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# URBAN ORGANIC FARMING FOR DIVERSIFIED AGRICULTURE

## Policy Recommendations

Urban organic farming had been shown in previous projects as well as the present one to have the potential of addressing the fundamental requirements of food security by addressing issues of availability since production is just in the vicinity, which also addresses the carbon footprint of food production because food need not be transported to far distances. The use of organic methods also contributed to increased food safety. More importantly, the practice of urban agriculture empowers local residents in the stewardship, specifically of their barangay's green spaces and more broadly the whole urban environment (see Mogk, Kwiatkowski, &Weindorf, 2010). However, to make full use of the potentials of urban agriculture, the local government should integrate these initiatives in urban planning and framing of policies and regulations (see Mougeot, 2006 and Mukherji& Morales 2010).

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## Policy Situation

Food security, despite limited availability of arable land, can be sustained when yields are kept high (Godfrayet al., 2010; Foley, et al., 2011). The need for a sustainable high yield creates the motivation for innovative agricultural practices such as urban and organic farming. Urban agriculture involves cultivation and raising food in and around metropolitan areas primarily to help address food availability requirements.

On the other hand, organic farming is a system aimed at producing food with minimal harm to the ecosystems, animals, or humans (McIntyre, Herren, Wakhungu, & Watson, 2009; De Schutter, 2010). Organic agriculture is known to match, or even exceed, conventional yields so that it has been suggested by United Nations Environment Program and United Nations Conference on Trade and Development in 2008, that organic farming could actually produce enough food per capita to support the current human population. Furthermore, organic farms had been observed to withstand severe weather conditions better than conventional farms, sometimes yielding 70-90% more than conventional farms during droughts (see Lotter, 2003). Consumers have a strong attraction to organically grown food because of the perception that it is also good for the health since toxic chemicals (i.e. as fertilizers or pesticides) are not used in its production.

Urban agriculture involves cultivation and raising food in and around metropolitan areas not only to help address food availability requirements but is also useful in dealing with poverty and allied issues owing to cheaper inputs, higher and more stable prices, and risk diversification (Bailkey & Nasr, 2000; Hanna & Oh, 2000; Scialabba & Hattam, 2002; Goldstein, Bellis, Morse, Myers, & Ura, 2011). Other benefits of urban agriculture include improved food safety while minimizing the environmental footprints (i.e. water, carbon, and heat footprints) of food production (Smit, Nasr, & Ratta, 2001; Bengtsson, Ahnstro¨m, & Weibull, 2005; Mukherji & Morales, 2010; Crowder, Northfield, Strand, & Snyder, 2010; "GrowTO," 2012).

If simple but practical designs for the urban practice of organic agriculture using indigenous materials can be developed, then the mass base of consumers for our urban agriculture model will be increased further.

To help develop simple and practical designs for urban organic agriculture, the following research questions were addressed:
How do nutrient source affect the growth and development of lettuce in terms of:

1. percentage of germination and germination and maturation period and yield, when grown using different types of nutrient sources are applied as fertilizer;
2. the level of nutrients (Vitamin A, iron, and copper) of harvested lettuce; and
3. the level of contaminants (heavy metals and pesticide) of harvested lettuce.

## Results

Results of the study indicate that lettuce grows better in terms of weight when cultured in pure vermicast than when in vermicast and soil mixture. On the other hand, the length of growth is not significantly different between the different mediums. Data gathered also indicated the nutritional value of the harvested lettuce. Vitamin A, in the form of beta-carotene, was lower than what was observed in a previous study but was still at significant levels. The lettuce leaves were also determined to contain trace elements of iron and copper, suggesting the good nutritional value of lettuce grown with vermicast as the nutrient source. To determine whether the lettuce did not take up materials at toxic levels, the metal and pesticide content of both leaves and the vermicast were analyzed. Data gathered indicated that the lead content of lettuce is high and traceable to the lead content of the vermicast, which was still only 5% of the permissible level but lettuce apparently concentrates lead from the vermicast. On the other hand, cadmium and nickel and the pesticide cyfluthrin levels in the lettuce leaves were all below the detection level of the instruments used. These results confirm our previous findings that organic farming using vermicast derived from garden waste is feasible but just like other forms of agriculture, the medium and the nutrient source must be free of contamination to ensure food safety.

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