Climate change: Social adaptation strategies for fishermen

Hayrol Azril Mohamed Shafril⁎, Asnarulkhadi Abu Samah, Jeffrey Lawrence D'Silva

A number of international studies have considered effective adaptation practices for fishing communities. Badjeck et al. [6], for example, have stressed strengthening the livelihood platform, diverse and flexible livelihood systems and systems and adaptive policies and institutions as factors to be considered for community adaptation practices. Cinner et al. [11] have grouped adaptation practices according to three time frames: 1) the short-term frame of adaptive practices, which involves active weather information sharing and dissemination, evacuation from affected areas and variation of fishing techniques, tool and catches; 2) the medium-term adaptive practices, which actively involve the community in managing coastal resources, strengthening the community's physical capital (e.g., jetties, houses and halls) and relocation to inland areas; and, 3) the long-term time frame of adaptive practices, which involves occupational multiplicity, investment in health and education, maintaining and improving ecological knowledge, and the need for local governance to allocate more investment to further strengthening community adaptive practices. Savacool et al. [68], construct community adaptive capacity based on the following three main elements: first, infrastructure resilience, which involves maintaining sea walls, replenishing sea ridges, replanting mangroves, nourishing beaches, conserving coral reefs and relocating water resources; second, institutional resilience, which involves systematic planning and managing of adaptation by political entities in the locality; and third, social resilience, which emphasizes community control over adaptation investments. Ahamed [1] has concentrated on religious activities prior to a cyclone as part of people's worship in satisfying their God, generating future and alternative awareness and active community involvement in management planning. Furthermore, several studies [23,27,31,58,60,68,90] have looked into the importance of community involvement in climate change adaptation planning which creates adaptation strategies that are cost-effective and in line with the local needs, interests and abilities. In addition, diversification of skills and techniques, financial support, technological support and insurance protection to strengthen the community's adaptive capacity have also been studied [21,42,56,62,86]. These scholars accentuate the importance of knowledge management, social relationships, skill diversification and community involvement in adaptation planning.

Although international studies have highlighted effective adaptive practices for fishing communities, many are general studies on a large scale. Thus, there is an urgent need to investigate the most effective adaptation practices for specific groups such as the small-scale fishermen who play an important role in securing food supply. This paper seeks to address this gap by reviewing the literature on adaptive practices in order to suggest strategies for adapting to the particular needs of small-scale fishermen within fishing communities to further strengthen community-based actions in relation to the changing climate.

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1.2. Methodology

Content analysis of published articles was undertaken in order to identify specific adaptation strategies. The relationships between the changing climate and the socio-economic circumstances of small-scale fishermen were clarified, based on analyses of selected publications. First, relevant articles were selected from the databases of Science Direct, Taylor & Francis, Sage Publications, and Emerald Publishing. This search was based on keywords including community adaptation towards climate change, climate change impacts on the environment, climate change impacts on fish productivity and climate change impacts on the socio-economic activities of the fishermen. This process yielded a total of 163 articles. However, only 90 were used after the screening process during the second stage. Of the usable 92 articles, 25% were found to be related to small-scale fisheries and commercial fisheries studies while the rest were related to climate change in general. The articles selected covered most regions, mainly from Asia, Europe and Africa. These selected articles were analysed. A total of seven articles were considered as the principal references in constructing the proposed adaptation strategies (see Table 1) while the remaining articles provided supporting information. The relationships were categorised to produce a total of six adaptation strategies for protecting the economy and minimizing the levels of poverty and vulnerability among small-scale fishermen.

This paper first considers the impacts of the changing environment on the socio-economic circumstances of the small-scale fishermen. A brief introduction is given to the impacts of climate change on fishermen's productivity, physical infrastructure, health, and social circumstances. There follows discussion of the six adaptation strategies deemed suitable to be implemented for small-scale fishermen: minimization of the risks associated with their fishing routine, the strengthening of social relationships, management of climate change knowledge, learning and acquisition of alternative skills, involvement in planning adaptation to climate change; and access to credit. Finally the climate change impacts and adaptations are then discussed.

2. The impacts of the changing environment on the socio-economic circumstances of the small-scale fishermen

In this section, firstly, the impact of climate change on the productivity of the small-scale fishermen is briefly discussed. This is then followed by its impact on small-scale fishermen's physical infrastructure and health. Finally, the focus is on the impact of climate change on fishermen's social circumstances.

