermi-composting, and tested options for household and semi-commercial scale of processing. Poultry wastes have been recycled through the mechanical process to develop granulated fertilizer. Early stage proof of concept has developed new alternative fertilizer products in the market and have been tested for their effects on

soil and crop performance. However, large scale commercial operations will be required for recycling of large quantity of organic waste prevalent in the country. The challenges for commercial scale operation of waste recycling will need to take into account the issues of cost associated with bulk handling for wastes collection from scattered sources, sorting of wastes from the mixture, moisture control and drying for the processing. Furthermore, issues related to the contamination and pathogen deactivation from the waste, choice of processing operations, removal of potential heavy metals load need to be critically evaluated. Industrial processing of organise waste provide opportunities for nutrients fortification for balance of elements in the fertilizer, packing of the products, control release and mineralization of nutrients and maintenance of N, P, K balance, and products identification for organic vs non organic uses. Fertilizer from waste can be a win-win; however, a coordinated approach need to be placed between the waste generators, handlers, processors and users of waste born fertilizer for sustainable recycling of waste for horticulture industry in Nepal.