Food and Agriculture Organization of the United Nations

DEMOGRAPHIC CHANGE IN ASIAN FISHING COMMUNITIES

Drivers, outcomes and potential impacts

DEMOGRAPHIC CHANGE IN ASIAN FISHING COMMUNITIES: DRIVERS, OUTCOMES AND POTENTIAL IMPACTS

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

BANGKOK, 2020

Required citation:
Siar, S.V. and Kusakabe, K., eds. 2020. *Demographic change in Asian fishing communities – Drivers, outcomes and potential impacts.* Bangkok. FAO. https://doi.org/10.4060/cb1752en.

ISBN 978-92-5-133529-1

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Preparation of this document

This publication presents past studies and recent work on demographic change in selected fishing communities in Asia, including the highlights of a regional consultative workshop on the subject. The regional consultative workshop, co-organized by the FAO Regional Office for Asia and the Pacific and the Network of Aquaculture Centres in Asia-Pacific (NACA), was held on 6 and 7 November 2019 in Bangkok, Thailand. The case studies on Cambodia and Thailand were prepared under a Letter of Agreement with NACA.

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Chapter 1. Introduction

Susana V. Siar and Kyoko Kusakabe

In 2018, there were 50.38 million people engaged in the primary sector of fisheries and aquaculture in Asia, representing 85 percent of the global total (FAO, 2020). There are millions more involved in post-harvest processing and marketing, many of whom are women. These men and women depend on fishing and related activities for food security, nutrition, and livelihoods. Many of the fishing communities where they live are vulnerable because of their geographical location, social and economic situation, demographic characteristics, and the condition of the fishery and natural resources on which they depend.

The topic of demographic change in fishing communities has received little attention. Available studies date back to the 1990s, such as the macro-level studies conducted by the Food and Agriculture Organization of the United Nations (Tietze, Groenewold and Marcoux, 2000). The studies revealed *inter alia*: (i) the trend of decreasing numbers of coastal fishers in Malaysia and the Philippines and increasing numbers of fishers in Bangladesh and India; (ii) intergenerational occupational mobility out of fishing, indicating that fishing was no longer a "last resort employment"; (iii) fishing households were not always the poorest and in some cases may be better off than farmers; and (iv) acknowledgement by fishers from Bangladesh, India and the Philippines of declining resources and the environment as a result of the increasing number of fishers and fishing boats and domestic and industrial water pollution.

More recently, Miki, Soejima and Seki (2018) showed that in Japan, the number of fishers and fish workers in fishing communities, both men and women, is decreasing, accompanied by an ageing population in these communities. Moreover, the rate of population ageing in fishing communities is higher than the national average. Membership by women in fisheries cooperative associations is also decreasing.

In the Association of Southeast Asian Nations (ASEAN) Member States, it is projected that by 2035, the percentage of the population over 60 years old will be 21 percent in Brunei Darussalam, 12 percent in Cambodia, 15 percent in Indonesia, 9 percent in Lao People's Democratic Republic, 16 percent in Malaysia, 15 percent in Myanmar, 11 percent in the Philippines, 34 percent in Singapore, 30 percent in Thailand, and 20 percent in Viet Nam (Zen, 2017). Based on these figures, Cambodia will have a young and growing population whereas Thailand will have an ageing population. This trend will have implications for different economic sectors, including fisheries and aquaculture.

Demographic change in fishing communities has implications for the future of fishing, fisheries, the fishing industry, and the social development of fishing communities in the Asian region. This publication looks at demographic change in small-scale fishing communities to understand potential implications for fisheries sustainability, migration patterns, climate change adaptation, and livelihoods diversification. The publication explores the general question: How are fishing communities in the region changing with demographic changes?

Specifically the publication tries to address the following questions:

(1) What are the changes in demography (ageing, migration) in selected Asian fishing communities?

(2) How are fishers adjusting their livelihoods with the changes in fishery resources and labour availability? Are they moving to other livelihoods?

(3) What are the consequences of these adaptation strategies? Are there any gender differences in the impact of such adaptation strategies?

(4) What are the challenges faced and policy and programme support needed for fishing communities for sustainable small-scale fisheries?

This publication contains recent work on demographic change in selected Asian fishing communities as well as the highlights of a regional consultative workshop organized on the subject. The desk and case studies and regional consultative workshop were conducted prior to the COVID-19 outbreak. In the Overall conclusions and recommendations section, some reflections on the impact of the COVID-19 pandemic in addition to demographic change are presented.

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Chapter 2. Desk study on demographic changes in fishing communities in the Asia-Pacific region and implications for fisheries and for the social development of fishing communities

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Introduction

The Asia-Pacific region has experienced unprecedented economic growth coupled with dramatic demographic changes that have greatly impacted the development of the region. Although these changes have not been uniform, the fast pace of economic growth has been praised for contributing to higher levels of development such as improved infrastructure, improved access to social and health services, increased labour opportunities, and greater attainment of education. Economic growth has not been inclusive and those on the margins have not benefited, thus widening and reinforcing inequalities. Harnessing the complete benefit of economic growth requires a better understanding of the drivers, impacts, challenges and opportunities of the demographic transition in the Asia-Pacific region.

Globally there has been an increasing number of people involved in fishing – from 12.5 million people in 1990 to 58.3 million people making their entire living or partial living from fishing and aquaculture (84 percent in Asia) in 2018 (FAO, 2018). Iwasaki (2016) states that as the global population is expected to grow to over nine billion by 2050, fisheries may become more vulnerable because of internal population growth as well as because of external pressure from others who opt to engage in illegal encroachment. Although government authorities and research institutions have focused on collecting data on vessels, species catch, fish stock and fishing gear, research providing socio-economic and demographic data of fisherfolk and fishing communities remains limited.

Socio-economic and demographic shifts indicate that change is affecting fisherfolk and fishing communities. A major challenge is to capture changes and assess qualitative and quantitative indicators within these communities. The lack of long-term empirical data on the demographic changes of fisherfolk and fishing communities is a serious impediment to developing and implementing effective and inclusive policies and programmes to improve livelihoods as well as fisheries management. Furthermore, understanding demographic change is essential in managing fisheries, livelihoods diversification, and climate change adaptation. To achieve the goals and targets of the 2030 Agenda for Sustainable Development, understanding the demographic changes of fisherfolk and fishing communities is imperative and requires further investigation.

Objectives of the desk study

The objective of this study is to understand the demographic changes, their drivers and the observed short-term and long-term impacts on fisherfolk and fishing communities in the Asia-Pacific region. Demographic markers such a fertility and mortality, age, migration, and gender intersected by the historical shifts and trends in fishing were assessed.

The following questions served as a guide for the desk study:

1. What information is available about the demographic situation/characteristics/status of fishing communities in the region?
2. What are the demographic changes in fishing communities?
3. What are the drivers of demographic changes in fishing communities?
4. What are the implications of the demographic changes on fishing, fisheries, the fishing industry, and the social development of fishing communities?
5. How are fishing communities changing with the demographic changes?
6. What challenges do fishing communities face because of the demographic changes and what policies and programmes will help them address these challenges?
7. What issues/aspects need to be taken into consideration in the development of an analytical framework and methodology for conducting case studies on demographic changes in fishing communities?
8. What are the gaps in knowledge and information on the demographic changes in fishing communities?

Methodology

An integrative literature review was conducted to understand the demographic and socio-economic changes of the fisherfolk and fishing communities. In this approach, guided by the research questions, qualitative and quantitative studies were assessed, information collected, compared and discussed in order to expose knowledge gaps and suggest areas for future research. The findings were used to create a theoretical framework to guide the conduct of the case studies.

The criteria used to select appropriate literature for this chapter were as follows:

Relevant: Literature selected had to include information on the demographics of the Asia-Pacific region (other regions were used only as a reference/benchmark), demographic and socio-economic trends and transitions and/or demographics of fisherfolk and fishing communities. Papers that included considerable information on all three topics were given more attention and heavily influenced the writing of the chapter.

Diverse: The literature had to come from a wide variety of sources. This includes academic journals, workshop and conference proceedings, project reports, dissertations and news briefs from newsletters related to fisheries.

Recent: Literature published from 2010 to 2019 was sought after, however, reference material dating back to the 1990s was sourced to provide a background not only on the demographic trends, but also on the methodologies previously used to investigate and document demographic changes of fisherfolk and fishing communities in the Asia-Pacific region. The findings from the 1990s also helped to capture and frame the changes.

This literature review draws only on secondary data and no primary data were collected. Limited statistics from international organizations and state ministries have been used. Only English language sources were consulted and this is a limitation of the data and knowledge accessed.

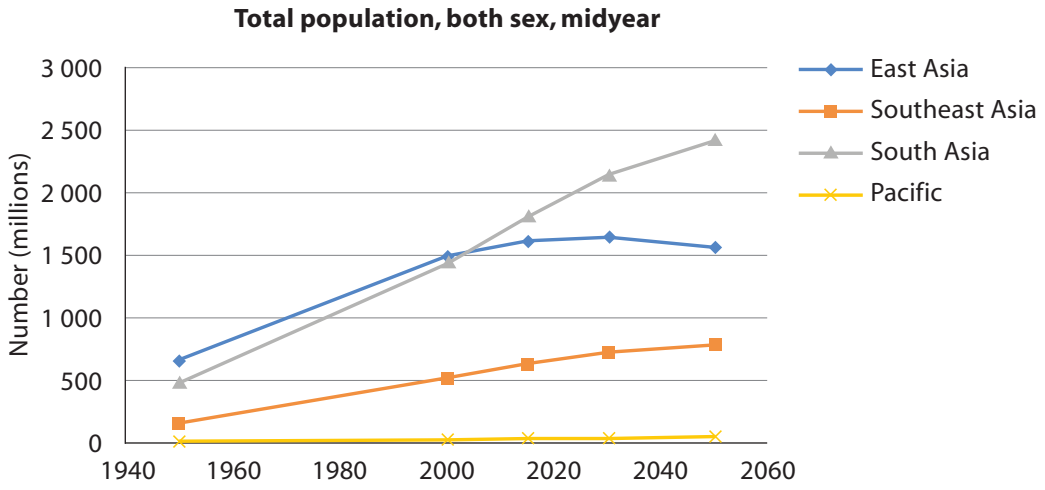
Structure of the chapter

This chapter will first provide the general demographic trends in the Asia-Pacific region as a background. The chapter will look at the drivers of demographic change in the region, then illustrate the observed demographic changes of fisherfolk and fishing communities through various case studies that are divided into the following subsections: (i) changes within the fishing population (age, education, sex, migration status, boat ownership); (ii) changes in mechanization; (iii) changes in aquaculture; and (iv) changes in resource management (cooperatives, women's participation, gender division of labour).

Subsequent sections discuss existing policy frameworks addressing transitions and knowledge gaps exposed during the literature review. Finally, the conclusions and recommendations are presented.

General demographic trends in the Asia-Pacific region

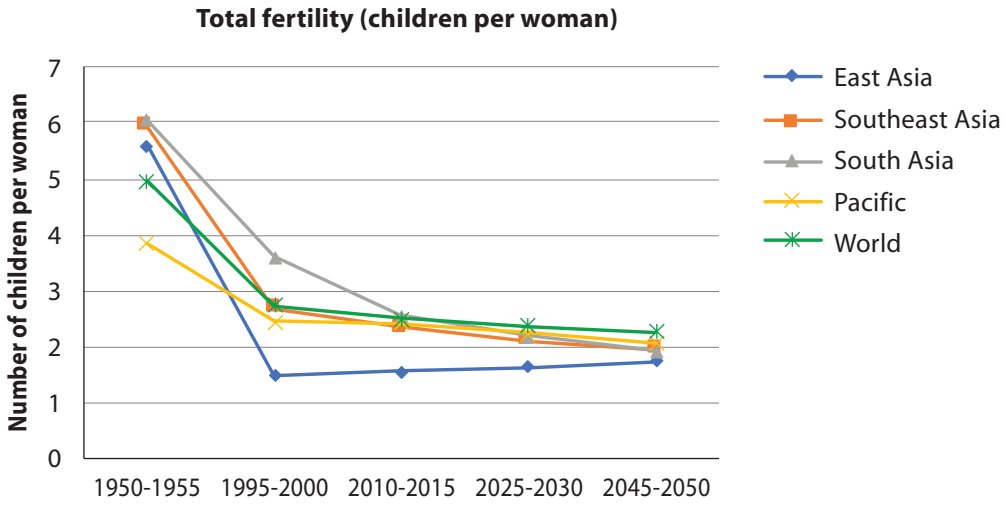
The Asia-Pacific region has been described as the "demographic explosion region" because of its dynamic demographic transitions (United Nations Development Programme (UNDP), 2016a). Home to 56 percent of the world's population, the region's population has tripled in the last 65 years and the projected population is expected to reach 4.84 billion by 2050; although once high, population growth has slowed, as illustrated in Figure 1 (UNDP, 2016a).



Source of data: UNDP, 2016a.

Figure 1. Population growth in Asia by region, 1940 to 2060

Fertility may have the biggest impact on when demographic change happens and how fast it progresses (UNDP, 2016a: 29). Although the total fertility rate for the region as a whole is estimated at 2.1 births per woman, changes have not been uniform (Figure 2). In the period 1995–2000 the fertility rate (children per woman) in East Asia was 1.48, in Southeast Asia it was 2.69, in South Asia it was 3.61 and in the Pacific it was 2.45. The fertility rate is expected to increase only in East Asia: 1.55 in 2010–2015, and 1.63 in 2025–2030. In all other regions the fertility rate has decreased. It is estimated that by 2025–2030 the number of children per woman will be 2.10 in Southeast Asia, 2.24 in the Pacific and 2.18 in South Asia (UNDP,



Source of data: UNDP, 2016a.

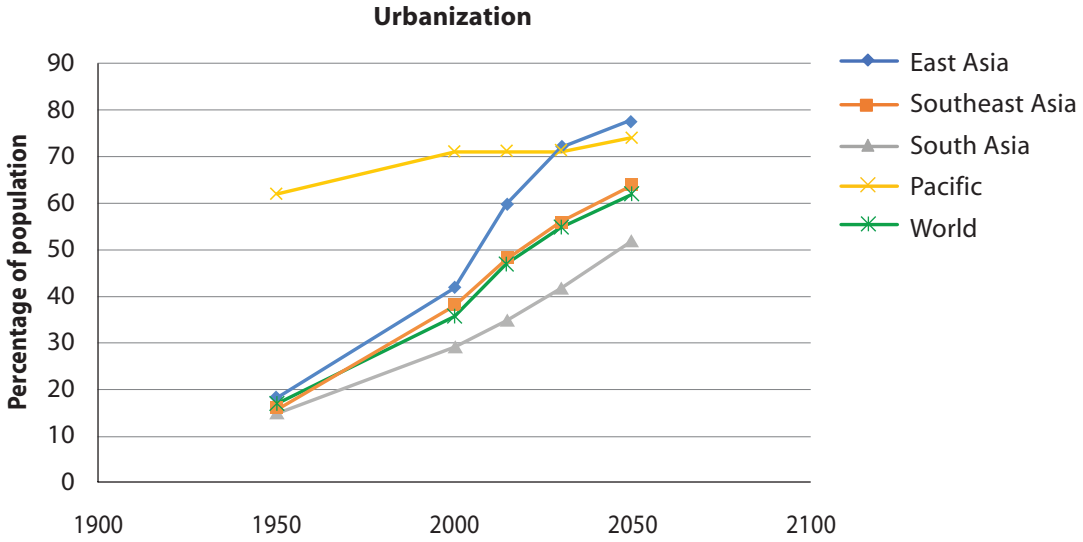
Figure 2. Total fertility rates in Asia by region, 1950 to 2050

2016a: 232). However, these numbers are skewed as a result of prenatal sex selection,[1] a concern in several of the most populous countries, with important consequences now and in the future for these societies (United Nations Population Fund (UNFPA), 2019).

Accompanying the slowdown is another demographic transition: the "youth bulge" and an increased ageing society, which are credited largely to improved health care and other services. UNDP estimates that the largest shifts will occur from 2015 to 2050 as the portion of children under the age of 15 will be less than half of what it was in 1950, and there will be three times as many people aged 60 and over (UNDP, 2018). The majority of the ageing population are women without access to social safety nets in their retirement (UNFPA, 2019). As women live longer than men, the proportion of elderly women increases relative to other age groups and they are more vulnerable to discrimination, abuse, poverty and social isolation than older men. With the changing family structure in the Asia-Pacific region as a result of urbanization and socio-economic and cultural factors, governments must provide social protection systems to address insecurities older people face. Therefore the impact of an ageing population is a development issue, particularly in relation to access to and the financing of health care services, and requires attention.

Another marked demographic shift is migration, more specifically urbanization, which is illustrated in Figure 3. Over the last 30 years over three billion people in the region have moved to the cities; in another 30 years it is estimated that an additional billion will be added (UNDP, 2018). Whereas this transition took over a century in the West, it has occurred in only three or four decades in the Asia-Pacific region (UNDP, 2018). Also noteworthy is international migration from the region: the Asia-Pacific region is the origin of 40 percent of global migrants (UNFPA, 2019).

[1] Prenatal sex selection is the deliberate elimination of female children through implantation and abortion and has historically resulted in severely skewed population sex ratios in a number of countries, especially in Asia. The practice reflects a cultural preference for sons.



Source of data: UNDP, 2016a.

Figure 3. Rate of urbanization in Asia by region, 1990 to 2050

In 2010, it was estimated that 2.7 million people from Asia, 49 percent of whom are women, were involved in international migration. Countries with the highest number of international migrants were India (5.4 million) and Pakistan (4.2 million); sex-disaggregated data were not available for these two countries. Indonesia and Sri Lanka have more female than male migrant workers going abroad – between 60 percent and 80 percent of all legal migrants. Starting in 1992, women migrants from the Philippines began outnumbering men, although by 2007 there were roughly equal numbers of men and women migrating (UNDP, 2010: 65). It is estimated that migrants provided their families with an estimated USD 174 billion in remittance flows. In Southeast Asia remittances to the Philippines contribute 10.2 percent of GDP, Viet Nam 6.5 percent, and Cambodia 5.8 percent (World Bank, 2018: 15). In South Asia, remittances ranged from a high of 28 percent of GDP in Nepal to 5.4 percent in Bangladesh, and 0.1 percent in the Maldives (World Bank, 2018: 22). In the Pacific, 16.8 percent of the population in the region comprises international migrants, of whom 51.2 percent are women sending back an estimated USD 6.5 billion in remittance flows (World Bank, 2018). Remittance flows to Tonga contribute 35.2 percent of GDP and over 16.1 percent of GDP in Samoa (World Bank, 2018: 15).

Demographic statistics for the Asia-Pacific region have also indicated greater inequalities faced by the rural poor. This includes lower education enrolment and attainment, especially for girls in South Asia, Cambodia, Lao People's Democratic Republic and many nations of the Pacific (UNDP, 2010). The rural poor are also more vulnerable to shocks from global climate change, loss of biodiversity and humanitarian crises, including conflicts and natural disasters. The poorest of the poor are female-headed households. These disparities between rural and urban areas along with globalization and the increased economic interconnectedness of the Asia-Pacific region has witnessed an increase in human mobility for reasons of labour, education and greater financial security (UNDP, 2010).

Both boys and girls from the rural areas lack access to education, but in general, girls have less access to education and training than boys do. This barrier is based on several factors rooted in social norms that reinforce gender inequalities in education. An outcome of poor educational attainment and wide gender inequalities in school enrolment and attainment in the Asia-Pacific

region in part reflects low per capita incomes, agrarian-based economies and relatively lower female labour force participation rates. It is also a function of low spending on education by governments, pervasive patterns of sex segregation and gender discrimination as exemplified in the region's high level of gender-based violence and lack of adequate legal support (UNDP, 2016b). Gender discrimination in natural resource management, food security and access to health care are barriers to educational attainment. Furthermore, socio-cultural factors restricting women's mobility and autonomy are major constraints on women's participation in the above-mentioned sectors.

It is particularly the rapid speed and scale of these demographic changes in the Asia-Pacific region as compared to the global average that presents various challenges as well as opportunities. The demographic shifts such as population growth, youth bulge and population ageing and migration directly impact regional development. However, the demographic transitions are diverse as these are influenced by a nation's economic wealth and stage of development and these are extremely varied throughout the region. The demographic dividend is largely influenced by increased economic wealth moving large sectors of the population out of poverty, though often unequally.

Drivers of demographic changes

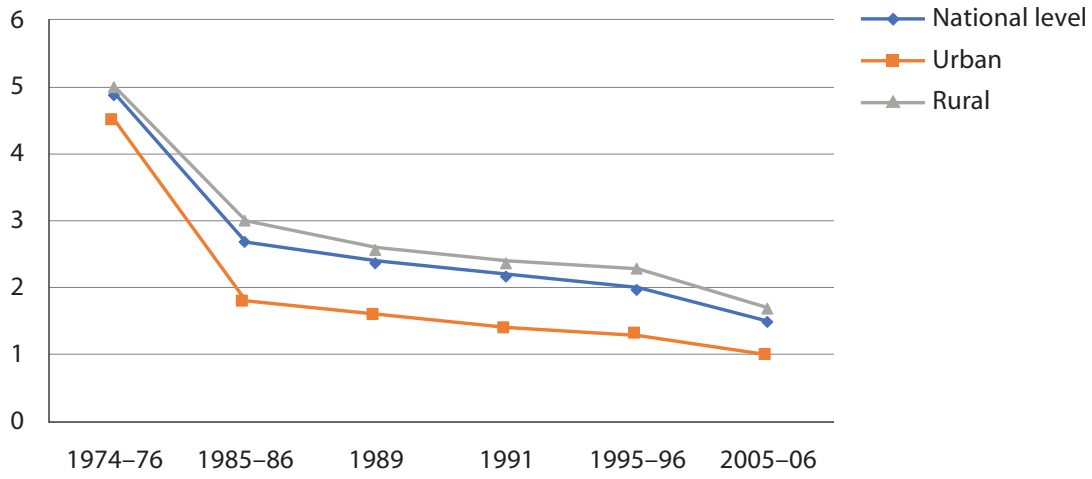
The Asia-Pacific region until recently has been a rural-based society, but since 2018 there are now more people living in urban areas. There is no historical precedent for urbanization on such as massive scale as has occurred in the region; and although urban growth has not been uniform throughout the region it has been increasingly consequential for agricultural land and ecosystems, which are converted to urban and peri-urban lands. Given this expansion, an understanding of urban-rural linkages and their complexities is crucial to ensure that growth is managed sustainably for the populations, regardless of their places of residence (United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), 2017a). In Southeast Asia, it is estimated that rural households derive up to 70 percent of their income from non-farm urban-based activities, as household members move between urban and rural areas (Institute of Southeast Asian Studies (ISEAS), 2010: 5).

Urbanization is viewed as an engine of economic growth; however, growth has been far from inclusive and is credited with the widening of inequalities (United Nations Human Settlement Programme (UN-Habitat), 2016). As regional economies shift toward the industrial and service sectors, away from the agricultural sectors including fishing, the urban population who are often labour migrants from rural communities looking for new livelihoods rely on informal and vulnerable employment. Rural areas in turn suffer from labour shortages and a disproportionate number of elderly and youth unable to fill the labour shortages, including within the fisheries sector.

Leaving the countryside: case study of Thailand and Cambodia

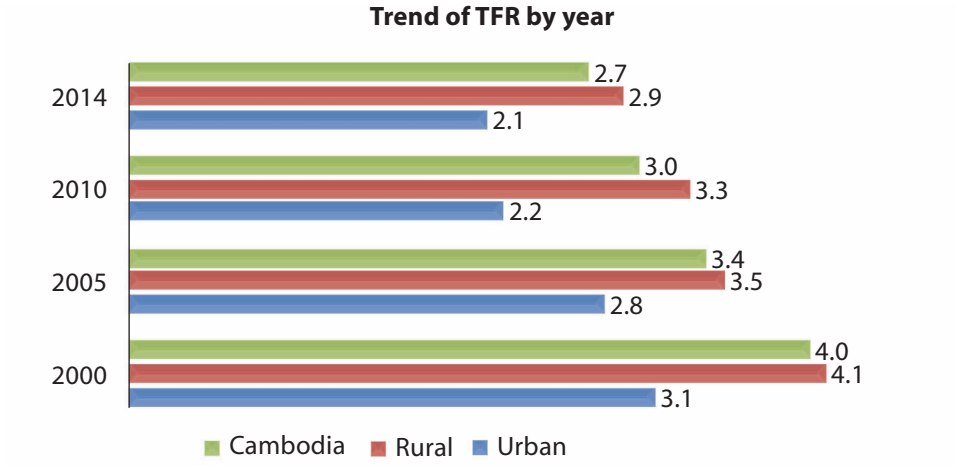
Thailand is classified as an ageing society with the lowest population growth (0.3 percent growth per annum) and the second lowest fertility rate (1.5 children per woman) in Southeast Asia. It is estimated that more than 50 percent of Thailand's 68 million people live in an urban area. Cambodia, with a significantly lower population of 15 million is a rural and agrarian society with 77 percent of the population residing in rural areas (UNESCAP, 2017b). The nation benefits from a "demographic bonus" with 31.4 percent of the population under 14 years of age and

4.3 percent over 65 years of age. Cambodia has the highest fertility rate (2.6 children per woman) and the second highest population growth (1.6 percent growth per annum) in Southeast Asia (UNESCAP, 2017b). It is important to note that fertility rates differ among regions, as well as between rural and urban areas in Thailand and in Cambodia (Figures 4 and 5). Fertility rates in both countries are higher in the rural communities.



