

Potential of Bioenergy Crop Production in Decontaminated Farmlands in Fukushima

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The devastating accident of Fukushima Dai-ichi Nuclear Power Plant occurred due to Great East Japan Earthquake on March 11th, 2011. The projects of remediation lands and removal of radiocesium-contaminated soil from farmlands are still ongoing. Essentially, it is an important aspect to utilize those decontaminated farmlands for local farmers and communities. In Japan, the researchers have now been seeking how to start agricultural production from decontaminated farmlands, restructuring local communities, and economic activity in Fukushima. Globally, the research regarding the renewable energy resources, for example, *Miscanthus × giganteus*, have increased significantly. *Miscanthus × giganteus* has the high potential for a biomass energy crop, because of high biomass yield with low annual energy requirements and financial inputs, including tillage and planting practices and fertilizer, herbicide, and pesticide application. In addition, *Miscanthus × giganteus* can growth under severe soil condition such as dilapidated land or reclaimed mine land. Under *Miscanthus × giganteus* cultivation, their nitrogen recycles system is sufficient, because the nitrogen is recycled as it moves from the rhizosphere into the developing shoots during spring and summer, and is transferred to the rhizosphere in fall and winter. If shoots are harvested, the nutrients remain in the rhizosphere. It can be utilized for *Miscanthus × giganteus* shoot growth in the coming season. The previous research showed that the average biomass yield of *Miscanthus × giganteus* over 6 years was 25.6 Mg ha⁻¹ year⁻¹ in Northern Japan. In addition, our previous research revealed that carbon sequestration rates of *Miscanthus × giganteus* were 1.96 Mg-C ha⁻¹ year⁻¹ over the 6 years of this research trial. *Miscanthus × giganteus* generally increase SOC stocks due to the greater carbon inputs of above- and belowground biomass and no tillage. Therefore, the objective of this research was to estimate the potential of bioenergy production through *Miscanthus × giganteus* cultivation in decontaminated farmlands in Fukushima, Japan. The key findings are outlined below: (1) *Miscanthus × giganteus* can be the new insight for agricultural production from decontaminated farmlands, (2) due to the high carbon sequestration under *Miscanthus × giganteus* cultivation, the fertility of decontaminated farmlands can be improved, (3) more field experiments need to be done in order to develop the bioenergy crop production.

Keywords: Decontaminated farmlands, *Miscanthus × giganteus*, Bioenergy