Jellyfish as an organic fertilizer

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Abstract

Agricultural lands cover around 38% of the earth's land and despite providing food; they are a major contributor to greenhouse gases, water pollution and soil degradation. Therefore, a sustainable agricultural system in a long period should provide human food demand, efficient use of land and resources, environmental quality through adoption of agricultural practices and sustainable social and economic conditions for local people. The main target of our preliminary overwiev is to study the possibility use of jellyfish as an organic fertilizer. It is assumed that the jellyfish fertilizer enhances soil quality and improve soil ecosystem services and functions.

Introduction

Increase in global temperature has caused serious impacts on marine and terrestrial biomes, as an example changes in global temperature increased both frequency and magnitude of jellyfish bloom especially in temperate regions (Gibbons and Richardson 2013, Lucas et al. 2014). In many coastal regions around the world jellyfishes are considered as pest because of their negative impacts on ecosystem productivity by decreasing harvested valuable fish stocks, limiting carbon and energy flow to higher trophic levels, blocking cooling water systems of the power plants (e.g. Fukushi et al., 2004) and causing negative economic influences on coastal infrastructure, aquaculture and tourism industry (e.g. Purcell et al. 2007). A few research has been done to assess the utilization of jellyfishes as fertilizer (Hossain et al., 2013; Woo Chun et al, 2011; Fukushi et al, 2003; Seo et al., 2014) therefore our understanding about the impacts of jellyfish fertilizer on soil as well as ecosystem services is still quite limited.

Methodology

According to the impacts of marine organic fertilizer on environment, a schematic representation is shown in figure 1. This model emphasizes on the relationship between main components which are involved in utilization of seagrass and jellyfish as a fertilizer and the impacts of them on natural ecosystem. The figure indicates that a strong relationship between research centres and industry partners is needed to improve the quality of fertilizers as well as sustainable utilization of marine products additionally the monitoring of each process and also quality assessments are recommended. It is also supposed that the marine organic fertilizers could improve soil water holding capacity (Emadodin et al., in preparation; Figure 1).

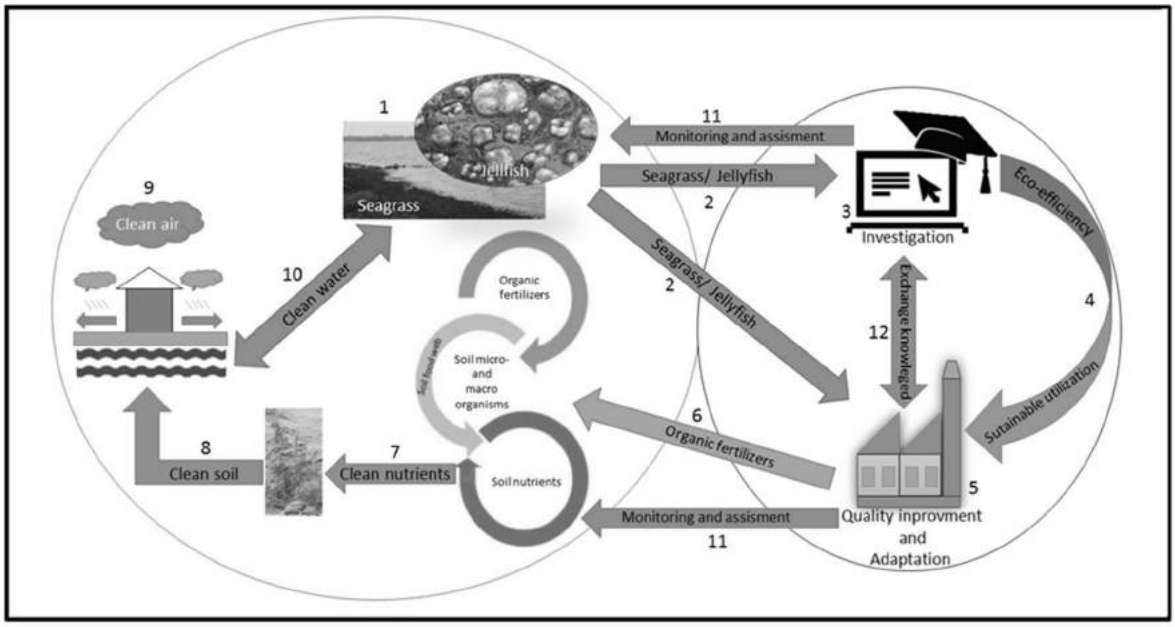

Figure 1: A schematic representation of the utilization of Jellyfish as an organic fertilizer and its environmental effects (exteract from Emadodin et al., in preparation)

Conclusion

It is assumed that the jellyfish fertilizer enhances soil quality, mitigates climate change impacts, reduces waste from marine environment and improves human health and nutrition (Figure 2; Emadodin et al., in preparation).

Figure 2: Impacts of marine organic fertilizer on soil ecosystem services and functions

This preliminary overwiev also suggests some important research questions on this relationship:

Is jellyfish fertilizer contributing to the sustainable agricultural activities?

Which of ecosystems services do link the jellyfish fertilizer and humans?

Is jellyfish fertilizer useful for restoration of degraded soil and vascular vegetation establishment?

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