Source of data: UNFPA Thailand, 2011:19.

Figure 4. Fertility rates in Thailand at national level and regional level, 1974 to 2006



Source of data: Cambodian Ministry of Planning, 2015: 4.

Figure 5. Total fertility rates (TFR) in Cambodia by region, 2000 to 2014

Despite the demographic differences, internal migration accounts for the largest type of migration in both nations. In Thailand, internal migration outstrips international migration, with 4.5 million people in 2017 compared to 8.3 percent of the Thai population having migrated internally during the previous five years, and overall 21.8 percent of the population did not live in their hometown (Thailand National Statistical Office, 2010). In Thailand, internal migration is largely associated with the shift from a largely agricultural-based economy to an economy mainly based on services and industry (Katewongsa, 2015). Similarly, internal rather than international migration characterizes Cambodian migration. It was estimated that 4.1 million

Cambodians changed their location of residence within the country compared to the 1.1 million who emigrated (United Nations Department of Economic and Social Affairs (UNDESA), 2017). Rural-rural migration makes up 58.4 percent of internal migration, followed by rural-urban (24.5 percent) and urban–urban (12 percent) migration, representing a significant proportion of internal migration in Cambodia (National Institute of Statistics, 2013), which has led to rapid urban growth (2.8 percent in both 2015 and 2016) (UNESCAP, 2017a). Rural-urban migration is fuelled by the lack of economic opportunities caused by slow national development following the civil war, deteriorating land and water conditions caused by climate change (Asian Development Bank (ADB), 2012), and customary inheritance practices that divide agricultural land among children, often allocating land that is too small to be productive. These push factors create a pool of labourers who are drawn to garment factories, construction, and the tourism and service sectors in economically active urban and peri-urban centres.

In Thailand the expansion of the industrial and service sectors has largely driven rural-urban migration. The decline in the share of internal migrants working in agriculture is a result of the rise of work in the industrial sector, which employed over 74 percent of Thailand's total internal migrants in 2009, compared to 64 percent in 1999 (Thailand National Statistical Office, 2010). It is important to note that rural-urban migration is seasonal: internal migrants move from the north and northeast regions towards the Bangkok metropolis and the central region during the dry season, and in the reverse direction during the wet season (Guest *et al*., 1994). Some evidence suggests that these trends still hold today: in the 2016 Migration Survey, 41.9 percent of migrants indicated they had moved from central to northeast Thailand, whereas 30.2 percent had moved in the reverse direction (Thailand National Statistical Office, 2016).

Who are leaving?

In Thailand the average internal migrant is between the ages of 20 and 29 (45.1 percent of migrants) and from poor households. However, they are usually better educated, have better health and are considered economic migrants (46.8 percent) (Thailand National Statistical Office, 2010). This does not capture seasonal migration. In 2012, 26.2 percent of migrants were in the agricultural sector and this greatly declined to 14.7 percent in 2016. In 2016 the majority of economic migrants found employment in the service sector (Thailand National Statistical Office, 2016). Employment differed for women and men: 22.8 percent of women found employment in agriculture, whereas 28.7 percent of men worked in this sector. In the manufacturing sector 17.4 percent of men were employed, whereas 24.9 percent of women found work in this sector. In the retail sector, 11.9 percent of women found employment, whereas only 5.3 percent of men were employed in this sector; and only 6.1 percent of women found employment in the construction sector, whereas 15.5 percent of men were employed in the sector (Thailand National Statistical Office, 2010).

Migrants in Thailand are young. In 2016, 54.5 percent of internal migrants were aged between 25 and 29 years old. In the period 2005–2010, 48.5 percent of internal migrants were women; both women and men stated employment as motivation to migrate (46.8 percent) (Thailand National Statistical Office, 2016). In Cambodia, men dominated rural-rural migration, whereas women comprised the large majority of migrants in urban-urban and rural-urban migration. Migrants tend to be of working age, 20 to 34 years of age (64 percent), have better health and educational attainment, single and without children (Cambodia Ministry of Planning, 2012). In Cambodia female migrants work primarily as garment workers, small business owners, domestic workers and entertainment and service workers. Male migrants work as construction or

non-construction workers, drivers, business owners and white-collar professionals. There is very little overlap between professions occupied by male and female migrants, indicating strong gender segregation in work. The construction sector provided the highest average salary for low-skilled entry-level workers, followed by manufacturing, security, and hospitality (Open Institute, 2016). Occupations taken up by female migrants have the lowest pay (Cambodia Ministry of Planning, 2012).

In Thailand gender differences in working conditions within fisheries were reported. Overall, men reported a higher prevalence of labour rights abuses (63 percent) than women (40 percent). Among men, the most common forms of labour rights violations were abusive working conditions (36 percent), deception (33 percent) and withholding of documents (25 percent). For women, abusive working conditions (22 percent) and deception (22 percent) were slightly less common, and very few had their documents withheld (5 percent) (UNTWG, 2019). Reports of intimidation, including threats and harassment, were experienced by an equal share of both women and men (16 percent). There was a significant wage disparity between men and women, with 73 percent of men receiving the minimum wage or more, whereas only 48 percent of women received the statutory minimum (UNTWG, 2019). In the seafood-processing sector, where both men and women were employed, men were paid an average of THB[2] 840 more than women each month (UNTWG, 2019).

The predominance of the informal sector in both Thailand and Cambodia exposes migrant workers to systemic risk of exploitation and abuse.

What does it mean for those left behind?

In Cambodia it is estimated that rural areas are losing about 4 percent of their population per year and despite remittances sent home, the loss of labour is impacting the agricultural sector negatively (Cambodian Ministry of Planning, 2012). Remittances are often small and are not considered enough to counterbalance the loss of labour (Cambodian Ministry of Planning, 2012).

In Thailand the loss of labour, particularly of young workers, is also an issue of concern. However, it is often counter-balanced by a higher level of remittances. In a study by Paris *et al*. (2009) it was found that remittances account for 38 percent of rice farmers' incomes in the northeast of Thailand, which greatly improved the households' well-being. Overall, internal migration has a significant positive impact on the per capita income of migrant-sending households, raising household incomes by between 17 percent and 22 percent, and reducing rural poverty and rural-urban inequality (ADB, 2012; Institute of Population and Social Research, 2012). Internal migration is also seasonal and most migrants return home for rice cultivation and harvest seasons. Labour shortages in Thailand are also being filled by immigrants from neighbouring countries. Improvements in land-use techniques have taken place in the Thai Northeast region and the return of internal migrants who have acquired better knowledge and skills through migration and education at their destination have contributed to improvements in agriculture (International Organization for Migration (IOM), 2011).

Not all internal migrant workers are involved in labour activities that enable them to significantly improve the well-being of the household left behind. For the poorest households

[2] THB = Thai baht.

from the northeast of Thailand, the volume of remittances does not always offset the loss in labour caused by the migration of an active member of the family, so that internal migration has been accused of deepening rural-rural inequality (ADB, 2012). What is currently of concern for both the Thai and Cambodian governments is households of migrants turning into "skip generation households", a term referring to households where the grandparents act as guardians for their grandchildren with limited assistance from the children's parents (UNTWG, 2014). The long-term impacts of youth migration, an ageing society and labour shortages, such as widening regional inequalities in development in both Cambodia and Thailand, still need to be examined.

Ageing society and policy response

Although youth migration may increase household income, as mentioned above it also may lead to increased responsibilities for the remaining household members ("skip generation households") as well as increased vulnerabilities such as low incomes, health-related functional disabilities, health problems, social isolation, and limited opportunities to participate (UNTWG, 2014).

Thailand is the third most rapidly ageing society in the world. About 20 percent of the population (13 million people) is over the age of 60; it is further estimated that by 2050 over 35.8 percent (about 20 million people) will be over the age of 60 (HelpAge Global Network, 2019a). This means that one in every third person in Thailand will be a senior citizen. The demographic transition has implications for older person care, which traditionally in Thailand was done by the family. With a low fertility rate and increased labour mobility, fewer young people are at home to provide support for the older person in their home; it is estimated that about 50 percent of older people do not have a child living in the same village/municipality, and 16 percent are completely alone (HelpAge Global Network, 2019a).

Vulnerabilities associated with ageing include greater risks of poverty. The Thai government estimated that in 2001 about 10.9 percent of older people in Thailand was poor, 7. 1 percent was near poor (which means that they are more vulnerable to becoming poor in the event of even a small economic shock such as a medical bill) compared with 7.7 percent of the general population (HelpAge Global Network, 2019a). According to the Thailand National Statistical Office (2011), about 33 percent of older people still work daily and 90.3 percent of them are working in the informal sector (HelpAge Global Network, 2019a). They are supported by family members (although the extent of support is changing) and according to the World Social Protection Report 2017–2019, 83 percent of people older than the statutory pensionable age in Thailand receive an old-age pension (contributory, non-contributory or both) (HelpAge Global Network, 2019a).

Cambodia is also attempting to address issues of an ageing society. As of 2019, over 1.2 million Cambodians (7.6 percent of the population) are aged over 60 (HelpAge Global Network, 2019b). The proportion of older people has increased by 40 percent from 849 911 since the last census was held in 2008 and this is expected to nearly triple in the coming decades. The fastest growing group of older people is the "oldest old", which are classified as those aged over 80 (HelpAge Global Network, 2019b).

The experience of ageing in Cambodia also differs for men and women. As a direct consequence of Cambodia's civil war and in addition to a longer life expectancy, women

outnumber men. There are 64 men for every 100 women over the age of 60, and 59 men for every 100 women over the age of 80 (HelpAge Global Network, 2019b). For women over 60 years of age it is estimated that 46 percent of women are widowed, whereas only 11 percent of men are widowed. The majority of women over 80 years often lack education and literacy skills; only 9 percent of women in this age group are literate (HelpAge Global Network, 2019b). Consequently this group of women does not have proper administrative registrations for identity, for land or other assets and tends to be dependent on their children, particularly their sons, to provide support in old age.

Those over the age of 60 are largely forgotten in the development/nation building dialogue (in terms of their needs and contribution) as it is largely assumed their households will care for them when required. Disability is another issue that is largely invisible and has an impact on the ageing population. According to the World Social Protection Report 2017–2019, only 3.2 percent of people older in the statutory pensionable age in Cambodia receive an old-age pension (contributory, non-contributory or both) (HelpAge Global Network, 2019b). Although migration does often improve household finances, those 60 years and older are left with the additional responsibilities of reproductive labour with limited support during illness.

Government policies

Thailand and Cambodia currently both have national level policies to address the issues related to their increasingly ageing societies. In 1991 Thailand established the "National Committee of Senior Citizens" and subsequently created the Second National Plan for Older Persons (2002–2021), the Act on Older Persons (2010) and a National Strategy for 2018–2037 that focuses on human resource development and social equality development. The national policies have three main objectives: 1) promoting a positive attitude toward elderly persons; 2) promoting health for the elderly; and 3) social protection for the elderly (HelpAge Global Network, 2019a). For example, in 2009 Thailand created a universal social pension policy, the Old Age Allowance, which provides monthly allowances to all citizens over the age of 60 (HelpAge Global Network, 2019a). In addition to providing universal health, the Thai government created the Act on Older Persons to promote healthy living, access to healthcare and long-term community-based care and to train health care professionals to be more aware of the needs of the elderly (HelpAge Global Network, 2019a). It also encouraged older people by making resources available to establish associations where elderly people can receive support for various issues they are facing.

In 2018 the Cambodian government declared the National Ageing Policy 2017–2030 with the objectives of creating retirement schemes for workers, placing geriatric care professionals in health centres, and enforcing firmer regulations against elder abuse. The plan will also consider free health care for older people. One thousand six hundred associations for the elderly are to be created to alleviate social isolation and provide support for those who are vulnerable or marginalized (HelpAge Global Network, 2019b). Although there is no state pension plan – veterans, civil servants or those from the private sector who have contributed to the National Social Security Fund (NSSF) receive pension benefits. The Cambodian government has announced that by the end of 2019 a "retirement salary" will be set up to provide all Cambodian workers with financial support once they stop working (HelpAge Global Network, 2019b).

What does it all mean?

The rapid economic growth in Asia has undoubtedly fuelled urbanization based on higher productivity, which comes from the activities of the industrial and service sectors. In Thailand, for example, Katewongsa (2015) stated that the influx of capitalism has further converted the traditional social structure of Thailand from that of an agrarian society to that of an industrial society (Katewongsa, 2015: 64–65). Research has shown that rural-urban migration has caused an imbalance in the population distribution because of economic and social differences between rural and urban areas. Numerous studies illustrate that the drivers of demographic transitions are the "pull factors" such as higher incomes or employment opportunities, which motivate rural to urban migration (Rattanawarang, 2002; Coxhead, Viet Cuong and Hoang Vu, 2015; Katewongsa, 2015). Even in nations that are highly urbanized, for example, India, China and Thailand, a labour force is still needed to sustain the growth of the agricultural sector, which includes fishing, although this is not often explicitly mentioned (Rattanawarang, 2002; Coxhead, Viet Cuong and Hoang Vu, 2015; Katewongsa, 2015). Greater research on the linkages between the widening of inequalities and the long-term impacts of the drivers of demographic transitions, in particular on fisherfolk and fishing communities that often remain invisible to researchers, is required.

Changes and impacts within the fishing population

A demographic study on fisherfolk and fishing communities, conducted by Tietze, Groenewold and Marcoux (2000) that covered more than a 20-year span from the 1980s to 2000 and included cases studies from Asia and Africa, namely Bangladesh, India, Philippines, Malaysia, United Republic of Tanzania, and Senegal, provides profiles of fisherfolk and their communities.

The findings clearly showed that despite the increase of fisheries resulting from the increased demand for fish and aquaculture products, the number of coastal fishers has started to decline or stagnate in Malaysia Malaysia, the Philippines, United Republic of Tanzania, and Senegal. However, in Bangladesh and India the number was increasing but only very slowly (Tietze, Groenewold and Marcoux, 2000). The findings also showed that levels of fertility and infant mortality in fishing communities were slightly higher than those in farming communities. Larger families were preferred and are understood by the older generation to be advantageous to fisher families. More children are equated with an increase in the family labour force, which is necessary to ensure diversification of the family income in a sector in which income is neither constant nor predictable. The studies showed that fisher families involved in coastal fishing were at an advantage and generally were better off than those in other rural communities. Trends also showed that the younger generation preferred to have smaller families and to marry at an older age, which is largely associated with higher levels of educational attainment by the younger generation, particularly women. This was more so the case in Asia than in Africa (Tietze, Groenewold and Marcoux, 2000).

Trends in male adult mortality data indicated that living and health conditions in fishing communities were worse than average in rural communities (Tietze, Groenewold and Marcoux, 2000). It was believed that it could be a result of the hard labour and hazardous nature of the occupation; however, more research is required. Population growth rates were the same for farmer communities and fishing communities. The differences between them for the most part can be explained by migration and occupational mobility into or out of the fishing population and labour force.

It is often perceived that fishing households are the poorest of the poor. Tietze, Groenewold and Marcoux (2000) showed this is not the case. Five out of the six country case studies showed that despite declining household incomes, the average household income was slightly higher than that of other rural households. In terms of fisherfolk's educational attainment, the study showed that compared to farmers' educational level it was equally high in the Philippines, whereas it was equally low in the United Republic of Tanzania. In Bangladesh and Malaysia farmers had a higher education level whereas in India and Senegal fisherfolk had a higher level of education (Tietze, Groenewold and Marcoux, 2000).

Tietze, Groenewold and Marcoux (2000) also illustrated that fishing was not seen as a "last resort" for employment, particularly with the possibility of higher incomes from artisanal fishing, marine conservation, and ecotourism; and in addition to intergenerational labour mobility these factors played a large role in the decline of fishers in some coastal areas. For example, in Malaysia intergenerational occupational mobility meant a shift into the service sector, whereas in the Philippines and the United Republic of Tanzania there was a shift into other rural sectors. Another explanation of the decrease in fishers was the declining fish catches and therefore declining wages. Moreover, rising levels of education and access to alternative and economically more rewarding employment opportunities have developed outside the fisheries sector leading many of working age in the fishing communities to seek employment in other sectors. However, this was not the case in Bangladesh and India both of which were experiencing increased labour mobility into the fishing sector. An increased entry into fishing was largely a result of increased government funding to support fisherfolk in Bangladesh and India (Tietze, Groenewold and Marcoux, 2000). It seems clear that the fisherfolk households within all the coastal communities researched, regardless of country, are not stagnant entities but adaptive units with agency who often diversify livelihoods to meet household needs.

Southeast Asia

Southeast Asia has emerged as a global fish producer; this is largely because of its rapid expansion of aquaculture, expected to contribute nearly a quarter share of global fish output in 2030, coupled with a large offshore fishing fleet (Chan *et al*., 2017). Fisheries and aquaculture, directly and indirectly, play a major role in livelihoods for the population of Southeast Asia. In 2016, it was estimated that 8.2 million people (11 percent of the global total) in the region were directly employed in fishing (Southeast Asian Fisheries Development Center (SEAFDEC, 2018). Table 1 presents available information in the region, with blank spaces indicating that information was not provided by the country for that year. The table shows those employed in full-time, part-time and occasional labour involved in marine capture, inland capture and aquaculture (mariculture, freshwater culture and brackishwater culture), as reported by the respective governments.

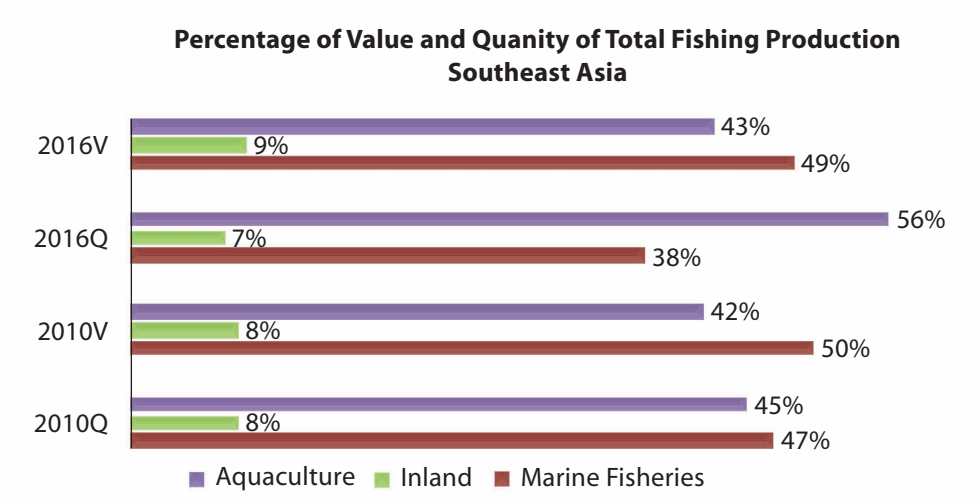
Employment statistics from state ministries provided by member countries to international organizations such as FAO provide insight into the socio-economic situation of fisherfolk and fishing communities. Primary data collected provide details of activities that generate income, provide food and support livelihoods, giving some insight into demographics and demographic trends among fisherfolk, although the data are often not gender-disaggregated. Significant importance is given to understanding remuneration in combination with employment to provide a key for understanding the sector's contribution to livelihoods. The very limited availability of gender-disaggregated labour data provides some insight, allowing for a basic gender analysis of those involved in the fisheries sector.

Table 1. Number employed in fisheries sector

Country	2007	2010	2015
Myanmar		3 160 070	3 781 550
Indonesia	2 231 967	5 971 725	5 667 440
Philippines	1 786 948		877 185
Thailand	168 140		666 908
Lao People's Democratic Republic			594 500
Viet Nam			553 900
Cambodia			420 000
Malaysia	99 617	155 913	169 937
Timor-Leste			7 600
Singapore	122	503	706
Brunei Darussalam	5 991		528

Source of data: SEAFDEC, 2007, 2010, 2015.

In 2016, Southeast Asian aquaculture produced 55.5 percent of production quantity whereas marine capture fisheries and inland capture accounted for 37.6 percent, and 6.9 percent respectively. However, in terms of production values, marine capture fisheries, aquaculture and inland capture accounted for 48.7 percent, 42.7 percent, and 8.6 percent, respectively (SEAFDEC, 2020). In 2010, Southeast Asian aquaculture produced 45.1 percent of production quantity whereas marine capture fisheries and inland capture accounted for 47 percent and 8 percent respectively; however, in terms of production values, marine capture fisheries, aquaculture and inland capture accounted for 50 percent, 42 percent, and 6.9 percent, respectively. A comparison of production quantity versus production value for each sector in 2010 and 2016 is presented in Figure 6.



Source of data: SEAFDEC, 2012 and 2020.

Figure 6. Percentage in terms of value and quantity of total fishing production in Southeast Asia, 2010 compared to 2016

The secondary sector, the pre- and post-harvesting of fish, employs a large number of people in Southeast Asia: Viet Nam 3.4 million, Cambodia 2 million, Thailand 1.2 million, and Indonesia 1.17 million. Consistent data on employment for Malaysia, the Philippines, Lao People's Democratic Republic and Timor-Leste were not available (SEAFDEC, 2020).

Demand for fish is also high and fish is a crucial source of protein for people. The growth of Southeast Asia's fish supply for human consumption is more than twice the population growth, inducing a rise in average per capita fish consumption. In 2013, the region had the world's highest annual per capita fish consumption of 32.5 kg (ASEAN, 2017: 9). In 2000, 56 million people in the Lower Mekong Basin consumed over two million tonnes of inland fish (Hortle, 2007). Communities in the Lower Mekong Basin are particularly dependent on fisheries for protein and food security, consuming an annual average of 29 kg to 39 kg of fish and other aquatic animals per person; this comprises 47 percent to 80 percent of their total protein intake (Hortle, 2007).

The key drivers of change that directly impact fisheries and aquaculture in Southeast Asia are population growth and urbanization, increased demand for food and energy, rapid industrial growth, and the impacts of climate change (Chan *et al*., 2017). The main pressures on resources resulting from human activities in the region are excessive use of water resources, increased wastewater pollution, and land-use change, further placing increased pressure on infrastructure, social services, employment and ecosystems in urban areas.

In addition to rural-urban internal migration, intraregional migration, both formal and informal, is equally important, largely to meet the growing labour demands in richer nations of Malaysia, Singapore and Thailand.

In the Philippines poverty has characterized fishing communities in both coastal and inland fishing communities; fisher communities are still the poorest in the nine basic sectors with a poverty incidence of 41.4 percent (FAO, 2018). The high levels of poverty can be attributed to the decline in fishing catch; in 2000 the daily income of fisherfolk was estimated at a retail value of 2 kg of fish per day in 2018 from 20 kg of fish per day during 1970 (FAO, 2014). Fishing communities often lack basic infrastructure and services. Electricity and freshwater supplies are difficult to access. This is largely because of their geographic remoteness. In the Philippines, fisherfolk household sizes are larger than the national average. Fishing for self-sufficiency is a characteristic that is shared in the majority of Southeast Asian nations. In Viet Nam, fishing and aquaculture contribute on average 75 percent to fisher households' incomes.

East Asia

Japan has one of the world's most abundant fishing grounds; traditionally fish is important in food security and livelihoods (FAO, 2009). Fish and fishery products accounted for 61.2 kg per capita annual intake of the Japanese nation in 2005 (FAO, 2009). This has decreased to 45.5 kg per capita in 2017 (FAO, 2017). In 2017 total fishery production was calculated to be three million tonnes and aquaculture production, including seaweed, was four million tonnes (FAO, 2017). Fisheries are a key industry supporting the regional economies of fishing communities where employment opportunities are limited. Especially in isolated island areas, more than 70 percent of the primary industry output comes from fisheries. About 20 percent of communities located inland from fishing ports are in isolated island areas and more than 30 percent in peninsula areas. More than 50 percent of communities located inland from fishing

ports are on narrow terrain at the foot of mountains or cliffs and about 25 percent on steep terrain. They are all vulnerable to natural disasters such as earthquakes and tsunamis (FAO, 2009).

Despite the economic and cultural importance of the fisheries sector to Japan, the number of people employed in fisheries has steadily declined by almost 30 percent (Yagi, n.d.). However, of particular importance to the future of Japanese fishing is the skewed age distribution as 43 percent of fisherfolk are over 60 years old and only 15 percent are under 40 years, as shown in Table 2 (Yagi, n.d.: 10).