2.1. The impact on productivity

The impact of climate change on marine resources is far reaching. It may result in profound impacts on the economic well-being of the small-scale fishermen [4,78,85]. As noted by Colgan and Merrill [12] and Macfadyen [46], unstable climatic conditions will restrict small-scale fishermen in conduct of their fishing routines as their small vessel size will expose them to strong winds and waves. This will lower the total days at work and reduce the fishermen's level of productivity leading to a reduction in income. As climate change has negative impacts on marine habitats, it may result in longer fishing trips as small-scale fishermen need to spend more time seeking new fishing locations. This has additional costs for fuel and ice [67]. Several studies [16,64,65,74] have confirmed that climate change has profoundly impacted the quantity and quality of fish – fewer and smaller fish means less money for the fishermen. Small-scale fishermen with less occupational flexibility are expected to face problems in coping with the changing climate, as they rely solely on fishing as their main source of income compared to those with more occupational mobility [9,15,18,72]. However, although fishermen with greater occupational mobility are expected to cope better with the changing climate, problems still occur for those who have

<table>
<thead>
<tr>
<th>Title of article</th>
<th>Authors</th>
<th>Adaptation strategies suggested</th>
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<tbody>
<tr>
<td>Impacts of climate variability and change on fishery based livelihood.</td>
<td>Badjeck, M.C., Allison, E.H., Ashley, S.H., &amp; Nicholas, K.D. [6].</td>
<td>Enhancing the livelihood platform, diverse and flexible livelihood systems, policies and institutions: flexible and adaptable alternative livelihoods (transition out of fishing, enhance capacities and health status of fishing communities, poverty reduction, developing forums to maintain and support ecological knowledge, investments in strong local governance institutions)</td>
</tr>
<tr>
<td>Socio-economic impacts of climate change on coastal communities: The case of North Java small pelagic-fisheries.</td>
<td>Fauzi, A., Diposaptono, S., &amp; Anna, S. [22].</td>
<td>Encourage community awareness and dialogue about climate change through targeted programmes, enhance and diversify livelihoods, Develop partnerships between stakeholder groups at a local, regional, national and international level, discuss options to encourage individuals to undertake such ‘risky’ strategies and for industry and community to support them</td>
</tr>
<tr>
<td>A framework for social adaptation to climate change.</td>
<td>International Union for Conservation of Nature and Natural Resources. [34].</td>
<td>Improved fishing boats, improved cyclone forecasts and radio signal, increased access to low-interest credit, fish market and insurance, enforcement of fishing regulations and maritime laws, development of human capital through education and skills, and creation of livelihood alternatives</td>
</tr>
<tr>
<td>Limits and barriers to adaptation to climate variability and change in Bangladeshi coastal fishing communities.</td>
<td>Islam, M.M., Sallu, S., Hubacek, K., &amp; Paavola, J. [35].</td>
<td>Livelihood diversification; support for financial transfer mechanisms, together and flexible loans; building on fishermen existing capital and capabilities, encouraging alternative livelihood sources</td>
</tr>
<tr>
<td>The livelihoods approach and management of small-scale fisheries.</td>
<td>Allison, E.H., &amp; Ellis, F. [3].</td>
<td>Periodical adaptive assessment; training and adaptive capacity building; participatory action research; access to climate technology, information and skills should be further strengthened, Early education and public awareness programmes, research information sharing and information dissemination programmes should be intensified; diversify fishermen alternative skills</td>
</tr>
<tr>
<td>The process of social adaptation towards climate change among Malaysian fishermen.</td>
<td>Shaffril, H.A.M., Abu Samah, B., D’Silva, J.L., &amp; Yassin, S.M. [71].</td>
<td></td>
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</tbody>
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Table 1
Articles selected in formulating the basis of adaptation strategies.
دریافت فوری
متن کامل مقاله

امکان دانلود نسخه تمام متن مقالات انگلیسی
امکان دانلود نسخه ترجمه شده مقالات
پذیرش سفارش ترجمه تخصصی
امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
امکان دانلود رایگان ۲ صفحه اول هر مقاله
امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
دانلود فوری مقاله پس از پرداخت آنلاین
پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات