Seaweed as an alternative income generation activity for coastal communities of Bangladesh

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Abstract
Coastal communities are blessed with abundance of natural resources, yet they remain poor especially in developing countries. The present source of livelihood there, is primarily based on the available coastal resources and from tourism season which is not sufficient. The current study elucidates the potential of seaweed farming as an alternate income generation activity to improve the livelihood of the coastal community in Bangladesh.

Background
Bangladesh possesses one of the largest coasts (710 km long) in South Asia, including Cox’s Bazar beach and St. Martin’s Island in the vicinity of the Bay of Bengal. The livelihoods of the inhabitants of these areas are based on the coastal resources, primarily fish. Nevertheless, the community is underprivileged compared to the in landers in terms of education, employment and medical advances [1]. They lack proper economic development due to increased population, loss of employment and income from only specific period of time, tourism season; this problem often worsens due to natural hazards that left the community with nearly no definite alternative source of income, and the locals also suggested for alternative livelihood with the present forms are essential for them [1]. What to do to improve their economy needs to be sought out and socio-economic assessments are required to ensure sustainable development and improvement of the community.

Rich biodiversity on the coast of Bangladesh have been reported with fish - 234 species, mollusks - 187 species, coral - 66 species, birds - 130 species, marine turtles - 4 species, sea snakes - 5 species, marine mammals - 9 species [2,3,4,5] and seaweeds - 202 species [6]. They later recorded 95 red, 47 greens and 60 brown algal species so far, mostly from St. Martin’s Island [6]. These seaweeds are valued greatly for their diverse applications worldwide. The whole plant body may use as food, fodder, and fertilizer or as a source of commercially significant hydrocolloids (agar, alginate) and cosmetics industries (Table 1). Although the coastal community in Bangladesh knows the value of seaweed, they lack the understanding of how to harness it as an alternative source of income. Seaweed aquaculture already substantiated economically viable and commercially sustainable way to improve the livelihood of the coastal communities in several countries like, Philippines, Indonesia, India and Tanzania [7]. Despite all the potentiality of seaweed culture, there is no established seaweed farm in Bangladesh. Thus, this untapped resource requires exploration as it can be a sustainable income generation activity along with the regular income activities to raise the socio-economic status of the community which depends on future research in this field.

Methodology
Underwater photo of seaweeds taken and samples collected from March- April, 2016 from St. Martin’s Island.

Table 1 :Potential use of seaweeds naturally grown on the coasts of Bangladesh

<table>
<thead>
<tr>
<th>Edible</th>
<th>Cladophora prolifera, Caulerpa sp., Codium geoppe, Dictyota atamaria, Dictyota exigua, Gracilaria sp., Hymenaea musciformis, Hydroclathrus sp., Halymenia sp., Padina sp., Ulva lactuca</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicinal/pharmaceutical (anti-bacterial, anti-fungal, anti-tumor properties)</td>
<td>Caulerpa taxifolia, Codium geoppe, Dictyota atamaria, Dictyota atamaria, Hydroclathrus sp., Halymenia sp., Gracilaria sp., Padina sp., Sargassum sp., Ulva lactuca</td>
</tr>
<tr>
<td>Industrial (agar, alginate)</td>
<td>Gracilaria spinuligera, Sargassum sp.</td>
</tr>
<tr>
<td>Agriculture (animal feed and fertilizer)</td>
<td>Cladophora sp., Codium geoppe, Dictyota atamaria, Gracilaria sp., Hydroclathrus sp., Hymenaea sp., Halymenia sp., Padina spp, Sargassum sp., Ulva lactuca</td>
</tr>
</tbody>
</table>

Results
Alternative livelihood is essential for the Socio-Economic development of the community.

The potential of Seaweed farming is an addition as it is not an economic activity, unlike other countries where it is used for various purposes.

This open a gate for tapping in the resource not only for the local community but also as a wider economy of the country.