Table 2. Age and sex distribution of employment in fishing sector for Japan, 1980 to 2000

		1980	1985	1990	1995	2000
Male	Age 15 to 24	27 020	19 759	12 510	7 810	5 970
	Age 25 to 59	307 640	267 030	205 250	144 560	112 410
	Age 60+	67 540	69 950	85 600	94 840	97 720
Female		80 910	75 350	67 180	54 230	44 090
Total		457 370	413 880	370 530	301 430	260 200

Source of data: OECD, 2008.

South Asia

In Bangladesh, as of 2018, an estimated 12 million people are engaged in fisheries, of which 1.4 million rely exclusively on fisheries (FAO, 2010). Of these, there are 900 000 in the marine fisheries subsector (including up to 450 000 seasonal fry fishers (contracted), mainly women and children). An estimated 9.5 million people (73 percent) are involved in subsistence fisheries on the country's floodplains. There are 3.08 million fish farmers, 1.28 million inland fishermen and it is estimated that fisheries and related activities support more than 7 percent of the country's population (FAO, 2010). In 1994, inland fisheries constituted 23 percent of the total fish production, almost all of which came from small-scale, artisanal fisherfolk. Currently the number is an impressive 42 percent. Another dramatic increase can be seen from 1993–1994 with 1.3 million active fisherfolk, of which 566 000 are reported to be marine fisherman (FAO, 2010). It is estimated that about 1.4 million women depend on the fisheries sector for their livelihoods through fishing, farming, fish handling, and processing (Shamsuzzaman *et al*., 2017). Different surveys revealed that more than 80 percent of labourers engaged in the fish processing industries comprised women (Shamsuzzaman *et al*., 2017).

The dramatic increases in opportunities for employment in the fish sector are attributed to increased demand for fish; there has been a massive population growth in urban areas and this has created a demand for fish which is a staple food for the population (FAO, 2019). These employment opportunities for poor rural citizens would also stem their migration to urban areas. Fish accounts for about 60 percent of Bangladeshi people's daily animal protein intake (Shamsuzzaman *et al*., 2017).

Landlessness has increased poverty rates in Bangladesh, particularly in the rural areas, and fishing has provided opportunities for income generation to the marginalized – those

belonging to the poorest sections of the population, usually lacking secure rights to settlements, access to health facilities and to education (FAO, 2010). These communities are vulnerable and their adaptive capacity to natural disasters and climate change impact is low. This is reflected in the characteristics of employment – boat and gear owners are often not engaged in fishing as they prefer to contract fishing groups (FAO, 2010). There are approximately 900 000 fishers belonging to such groups or fishing individually without boats (fry fishing). Coastal fisheries are a social safety net for groups lacking other livelihood options. The alternative livelihood options are limited and seasonal – from January to June fry fishing is the major source of income.

Iwasaki's (2016) study in India was able to capture change in the demographic characteristics of fishing communities. The study showed that population growth in these fishing communities was largely determined by fertility and mortality rather than migration. The communities experienced an increase in fishing population as younger men dropped out of school to find employment in fishing, which may limit alternative job options and at the same time will boost the likelihood and intensity of excessive fishing competition among resource users in the future. In response to improved fishing gears and increased value of fish landings, resource users have moved away from traditional fishing gear to the use of *khanda* (box trap nets). Increased pressure on resources and fishing gear also led to a change in seasonal fishing practices, from the previously practiced traditional multistrata fishing activities, to unlimited seasonal fishing covering the entire lagoon. The findings of this case study clearly illustrate the linkage between demographic and socio-economic changes as one of the major challenges for resource management.

India is the seventh top marine fish producing country globally and much effort to systematically understand the demographic trends has been undertaken (Syda *et al*., 2016). The ICAR-Central Marine Fisheries Research Institute (ICAR-CMFRI) conducted the marine census in 1980, 2005 and 2010, and provides a plethora of insight into the gendered demographic trends. The primary aim of the marine fisheries censuses was to provide updated information on size, composition and distribution of fisherfolk households and population, fishing gears, fishing crafts and fishing related infrastructure facilities, as well as data on the social and educational status of fisherfolk in the coastal villages in the country. The sex-disaggregated data collected and presented also provides key demographic indicators of fisherfolk in comparison to the national population.

Using data collected from the 2005 and 2010 Indian censuses, information cross cut with a gender analysis on population growth, sex ratio, literacy level and educational status, poverty level, sectoral dependency and occupational categories of the coastal fisherfolk was analysed and compared with national statistics (Syda *et al*., 2016).

Results from Syda *et al*. (2016) clearly showed that whereas the fisherfolk contribute one percent of the national GDP and five percent of the agricultural GDP, fishing communities only make up about 0.33 percent of the population. From 2005 to 2010, marine fishing households have increased by 2.87 percent in comparison to the national population of only 1.7 percent. Fishing communities have higher fertility rates, as well as lower education levels for women as compared to the national average. Households below the poverty line in fishing communities at 61 percent are also higher than the national average of 31.5 percent. At the national level, demographic and socio-economic indicators showed fisherfolk below the national average. These are issues of concern that must be addressed in policies addressing the sustainable development of fisheries (Syda *et al*., 2016).

Changes in mechanization of fisheries

It is estimated that the global fleet size has double from two million vessels in the 1970s to four million in the 2000s, of which 75 percent are based in the Asia-Pacific region (Garcia and Grainger, 2005). Although the number of large vessels has not greatly increased, the total number and power of smaller boats has increased during the same period. As a consequence, global fishing capacity is still very high, probably at its highest point yet. With fishery resources severely depleted, oil prices increasing, and subsidies decreasing, further massive investments are much less likely (Garcia and Grainger, 2005). Despite the increase, particularly of small-motorized fishing boats, global fleets catch only 20 percent as much fish for the same amount of effort (Stokstad, 2019).

Technological progress has been both a source of beneficial expansion and well-being for fishing communities and a constant challenge for managers (Garcia and Rosenberg, 2010). Fishing power and efficiency have increased dramatically because of larger or more powerful engines capable of propelling larger vessels and a greater amount of gear over a greater range. Other innovations include: hydraulic power applications; stronger materials for fishing gears increasing size and efficiency; better electronic aids for navigation, bottom mapping, fish finding, gear deployment and communication; and improved fish preservation technology.

Table 3. Total number of boats and a comparison of non-powered to powered boats in Southeast Asia, 2007, 2010 and 2016

Country	2007			2010			2016		
	Total number of boats	Number of non-powered boats	Number of powered boats	Total number of boats	Number of non-powered boats	Number of powered boats	Total number of boats	Number of non-powered boats	Number of powered boats
Brunei Darussalam				2 743	141	2 602	1 449		
Cambodia							103 348	39 726	63 622
Indonesia	590 314	241 889	348 040	570 827	172 907	397 920	568 329	143 135	425 194
Malaysia	39 221	2 645	36 576	49 756	2 977	46 779	72 786	28 830	48 956
Myanmar				32 824	17 054	15 865	26 414		
Philippines	788 526						6 901		
Singapore				39			30		
Thailand							40 688		
Viet Nam							300 976		

Source of data: SEAFDEC, 2010, 2012 and 2017.

Table 3 shows the total number of boats and the comparison of non-powered to powered boats in Southeast Asia. It is important to note that SEAFDEC defines powered boats as boats powered with either outboard or inboard power. The inboard powered boats include boats less than five gross tonnage (GT) up to 500 GT. Incomplete data or information not reported by the governments are left blank in the table.

Comparing the changes of both fishing vessels and of fishing gears in Southeast Asia proves problematic as limited statistics exist. However, the information collected by SEAFDEC shows

that fishing gears have modernized: in 2007 hook and line fishing gear dominated, this then changed to trawls in 2010 and 2016 largely because of the increased number of motorized fishing vessels in the region. Using Indonesia and Malaysia as examples (Table 4), as they were the only two countries to consistently report the number of fishing boats (powered and non-powered), trends indicate that an increased number of motor powered boats can be linked to the changes in fishing gear.

Table 4. Changes in fishing gear in Southeast Asia, 2007, 2010 and 2016 (percentage of units used of all gear types)

Gear	2007[a]	2010[b]	2016[c]
Hook and line	58.37	1	n/a
Gill nets	9.37	6	12.66
Push nets	1.18	n/a	0.47
Seine nets	1.06	25	29.2
Traps	0.85	3	n/a
Surrounding nets	0.61	9	4.23
Lift nets	0.34	n/a	0.53
Trawls	0.2	55	44.67
Hand collecting	n/a	n/a	0.64
Other	n/a	n/a	3.62

Source of data: SEAFDEC, 2010, 2012 and 2017.

[a] The countries the data were collected from were not mentioned.

[b] Only Brunei Darussalam, Malaysia, Myanmar and Singapore provided information.

[c] Only Brunei Darussalam, Malaysia, Singapore and Thailand provided information.

Many of these technologies have also become inexpensive and compact enough to be available to vessels of almost any size (Garcia and Rosenberg, 2010). Technology has improved fishing capacity and efficiency as well as safety on board, and in some cases improved fishing selectivity and product quality, but it has also greatly increased fishing mortality, spreading overfishing worldwide (Garcia and Rosenberg, 2010). Its unbridled use will continue to place fisheries on a trajectory of progressive automation and reduction of labour, with negative implications for coastal communities.

It should also be noted that although available, improved technology might not be applied unless both fishers and government officials are willing to adopt it. This may require much greater incentives, particularly for technologies that improve reporting, monitoring and management capacity (Ramenzoni, 2017).

Changes, or "modernization" of the fishing sector, can reinforce the segregation of tasks between sexes and exacerbate inequalities, as exemplified in the Maldives. "Maldives fish" was recognized as a regional delicacy and exported throughout the region. The traditional process started with men fishing and women involved in small-scale processing, with women's labour participation more than 50 percent, which was one of the highest participation levels in the Asia-Pacific region. Modernization of the fishing sector in the Maldives has changed traditional fishing practices and the processing of fish. Currently, fishermen directly sell their catch to

collection vessels, which subsequently export it in frozen form or give it to canning factories for processing. Women's labour participation fell to 21 percent in 1985 and in 1996 was down to 19 percent. Women's drop in the labour force moved them back into the household (Balakrishnan, 2005).

Changes in aquaculture

The contribution of aquaculture to the global production of capture fisheries and aquaculture combined has risen continuously, reaching 46.8 percent in 2016, up from 25.7 percent in 2000 (FAO, 2018). If China is excluded, aquaculture's share reached 29.6 percent in 2016, up from 12.7 percent in 2000 (FAO, 2017). At the regional level, aquaculture accounted for 17 percent to 18 percent of total fish production in Africa, the Americas and Europe, followed by 12.8 percent in Oceania. The share of aquaculture in Asian fish production (excluding China) increased to 40.6 percent in 2016, up from 19.3 percent in 2000 (FAO, 2018).

China's impressive economic growth has also included impressive growth in fisheries. Benefits are relatively higher in the fisheries sector, and therefore the labour force in the other agricultural sectors is increasingly attracted to the fisheries sector. In 1949 it is estimated that fisheries accounted for 0.2 percent of total production value of agriculture. This increased to 1.4 percent in 1978 and in 2014 was 12 percent of total production of agriculture (FAO, 2018). Freshwater aquaculture dominates China's fish farming business, representing more than 70 percent of the total fish produced in China (FAO, 2018). Since 1984, China has expanded aquaculture in both inland and marine waters. Expansion in area and increase in intensity of production have been the key. The use of open waters such as lakes, reservoirs, rivers and paddy fields for freshwater aquaculture has steadily increased, from 2.8 percent a year in 1984 to 6.9 percent a year between 1991 and 1995 (Silpachai, 2001). It is estimated that 25 percent or 14.6 million Chinese are involved in capture fishing and China alone accounted for 62 percent of aquaculture involvement in Asia. In China, the aquaculture industry is concentrated largely in the coastal regions, with the regions of Guangdong, Shandong, Fujian, Jiangsu and Hubei being the key aquaculture provinces in China. Among the fishery operators, there was a total of 1.82 million fishermen, 5.12 million aquaculture workers, 872 906 supporting sector workers, 4.85 million part-time workers, and 1.63 million temporary employees. With the rapid growth in production, China's share in the global fish production grew from seven percent in 1961 to 35 percent in 2011 (FAO, 2018).

Aquaculture in China is facing demographic challenges and there is now concern about labour shortages in the sector. The ageing of China's population and the long-lingering effect of the recently abandoned one-child policy, means that China's migrant (internal) worker population declined by 5.68 million to 247 million people over a fifteen-year period from 2000 to 2015 (Godfrey, 2016). The ageing and fewer aquaculture farmers are forcing the Chinese government to modernize and mechanize and consolidate the industry to draw migrant workers into the sector as labourers (Godfrey, 2016). The government also believes that consolidating the aquaculture sector into a series of large, more efficient companies will better assure the quality of Chinese aquaculture output and make it easier to enforce environmental regulations. In addition, workers will receive better salaries, fueling the labour market with young urban people (Godfrey, 2016).

The Bureau of Fisheries is largely supporting training and research to modernize and mechanize the country's vast aquaculture network. In 2002, it was reported that 18 462 fisher extension

stations were established throughout China and over 1.8 million aquaculture farmers and trainers were trained. China also has a vast research and education network, the Chinese Academy of Fisheries Science, which is made up of ten different academic research institutions (Farquhar, 2017). As a result, education in aquaculture is offered in over 30 Chinese universities and over 1 000 students enrol per year in the subject and at the graduate level such courses are also popular. Moreover, the government supports research that is shared openly with extension centres so that it is disseminated to farmers (Farquhar, 2017).

Considered one of the most suitable regions in the work for inland fisheries, particularly aquaculture, Bangladesh has the world's largest flooded wetland and third largest aquatic biodiversity in Asia (Shamsuzzaman *et al*., 2017). In 2015 it was estimated that aquaculture provided about half the fish for direct human consumption in Bangladesh and is set to grow further (Shamsuzzaman *et al*., 2017). The aquaculture industry contributes to the economy with increasing production capacity and abundant opportunities for export. From 2005 to 2010 the average growth rate of fisheries was 5.4 percent, whereas for aquaculture the average growth rate was 8.2 percent (IFPRI, 2017). This recent and rapid development has boosted Bangladesh's rank to fifth in world aquaculture production. Debunking the traditional view that fish farming in Bangladesh is mainly subsistence oriented, the study shows that the market for farmed fish grew by a dramatic 25 times in three decades, and that among fish farmers, 75 percent of them sell fish commercially (IFPRI, 2017).

This rapid growth in aquaculture has been attributed to increased demand, improvements in technology, communications and infrastructure and investments by millions of farm households and small and medium enterprises. The government played an important role in the early stages with infrastructure investment (such as investment in fish seed production, electricity and roads) (IFPRI, 2017). There has been an increase of feed mills, hatcheries, farmers and traders, with a rapid increase of purchased seed and feed, a rapid increase in the use of chemicals, an increase in the use of hired labour, and a rapid increase in investment in agriculture equipment. The sector now employs as many people as the garment sector, which also experienced unprecedented growth (IFPRI, 2017).

Just over a decade ago, rural fish farmers usually sold their fish to local traders; now they are selling two-thirds of their product to large wholesalers based in towns and cities (IFPRI, 2017). Rapid increases in urban consumption of farmed fish in Bangladesh mirror the trend taking place throughout Asia. This trend is particularly significant for Bangladesh, where fish is the most important food, after rice, in terms of the food budget (FAO, 2019).

Changes in resource management

Cooperatives are often organizations located in areas whose economies are based on the use of renewable resources, such as agriculture and fishing, with social, economic and ecological objectives that provide avenues of cooperation, collective action, capacity building and partnerships with the aim of promoting equality and sustainability (Alonso-Poblacion and Siar, 2018). Throughout the world fishing cooperatives exist and impact how fisherfolk and fishing communities interact with industry and government. The cooperatives for economic and technical cooperation have greatly improved community social organization, information sharing, technical exchanges and mutual support, and are rapidly expanding throughout fishing communities.

Fisheries cooperatives play a major role in the daily lives of fisherfolk. Economically, cooperatives play a role in marketing products, dealing with credit and developing public-private partnership. Socio-politically, cooperatives manage fishing rights and address sustainable approaches to exploit fish stocks (Alonso-Poblacion and Siar, 2018). Because the number of fishers and fish products has declined, and about 70 percent of fisheries cooperatives has reported losses, many cooperatives are opting to merge to save funds in an attempt to retain their influence. For example in the case of Japan, this is attributed largely to the ageing population, as well as occupational mobility as young people are no longer selecting the fisheries sector for employment (Soejima and Makino, 2018). This has in turn provided opportunities for Japanese women in cooperatives to gain increased decision-making power within the cooperative and reposition their own organization to provide a strong position for fisherwomen within the cooperatives (Soejima and Makino, 2018).

Globally, women are engaged in all facets of the value chain in the fishing sector. In 2014, women made up 19 percent of the labour force engaged in the fisheries sector globally (UNESCAP, 2017b). In Asia when primary and secondary fisheries sectors engagement are combined, women make up half of the workforce (UNESCAP, 2017a). Furthermore, it is estimated that 50 percent is involved in inland fisheries, 60 percent in seafood marketing, 66 percent in large-scale marine fisheries and 54 percent in small-scale fisheries (UNESCAP, 2017b). Women account for a larger number of the work force in the fisheries sector, but work more often than men as low-skilled, low-paid workers and have irregular seasonal employment in processing, packaging and marketing. A crude description is "women as the workers and men as the managers", both in the family and community (Balakrishnan, 2005). They often lack proper contracts, health and safety and labour rights protection (UNESCAP, 2017b). In general, fewer women than men are seen in the actual catching of the fish. Instead, post-harvest distribution as well as processing are largely dominated by women (Kusakabe and Sereyvath, 2014; Seila *et al*., 2016). Women have marginal access to extension, training and new technologies (UNESCAP, 2017b). Although women participate in a range of activities throughout the value chain they are not often represented in any decisionmaking/policy-making bodies and control over resources, e.g. ponds, land, water, knowledge, management, information skill (Kusakabe and Sereyvath, 2014; Seila *et al*., 2016). They are also largely absent in fisherfolk cooperatives, which creates an enormous obstacle to challenging inequalities (Alonso-Poblacion and Siar, 2018). This is largely explained by the given and unquestioned gender norms. Combining the above factors with women's restricted mobility and access to credit facilities it becomes clear why women's participation and involvement in small-scale, backyard aquaculture activities is more important to them than is involvement in large-scale commercialized aquaculture activities (Kusakabe, 2003). There is an absence of sex-disaggregated data that reinforces the invisibility of women as producers and as contributors to the economy. Although the gender-division of labour is important to expose hidden contributions, sex-disaggregated data and gender analysis is a starting point for learning about differences in opportunities, wages, and whether there are policy, governance and operation gaps that need to be addressed in order to really mainstream gender in the sector. This can be exemplified in the case of women's involvement in fisheries in Myanmar. Whereas official data on fisheries only focused on open-ocean and river fishing, which are male bastions, the rest of the fishing cycle in which women work is invisible (UNESCAP, 2017b). Women's work in Myanmar includes post-harvest processing, net making and the selling of fish. They have primary responsibilities for such jobs as cleaning, smoking, salting and drying as well as for selling fish and seafood products in local markets. Lack of official status can be a barrier to access finance and policy support for women working in this sector (UNESCAP, 2017b).

Japanese cooperatives provide an interesting case study in which demographic drivers intersect (Soejima and Makino, 2018). In Japan, historically, private wholesalers and traders dominated marine products distribution and controlled markets until about 1932; as a result fisherfolk often were forced to sell their fish at 30 percent or 40 percent lower than the market price to these private wholesalers and traders (Soejima and Makino, 2018). Fish during this period steadily decreased and the fisheries sector lapsed into dire economic conditions following the economic crashes of 1927 and later of 1930–1931. Therefore, the national government got rid of the privately held monopoly controlling the sector and promoted the creation of the fisheries cooperative association (FCA) to handle fish caught by local fishers. As a result, many wholesale markets in producing areas were opened by FCAs, and many cooperatives sell fish at auction. Much of the income of FCAs comes from sales of fish at their wholesale markets. In 1999, as a result of the declining fish catch the FCAs were in financial trouble. The government took the opportunity to create a policy to reorganize and amalgamate the FCAs to increase their economic leverage. Currently the demographic drive of an ageing society is again posing a challenge for the male-dominated organizations. Despite the importance of the fishing sector to Japanese society the number of fisherfolk have greatly declined as a directly result of the ageing population (Soejima and Makino, 2018).

In Japan women have historically been involved in fishing and hold both reproductive and productive roles. Women have been traditionally involved in pre-processing, preparation and marketing of fish in pre-harvest and post-harvest periods (Soejima and Makino, 2018). For example, women have been involved in fish peddling which involves selling prepared fish with a low value in the market, but the value increased when women not only transported the fish, but also prepared the fish at a time and place of the customer's convenience often communicated by mobile communication. More recently women have created women's fishery entrepreneurship groups to conduct economic activities to increase their economic capital and respond to the financial decline of FCAs. In 2015, 680 women's fishery entrepreneurship groups with 40 102 members greatly contributed to their economic empowerment through an estimated production value of USD 9 385 000 per year (Soejima and Makino, 2018). Generational issues exist within the women's fishery entrepreneurship groups as many young women, who often do not participate or leave the groups, view the groups' activities as merely re-creating women's reproductive roles within fishing society and retaining women chiefly as bearers of a male-dominated culture. These roles include cooking traditional foods, caring for the elderly, promotion of local traditional cooking methods. However, the older generation of women within these groups view involvement as an economic opportunity, as well as an opportunity to increase their political involvement within the FCA.

As of 2013, female employees were estimated to constitute 14 percent of the total fisheries workforce (MAFF, 2013). However, in some areas of the fisheries industry, the majority of the workforce consists of women, for example, in processing facilities. By working with on-land operations, women have been able for generations to generate income and have contributed tremendously to the livelihoods of their families and their coastal communities (MAFF, 2013).

Addressing demographic changes and their impacts

Despite economic success and a broad policy of inclusion, the Asia-Pacific region still struggles to develop greater equality. This will require more inclusive policy and programming to address the impact of demographic transitions as well as to harness the opportunities presented by these transitions. This section presents three approaches at the international, regional and

national levels aimed at addressing demographic transition in fisherfolk and fishing communities to enhance their livelihood security and the interrelated issues of fisheries management and ecosystems conservation.

International approach

In 1997 the FAO held a workshop in India on the "Population characteristics and change in coastal fishing communities" to address the inadequate information available on this topic. Fisheries scientists/socio-economists with experience in demographic and population research on fishing communities (in Bangladesh, India, Malaysia, the Philippines, the United Republic of Tanzania, and Senegal), population experts, representatives of fisherfolk associations and fisheries planning experts and administrators were brought together to present studies of the population characteristics of fishing communities. One objective of the meeting was to guide the design and introduction of special population policies and programmes for fishing communities in support of food security and sustainable exploitation of fisheries resources. Another objective of the workshop was to improve the living standards of coastal fishing communities and enhance their role in the sustainable exploitation of fisheries resources and their contribution to food security at national and global levels. Finally, the workshop aimed to provide recommendations, which included the further institutionalization of population research on fishing communities and the consideration of population research findings in fisheries planning and management. Actions to create a useable framework in which to implement the suggestions of the 1997 FAO workshop were pushed forward for the formulation of a new fisheries framework, which would be inclusive of fisherfolk and fishing communities, and would help to achieve a better understanding of demographic changes.

Since 1997 the FAO and its members have been working together to further the more inclusive framework. As a result of participatory and consultative processes involving representatives of fishing communities, civil society organizations (CSOs), governments, regional organizations and other stakeholders, FAO has brought fisherfolk and their communities into the international dialogue. Most notable, related to the integration of demographics, was the FAO's proposed use of a human rights approach in fisheries through the implementation of a new global governance instrument called the Voluntary Guidelines for Securing Sustainable Small-scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines). The SSF Guidelines importantly call for equitable distribution of fishing rights and raise the importance of inclusion. The SSF Guidelines encourage states to address human welfare and safety along the value chain, the mainstreaming of gender and the recognition of women's roles, and impacts caused by climate change, natural disasters and armed conflict. Ratner, Asgard and Allison (2014) suggested three linked priorities for action: 1) strengthening capacity to document, raise awareness of, and respond to specific incidents of rights abuse; 2) applying a human rights approach to address the roots of vulnerability and exclusion in fishing-dependent communities; and 3) supporting human right advocacy as a driver in fisheries sector reform.

The SSF assessment framework has evolved to unpack the information in the SSF Guidelines in a manner that could support rapid assessments and facilitate consensus. The SSF assessment framework is useful in increasing "awareness of the multisectoral nature of securing sustainable small-scale fisheries and support the development of an integrated portfolio of actions to improve in-country implementation" (Courtney, Pomeroy and Brooks, 2019: 362). Furthermore the assessment framework is composed of eight themes: 1) responsible governance of tenure;

2) sustainable resource management; 3) social development, employment, and decent work; 4) value chains, post-harvest, and trade; 5) gender equality; 6) disaster risks and climate change; 7) policy coherence, institutional coordination, and collaboration; and 8) information, research, and communication (Courtney, Pomeroy and Brooks, 2019: 363).

From these eight themes the following 20 strategies were derived (Courtney, Pomeroy and Brooks, 2019: 363):

1. recognize and protect legitimate tenure rights;
2. grant preferential and equitable access and use;
3. address competing and conflicting resource use;
4. promote responsible fishing practices and policies that ensure sustainable resource use;
5. strengthen the capacity of stakeholders to manage resources sustainably;
6. develop effective monitoring, control, and surveillance systems;
7. develop effective co-management arrangements;
8. improve working conditions and safety for small-scale fisheries workers;
9. develop human resources capacity for small-scale fishers and fishing communities;
10. diversify livelihoods and income-generating activities;
11. ensure access of children and youth in fishing communities to education;
12. build capacity for small-scale fisheries to benefit from market opportunities;
13. improve the value chain for fish and fishery products for domestic and export markets;
14. reform national policies to minimize adverse impacts of domestic and international trade on small-scale fisheries;
15. mainstream gender equality as an integral part of small-scale fisheries development;
16. recognize and address climate change on small-scale fisheries and communities;
17. adopt national policies and laws that support an integrated, holistic, ecosystems-based approach to marine and coastal management;
18. establish mechanisms for institutional coordination and collaboration at international, regional, national and subnational levels;
19. improve knowledge of socio-ecological systems; and
20. improve access to information and data needed for decision-making.

The motivating factor behind the SSF Guidelines was the need to provide a means of addressing the root causes of inequalities that lie in unequal power relations that further marginalize fishing communities. Additionally, there was the need to bring in fisherfolk themselves as equal partners in resource management. The SSF Guidelines do offer a new approach to address social or distributive justice elements – those historically neglected in the sector. As has been stated, "vulnerable people whose human rights are routinely violated don't make effective guardians of fishing rights or environmental stewards" (Ratner, Asgard and Allison, 2014: 125). Bringing human rights into the dialogue, the SSF Guidelines challenge the status quo and are an inclusive and empowering approach to sustainable "human centred" development of all within the fisheries sector (not exclusively small-scale fishers).

Regional approach

Confronted with degrading fishery resources, fisherfolk have to cope with low living standards and poverty. Considering that many fishing communities are outside of any social safety net systems that may exist in other areas of a country, it has become urgent to strengthen community fisheries organizations and build capacity for better development and management of the coastal and inland fishery resources and sustain the livelihoods in fishing-dependent communities. It is very important that appropriate coastal resource management and stable alternative livelihoods be put in place.

Appropriate resource management is an indispensable activity that keeps fishery resource utilization sustainable. Autonomous resource management by community fishers' groups was deemed the most effective and efficient way rather than the top-down management of coastal and inland fisheries by the government. However, community fishers alone can hardly establish and implement community-based resource management (CBRM) without governments' support and initiatives.

ASEAN (Association of Southeast Asian Nations) and the Southeast Asian Fisheries Development Center (SEAFDEC) organized the ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security in the New Millennium "Fish for the People" in November 2001, where the ASEAN-SEAFDEC Ministers adopted the 2001 Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region. In a span of ten years, the ASEAN Member States have made significant strides in the implementation of the 2001 Resolution and Plan of Action, but efforts of the countries have been hampered by a number of emerging issues brought about by the changing environment not only because of climate change but also changes in the requirements for trade of fish and fishery products. Such changing scenarios therefore called for a follow-up Conference, the ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020 "Fish for the People 2020: Adaptation to a Changing Environment".

In 2014, the ASEAN Regional Workshop for Facilitating Community-based Resource Management in Coastal and Inland Fisheries was organized in Phnom Penh, Cambodia. Results from the discussions led to the establishment of a resolution and plan of action:

1) adopt co-management at all levels and with all relevant stakeholders in the process of planning and policy formulation for management, conservation and rehabilitation of habitats and protective geographical features, as well as policy formulation on the use and management of natural and human resources to ensure that climate change responses are integrated into fisheries policy frameworks;
2) strengthen the capacity of fisheries communities and the capability of fisheries-related organizations, NGOs and the private sector to better implement necessary actions towards enabling the communities and local organizations to increase resilience, improve livelihoods, alleviate poverty, adopt alternative livelihoods, adapt to climate change in support of achieving sustainable development, and encourage the participation of women and youth groups in the process;
3) enhance and promote the participation of local communities, fisheries associations and other stakeholders in fisheries management and co-management; in addition, communities should take part in fisheries and stock assessments by providing data, local ecological knowledge, and status of the stocks; and

4) raise awareness of the need to develop financial incentives, especially for small-scale stakeholders and cooperatives, e.g. microcredit, with national and regional institutional assistance for the responsible development of fisheries enterprises and developmental activities that will optimize socio-economic returns and food security.

National approach

Japan

The Japanese Government has recognized that reform is needed to address the ageing population of fisherfolk coupled with the declining fish prices, expensive fuel costs and ageing fishing fleet to boost the fishing sector which is economically and culturally important to the nation (Yagi, n.d.; World Fishing and Aquaculture, 2008). There has been a 30 percent decrease in employment in the Japanese fish sector. Successors are an issue as fishing is seen as an old fashioned occupation. Many young people opt for employment outside the sector as they state fishing is "dangerous, filthy and hard" (World Fishing and Aquaculture, 2008). In Japan fisheries are seen as part of the culture but fishermen do not have a good position in society (World Fishing and Aquaculture, 2008).

The average age of fishermen increases each year because of the continuing reduction in the number of younger fishermen aged from 25 to 39 who leave fishing for land-based employment. In fact, 43 percent of all fishermen in Japan are aged over 65 (MAFF, 2013). Most use pension income to cover revenue shortages from fishing. With new recruits to the fishing industry numbering only about 1 200 a year, the Fisheries Agency is publicizing job information to try and increase recruitment. In addition to coastal communities, young people in urban areas are being targeted and offered a six-month on-the-job training programme (World Fishing and Aquaculture, 2008). Increased women's participation is encouraged, foreign labour sources for fishing fleets and a youth fishmonger programme aimed to revive traditional marketing and trading and encourage interest in the sector have been implemented. In addition, the Japanese Government has enacted the "Basic Law on Fisheries Policies" (2001) that is assisting in modernizing the fishing fleet through a package of measures aimed at restructuring fishing vessel operations and assisting the purchase of energy-saving, labour-saving vessels, which is an attempt to modernize the sector and attract a younger generation of modern fisherfolk (Organisation for Economic Co-operation and Development (OECD), 2008).

Knowledge gaps

Limited, dated and gender-blind information on demographic changes in fisherfolk and fishing communities widen the already deep knowledge gaps. The following knowledge gaps have been identified as a result of the desk study conducted:

1) Information collected, even from the FAO country profiles, is inconsistent and vague. Information provided was disconnected from other demographic information at the national or regional level, which makes it difficult to understand any correlations of the demographic trends. There is a need to understand cause and effect rather than just provide statistics or qualitative data.
2) There are no linkages between demographics and socio-economic indicators. Much of the research accessed could be generalized as disconnected. Research provides

details on specific issues but fails to link demographics to economic, social, cultural and political factors.

3) The lack of disaggregated data promotes an erroneous perception that fishing communities are homogenous, for example, in terms of generational, economic, gender, sex, religious, ethnic differences, which are often not taken into consideration.
4) Sampling sizes are usually small. Where information was available the sampling sizes were extremely small, making it very difficult to assess the impact and drivers of demographic changes on fishing communities at a national or regional level.
5) There are limited linkages between demographics, economics and ecosystems. Understanding of the demographic behaviour in terms of both economic change and changes in ecosystems is extremely limited.
6) Policies are people-blind. Policies addressing demographic changes focus on resources, economics and technologies rather than people or communities and their cultural identity and existence.
7) Research is often gender-blind. Gender analysis and gender-disaggregated data rarely appeared in many of the documents researched. There is a strongly emergent literature focusing on gender and fisherwomen that provides valuable information. However, gender must be mainstreamed throughout all research.
8) Much of the information available is outdated. A large number of reports on "transition and change" related to demographics and fisherfolk was published in the late 1990s and early 2000s, largely supported by FAO. The number of recent publications providing new statistics is limited.
9) Drivers of demographic transition largely focused on the agricultural sector, and there is limited research on the fishing sector.
10) Long-term research, which would help us understand the impact on the demographic transitions, particularly population ageing, in the fishing sector, is limited.

Conclusions and recommendations

The findings from the literature on demographic changes in the fishing sector have exposed the following challenges and opportunities that need to be taken into account in any effort to understand demographic changes and their impacts on fishing communities:

- In the Asia-Pacific region the population has tripled in the last 65 years; however, recently population growth has slowed as a result of lower fertility rates and increased life expectancy. These factors have created a youth bulge and an ageing society, a development issue that is being experienced in the fishing communities.
- Until recently the Asia-Pacific region was a rural based society; however, since 2018 more people in the region live in cities. Urbanization has contributed to labour shortages in the fishing sector. Cities are the engines of economic growth in the Asia-Pacific region and working-age people are drawn to the city to find higher wages and better opportunities, which are often seasonal. A large amount of literature on this topic focuses on the agricultural sector, and greater research on the fishing sector is required.

- There is a decrease in the number of individuals involved in marine and coastal fishing and an increase in the number of those involved in aquaculture.
- Technological advances in the fishing sector are edging out those without access to financial resources and training.
- Gender inequalities exist in the fishing sector.
- Declining labour availability and economic growth is creating opportunities for women, in particular giving them access to economic and political participation in fishing cooperatives.
- Fisherfolk and fishing communities are diverse and they experience demographic change differently.
- Capturing change and the implication of change through the interconnected sectors of environment, economics, and demographics of fisherfolk and fishing communities is challenging as very limited research on the topic has been done.
- Long-term research on the demographic transition and fisherfolk and fishing communities is limited, so understanding adaptive strategies and resilience is difficult.

Fish is a commodity that is globally shared. People are at the centre of the sustainable development of the fisheries sector. However, as the findings in this chapter show, fisherfolk and fishing communities, and their demographic and socio-economic indicators are not considered central in research, policies and programming for the sustainable development of fisheries. Addressing demographic change is essential in managing fisheries, livelihoods diversification, and climate change adaptation.

Gender must be considered at all levels of research, management and formulation of programming and policymaking, among others. It is very necessary to:

- adopt a gender lens as a development framework;
- undertake gender mainstreaming in assessments and methods;
- produce sex-disaggregated data;
- promote women's rights as human rights; and
- recognize women's knowledge, capacities and agency in the sustainable management of fisheries.

Bold steps need to be taken to integrate demographic and socio-economic indicators and a clear gender perspective of fisherfolk and fishing communities into research and the formulation and evaluation of policies and programming in fisheries. Long-term commitment is needed to ensure data collection covers a long period of time in order to have a better understanding of the issues.

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Chapter 3. Study on demographic change in fishing communities in Cambodia and Thailand

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Executive summary

The study focuses on Thailand and Cambodia as case studies of demographic change in fishing communities. Thailand is well-advanced in terms of becoming an ageing society, whereas Cambodia is still a young society. At the same time, Cambodia has experienced large out-migration in recent years. From a policy and planning perspective it is necessary to understand the various drivers of demographic change as well as its impact. The study is based on focus group discussions, key informant interviews and in-depth interviews in fishing communities. In Thailand, the study took place in the coastal area of Klong Yai District, Trat Province. In Cambodia, an inland fishing community in Kampong Svay District in Kampong Chhnang Province as well as a marine fishing community in Srae Ambel District in Koh Kong Province and Tuek Chhou District in Kampot Province were selected.

In both countries, fishing communities have a higher ratio of elderly people. The population ageing process is advancing faster in fishing communities for various reasons. In Thailand, the average age of fishers is on the increase, since the younger generation is leaving fishing to work in urban areas. Labour shortages in fishing communities are filled in by cross-border migrant workers from Cambodia. New rules and regulations to combat illegal, unreported and unregulated (IUU) fishing have made it more difficult for medium-scale and small-scale fishers to comply with all the regulations. Thai fishing communities do not have any strong organizations to negotiate with the state.

In Cambodia, the decrease in fish resources especially in the inland area has made it more difficult for full-time fishers to maintain their traditional livelihood. The young generation has started to migrate to urban areas as well across the border to Thailand and the Republic of Korea. Cambodian fishing communities are organized under community fisheries (CF) to protect their fishing grounds, but their legal rights as well as their institutional strengths are not enough to be effective in protecting their fishery resources.

In all the study areas, in spite of the difficulty they face, fishers have a strong identity as fishers and the old fishers are determined to continue their occupation. However, it is getting difficult

to maintain medium-sized boats in Thailand, and in all the study areas there is a heavier dependence on remittances and non-fishing income. It is often the case that working age children send remittances to support the fishing activities. With respect to non-fishing wage work, in coastal Cambodia it is mainly the daughters who go to work in garment factories and casinos in the area. Lack of labour in all the study areas also means that there are fewer workers for fish processing or any other activities that can add value to fish products. Having fewer young fishers also affects the vibrancy of the fishing communities that in turn affects the possibility of collective action that is important in solving the problems of fishing communities and in negotiating with the state and other stakeholders. The ageing population in fishing communities also means that elderly care is going to be a challenge in the near future. In both Thailand and Cambodia, the government does not have any comprehensive elderly care support, and it is largely left to the elderly themselves and their families to provide support. It is the women and daughters that are expected to meet such responsibilities.

The study recommended the need to: (1) create more participatory and transparent governance on fisheries that is supportive of small-scale fishers in Thailand, and that empowers community fisheries in Cambodia; (2) provide safe migration options as well as strengthen non-fishing occupation options in fishing communities; and (3) introduce comprehensive elderly care support so that older fishers can sustain their livelihoods in fishing communities.

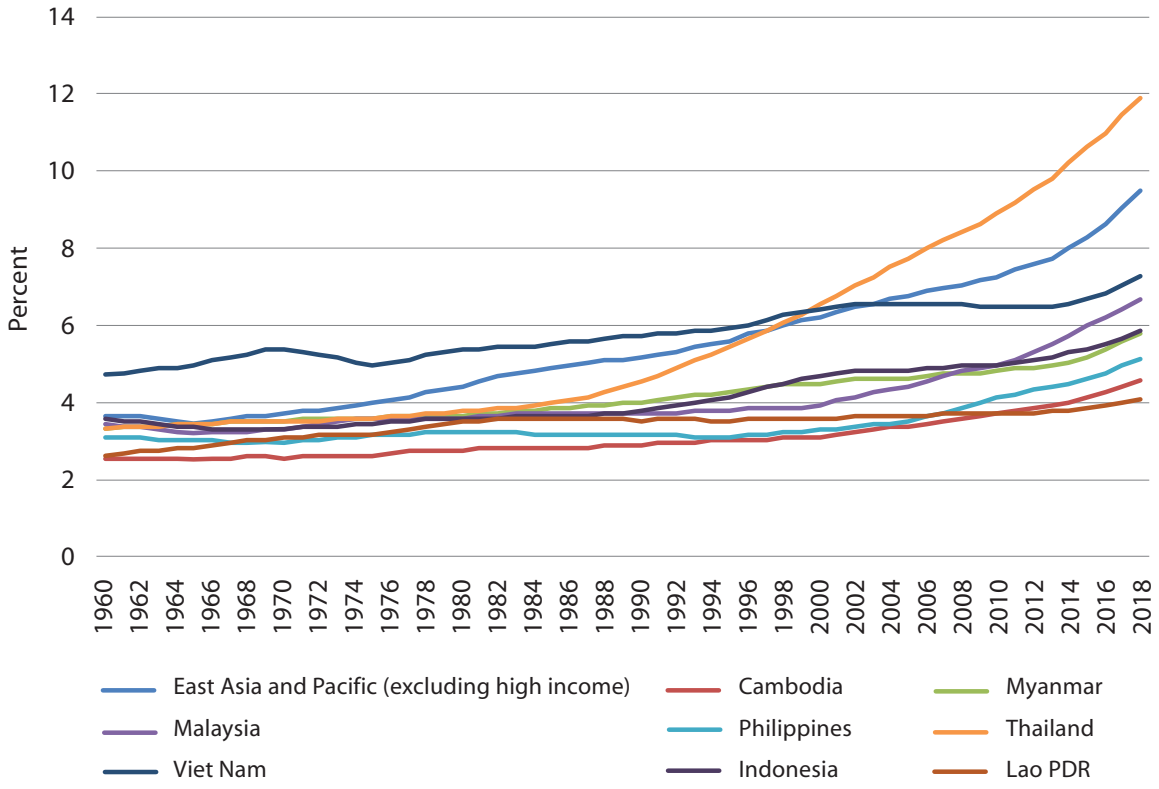
1. Introduction

1.1 Background

In ASEAN Member States, it is projected that by 2035, the percentage of the population over 60 years old will be 21 percent in Brunei Darussalam, 12 percent in Cambodia, 15 percent in Indonesia, nine percent in Lao People's Democratic Republic, 16 percent in Malaysia, 15 percent in Myanmar, 11 percent in the Philippines, 34 percent in Singapore, 30 percent in Thailand, and 20 percent in Viet Nam (Zen, 2017). As can be seen in Figure 1, ASEAN countries are moving towards having ageing societies.

The trend towards an ageing society is higher in rural areas (FAO, 2018) but can be even higher for fishing communities. This is not only because of lower fertility rates, but also because urbanization and a decrease in youths who aspire to a fishing occupation has led to higher ageing population processes (Seki, 2014; Imagawa, 2019). There is a need to understand how fishing communities are changing with such demographic changes.

Studies on fishing communities have often focused on fishery resources as well as property ownership (Martin *et al*., 2007). However, in order to understand the impact of social phenomena and how policy changes affect the community, it is important to capture the fishing communities in a more holistic way (Martin *et al*., 2007; Clay and Olson, 2008; Farr, Stoll and Beitl, 2018; Ratner, Asgard and Allinson, 2014). A decrease in the number of fishers can relieve pressure on fishery resources and governments can introduce policy to limit fishing effort for conservation (Tietze, Groenewold and Marcoux, 2000). However, how might such decrease in the number of fishers affect the fishing community? What leads to demographic change in fishing communities, and what shapes the effect of the demographic change? How demographic change together with policy and environmental changes influence the current and future situation in fishing communities needs to be understood in order to develop appropriate measures to support fishing communities for sustainable livelihoods.



Source of data: World Bank (https://data.worldbank.org/indicator/SP.POP.65UP.TO.ZS) (graph generated by author).

Figure 1. Ratio of population aged 65 and above in selected countries in Asia

The study focuses on Cambodia and Thailand. Thailand is one of the countries in Southeast Asia where there is already a large ageing population (Figure 1). Cambodia is a country that has not yet become an ageing society. Both countries have communities that are heavily dependent on fishing. Through a comparison of these two countries, the study identifies the factors that influence demographic change and their outcomes.

1.2. Objectives of the study

This study looked at demographic change in small-scale fishing communities in Cambodia and Thailand to understand its potential implications for fisheries sustainability, migration patterns, and livelihoods diversification. The study explored the general question: How are fishing communities changing with the demographic change? Specifically the study tried to answer the following questions:

(1) What are the changes in demography (ageing, migration) in the fishing communities?

(2) How are fishers adjusting their livelihoods with the changes in fishery resources as well as labour availability? Are they diversifying to other livelihoods?

(3) What are the consequences of these adaptation strategies? Are there any gender differences in the impact of such adaptation strategies?

(4) What are the challenges faced and policy and programme support needed for fishing communities for sustainable small-scale fisheries?

1.3. Analytical framework

In order to capture the impact of demographic change in fishing communities, it is important to provide a holistic understanding of fishing communities and not only in relation to fish resources. As Clay and Olson (2008) noted, a multi-objective model that reflects the various goals that different people in different fishing communities have is needed to capture the impact of the changes and how people adjust to the changes.

Demographic change can be experienced differently by different communities because of drivers, either from within fisheries or outside fisheries (Figure 2).

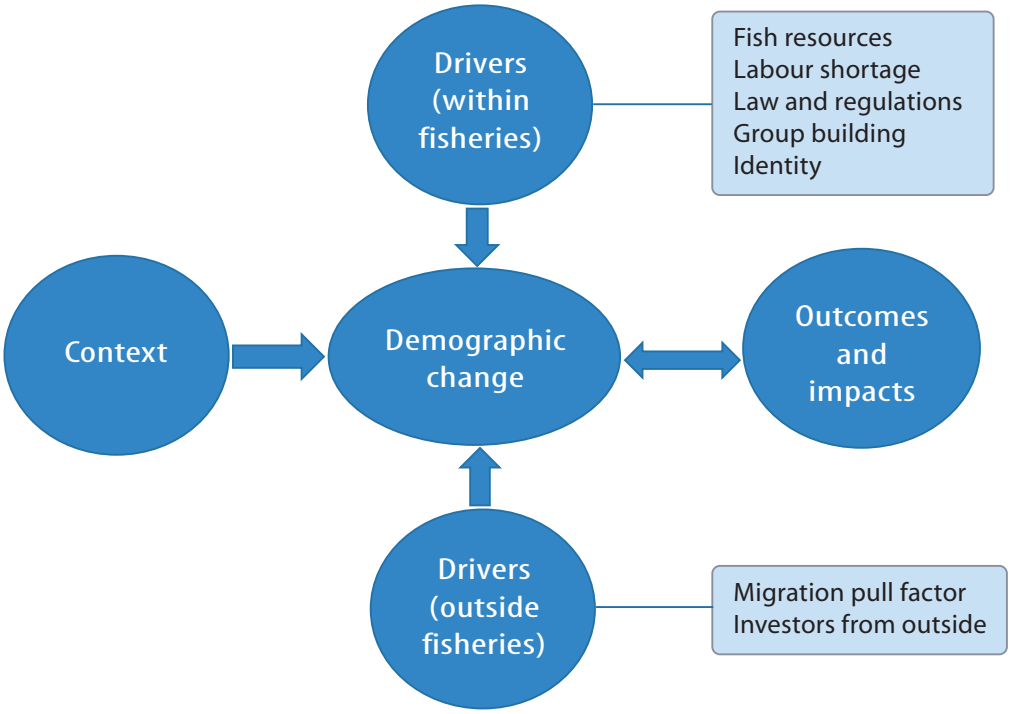


Figure 2. Analytical framework

Drivers within fisheries can come from:

(1) Changes in fisheries resources

Decrease in fish resources can impact income from fishing that can change the number or types of people involved in fishing. Fewer fish resources can lead to fewer people involved in fishing. FAO (2018) demonstrated that a decrease in freshwater levels as well as deterioration of water quality can have a devastating effect on fishing. Seki (2014) noted that the decrease in fish can cause women to play a greater part in fishing activities. Changes in fish harvesting practices can also create a context where those active in fishing can change (Martin *et al.*, 2007), whereas Imagawa (2019) demonstrated how in Japan, a decrease in fishers led to more resources being available per fisher, making it more attractive for people to return to fishing.

(2) Labour shortages

Labour shortages can also shape the way fishing communities experience demographic change (Imagawa, 2019). A decrease in fish resources as well as improved employment opportunities outside fishing can lead to a decrease in the number of fishers. In countries such as Japan, the labour shortage is covered by migrant workers (Sasaki, Miwa and Horiguchi, 2015). Nakamichi (2008) highlighted a case study in Japan on the difficulty of recruiting youths, and on how most fishers are becoming part-time fishers. Seki (2014) demonstrated how women's role has become more important as youths leave the fishing villages. FAO (2018) showed the tendency of people moving to urban areas, which exacerbates the labour shortage in rural areas.

(3) Laws and regulations

As Clay and Olson (2008) noted, the vulnerability of fishing communities cannot be understood without considering the political, social and economic relationships. Farr, Stoll and Beitl (2018) emphasized how different individuals will be affected differently by regulatory measures in fisheries. Noting the recent changes in fishing regulations in Cambodia and Thailand, fishing regulations can have a defining effect in shaping the demographic change in fishing communities.

(4) Group building

Linked to the political and social processes discussed above, group building can create visibility, voices and opportunities for people in fishing communities and can influence the outcome of demographic change. Nakamichi (2008) showed how women played an active role in environmental protection in fishing villages in Japan, and Yokoyama *et al*., (2013) showed cases where a fishing community added value through tourism and direct sales. Such group activities have created opportunities for fishing communities, thus contributing to their sustainability.

(5) Changes in identity

Even with the changes in fish resources, an identity as a fisher encourages individuals to continue their fishing activities. An identity as a fisher is created through commitment to fishing as a way of life (Clay and Olson, 2008) and a sense of cultural connection to fishing (Clay and Olson, 2007). A sense of a being a fisher defines how individuals see themselves as members of fishing communities (Martin *et al*., 2007). Tai (2015) said that fishing is closely related to masculinities, and elder men fishers feel isolation when their advanced age make it difficult to continue fishing, both because of their physical weakness as well as because of the modernization of fisheries.

Drivers outside fisheries can be:

(1) Migration pull factor

Many fishers are able to educate their children, and the higher education of their children can expand their choices of occupation. If there are many employment opportunities outside fishing, there is an incentive for youths to move out of fishing and stay in urban areas. The opposite move can also happen. As Imagawa (2019) noted in the case of Japan, the deterioration of the general labour market pulled youths back to fishing.

(2) Investors from outside

Ratner, Asgard and Allison (2014) maintained that small-scale fishing communities tend to be marginalized in the political process. With wide social inequities and lack of effective representations, it is difficult for fishing communities to claim their own rights to their place and livelihoods. Coastal areas and other waterbodies are contested for industrial as well as tourism use, and fishing communities need to fight against, and negotiate with, external investors. Their marginalization in the political process can deter youths to take up the occupation as well as make it difficult for older generations to continue fishing, hence can shape the demographic changes in fishing communities.

One possible outcome of all these changes might be the feminization of fisheries. However, as FAO (2018) pointed out, there is a pattern where the ratio of women is higher in urban areas than in rural areas in Southeast Asia, whereas it is the opposite for South Asia. Hence in the Southeast Asian context, the feminization of fisheries might not happen. The increase in the average age of fishers and weakening of fishing as a viable livelihoods option can lead to weakening of both women and men in fishing community's say in the coastal land management with decreasing presence of fishers in the community, changes in their identity as fishers, and community cohesion. In-migration might work to activate fishing activities in these villages, but whether or not there is enough support to enable migrants to be integrated into the receiving community needs to be investigated. Remittances from children who migrated out is another source of support for the fishing community, but how the remittances are used can lead to different outcomes.

1.4. Design of the study

In order to understand demographic change in fishing communities and its consequences, the study was conducted in coastal fishing communities in Thailand, and inland and coastal fishing communities in Cambodia.

1.4.1. Selection of study area: Thailand

Criteria for selection of the study were:

- villages where more than half of the villagers are full-time fishers (dependent on fishing for livelihood); and
- villages to be studied must include a variety of villages where: (i) small-scale fishers dominate, (ii) large-scale commercial fishing dominates, (iii) there is a mixture of the two.

Based on this set of criteria as well as the connections that the research team had, Trat Province was selected as a study site. In Trat Province, Klong Yai district was selected, since it is a coastal district. There are three subdistricts in Klong Yai district, and three villages from two of the subdistricts were selected in order to cover the variety of villages as listed above. Table 1 shows the selected villages for study.[3] Klong 1 is a mixture of both small-scale and commercial fishing boats, Klong 2 is a village dominated by small-scale fishers, and Klong 3 is dominated by larger-scale commercial fishing boats.

[3] Names of villages are pseudonyms.

Table 1. Study villages in Klong Yai district, Trat Province, Thailand as of 2019

Name of village	Number of households	Population	Number of women	Number of men
Klong 1	661	2 251	1 132	1 119
Klong 2	298	958	464	494
Klong 3	627	2 011	985	1 026

1.4.2. Selection of study area: Cambodia

Criteria for selection of the study area were:

- villages where more than half of the villagers are full-time fishers (dependent on fishing for livelihood); and
- villages to be studied must include a variety of villages: (i) Tonle Sap Lake, (ii) coastal.

The research team asked advice from the non-government organization (NGO) Fisheries Action Coalition Team (FACT), an NGO that has been working with fishing communities for a long time in Cambodia. FACT suggested some active fishing communities based on the criteria above. Three villages were selected as seen in Table 2. Kampong 1 is in Tonle Sap area, Kampong 2 and Kampong 3 are coastal villages.

Table 2. Study villages in Cambodia as of 2018

Commune	District	Province	Number of households	Number of population
Kampong 1	Kampong Svay	Kampong Chhnang	≈ 1 400	≈ 7 000
Kampong 2	Srae Ambel	Koh Kong	≈ 1 000	≈ 5 000
Kampong 3	Tuek Chhou	Kampot	1 231	5 320

1.4.3. Research methods

In order to have a historical and holistic understanding of the demographic change, the study employed key informant interviews and focus group discussions. It then carried out in-depth interviews to capture the detailed context of how fishers experienced demographic change. Fieldwork was conducted during August to September 2019. The coastal area does not have a clear fishing season, but for inland fisheries in Cambodia, the data collection period was already in the fishing season. However, for 2019, the start of fishing season was late, and at the time of data collection, the fishing season had not yet started.

(1) Key informant interviews

Key informant interviews (Kii) were conducted to understand the historical changes happening in fishing communities in terms of fishing and other livelihoods, community cohesion and gender relations, culture and identity. In total 16 Kii (13 men, 3 women) in Thailand and 30 Kii (23 men, 7 women) in Cambodia were conducted (Table 3).

Table 3. Key informant interviewees

Key informant	Number and sex of informant
Trat province Thailand	
District social worker	Male
Port-in-port-out officer	Male
Small boat owner	Male
Large boat owner	Male
Fish processor	Female
NGO	Two males
Village heads	One in each village (three males)
Subdistrict head	Male
Fish trader (small)	Female
Fish trader (large)	Female
Elderly	One in each village (three males)
Cambodia	
District governor	District governor for Kampong Thom and deputy governor for Kampot provinces (two males)
Commune council member	One for each study province (three males)
Provincial Fishery Administration Cantonment	One for each study province (three males)
NGO worker	One for each study province (three males)
Fish processor	One for each study province (three females)
Fish trader	One female in Kampot, one male in Koh Kong, two males in Kampong Thom
Elder men	One for each study province (three males)
Elder women	One for each study province (three females)
Large boat owner	One for each study province (three males)
Small boat owner	One each in Kampot and Koh Kong (two males)
Community fisheries	Community fisheries president in Kampong Thom (Male)

(3) Focus group discussions

Focus group discussions (FGDs) were conducted to gather information on the changes in the villages from the local people's perspective. One group was comprised of older people, who might be feeling it physically challenging to continue fishing but have been doing fishing their whole life. The other group was comprised of young people who might be considering a variety of livelihood options.

In Cambodia, two FGDs were conducted for each of the three study areas – one with older people and one with younger people. Although the researchers were able to recruit people over 45 years old for the older people's groups it was difficult to find young people below 30 in the villages for the young people's groups, so they were slightly above 30. Each focus group

comprised two men and two women. In Cambodia, a village map and time lines were drawn on a flipchart, and the discussions were recorded.

In Thailand, it was difficult to organize focus group discussions, since not many people were available in the villages when the data collection was conducted. Instead, several older and younger people were interviewed using similar questions used with the FGDs in Cambodia. In Klong 3, two elderly men, one young man, one young woman and two migrant women were interviewed. In Klong 1, two older men, one young man, one young woman and two migrant women were interviewed. In Klong 2, two elderly men, two younger men, one elderly woman were interviewed.

(4) In-depth interviews

In-depth interviews (IDIs) explored the personal history of villagers in the fishing villages. The interviews focused on (i) changes in fishing activities; (ii) how community members are coping; (iii) how they feel about how they have coped; and (iv) their relations with other members of the family as well as with members of the community. Interviews were recorded as much as possible when respondents allowed the team to record. In Thailand, four people (two men and two women) were interviewed in each study village. People above the age of 40 were selected as they could give information about the historical changes in the community. In Cambodia, four people (two women and two men, all above age 40) were interviewed in Kampong Thom, seven (two men below 30, one man above 45, two women below 30, two women above 45) in Kampot, and eight (three men above age 40, one man below age 40, two women above age 40, two women below age 40) in Koh Kong. The number of respondents in each area differed depending on the availability of people for interview.

1.5. Limitations of the study

The focus of the study is demographic changes in fishing communities. Therefore, working conditions of migrant workers, although an important issue in fisheries in Thailand is not the focus in this study and the number of migrant interviewees is limited. The study was conducted in a limited geographical location, and the findings cannot be easily generalized.

2. Demographic change in fishing communities

In the following section, a brief description of the study area is provided. In Thailand, demographic change is seen in the ageing population as well as in the in-migration of cross-border migrant workers. In Cambodia, the country is not yet an ageing society, but the out-migration of youths is creating demographic change in fishing communities.

2.1. Thailand

2.1.1. General description of the study area

Trat Province is in the southeastern part Thailand, bordering Cambodia. The study area, Klong Yai district, is a narrow strip of land between the sea and the border. Trat Province has seven districts and Klong Yai is one of the districts along the coast. Klong Yai district has three subdistricts and 20 villages. Klong Yai was part of a Thai province called Patchan Khiri Khet, which was ceded to France in 1904 (Mekloy, 2019). At that time France ruled Cambodia and Patchan Khiri Khet became part of Cambodia hence there are many people in Klong Yai district,

which was subsequently returned to Thailand, who have relatives in Cambodia. During 1979 to 1986, about 100 000 displaced Cambodians fled across the border to this district to escape the war in Cambodia between the Cambodian government backed by the Vietnamese troops and guerrilla fighters of the Khmer Rouge. Some Cambodians settled in Thailand. Therefore, there are still people in this district who do not have Thai nationality or who only recently received Thai nationality.

According to the village head of Klong 2, many people used to do agriculture, but during the war in Cambodia that also affected the border area of Thailand, their farmland was inflicted with land mines, and they were not able to do agriculture. Most of the people in Klong Yai district depend on fishing as their occupation. Some parts were reclaimed from the sea. Therefore, many of our respondents do not have any land – their houses are not built on land but on stilts on the seashore. Jumnongsong's (2016) study in Trat showed that more than 90 percent of their respondents are involved in fishing as their main occupation. In 2013, there were 587 small-scale fishery (fishing boats no longer than ten metres) households and no medium-large scale fishery households in Klong Yai (Jumnongsong, 2017: 24). According to the port-in-port-out (PIPO) centre in Klong Yai, there are more than 420 large boats[4] and 300 small boats, but large boats come from other areas, and the owners are not resident in Klong Yai. Small boats are not allowed to use electric generators (Klong 1 01, female youth respondent). Klong 2 is said to have about 100 boats. Klong 3 has larger boats than the other two study villages, with 9-ton boats considered as small boats and have an average income of THB 2 000 to THB 3 000 (USD 66.7 to USD 100[5]) per fishing trip (Klong 3 10, woman respondent). Box 1 presents the marine fisheries categories in Thailand.

Klong Yai district had the highest quantity and value of fish landing among all districts in Trat during 2006 to 2011 (Jumnongsong, 2017: 28). Jumnongsong's study showed that the fishing household income was about THB 500 (USD 16.7) for small-scale fishers and THB 3 500

Box 1. Marine fisheries categories in Thailand based on Thailand National Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (Thailand NPOA-IUU) 2015 to 2019

1) Artisanal fisheries mean fishing operations that take place near a shoreline by using small boats without engines and with engines such as inboard and outboard engines (long tail boats). Mostly they use household labour with a small number of traditional fishing gears. It is subsistence fishing where the fish caught will partly be sold in local markets and the remaining used for household consumption.

2) Commercial fisheries mean fisheries using boats with engines and auxiliary fishing gear for increased fishing efficiency. Workers are employed. They operate in fishing grounds in the offshore areas including outside Thai waters. They move to different areas based on season and target species. Fish caught is for domestic consumption and is used as raw material for processing for export.

[4] Small boats are defined as 10 tons (less than 20 tons), medium as 20 tons (less than 60 tons), large as 60 tons (less than 150 tons), extra large as 150 tons up. If the size of engine exceeds 280 horsepower and if they are using trawl net, it is also considered a commercial fishing boat. Commercial boats cannot fish within five miles from the shore, three miles from islands. This regulation was just introduced in 2017 (according to interview with PIPO).

[5] Exchange rate used is USD 1 to THB 30.

(USD 116.7) for large-scale fishers per person per day, and the study concluded that the household incomes are higher than the national poverty line as well as the minimum wage in Thailand.

Up until 2015, fishing in this area enabled the fishers to earn enough to send their children to high school and above. There was no restriction in the fishing area, and fishers were able to fish freely. The catch was good and fishing was considered a good occupation.

In 2015, a yellow card (essentially a formal warning that some aspect of fishing conduct needs to be improved) issued by the European Union (EU) prompted the Thai government to overhaul the fishing industry to address illegal, unreported and unregulated (IUU) fishing (see Box 2 for definition of IUU fishing). A series of regulations have been introduced (see Box 3 for the regulations). This provided more restrictions on the activities of commercial fishers including stricter registration and monitoring responsibilities as well as stricter adherence to foreign

Box 2. Definition of Illegal, Unreported and Unregulated (IUU) fishing

"Illegal fishing refers to activities:

(1) conducted by national or foreign vessels in waters under the jurisdiction of a State, without the permission of that State, or in contravention of its laws and regulations;

(2) conducted by vessels flying the flag of States that are parties to a relevant regional fisheries management organization but operate in contravention of the conservation and management measures adopted by that organization and by which the States are bound, or relevant provisions of the applicable international law; or

(3) in violation of national laws or international obligations, including those undertaken by cooperating States to a relevant regional fisheries management organization.

Unreported fishing refers to fishing activities:

(1) which have not been reported, or have been misreported, to the relevant national authority, in contravention of national laws and regulations; or

(2) undertaken in the area of competence of a relevant regional fisheries management organization which have not been reported or have been misreported, in contravention of the reporting procedures of that organization.

Unregulated fishing refers to fishing activities:

(1) in the area of application of a relevant regional fisheries management organization that are conducted by vessels without nationality, or by those flying the flag of a State not party to that organization, or by a fishing entity, in a manner that is not consistent with or contravenes the conservation and management measures of that organization; or

(2) in areas or for fish stocks in relation to which there are no applicable conservation or management measures and where such fishing activities are conducted in a manner inconsistent with State responsibilities for the conservation of living marine resources under international law."

Source: FAO (2001: 2-3).

Box 3. IUU fishing-related legal and policy changes in Thailand

A yellow card issued by the European Union in 2015 prompted Thailand to take various measures to overhaul the fishing industry to meet international standards. The yellow card was lifted in January 2019 as a result of these efforts. Some of the changes introduced are as follows:

(1) Royal Ordinance on Fisheries has been adopted in November 2015 and revised in June 2017. This introduced regulations such as: (a) heavier fines for hiring undocumented workers; (b) set in place a stricter monitoring, control and surveillance system where fishing vessels need to prepare fishing logbook and report to port-in-port-out (PIPO) centre within a set period of time; (c) coastal zone demarcation where artisanal fishing is allowed in the coastal area and commercial fisheries is allowed only in offshore areas.

(2) Over 100 IUU fishing-related implementing regulations have been adopted to implement the Royal Ordinance of Fisheries (The Royal Thai Government, 2018).

(3) Thailand National Plan of Action to Prevent, Deter and Eliminate IUU Fishing 2015 to 2019 introduced Thailand's fisheries policy change from open access to limited access fisheries according to maximum sustainable yield (MSY).

(4) Issuance of vessel registration was suspended for two years in accordance with the Royal Ordinance amending the Thai Vessels Act of B.C. 2482 (1938) B.E. 2561 (2018). This is to ensure that the registration database is in accordance with existing vessels. The Marine Department also issued regulations requesting all vessels of size 60 gross tonnes and above to be equipped with an automatic identification (AIS) system.

(The Royal Thai Government, 2018).

worker registration.[6] They used to fish freely across the border, but now are monitored more strictly. Small artisanal fishers are less affected except for the restriction to fish only in the coastal area and not offshore.[7]

2.1.2. Ageing trend in study area

Thailand in general is moving towards an ageing society, and Trat Province has a slightly higher ratio of population above age 60 compared to the Kingdom as a whole (Table 4).

Klong Yai subdistrict (where Klong 1 village and Klong 2 villages are located) has an even higher ratio of population above 60 than the Trat Province average. According to the district database, 21.9 percent (1 453 people) among all Thai nationals in the subdistrict is aged 60 and above. In contrast, Hatlek subdistrict (where Klong 3 village is located) has a lower ageing population rate with 12.6 percent (625 people) who are aged 60 and above. However, in general, there is an increasing trend in the ratio of population aged 60 and above.

[6] Commercial fishing boat operators have staged a sit-in to demand easing of the fishing restrictions and address labour shortage (Bangkok Post, December 18, 2019: 2).

[7] The definition of offshore area depends on the location. In the study area, it is set as three miles. Not only the area that they can fish, but also what they can catch has been regulated with the new regulations.

Table 4. Number of population and percentage of population aged 60 and above, 2009–2018 in Thailand (thousands)

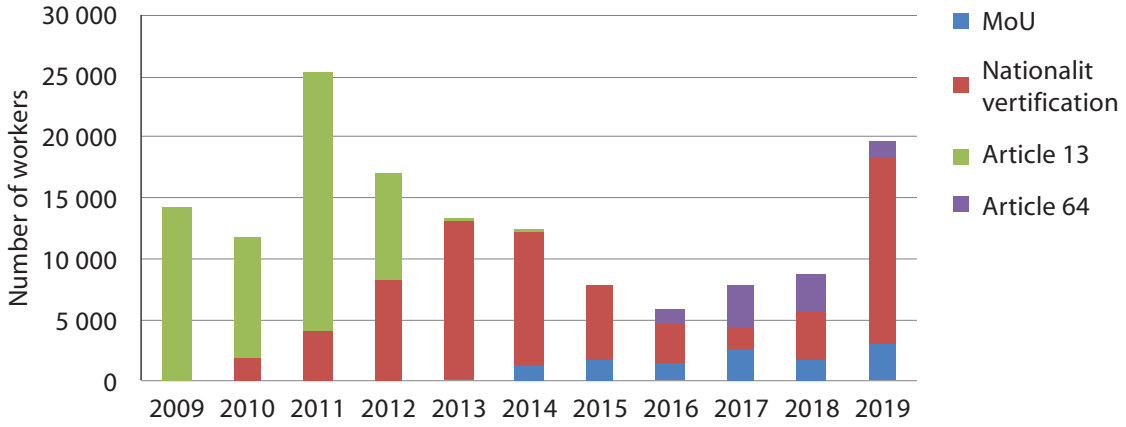
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Whole Kingdom	No.	63 525	63 878	64 076	64 457	64 786	65 125	65 729	65 932	66 189	66 414
	%	11.3	11.7	12.2	12.7	13.5	14.0	14.4	14.9	15.5	16.1
Trat Province	No.	220	221	222	223	224	225	229	229	230	230
	%	11.7	12.2	12.6	13.1	13.9	14.4	14.7	15.2	15.7	16.4

Source: National Statistical Office, Thailand (http://statbbi.nso.go.th/staticreport/page/sector/en/01.aspx)
%: Percentage of population aged 60 and above.

2.1.3. Migrant workers in the study area

Owners of small artisanal boats do not hire helpers, but owners of commercial fishing boats in the study area hire two to five workers. Previously, they used to hire other people in the same village. However, in the last ten years or so it has become more and more difficult to find local workers since young people go to urban areas to work and fishing is considered a dangerous and strenuous occupation. Thus, owners of commercial fishing boats started to depend on migrant workers from Cambodia. Respondents say that to hire migrant workers they need to pay much higher wages than the minimum wage in Trat Province (THB 320 or USD 10.7 per day) and normally pay about THB 600 to THB 1 000 (USD 20 to USD 33.3) per day.[8]

Migrant workers have been hired to make up for the lack of workers in the area. Although Figure 3 shows a decreasing trend since 2011 and an increase in 2018, this does not reflect the reality. The number of workers continued to be high until about two years ago when the regulations to combat IUU fishing started to take effect. In 2019, the number of migrants increased as a result of the registration regulation becoming much stricter thus forcing



Source of data: Department of Employment website (http://lib.doe.go.th/frmNavstatdoc#) (graph generated by author).

Figure 3. Number of registered migrant workers in Trat Province

[8] Studies such as ILO (2018) identified that migrant workers working in fisheries sectors experience labour rights abuses (63 percent of men respondents) and are paid less than the minimum wage (34 percent of total respondents). This present study was conducted in a location on the Thai–Cambodian border that was not included in the ILO study. Many villagers in Trat are also originally from Cambodia. The Thai government has introduced Article 64 that provides a different registration system for migrant workers from other parts of the country (Box 4).

previously undocumented migrants to get registered; there is no sign of an increased influx of migrants. Interviewees have opined that the number of migrants increased since about 2005 and was at its peak about 2014. The number of migrants decreased about four or five years ago (Klong 1 01, female youth).

The explanation of categories of registered migrants are shown in Box 4.

Box 4. Categories of registered migrant workers from neighbouring countries

MoU:

Memoranda of Understanding (MoU) between Thailand and neighbouring countries of Cambodia, the Lao People's Democratic Republic, Myanmar and Viet Nam provide a fully legal channel to access job opportunities in Thailand.

National verification (NV) process:

Allows undocumented migrants to regularize their status without having to return to their countries of origin. The migrants can register for identification card at One-Stop Service Centres to start the nationality verification process.

Article 13:

This is a special arrangement introduced to regularize workers from neighbouring countries. Registration under article 13 has been replaced by nationality verification.

Article 64:

This is a special arrangement for border provinces. Residents of the border areas are able to work across the border with a border pass without having to go through nationality verification, although they need to renew the work permit more often than NV.

2.2. Cambodia

2.2.1. General description of the study area

Cambodia has four large ecological zones for fishing – the coast, Tonle Sap Lake, Tonle Sap flooded plain, and the Mekong River. According to the Agriculture Census 2013 (National Institute of Statistics, 2015), in 2012-2013, only 9.7 percent of rural households (50 963 households) were full-time fishers, 76 percent of rural households are fishing in combination with agriculture, and only eight percent are doing so for sale. Rural households eat fish about five days a week, and about 80 percent of rural households eat fish caught by themselves (Mousset *et al*., 2016). Fish provides 68.6 percent of the total animal protein intake for Cambodian households (Kurien, 2017). The commune database of the study provinces showed that in 2013, 4.7 percent of villages in Kampong Thom Province, 10 percent in Kampot and 66.4 percent in Koh Kong reported fishing as one of their household economic activities (Provincial Department of Planning of Kampot, 2019; Provincial Department of Planning, Koh Kong, 2019; Provincial Department of Planning, Kampong Thom, 2019).

Community fisheries were introduced in 2005, and provided rights to fishers along the fishing area to manage, conserve and protect fishing resources (see Box 5 for definition of community fisheries). Since French colonial times, fishing lots have been given to large concession owners, but in 2012, these were abolished and small-scale fishers are now free to fish anywhere in the waterbody. Family-sized fishing gears, which most of the small-scale fishers use, can be used all year round.[9]

Box 5. Community fisheries (CF)

The Sub-decree on community fisheries management of the Royal Government of Cambodia signed 10 June 2005 defined community fisheries as

> "a group of physical persons holding Khmer citizenship who live in or near the fishing area, voluntarily established and taking the initiative to improve their own standard of living by using and processing fisheries resources sustainably to contribute to economic and social improvement and poverty alleviation." (Sub-decree on community fisheries, chapter 2, article 6).

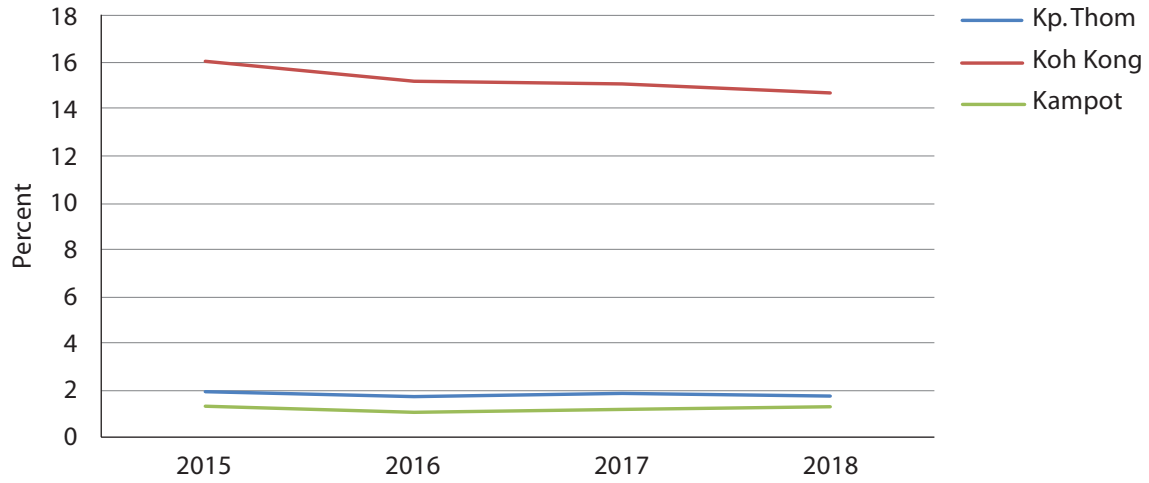
There are 516 community fisheries registered in 2018 – 477 for inland and 39 for marine fisheries (Lieng, Yagi and Ishihar, 2018).

However, respondents in Tonle Sap said that the fish catch has decreased since the fishing lots have been abolished. Respondents blamed the decrease in fish catch to the increase in fishers as well as illegal fishing.[10]

The difficulty in fishing led to a slight decrease in fishers especially in Koh Kong (see Figure 4), and in the number of boats especially in Kampong Thom (see Figure 5).

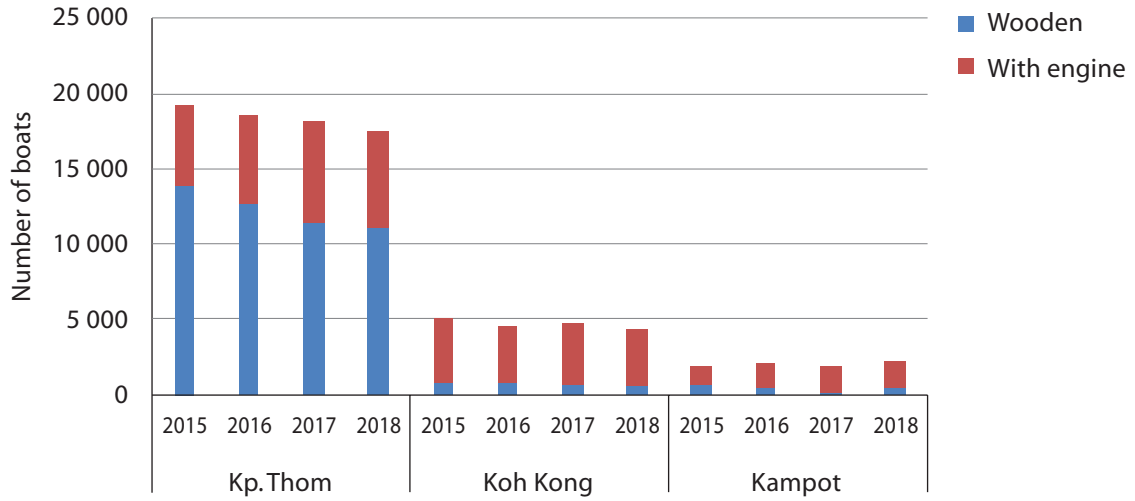
[9] Small-scale (family-sized) fisheries use gear including: gill nets, cast nets, oblong traps, drum traps, slit traps, scooping baskets, folded cone traps, vertical vase traps and hooked longlines (Kurien, 2017: 56). Small-scale fishers do not need any license. Only these gears are permitted in community fisheries. Small-scale fishers can fish all year round, whereas a closed season applies (1 June to 30 September or 31 October depending on the location) for medium-scale fishers.

[10] The following gears are prohibited according to the Law on Fisheries Article 20: (1) Electrocuting devices, explosives or all kinds of poisons; (2) all means of pumping, bailing, drying any part of the fishery domain, which causes destruction of the fishery resources; (3) brush parks (known as *samras* in Cambodia) or other devices to attract fish and other aquatic animals; (4) spear fishing gears, *chhbok, sang, snor* with projected lamp; (5) fixed net or all kinds of boa nets; (6) net or all kinds of seine with mesh size of less than 1.5 centimetres in the inland fishery domain; (7) all kinds of net with mesh size bigger than 15 centimetres in the inland fishery domain; (8) pair trawler or encircling net with attractive illuminated lamp for fish concentration; (9) fishing gears made of mosquito net in inland fisheries; (10) all kinds of trawling in the freshwater, and mechanized push net; (11) all kinds of bamboo fence with mesh size of less than 1.5 centimetres; (12) all kinds of transversal string and any measure which causes fish to escape; (13) dam with all kinds of fishing gears; (14) all kinds of modern fishing gears, newly invented fishing gears or fishing practices leading to the destruction of fish, fishery resources and fishery ecosystem, or which are not listed in the proclamation of the Ministry of Agriculture, Forestry and Fisheries.



Source of data: Provincial Department of Planning (2018, 2019) for Kampong Thom, Koh Kong and Kampot (graph generated by author).

Figure 4. Ratio of households whose primary job is fishing by year (2015–2018)



Source of data: Provincial Department of Planning (2018, 2019) for Kampong Thom, Koh Kong and Kampot (graph generated by author).

Figure 5. Number of boats by province and year (2015–2018)

The following sections describe the study districts.

Kampong 1, Kampong Svay District, Kampong Thom Province

According to the Agriculture Census 2013 (National Institute of Statistics, 2015), 41.3 percent of agriculture households are engaged in fishing in Kampong Thom.[11] The village head of Kampong 1 mentioned that in Kampong 1 village, 30 percent of villagers have paddy land and 70 percent are fishers. Their landholdings are small. In the late 1980s to early 1990s, the villagers were provided with private landholdings but it comprised dense forestland, which was not possible to develop without the help of machinery. The villagers could not afford the machinery

[11] It is 45 916 households among the 111 227 agriculture households in Kampong Thom Province.

so they sold their land at a low price to outsiders (Kampong 1, fish trader, man 56 years old). The villagers now need to rent land in order to do dry season rice farming.[12] A microfinance institution (MFI) came to the village and started to lend money in 2000. Previously, villagers bought fishing nets only whenever they had money but MFI has made it possible for them to buy nets anytime. However, this led villagers to be indebted and according to the village head, about one-third of borrowers have difficulty in making repayments. This village is much poorer compared to the other two in this study. The commune data shows that the percentage of poor households (as defined by IDPoor – the national poverty identification system) in the Kampong Svay district is 11.4 percent, which is the highest in the province (Tuek Chhou district in Kampot is only 4.2 percent and Srae Ambel district in Koh Kong is 4.0 percent).

The community fisheries in this village were established in 2016. There are about 300 members. Respondents said that until about 2008, there were many fish. However, since about 2015/16, the fish catch has decreased. Villagers stated that one of the reasons was a big fire in 2016 that destroyed hundreds of hectares of flooded forest.[13] Another reason is fishers using illegal gears. In this area, there are both medium-scale and small-scale fishers. Small-scale fishers can fish anytime of the year, but medium-scale fishers can fish only during the open season, which is from October till the end of May. They use 100 metre drag nets and can catch 60 kg to 70 kg. This is in contrast to using gill nets, with which they can catch only about 3 kg. Medium-scale fishers hire workers at KHR[14] 25 000 (USD 6.25) per day, which is the same rate as construction work.

Kampong 2, Srae Ambel district, Koh Kong Province

According to the Agriculture Census 2013 (National Institute of Statistics, 2015), 77.1 percent of agriculture households are engaged in fishing in Koh Kong Province.[15] The villagers in this area were doing shifting cultivation before, but in 2002, the state turned their land into economic land concessions to give to private investors. Land available for upland farming became limited, so the villagers sold the rest of the land and started to focus only on fishing. Previously, villagers did not have cash and used small wooden boats. After they sold their land they had cash in hand, which they invested in fishing and bought better boats. MFI staff started to come and convinced villagers to borrow money to buy gears.[16] Now when fishers face problems of poor fish catches, they become indebted and cannot pay back their loans.

In this village, about 90 percent of the villagers are full-time fishers. In the early 2000s, there were large boats that came nearshore to fish, and destroyed the nets of the villagers. The villagers fought with these large boats and sometimes it became violent to the extent that some fishers died during the conflict. The destruction of their nets left the fishers further indebted and not able to repay the loans that they took out to buy the gears. In order to collectively fight against the large boats, in 2003, they organized themselves to establish community fisheries (CF).

[12] This is a flooded area, so it is not possible to plant rice during the wet season, and they produce rice only once a year during the dry season.
[13] Interview with Kampong Thom Provincial Fisheries Administration.
[14] Cambodian riel.
[15] This comprises 6 278 households among the 8 143 agriculture households in Koh Kong Province.
[16] Interview with Koh Kong Provincial Fisheries Administration.

There are 431 CF members. With the decrease in fish resources near the shore, large boats seldom come nearshore, but still there are fishers using illegal gears, and CF is active in patrolling. They are also active in establishing eco-tourism in the village. There are factories and casinos established in the province, and many youths go to work in these establishments. Thus, they have multiple income sources.

Kampong 3, Tuek Chhou District, Kampot Province

According to the agriculture census 2013 (National Institute of Statistics, 2015), 46.9 percent of agriculture households are engaged in fishing in Kampot Province.[17] In this area, larger boats are three metres wide and 12 metres to 17 metres long and small boats are 1.2 metres wide and 5 metres long.[18] Not many people have boats and those without boats work as crew members for others. Boat workers do not receive payment in daily wages, but in the form of a share of the catch. If there is a boat owner and a crew member on the boat, the net income will be divided into four – the boat owner gets three shares and crew member gets one share. If there are two crew members, then, the boat owner gets two shares and each crew member gets one share. Fishers who do not have boats use push nets (*chup*) and can earn KHR 20 000 to KHR 40 000 (USD 5 to USD 10) per day, whereas those using gill nets can earn KHR 100 000 (USD 25). Those with boats can catch shrimps, crabs and squid and earn KHR 300 000 to KHR 700 000 (USD 75 to USD 175) per trip.

By 2005, the fishers started to feel the deterioration in fish resources, with mangroves being cut both by villagers themselves and by outsiders as well as with increase in fishers using illegal gear.[19] The fishers established their CF in 2009 and started to plant mangrove trees. By 2019, 700 ha of mangroves have already been planted. The CF started their own eco-tourism activity to supplement the fishing income as well as to raise awareness of the importance of coastal resources.

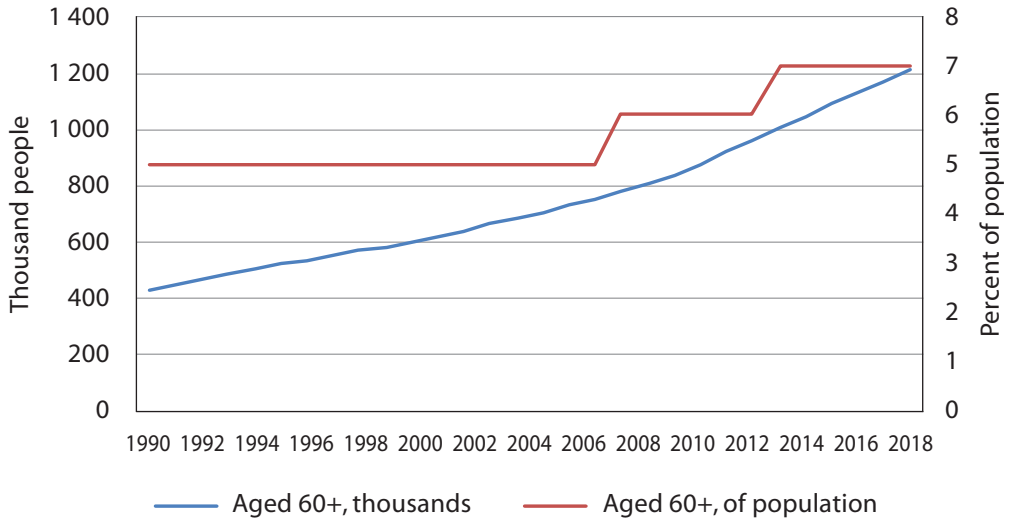
At the same time, the CF had to fight with outside investors who come to buy land for development. A nearby village in the same district had their fishing area reclaimed by outside investors, and fishers in that village lost their fishing ground. As a result, they moved into Kampong 3 village for fishing.[20] Small boat owners in Kampong 3 said that before the fishing grounds were reclaimed, they could get 70 kg to 80 kg of fish in two to three hours. After the reclamation, they cannot fish anymore. Fishers also encountered conflicts with large boats that overfish and destroy their gears. In 2016/17, there were serious clashes, and some people died as a result.[21]

Although there are multiple threats to fishing, many villagers are constructing large concrete houses. Such construction started about 2015/16. The money for construction came from selling their agriculture land, and not from fishing. There are many outsiders who offer to buy their land.

[17] This is 52 735 among the 112 382 agriculture households in Kampot Province.
[18] According to the interview with Commune Council members.
[19] According to FGD with people above 45 years old.
[20] According to FGD with people above 45 years old.
[21] According to FGD with people above 45 years old.

2.2.2. Ageing in Cambodia

Cambodia still has a relatively young population. Of the population of 16 487 000 in 2019, seven percent is aged 60 and above.[22] As can be seen in Figure 6, the percentage of elderly population has not increased much in the last few decades. The old age support ratio (ratio of working age persons aged 15 to 64 per older person aged 65+) is on the decrease – it was 18 in 2000 whereas it is 13.6 in 2019 (UNESCAP, 2020).



Source of data: UNESCAP Statistics Division (http://data.unescap.org/escap_stat/#data/10) (graph generated by author).

Figure 6. Percentage of population age 60 and above by year for Cambodia

The study villages have a higher elderly ratio than the national average. In 2020, seven percent of the population is above age 60.[23] As can be seen in Table 5, in all the study districts, the ratio of population aged 65 and above is higher than the national average. What is worrisome is the number of people aged 61 and above who do not have a place to live. It is noted in Table 5 that there is higher ratio of vulnerable people among the elderly compared with the total population.

[22] Source: UNESCAP data https://dataexplorer.unescap.org/vis?dataquery=KHM.CHILD_ELDER_POP..&period=1970%2C2020&frequency=A&locale=en&facet=datasource_id&constraints[0]=datasource_id%2CChild%2Fyouth%2Felderly%20population%23CHILD_ELDER_POP%23&start=0&dataflow[datasourceId]=ESCAP_KEYS&dataflow[dataflowId]=DF_ESCAP_THEME_Dataflow&dataflow[agencyId]=ESCAP&dataflow[version]=1.0&filter=REF_AREA.

[23] Source: ibid.

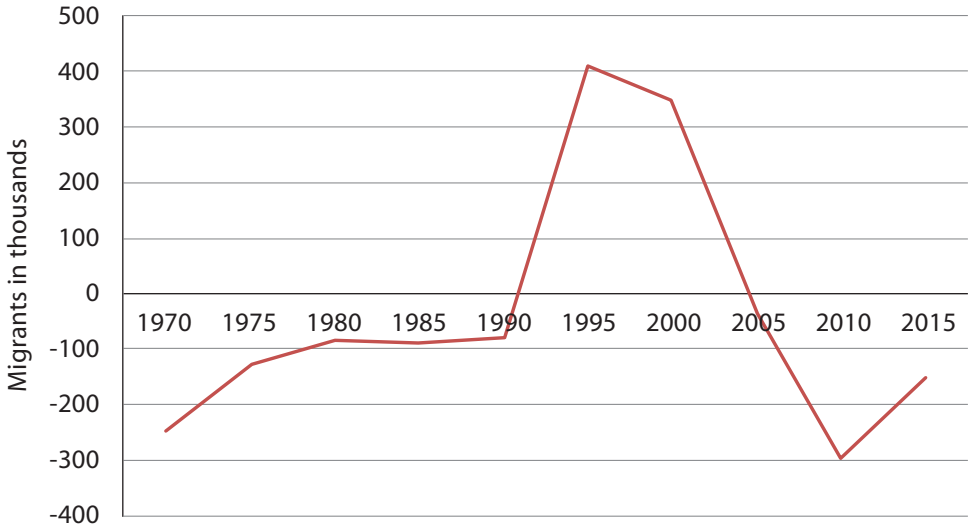
Table 5. Data from Commune Database for the study districts in Cambodia in 2019

	Kampong Svay District, Kampong Thom Province	Tuek Chhou District, Kampot Province	Srae Ambel District, Koh Kong Province
Percentage of people aged 61 and above	9.5%	9.3%	7.8%
Number of people aged 61 and above who do not have place to live (in thousands)	10.6	11.4	17.3
Vulnerable people (orphan, disabled, elderly without home, homeless) (in thousands)	10.6	8.6	2.2

Source of data: Provincial Department of Planning (2019) for Kampong Thom, Kampot, Koh Kong.

2.2.3. Migration in Cambodia

In 2015, the net migration rate[24] was minus 2.01 and the net number of migrants was minus 15 000 people.[25] Figure 7 shows the changes in migration trend in Cambodia. During the civil war, there was a larger out-migration than in-migration, because of people fleeing the war. In the 1990s, many refugees came back home and this contributed to the higher in-migration figure. However, in the 2000s Cambodians started going outside the country as migrant workers.



Source: UN Department of Economic and Social Affairs, 2019.

Figure 7. Net number of migrants in Cambodia

[24] Number of immigrants minus the number of emigrants for a particular period per 1 000 persons.
[25] https://knoema.com/atlas/Cambodia/topics/Demographics/Population/Net-migration-rate

A similar trend is seen in the study areas. There has been high out-migration in all the study areas until about the mid-2000s. However, later, in the coastal area, factories started to be established inside the province and youths were able to find employment at home, hence the rate of migration decreased. This was not the case for inland areas such as in Kampong Thom Province. As can be seen in Table 6, there is higher out-migration in Kampong Svay district, Kampong Thom Province compared to the other two coastal districts.

Table 6. Migration in the study districts in Cambodia in 2019

	Kampong Svay District, Kampong Thom Province	Tuek Chhou District, Kampot Province	Srae Ambel District, Koh Kong Province
Inside country migration	17%	8.4%	8.7%
Outside country migration	7%	2.1%	1.8%

Source of data: Provincial department of Planning for Kampong Thom, Kampot, Koh Kong, 2019.

3. Drivers of demographic change

As seen in the previous section, in Thailand young people are not taking up fishing as an occupation and the number of fishers is decreasing. Communities are becoming ageing communities. In Cambodia, such ageing is not yet seen as young people still remain in fishing. However, with increased opportunities for other employment both within the country and abroad, youths are leaving the fishing communities. This section analyses the drivers of such demographic changes. The decrease in fish resources could lead to fishers exiting the fisheries. There is a transition towards a decrease in the number of fishers, and the process of transition, as well as the direction towards which the changes happen, could be shaped by various drivers. As discussed in the analytical framework, the drivers are discussed within the context of fisheries and outside fisheries.

3.1. Drivers within fisheries

3.1.1. Decrease in fish resources

In both Thailand and Cambodia, fishers have experienced a decrease in fish resources but to a different degree. The decrease in fish resources has made fishing less attractive as a full-time occupation.

Thailand

In the case of Thailand, fishers complained of the limitation in fishing area and the fact that small-scale fishers were able to go fishing only within three miles from shore. Respondents say that the catch has decreased to one-third or one-fifth of what they used to get when fishing was good.

> I worked on a large trawler boat for ten years. I did not have the money to go fishing myself. I got my own boat four or five years ago. Ever since I got my own boat, I have been a full-time fisher. Currently the catch is decreasing. I caught fewer fish than before. In a day, I get about 20 kg at most. In the old days, four or five years ago, I was able to

> catch about 100 kg of fish. I also got approximately 1 000 kg of anchovy fish. I think the reason for the decline in fish is that there are more small boats. Also, I think the population is increasing and the limited area for fishing might cause a decrease in the fish catch. (Klong 1 03, elderly man).

> Back then when we laid the cages at night, we would get about 2 000 baht. Now we have to lay the cages for five days to get 2 000 baht! … You have to understand that [at that time] there were no machines, no modern tools, the employee and the boss was the same person – and he pulled the net by hand. Sometimes, you have to understand, the hand is inflamed and cracked all over – uh! Imagine back then, we have a net with 1 000 units. It (fish catch) is good, so we keep increasing, we have a pile of money, and can buy another boat… (Klong 2 03, man).

Pollution was also blamed for the decrease in the fish catch.

> Before there were shrimp farmers the water was clean. Now, with shrimp farms, they release wastewater and all the fish die. This is a problem for our community. (Klong 2 02, man).

Debt has been a persistent problem and it is getting worse because of the low fish catch as well as increased expenses to support their children's education. It is interesting to note that women more than men felt that indebtedness is a problem. Men were more concerned about the decrease in the fish catch. During the interview in Klong 2, a husband and wife talked about the largest problems they face. Whereas the husband (02) emphasized the difficulty in fishing, the wife said:

> The net is torn and we have no money to buy a new one. We are getting old …. We have to be indebted to the moneylenders now. We have to borrow money for children …. We have to find a way to pay back the debt …. Before, there is more happiness because the children were small and we did not need to be indebted. If there is a storm and a strong wind, we cannot go out [fishing], it is bad. Because we still have debt, and I do not know what to do. I feel defeated, I do not want to work … defeated. I really feel defeated. I feel bored, bored and I do not know what to do because it is up to this point already. (Klong 2 03, woman).

Cambodia

In the case of Cambodia, the decrease in fish resources was considered to be one of the strongest reasons why fishing is not an attractive occupation any longer, even though the price of fish has increased. The decrease is much steeper than in Thailand – respondents said that the catch dropped to one-tenth of what they used to get.

> Now I can catch only four kg or five kg in one trip whereas before I could catch 50 kg or 60 kg. Before, I could catch crab and shrimp. It started to be difficult about 20 years ago. People outside are coming in and destroying the resources. There are many trawlers, and I cannot sleep because of so much noise. (Kampong 2, elderly man).

Respondents in Kampong 1 in Tonle Sap area said that there were more fish when there were fishing lots because these private lots protected the resources. So, even though their fishing grounds were restricted, the available fish resources were more abundant than now. The

respondents blamed the use of illegal fishing gears for the decrease in fish resources. The increase in the number of fishers is also considered to be part of the reason. A respondent in Kampong 1 blamed the decrease on the disappearance of the flooded forest:

> There was a reduction of fish since the forest was cut in 2005. Since the flooded forest decreased, fish also decreased. The forest is not yet gone, but most parts were cut. Fish and wildlife are also gradually going. In the past two years, fish is almost gone …. Fish is gone because there is no forest for breeding. (Kampong 1, village head).

A decrease in fish resources works to discourage new entrants to fishing as an occupation. The older fishers continue to fish. Youths who would like to continue fishing, find it difficult to support themselves with this occupation, thus leading to an ageing fishers population. This is especially the case in Kampong 1. For the coastal villages, they feel the decrease in resources but fishing still provides a better income than manual labour such as construction.

3.1.2. Labour shortage

Thailand

A labour shortage is felt more in Thailand than in Cambodia. In the study area in Thailand, many youths are not fishing anymore. Many are educated and they work in urban areas in offices and factories. With younger people not available to work in fisheries, there is a need to hire migrant workers. Klong Yai district fishers have been hiring migrants for a long time. In the 1980s, there were migrants from northeast Thailand that came to work as fish workers. Later, no Thais wanted to work as fisheries workers, and the villagers started to hire Cambodian workers who crossed the border to work. Cambodian migrants started to come in large numbers from about 2005. Small boats do not need to hire workers, but medium-sized boats need to hire a few workers per boat.

> In this community, Cambodian migrant workers have been employed for such a long time, since about 30 years ago. The majority of migrant workers would come to work as crews in large fishing boats. Some fishing boats have a Thai captain and the rest are Cambodian migrant workers. In the past, about ten years ago, Thai workers were employed as crew members. Later on, there were no Thai people wanting to work in fishing anymore. We have to fill this shortage of labour with migrant workers. It is quite difficult for Thai fishermen to avoid depending on migrant workers. (Klong 3, elderly men).

There are many migrant workers not only in fishing boats, but also in fish processing factories. The migrant worker respondent below works in a factory with 200 to 300 workers.

> 90 percent of workers are Cambodian workers. Most Thai workers are supervisors. There are more women working in the descaling section because it does not need that much physical power. Men work in the transporting section because it needs strength to carry fish baskets. (Klong 1 06, migrant woman).

The influx of migrant workers has changed the village's population composition. Many Thais left the community, and many Cambodians came in. The respondent below mocked the situation where hardly any Thais remain in the community:

> In the past, there were only a few migrant workers. But now more are coming and have settled down here …. There are rarely any Thai people here – only old people. Twenty years ago, Thai people in the community left to work in neighbouring countries. So now those who remain are the Thai "residue". (Klong 2 05, man).

Initially, it was easy to hire Cambodian workers since the immigration regulations were not strict. However, since about 2014, the immigration regulations have become stricter and it is more difficult to hire Cambodian workers. Cambodia has also developed its own industries, and there are more workplaces and opportunities inside Cambodia than before. A Special Economic Zone has been established on the Cambodian side of the border with Thailand, and there are many factories there where Cambodian workers can find employment. Because it is difficult to get workers to work in fisheries, wages for fishing workers are much higher than the minimum wage. Many migrant workers returned home, and there are now fewer migrant workers in the villages.

> Thailand continues to rely on migrant workers. But the important thing is that the shortage of migrant workers coming to work in the fishery is getting more and more severe every day. Although the employers offer a much higher wage than the standard minimum wage, it is difficult to get workers. In fishing jobs, it is common for the average wage for migrant workers to be THB 700 to THB 1 000 per day. The working hours are from 8 a.m. to 4 p.m. But most employers still face a consistent shortage of workers. Another factor is the opening of special economic zones in Koh Kong, Cambodia. Many factories have moved their production bases to Koh Kong, which means that there is a high demand for local workers. For these reasons, most migrant workers have decided to return home and work there. (Klong 3, elderly man).

Migrant workers themselves feel that it is getting less attractive to stay and work in Thailand, and they find that there are more employment opportunities back home.

> I feel I am wasting time when I renew my [border pass] card, because I have to travel to Hat Lek district [at the Cambodian border], which is far and I also have to wait in line. There are new factories in Cambodia and many people decided to go back to work there. There are more and more laws and documents that need to be completed to work in Thailand, and these can be some of the reasons why Cambodians are going back to Cambodia. (Klong 3 05, migrant woman).

Cambodian workers used to rent rooms in the village and shopped in the villages. Local people were doing good business with many Cambodian workers buying from their shops. One shop owner said that Cambodian workers will buy soap and food for about THB 300 (USD 10) per person to prepare to go on a boat. Thanks to them, she was able to expand her shop. Many respondents said that they would rather have more Cambodians for the sake of the village's economy. Without them, the village is quiet.

> Now, not even the Khmer people are staying. Are there any? Before they came to work. When the place was booming, work and life were easy, so they moved to our country. Now there is nothing for them to do. They go to the city, they go back to their country. (Klong 1 07, elderly woman).

Once the migrants are gone, the population in the village decreased and this affected the economic activities in the village. Businesses such as grocery stores are not able to sustain their business without migrant workers. The owner of a grocery store has changed her business to sell toys, to adjust to the decrease in the number of Cambodian workers. However, even though the villages rely heavily on migrants, there are some anti-migrant sentiments.

> Well, do not want to have [more foreign workers] – if we do, it is inconvenient. We have to take care of the workers …. It is better if there are fewer of them. They do not have to compete to work and to live here. (Klong 1 04, elderly man).

Cambodia

In the coastal area of Cambodia, some fishers want to hire other Cambodians who have migrated from inland areas to the coastal area to find work. At one time many internal migrants came to work in the coastal villages. However, at present, many workers either go abroad or to Phnom Penh. Even though a shortage of workers is not felt as much in Cambodia as it is in Thailand, some employers in the coastal area who used to hire workers for fishing are feeling the shortage. This is because not only are there fewer internal migrants coming in to the community, but many young people in the coastal communities are migrating to urban areas.

> I want to have a helper but I cannot find one now. It is hard to find a young person to be a helper. I do not mind hiring young or old people. If there is anyone, I just hire. When young people migrate, it affects local labour availability. Four to five years ago, young people did not migrate and it was easier to find a helper. When they go to work at factories in Phnom Penh, Sihanouk Ville and Thailand, it is hard to find a helper now. (Kampong 2, woman 30 years old).

In some cases, the difficulty of finding a helper has resulted in women going fishing to help their husbands.

> I go fishing with my husband if he cannot hire labour. It is hard to hire labour since our boat is old and we do not have enough fishing gears. (Kampong 3, woman over 45).

Lack of labour also affects processing activities. It is difficult to find workers to help in processing or if there is enough workers the labour cost is too high for local fishers to afford.

> I do not do processing. I sell all fresh. I do not have time to do processing. Two of us [husband and wife] go fishing. If I come back and do processing, I will die. I do not hire a helper. If I hire a helper I do not think I would have money to pay them. It is very hard to find helpers now. We have to find someone we know. Now there are factories and fishing does not pay well, so people do not want to work with us. (Kampong 3, Kii small boat).

However, in most of the cases in Cambodia, the fishers are small-scale fishers and do not need helpers to go fishing. Some even do not have boats. Therefore, they rely only on their own labour and do not need extra labour. They also changed gears to reduce labour needs.

> If I compare to the past, my life now is much better. Before, I used nets and now I use traps. It is easier. Gears help me a lot to reduce labour. (Kampong 3, man above 45).

3.1.3. Law and regulations

Thailand

The largest issue that Thai respondents referred to in terms of challenges in fishing occupation was the current changes in regulations on fisheries and immigration. Earlier, fisheries regulations were relaxed and fishers enjoyed the freedom to fish wherever they wanted to. Respondents noted that small-scale fishers are now able to go only up to three miles from the shore, and they have conflicts with commercial boats in fishing grounds.

> Back then there was freedom. Now it is not free. We lost to them (commercial boats). We only got three miles. We wanted five miles to get larger fishing areas …. We have to watch the crab nets because sometimes we lay the nets, and the commercial boats drag them and they disappear. (Klong 2 03, woman).

To deal with the problems of IUU fishing, the government has introduced many regulations on fishing activities (see section 2.1.1 and Box 3). This has made it difficult for small-scale and medium-scale fishers whereas the large-scale boats have relatively more financial resources to help them comply with the regulations. As respondents in Klong 3 (where boats are larger than in other villages) said:

> Due to overly strict laws [in Thailand on fishing], some groups of owners of large boats decided to move to Cambodia for their living. This is because they are not forced to follow strict regulations like in Thailand …. The locals feel that the government is trying to force local owners of large boats out of business. (Klong 3 11, man).

The changes in regulations have led to an increase in paperwork, which fishers are not familiar with. They need to hire an agent to do the paperwork for them to register the boats and workers, which is an additional cost for boat owners. Some owners registered the boat under their wife's name because government officers come to inquire about the boat quite often during the day when the men are out. As women are at home more than men, fishers find it more convenient to put the women as legal owners of the boats so that they can deal with the government officers. The consequences for non-compliance are severe. If boat owners are found to have different workers on the boat from those that are registered, that particular boat and all the boats owned by the same owner would be prohibited from going out fishing. Such bans can last for months, and by the time the ban is lifted the condition of their boats could be so bad that they would need a sizeable investment to return it to a usable state. Some fishers became so discouraged that they abandoned their boats altogether. One fish trader said that fishers and fish traders came together to request the government to hear their voices and relax some of the regulations to reduce the impact on their livelihoods. However, the respondents felt that their requests were not taken into consideration.

Cambodia

In Cambodia, the fishing law specifies which gears are illegal, but respondents complained of the weak enforcement of the law. Community fisheries (CF) patrol their area regularly, however respondents said that by law CF can only inform and do not have the power to arrest fishers using illegal gears, and even when they are able to catch them, the wrongdoers are not necessarily punished. As a CF head in Kampong 3 said, "CF have rights but no power", referring

to their legally stated right to manage and protect their fishing grounds but lacking the power to actually exercise the right and enforce the law by arresting those who violate the regulation.

Respondents in the coastal villages complained of large boats destroying their fishing gears and becoming indebted as a result, leading them to stop fishing altogether.

> Some fishermen sell their boats and gear and stop fishing. Some people stop fishing and go for non-fisheries job in the district centre …. Fishers spend three or five million riels to buy a net. They use it only for a week and a trawler destroys it. In one week, they lose five million riels, so how can they earn a living? They have to borrow money from others to buy nets. (Kampong 2 trader).

The conflict between large boats from outside and small boats of the local communities once became quite violent, but now that the fishery resources around the coast have decreased, large boats do not come and there are fewer conflicts. However, conflicts about coastal land are now threatening the communities.

> People do not have farm land. They sold it in the past three or four years …. More and more people from outside buy land and then they do not allow us to pass through the area, so it is hard for us to access the sea …. Before, people can go gleaning along the beach but now some places belong to private owners so we cannot go anymore. Fishermen are losing fishing areas because they are converted into private land ownership …. Some land owners block the land and not allow the local people to pass through because they claim that the land belongs to them. Sometimes, the newcomer buys the land and blocks the area so that those who have land inside cannot access the land to go outside. They ask to buy the remaining land at a cheap price. If we do not agree to sell, we do not have a way out. They buy land and put up a fence and they do not allow us to enter …. I am really sorry for the change in my village. I have no words to express my feelings. When the newcomers come they do not make friends with us. (Kampong 2, 78 year old man).

It is not only in the coastal area, but also in the Tonle Sap area, that such conflicts take place, especially conflicts concerning land with paddy production.

> Rich people block the water so that it does not to flow into the stream and the commune cannot do anything because the owners have strong connections. The dyke was built with a good intention, but it was built using the wrong technique. The rich owners stop the water from flowing out into the stream, because they want to keep water for dry season rice and they sell water to farmers [during the dry season]. The rice growers formed a group and they do everything for their own interests. They do not care about other people's interests. (Kampong 1, man, head of village).

In both Thailand and Cambodia, fishing occupations are under threat because of the regulations or lack of enforcement of regulations. Even though small-scale fishers suffer in different ways, they all are facing difficulty in continuing fishing as a full-time occupation. The current fishers need extra effort and struggle to continue fishing. Since the struggle is so hard, they might stop fishing as they grow old and lack the energy to struggle. Such uphill battles can discourage younger people from taking up the occupation.

3.1.4. Social cohesion

Group building facilitates community cohesion and it is expected to build stronger identities as fishers. In both Thailand and Cambodia, group organizing has taken place.

Thailand

In Thailand, there are groups such as women's group, fishers' group, crab bank group, artificial coral conservation group. Group organizing, such as crab bank group, aims to raise awareness of the importance of natural resources management.

> In the past, there were no groups. Everyone did their own thing separately. Everyone minded their own business. Gears harmful to resources were used and the amount of fish decreased. Then we organized fisheries groups …. The sea helps us, we have to help the sea too. (Klong 2 08, man).

Some fishers have organized themselves to bypass the middlemen and sell collectively to a hotel and they have developed market channels that connect them directly to consumers.

> Fishing income mostly depends on the middlemen. So income is not stable. Once the middlemen know that I will sell a certain fish, they will lower the price. We have no choice [but to sell to the middlemen]. So we decided to sell directly to the hotel instead. We deliver fresh shrimp to the hotel every week, once a week. 700 kilos each time. We will also buy from local fishers. We were trying to cut out the middleman because of the issue of unfair price. For food processing, we make sun dried fish and sell directly online. We sell to customers all over the country through this online shop. 200 baht per kilogram. Both cooked and raw fish. Fried fish for 400 baht. Also we sell to normal [local] customers and tourists. (Klong 2 08, man).

Some jointly use fishing gears.

> People in the same community can talk, or lay nets together. They purchase and use nets together. Here we always depend on each other. (Klong 2 09, woman).

However, things are changing with fewer people around, with youths leaving the community. People have to pay for help.

> It was a united community, usually helping each other. But now, for everything that needs to be done you need to hire others …. Now most of the people mind their own business. But there is no conflict. If there is a group, they form it to borrow money [from the government]. There is no thief here. People are living together as a family but the nature of community has changed because it has become more modern. People are more individualistic. (Klong 2 05, man).

Cambodia

Fishing communities in Cambodia have been organized under CF. Two of the coastal communities in this study initiated ecotourism collectively. Some respondents observed that CF's collective effort of patrolling and reforestation of mangroves helped increase natural resources. However, the cost of patrol is dependent on NGO support, which is limited. In the coastal areas, the CF members came together to demonstrate against external investors.

Securing tenure rights for small-scale fishers is what SSF Guidelines aim for (Jentoft *et al*., 2018), and in Cambodia, the study communities have demonstrated their claim for rights collectively. They are not necessarily successful, however.

> The villagers are fighting because the people from outside cause suffering to local people. Local people used to file complaints but they (rich people from outside) usually win the case. Three hundred and fifty households complained at provincial level, but local people lost. (Kampong 1, man, village head).

But collective actions have created cohesion among the community members, and they are proud of whatever they have achieved so far.

> Land fill in the sea is seriously affecting fisheries. Places where fish breed and seagrasses are there too. A company reclaims land but I do not know the name of the company. Once a meeting was called to talk about this but there was no solution at all. The area now belongs to the company because villagers sold land to the company and the relevant officers take bribes from them so they can reclaim the land. If we allowed this to continue, the creek to the sea will be fully refilled. If there was no demonstration, the creek would already have been filled with land a long time ago. (Kampong 3, Kii small boat).

At the same time, some respondents do feel discouraged by the failure of collective action.

> If a land grab is seen, people can only inform the fishery officer. But there is no one going to do anything after being informed. The officer only confiscates the trucks of those who destroy the flooded forest. The developers use tractors to level the land for development. After the arrest of ten people, another ten people came to develop the land and cut down the trees. I am scared now. If the tractors are confiscated, the developers bring new ones. (Kampong 1, commune council).

> The conflicts between small and big boats have happened and people have been killed. Three of my relatives were crushed by big boats and they were killed. I also have been crushed by big boats. The community fishery tries to help solve the problem. But it is beyond the ability of the community. We never see the people on large boats directly. We just heard that they said if we want to make complaints we need to give them evidence. (Kampong 2, trader).

The CF do not feel that they are supported by the authorities.

> Yesterday I had a meeting with the commune council. I saw in the report, the commune had 300 million riel for its work but no money for fishery management. The budget only focuses on economic and social issues but there is no budget for natural resource management, health, security and gender. I was so angry with the commune council – why was there no budget for fishery management? I am angry with the commune council – why do you only care for only economic and social issues, how about natural resources management and gender? There are more women than men [since men have migrated out]. You should care for natural resource because they are the home of local people and the source of livelihood of local people. Local people are dependent on fishery. Why does the commune council not allocate budget for us to do patrols? Please allocate budget for us to do activities. We are volunteers … we do not have a salary so

> the local authority should think about this too. At the national meeting, we also proposed the government to allocate budget for fishery management. I was so angry and talked during the meeting. The commune head did not react. He just smiled. (Kampong 1, CF FGD).

And some feel that the community cohesion is decreasing with increasing economic disparity.

> Before my life was happier …. Normally, rural people do not look down on each other because all of us are poor. Before if you walk, I walk. But now it is different. I walk, they drive a car or motorbike. (Kampong 2, man 63 years old).

In all study areas, organizing fishers and fighting for tenure has been an uphill battle. Their continuous struggle has made it difficult for the fishing community to sustain their livelihoods.

Box 6 gives the testimony of an NGO worker about the conflicts between local people and outside developers in Cambodia's coastal zone. Most of the conflicts revolve around the destruction of mangrove forests and the filling of land for construction projects.

Box 6. Conflict with developers in the coastal area in Cambodia

The fishing zone of the fishery community is being filled with soil by outsiders. This is because the construction sector is expanding. We don't know who to blame. The government gives rights to the private sector. Mangrove forests will die when the land is filled because they need water. The fishing area of Kep Thmey Community Fishery was filled. The developers wanted to construct a business port in the province. As far as I remember, it was filled in 2006. Local people in the community do not get any benefit from this business port project. On the contrary, fishers in that community lost their fishing area so they had to move to other neighbouring fishing communities such as Tropeang Ropov or Tropeang Sangker. Recently, Tropeang Ropov Community Fishery has been under threat by an outside company. The other day, that company had a public forum. It was so controversial. The issue of land filling the sea is so big …. It will have a strong impact on the community. Even if the company keeps the community as it is, if they fill the surrounding area, sooner or later the community will be lost. The mangrove forest will die because there will be no water flow, the seagrasses will die. The community relies on these resources. So, we can say that the community fisheries will survive if we can protect these natural resources. One way that community people have changed is that before they became organized, they did not realize that they had power. They were afraid. However, in the last several years they have become brave. They use smart phones so they can send evidence of wrongdoing to others. They dare to raise their concerns.

(Testimony by an NGO worker in Kampot).

3.1.5. Change in identity

In all the study areas, respondents have a strong identity as fishers and an attachment to fishing and to the sea.

Thailand

Even though there has been much struggle to continue fishing, as has been seen in the above sections, respondents still have a strong attachment to being fishers. Freedom is one of the key words that respondents use to express the attraction of the occupation. A 20-year-old respondent in Klong 1, who studied until ninth grade, started fishing at 16 years old. At first, he fished with his father, but he proudly told us that for the past year, he has been able to fish on his own. He expressed his views on the differing perspectives on fishing as an occupation among his own generation:

> People in my generation, if they do not fish, they might do construction work. There are not that many people who work in the city. I used to ask my friends why they don't want to do fishing. They said that the income is not stable so they work as employees and get a monthly salary. I think most people see that this occupation [fishing] is not very stable. Sometimes fishermen don't get anything. But others [who work in other occupations] need to go to work every day. I do not like that. I think there is no freedom. (Klong 2 06, man).

Others also express the importance of freedom as:

> We are our own boss. If we are tired, we can rest. But if we work as employees, sometimes we might be uncomfortable to work. (Klong 2 01, man).

Although they like the occupation, respondents are not necessarily supportive of their children taking it up.

> I do not want [the younger generation to do fishing]. Fishing is a risky occupation. Very risky. Going out to the sea, the waves go *toom taam* [blasting noise], and we will fall head over heels. We can barely survive. There are many times when we went out and sank. It is risky. I do not want them [the children] to do it. (Klong 2 04, woman).

Older people said that they are fishers and have been fishing all their lives, and do not know what else to do apart from fishing. This is the case for both women and men. Even though women do not go fishing themselves, they also have an identity as fishers. One reason for their attachment to fishing is because they think they do not have any other choice. Especially in Thailand, they are proud of fishing as an occupation, since they were able to send their children to higher education through fishing. Many of the respondents' children went for higher education and now are working in the urban area in office jobs.

Cambodia

In Cambodia, some respondents have a strong identity as fishers, especially in the coastal area, since that is what they have been doing for generations.

> After Pol Pot there were about four or maybe 10 or 20 families that settled down here. I came back home [to this village] because old people told me: do not run away from

> your home town. Please do not go away from the sea. If you go away from the sea, you will have nothing to eat. (Kampong 2, man 78 years old).
>
> Not only that, in the future it would be hard to make a living by fishing, but the idea of not being able to fish makes us want to cry. (Kampong 1, woman 53 years old).

Some respondents are attached to fishing because they consider fishing to be a good occupation.

> I think fishing is better than non-fishing occupations. Compared to factories, fishing is better because working in factories requires you to work harder. (Kampong 3, woman above 45).
>
> People here do not wish to leave the community because we see that people in other villages are not better off than we are here. (Kampong 1, woman 57 years old) .

As in Thailand, many respondents emphasized freedom as the reason why they are attached to fishing.

> In Thailand [when I worked as a migrant worker], I earned more but I also spent more. I like to go fishing because I have freedom. I can go fishing anytime. If I am sick I do not go. Many people already returned from Thailand. They came back to be sellers. Some people came back and do nothing. Some people came back to be fishermen and some people came back to work for others. If one is used to working at sea when one goes to work on land it is hard to adapt …. We have more freedom by working as fishermen. We can work 12 hours or eight hours [as we like]. If we are employees, they do not allow us to take a rest. (Kampong 2, large boat 37 years old).

However, in Kampong 1, in the Tonle Sap area, where fish resources are decreasing drastically and where respondents also have rice fields, they have a mixed identity as fishers and farmers, depending on which occupation is giving them a better income.

> I consider myself as fisherman and a rice farmer. Now rice is more important than fishing, but before, fishing was better than rice farming …. Two years ago, 60 percent of family income was from fish, but now it is only 30 percent. Fish is still important but if there is no water, then there is no fish. (Kampong 1, man 46 years old).

Even though the respondents have a strong identity as fishers, they do not want their children to be fishers. Even though fishing can give sufficient income for them to make a living, they consider the occupation to be dangerous, irregular and hard work. If possible, they do not want their children to go through the difficulties that they have gone through. Hence they do not consider the occupation to be a good family occupation. Many youths are also more interested in working outside the village. At the same time, boys often go for fishing because it gives them a quick income. Boys start to go fishing with their fathers at a young age, in the morning before school or during weekends. The attraction of quick money and the financial situation of the family encourage boys to drop out of school and start fishing in Cambodia. How much the fishers and their children value an identity as fishers shapes how many of them remain/join fishing as a full-time occupation, and influences the demographic change in fishing communities.

> Children start fishing during the school break and holidays and Saturdays and Sundays. My youngest son wants to stop studying and work on a fishing boat but I do not allow it. He said if he goes to school, he gets only 1 000 riels or 2 000 riels [as pocket money], but if he goes fishing he would have his hands full of money. He does not ask my permission to stop school directly, but he does not get up even when it is time to go to school. I wake him up and have to ask him to go to school many times until finally he goes. I am so angry with him. My husband and I are uneducated so I want him to be educated but he does not want it. Children always want to drop out from school for money. When I am angry I ask him to carry cement [to work in construction]. He said he would go if he gets money. Working is more attractive than study. This happens to almost every family here. When boys reach 15 years of age, they want to drop out of school. (Kampong 2, woman 35 years old).

3.2. Drivers outside fishing

There are drivers outside fishing that shape demographic change in fishing communities.

3.2.1. Higher education of children and migration pull

Thailand

Thanks to the income from fishing, children in fishing communities are able to receive a higher education in Klong Yai district in Thailand. Such an education allows children to get employment in private companies and in the government sector, working as teachers and technicians and office workers. Many have settled in urban areas. It would be difficult for these children to come back to Klong Yai to do fishing.

> My daughter works in a factory in Rayong. She is married and she and her husband have already bought a house and plan to settle down there. (Klong 3 09, elderly man).

> The teenagers about 17 or 18 years old are not very interested in a fishing occupation like their parents. If they have already left school, they usually leave the area and start working in Trat provincial centre instead. (Klong 3 10, woman).

Cambodia

In Cambodia, higher education is considered to be the only way to achieve upward social mobility (see section 3.1.5). Therefore, some parents say that they do not bring their children along when they go fishing as it is likely the children will be interested more in fishing, since they can get a quick income from it. Then they will drop out of school. In order to keep them in school, they prefer not to teach their sons how to fish.

There are growing employment opportunities for youths in Cambodia, which were not available in the past decade. The expansion of garment factories and construction work, as well as opportunities to work in other countries such as Thailand, Malaysia and the Republic of Korea, lure youths to go outside the village to work. In Kampong Chhnang, this is especially evident, since the income that they get through fishing and agriculture is usually less than what they can get through migration.

> My children migrated. They do not want to continue fishing. They say it is hard. All three children used to fish but have now stopped. Before they migrated two years ago

> because fishing was not productive, they fished. They work in construction now. (Kampong 1, woman 53 years old).
>
> Young people now are migrating. All of them are gone. They go to work in garment factories. Between age 16 and 17, they leave the village to find work in a factory. Migration makes their family's life better. (Kampong 1, woman 57 years old).
>
> My youngest son also fished but now he stopped. He said he goes fishing and has no result. If he works in factory, it is better for him. Now he is working in Sihanouk Ville [a port city in another province on the coast] and I am not sure if he will return to the village or not. (Kampong 2, man 63 years old).

Youths still leave even though it is often the case that they cannot earn better income through migration. Several respondents said that migration is not a better option than fishing. Still, many migrate since it is getting easier to go to other countries and to urban areas as more and more networks between the villages and the potential destinations of migrants are established. Development of such networks for migration shapes the demographic change in the study area.

> I do not know why people migrate even when they do not get a better life. If we go to work in construction, we earn 30 000 riels. We can catch fish and earn more than in construction. If we calculate, migration is not good. Maybe they migrate because they want to learn some skills. They want to live in a more modern country. (Kampong 2, large boat owner man 37 years old).
>
> My children who are working in the village have better living conditions than those who migrate. Those who migrate do so because they have no land. (Kampong 1, man 46 years old).
>
> Many people leave the community to work outside. I stay in this job because I want to stay near my family. But if compared to the incomes of those who have migrated, it is not much different. (Kampong 1, fish processor 46 years old).

In the coastal provinces of Cambodia factories and casinos have been established, creating jobs for youths. Daughters especially find alternative occupations to fishing. It is noted that the wages from factory work is not as good as the income from fishing, and this is considered only a secondary income for fishing households. These jobs are not considered "real" jobs, that is, they are considered only as temporary jobs and their social status can be lower.

> If they go to work in a factory or in construction, they go for a period of time and they come back and go fishing. (Kampong 2, small boat owner 23 years old man).

Although the status of factory work is lower, income from these jobs is stable. As will be seen in section 4.2, income from these factory and casino jobs supplements fishing and helps to maintain fishing as an occupation.

3.2.2. Investors from outside

This is especially significant for coastal provinces in Cambodia. As was discussed in section 3.1.3, external investors are coming in to Cambodia to buy the coastal land. Many people in Koh Kong have sold their land to these external investors. There are now many houses that are newly built

by those who have sold land. Income from fishing or even from migration is not enough to allow them to build a house. However, new houses do not seem to be an incentive for young people to stay in the village. On the contrary, since they have no land, if the fishing is not good, they go out of the village.

The fishers sell their land because they do not have enough capital to develop the land; hence the land is underutilized. Such selling of their land to external investors makes the fishers' livelihoods even more precarious, since they are more and more dependent on fishing. Such precariousness encourages the fishing households to diversify and hence children increasingly take up non-fishing activities.

3.3. Summary of the drivers of demographic change

In the preceding sections, we have seen the drivers of demographic change in the study villages in Thailand and Cambodia. The demographic composition of fishing communities is changing not only because of the changes in longevity and the fertility rate but also because of various factors such as labour availability, migration patterns, laws and regulations as well as the people's identity as fishers.

In Thailand, the change to an ageing society is happening rapidly, but it is even faster in Klong Yai district because of a larger push factor to keep young people out of fishing. Stricter regulations on fishing as well as immigration are making medium-scale fishing difficult to sustain. Youths are getting more educated and because of a discouraging environment for fishing, they are leaving fishing and going for other occupations. The villages are getting more and more composed of older people, and with older migrants returning to Cambodia in large numbers, there is a large decrease in the number of young people in the village that is affecting the whole economy of the village.

In Cambodia, the change to an ageing society has not yet begun, but young people are increasingly opting out of fishing, especially in the inland areas such as Kampong Thom. The environment for fishers is discouraging both in the inland areas as well as in coastal areas. At the same time, unlike in Thailand, the youths in Cambodia are not able to achieve a higher level of education sufficient to enable them to change their occupation, and even when they go for non-fishing occupations, they tend to find only temporary jobs. That is, many are not able to build a career out of the non-fishing occupations. This either means youths will come back to continue fishing or it might be the case that the fishing communities become dependent on remittances from meagre incomes from their children in precarious jobs.

In all the study areas, the changes are happening fast, and we need to question whether these communities are prepared for these demographic changes. In the next sections, we will analyse the outcome and impact from the demographic changes.

4. Outcome and impact of demographic changes

In Thailand, the number of fishers decreased because of higher education of children and because they have other employment opportunities. The regulations concerning fisheries that have been introduced by the government have also played a part. Older people still struggle to continue fishing but have to rely on migrant workers. However, such dependence on migrant workers is also getting difficult since they face tighter immigration controls in Thailand as well as the fact that they have increased employment opportunities in Cambodia, discouraging Cambodians to migrate to Thailand.

In Tonle Sap area, the number of full-time fishers is decreasing, because of a sharp drop in resources. Many youths opt for labour migration to supplement the household income. However, unlike in Thailand, such youths are not able to build a career outside of the villages. Hence, they might come back eventually to the village to do fishing, or they might make the household dependent on remittances from their meagre incomes. In the coastal area, there is a decrease in catches, but the increase in the price of seafood is allowing fishers to continue fishing. Children who are working in the nearby factories also support their households' fishing activities.

4.1. Increase in smaller boats

In Thailand, those who have larger boats are experiencing difficulty in continuing fishing because of stricter regulations and increasing difficulty in getting workers. Respondents said that if they are not able to find workers, they might sell their larger boats and replace them with smaller boats so that they can fish on their own. Respondents said that they could continue fishing for home consumption until they reach 60 or even more, especially if it is with small boats.

> The economy has become slower than it used to be in the past few years. Everyday incomes are getting smaller and smaller. Because of this problem, villagers are replacing large commercial boats with small ones. (Klong 3 11, man).

> More and more people are turning to fishing with small boats instead of large commercial ones since they may face more restrictions [such as registration and reporting]. We can use small boats and still do fishing for a living or even do fishing as a part-time job. (Klong 3 06, elderly woman).

In general, fishing needs physical strength, so it is difficult for villagers to fish when they are old, but if a small boat is used, they can fish into their old age.

As was discussed earlier, small and medium sized fishers find that the current regulations are too strict for them to comply with, and only larger boat owners with sufficient capital can comply with them. The respondents said that they will not quit fishing, but might go for subsistence fishing.

A similar phenomenon of changing to smaller boats was seen in Cambodia.

> I sold my large boat in 2000. I have been using it since 1993. This is because my husband has become old and also it has become difficult to pass through the border to fish. I started to use a small boat about three or four years ago. (Kampong 3 woman above 45).

Almost no one that was interviewed was using larger boats. The villagers, if they can afford to buy boats have enough money to buy smaller boats only. Many fishers in Cambodia do not even have small boats. With the decrease in fish resources, it is impossible for smaller boat owners to become larger boat owners. Larger boats will only come from outside the community.

> I migrated to Koh Kong for three or four years. There I used a big boat as I hadn't done this before and I wanted to try it. With the big boat, I needed to fish in deep water. I tried but it did not work out well. I can find money nearby home so why do I need to go so far away. If I go far away to fish, it just makes me feel tired and it may affect my children's

> education [because I need to bring my children to fish, since I will be out for a long period of time, and children will miss classes]. I do not think it worked out well. So I sold the big boat and came back to my hometown. (Kampong 3 Kii, small boat owner).

4.2. Reliance on remittances and non-fishing income for sustaining fishing as an occupation

In Thailand, decreasing incomes from fishing, increases in the cost of living, and old age have led to the indebtedness of the respondents.

> Now the sea has very few fish, and the cost of living is high. Sometimes I earn about a thousand baht. That may be enough for expenses. But some people have five or six people in the house and that would not be enough. After five or six days the money will be finished. They will not have enough to eat. One family needs one hundred to two hundred baht per day. If they have to buy gas, have to buy rice then the expenditure will be a thousand baht (per day). So, it is not enough. Nowadays we need to learn how to economize but still we need five hundred baht a day to survive. If there is anything that I can do I will do it [meaning that one needs to work hard in any occupation in order to survive]. (Klong 2 09, woman).

> Right now, it is hard. We have to compete. Incomes are low and we miss out all the time. With our age – my husband has not been able to fish in the last year or two. He is 65. His body is thin – with no strength. One hand is not usable …. When the net is torn, we have no money to buy a new one. We have to become indebted to moneylenders. Till now, we are indebted. Before, we had to borrow money for the children's education. We are always indebted. It is not easy to be free from debt. (Klong 2 03, woman).

The difficulties in fishing encourage women to take up fish trading, fish processing and other related businesses. Older fishermen, who do not go fishing, help the women in these businesses. With less labour and fishers getting older, they start to diversify their income and rely less on fishing. One respondent said that her household income from fishing income decreased from THB 3 000 to THB 5 000 per day (USD 100 to USD 166) to THB 1 000 per day (USD 33). Since it is not enough, she is now engaged in fish trading and processing as well as catering services for events (Klong 1 09 woman). Women have established a group to do fish processing together. This provided extra income for the family, but also has added time pressure for women and those women with other household responsibilities are not able to join.

In Thailand, even though older people continue to fish, their income from fishing is less than before, especially with the stricter fishing regulations. Their children, thanks to the good income from fishing, were able to study further, and they now work in the urban areas. Some send remittances to support their parents. Such remittances allow the old parents to fish without much pressure. Some respondents said that these remittances are essential for them to repay their debt.

> If the children do not give [money], I would have died. When repaying the village fund …. They support in paying back debts …. My son is working there, and every month he gives us 2 000 baht. (Klong 2 03, woman).

Similar dependence on remittances from children is seen in Cambodia as well, both in the coastal area as well as in the Tonle Sap area. Remittances from daughters especially are considered to be reliable. Although some respondents said that fishing provides almost an

equal amount of income to migration (section 3.2.1), there are some respondents that are dependent on remittances.

> My son in Sihanouk Ville [port city in a nearby province] sends money to me every month. If he earns a lot he will send 100 dollars and his salary is 250 dollars. This can help to deal with our living condition. If there is no help from our children, it will be difficult. Fishing is hard now. (Kampong 2, small boat owner, woman 48 years old).

> Children raise old people in this area. If children give USD 10 they live on USD 10. Most of the old people are living by themselves …. Sometimes children send me 40 000 or 100 000 riels. It is not stable. If I need money they send me through a money transfer agent. (Kampong 2, 78 years old).

> Families with young people migrating are better off because they can help their parents. Whether they migrate or not is decided by the family. Girls help more than boys in the family. (Kampong 1, elder man).

Often remittances finance their fishing business. As in the case of the respondent below, the remittances were used to buy nets.

> [When I worked in Thailand] I sent all [my savings] to my parents. My parents used the money I sent to buy nets. They also used the money for daily consumption. When I arrived home, I did not want to go back to Thailand. Even if I did want to go, I do not have money to go. (Kampong 2, small boat owner 23 years old man).

In coastal Cambodia, there is less migration. However, youths especially young women, go to work in factories and casinos nearby (see also section 3.2.1). Men as well as their sons continue to fish, whereas daughters undertake non-fishing employment. These daughters contribute financially to the household. Older women do home-based work such as crab meat picking to earn money. Some women go for gleaning. Working in a salt farm is considered to be degrading for the people in fishing villages, and only female-headed households who do not have any other option will go to work there (Kusakabe and Prak, forthcoming). Fishing provides much better income than any of these other income generating activities, and these are not considered "real" work (see also section 3.2.1). At the same time, such income is important for the household especially with catches going down and expenditure increasing. Migration can provide money, but the jobs done by the migrants are generally not considered to be jobs that they will do for a long time.

In all the study areas, fishing is considered the core occupation of the households and regardless of the situation, fishing continues. Other work is considered support work for fishing. Therefore, even with the decline in fishing because of resources and labour shortages as well as ageing, children and women are mobilized to support and maintain the occupation.

4.3. Fewer fish and less processing

In the study area in Thailand, some women produced fermented shrimp paste and dried fish and some of their products are also sold under the One Tambon One Product[26] banner.

[26] One Tambon One Product (OTOP) is a "local entrepreneurship stimulus program which aims to support the unique locally made and marketed products of each Thai sub-district all over Thailand." (https://www.thaiembassy.sg/friends-of-thailand/p/what-is-otop). After superior local products are selected promotional support is provided for the products in local and international markets.

However, none of them undertakes this as the main source of income. It is more popular to sell fresh fish and more difficult to get fish to process. Fewer fish resources and fewer fishers lead to less processed fish. Large retailers and processers are also changing the resource flow. Large retailers demand more fresh fish, whereas large processors take more raw material for fish processing making it more difficult for fishers to process the fish themselves. As seen in 3.1.4, in Klong 3, they sell fresh fish directly to hotels, so there is no need for them to process the fish.

> During the summer, we were processing seafood. The villagers would dry squid and sell within their community. There was a change in seafood processing ten years ago after the opening of a frozen seafood-processing factory in Klong Yai district. Seafood products were directly sent to the factory for further processing. (Klong 3 09, elderly men).

In Thailand, fish processing is not very common because it is easier to sell fresh fish. Also because of the shortage of labour, it is not possible to produce a large amount of processed fish. One woman (Klong 2 03) said that she does not do processing anymore since she is old and her eyes are not good enough to do this work. Villagers also do not have the capital to venture into aquaculture, since raising fish in the marine environment can be costly. Only micro-scale aquaculture is carried out along the canal.

In Cambodia, in the Tonle Sap area of Kampong Thom Province, villagers still continue their tradition of fermented fish making seasonally, but because there is not enough fish, they do this more for home consumption. In coastal Cambodia, the fresh marine fish price is so good that it is better to sell fresh than to process. There are also not enough people to help in processing fish. There have been attempts to organize people to process together, but none seem to have been successful.

> People here do not do fish processing. They like to sell fresh fish. [There is] no labour to do processing and we get a better price by selling fresh. (Kampong 3, woman 57 years old).

> I do not do fish processing. I sell only fresh fish. I do not have time to do processing. Two of us [my husband and myself] go fishing together. If I come back and have to process fish, I will die. (Kampong 3 Kii, small boat owner).

In all the study areas, it has been seen that adding value to fisheries products and diversifying into fish processing are not considered a viable option. The lack of fish resources and labour are constraints.

4.4. Less collective power

In Thailand, it is getting more difficult for people to organize and do something together, especially with younger people leaving the community and with the general lack of labour. People feel a sense of apathy.

> The number of fishing boats is continuously decreasing. One day fishing as an occupation will disappear. We were born and raised in a fishing village. It is difficult to do fish farming, since we do not have land and most land is muddy and not suitable to farm fish. (Klong 3 09, men).

Because of the lack of labour, villagers need to hire others for whatever they need to do, making the village relations more based on pecuniary transactions than before (see also section 3.1.4). The lack of labour also means a lack of time for villagers to participate in collective activities (see section 3.1.4). The change in fishing regulations has led to some protests by large-scale fishers, but small-scale fishers are not involved.[27] The strict fishing regulations also mean that they are not able to have the flexibility in sharing their crew to fish together. It is getting more difficult to work together in a number of areas.

In Cambodia, fishing communities are organized into CF. CF need to negotiate with the government and external investors to protect their fishing grounds as well as to patrol the area against illegal fishing (see also section 3.1.4 and 3.2.2). However, the decrease in the number of fishers, especially the youths, as well as the increase in pecuniary transactions with more cash income coming in from remittances can make their collective action and mutual help weaker.

> Now we cannot ask help from others. We need to hire. If our generator is broken and if we do not have a machine to pump water to the paddy fields, we need to hire that of others. We cannot borrow the pump for free. Twenty years ago, I can borrow for free but now no more. Even with siblings or relatives, we have to pay them a market price. (Kampong 1, woman above 40).

> Now villagers stop asking for help from each other. They pay. The change started in 2004 or 2005, and by 2014 and 2015, it had changed completely. (Kampong 2, NGO).

Fishers are often not successful in protecting their resources. Some members get discouraged with the result (section 3.1.4). In the coastal area, youths are active in the conservation activities – working in ecotourism and planting of mangrove forests. However, such activities are not seen in Tonle Sap area of Kampong Thom, since there are not many youths in the community in Kampong Thom.

Ageing and a declining population in the community, as well as less active participation in the community organizations, especially by youths, decrease the vitality of the community. Such weakness in community cohesion can lead to the community having a weaker voice and weaker negotiation power vis-à-vis the government and companies.

4.5. Elderly care

In both Thailand and Cambodia, there are no satisfactory elderly care services provided either by the government or community, and the parents have to rely on their children when they become old.

In Thailand, respondents said that older people usually use up all their savings for the education of their children and do not save for their old ages. The elders in general feel that they can depend on their children if they have difficulties in the future. At the same time, respondents who have children in urban areas do not want their children to abandon their jobs and come back to the village to look after them. There is a feeling of ambivalence among the older generation. Since this is the first generation of children who have been educated and subsequently have gone out of the village to pursue a career, they actually do not have any model of what the life of the elderly in this new era should be like.

[27] Bangkok Post, 2019, page 2.

> There is not yet any agreement [among siblings who will take care of parents], because father and mother [usually] take care of themselves. I have three siblings, and they have their own families and jobs. No one takes care of the parents now. They do not give money to parents. My father is 60 and goes out on the boat by himself …. I cannot support my father and mother. I ask, "Father and mother, you could take care of us, but why am I not able to take care even of myself? It is because of the economy! (Klong 1 01, woman).

> There is no strict rule about who will look after the parents. Or do parents really want to be with any of the children? This depends on the convenience of each family. Like some families, all children have work in other cities. They come back to visit the parents twice a year. But nobody abandons his or her own parents. (Klong 3 10, woman).

But is it often expected that daughters will take care of the elderly parents.

> My younger sister is now looking after the parents. There was no clear agreement between us. She just moved back at the moment [it was necessary], so she is willing to take up the responsibility. I visit them often instead. (Klong 3 03, man).

> Responsibility for elderly care is a private matter for individual families and children must make their own decisions about this. However, most of the time, daughters would be considered as the first persons to take care of their parents. Because of their gratefulness to parents, at least one person in each family must take care of their parents. (Klong 3 09, elderly men).

Some respondents expressed their concern for elders who do not have children to take care of them. Children have migrated out and it is not always the case that they can come to take care of the elders.

> Before, people could stay along the canal for free, but since the area is categorized as a fishing area and the residents do not have any ownership documents, the government started to collect fees. It is about ten years now. We have to pay. Before we do not have to pay. We have been paying for this house about 400 to 600 baht …. If people grow older and do not have money to pay, what will happen? We have to think of the old people. Some do not have children, or children do not take care of them. And how would they pay the fee? (Klong 1 03, elderly man).

In Cambodia, the situation is more or less the same. Respondents, both young and old, say that it is the children's responsibility to take care of their parents, especially women.

> For Muslims, parents take care of the children. I do not know how much my parents spent on me. From breast-feeding to toddler; they took care until we grew up. They also look for a girl for me to marry too. I cannot find a good wife if my parents did not help me. With their religious beliefs, parents help children to have morality. So children have to pay back by taking care of the parents. When parents get sick, I have to stop working and do everything to take care of them at hospital. Even if I get a job with USD 1 000 or USD 2 000 salary, I have to leave the work and take care of my parents. If the elder is poor, the government also helps. For old people in the neighborhood, if they are poor and do not have children, we have to collect a contribution of 500 riel or 1 000 riel each. In this village, people help each other. (Kampong 3, KII small boat).

> When I got sick, my children took turns to take care of me. I do not know why my daughter is taking care more than my son. The eldest daughter is the main caregiver and contributor to the household financially. Even when no one is around, my eldest daughter always comes for me. She brings me to hospital and also is responsible for paying the bill. Other children just contribute some money. (Kampong 1, man head of village).

However, the parents also feel that if children are poor, they will not be able to support them. This is especially so when their children are married and have to finance their own the households. In such cases the elders feel that they cannot depend much on their children.

> Parents here get help from children when they do not have family. If they [the children] have family, they stop because they have to help their [own] family too. (Kampong 2, 48 year old woman).

> I glean and I use a trap to catch fishery products. I can earn 10 000 riel to 20 000 riel per day. I do not stop completely yet. I cannot stop fishing. If I stop, I will have no money. But I cannot go to the sea any more. I can only put a trap at the creek leading to the sea. Old people still work. Old people do not want children to help them or they have no children to help them. My child is in Kompong Som, and he is not yet married. If he has [his own] family, he will not help me anymore. Children help parents only when they are single. They support with daily food. Elders who have children that stay in the village have a better life. People migrate and I do not see when they come back. (Kampong 2, man 63 years old).

The elders find it difficult to manage their old age without help from the children or the community.

> The life of old people here is difficult. Old people are dependent on children and they cannot go fishing. I am a woman and I am dependent on my husband and when my husband is sick I am dependent on our children. (Kampong 2, small boat 48 years old woman).

> Old people [more than 40 or 50 years old] have a difficult life and some are collecting waste for sale because they cannot go fishing. They can do only something light and they cannot do farming. (Kampong 2, 78 years old).

It is highly likely that children from poor parents cannot get sufficient education to move out of poverty, and in this case the children might not have sufficient financial means to look after their parents. Parents find it difficult to support themselves financially, since they often do not have savings.

> When people are young, their income is just enough for survival and to feed their children. When they get old, they cannot save enough money for their living [expenses]. If they need help, only children can help and no one else can help us (Kampong 3, man below 30).

> Twice a year he [father] goes to hospital. Fishermen have a difficult life when they get old. If they cannot go to the sea, they work in construction and if children support them they stop. No other people help them except their children. There is no social welfare. If we do not go fishing we do not have anything to eat. While we are young we have to save but it is hard to save. (Kampong 2, small boat owner 23 years old man).

Both Thailand and Cambodia might be facing a crisis in elderly care provision. The changing demography in fishing communities is happening faster than the national average in Thailand (section 2.1.2), and it will face such a crisis faster than other areas. In Cambodia, even though the population ageing process has not yet started, the increased out-migration can make it more difficult for children to look after parents, as has been the expectation earlier.

5. Conclusions and recommendations

5.1. Conclusions

In both Thailand and Cambodia, the attraction of fishing as an occupation is decreasing. Until five to ten years ago fishing was still a viable occupation that could support and improve people's living conditions. However, with the decrease in fish resources as well as changes in fishing regulations, it is not providing as much income as it used to. In all the study areas, the numbers of fishers are either decreasing or the fishers are ageing. In Thailand, the population ageing process in fishing communities is higher than the national average (section 2.1.2), and in Cambodia, out-migration is higher in fishing communities (section 2.2.3).

The study found that the nature of demographic change in fishing communities is shaped by drivers such as: (1) decrease in fish resources; (2) labour shortage; (3) changes in laws and regulations; (4) group building that can improve the fishers' identity of being fishers; (5) their strong identity as fishers; and (6) drivers outside fishing that causes the youths from fishing communities to migrate to urban areas and across the border for career development. Although both countries have seen a decrease in fishers especially among the youth, these factors have shaped the nature of demographic change in different ways. Thailand experienced an influx of migrant workers to fill in the labour shortage as the youth moved out and settled down in urban areas with no sign of returning. The decline in fishing as well as the decrease in migrant workers further led to declining populations in fishing communities, ageing populations and slower growing local economies. Cambodia's Tonle Sap area experienced out-migration of the youth that led to ageing communities with older fishers remaining at home dependent on remittances from children. In the coastal area, out-migration of youths has stopped, but youths are taking up non-fish occupations, and fishers themselves are ageing.

Such accelerated change in demography has led to: (1) difficulty in maintaining medium-sized boats; (2) reliance on remittances and non-fishing income; (3) difficulty in diversifying, such as through fish processing; (4) less collective power; and (5) a crisis in elderly care. In both Thailand and Cambodia, the demographic change is happening fast and since it is a new phenomenon for them, fishing communities are still striving for a better way to weather the change.

The study showed that the relationship between demographic change and the changes in fishing is not straightforward. It is not possible to conclude that the fewer the number of fishers there is, the better it is for the fish resources since it will alleviate pressure on the environment (Tietze, Groenewold and Marcoux, 2000). The analysis of drivers that shape demographic change allows us to understand the implication of the change in a more holistic way. Youths moving out of fishing can achieve upward social mobility or they can continue their precarious status in different locations. The ageing fishing community can continue the fishing tradition or become a declining community with struggling elders. Fishing communities can change their way of life or can be forced to change by external investors. Based on our analysis, the following three issues are key concerns for the fishing communities to adjust to demographic change in Thailand and Cambodia.

5.1.1. Polarization of fishing boats

As discussed in section 4.1, it is getting more and more difficult to maintain medium-sized boats. Especially with fewer youths joining the occupation, elder fishers prefer to fish in small boats near the shore, since they do not have enough physical strength to go far. Hence, those with capital will invest more to comply with the fishing regulations and take advantage of their advanced gear to fish far away, whereas the number of small-sized and medium-sized fishers will be reduce even more.

This means that there will be loss of fishing knowledge of fishers, as they will restrict their fishing activities. There will also be disparity between large-scale and small-scale fishers, and small fishing villages will face difficulties in maintaining their livelihoods. Demographic change has also decreased the vibrancy of the fishing villages, and such polarization and disparity in the fishing communities can lead to their further decline.

5.1.2. Feminization of fishing household income

Fishing is facing considerable difficulty in sustaining itself and it is the income from children and women that supports the continuity of the occupation. When the fishers have difficulty in getting workers, sometimes women take up the work to save money that would be spent hiring others to a limited extent. But more importantly, women support fishing through non-fishing incomes. When the fishing income cannot sustain the household, children, especially daughters, will go for factory work to send remittances home and this will be invested in fishing. Women do other wage work to support the fishing activity of the male members of the household. Therefore, the women will support the household income and fishing will remain the household occupation.

5.1.3. Elderly care

Both parents and children in Thailand and Cambodia feel that it is the children's responsibility to care for the elderly. However, the big question is whether this is possible under the changes that are happening in fishing communities. In Thailand, children can have good jobs in the urban area. In Cambodia, children of poor fishers are also poor, and they might not have the ability to support the elderly. As youths are increasingly leaving fishing, the future of elderly care in fishing communities is uncertain. This is the first generation to experience the effects of young people's geographical mobility as well as of large changes in natural resources. There is clearly a coming crisis in elderly care, and how to get through this transition needs consideration and policy support.

5.2. Recommendations

Based on the above analysis, the following recommendations are made in order to support the fishing community to adjust to demographic change and sustain itself.

5.2.1. Support for fisheries communities

The population ageing process in fishing communities and among fishers will lead to a decrease in the vibrancy of fishing communities if it is left as it is. The fisheries communities will have fewer people who will consume/produce less and the economy will deteriorate as there will be fewer income generating opportunities for the elderly. However, there is still an opportunity for fishing communities to be vibrant again, since demand for fish is still very high and the price is good.

For Thailand, there is a need for clearer and more realistic regulations for fisheries that are more supportive of small-scale fishers, and are participatory and transparent. There is a need to support the participatory organization of fishers and work out better regulations in which fishers will be able to have a voice in order to encourage fishers to have control over their own future in fishing communities.

For Cambodia, it is important to empower community fisheries so that they will be able to have stronger negotiating power with respect to investors and the government to manage their natural resources. Community fisheries need more resources in order to have stronger negotiating power. Better technical support for fishers to diversify within fisheries, such as through tourism, fish processing, and aquaculture, need to be explored more rigorously.

In Japan, the decrease in fishers has created new opportunities for new fishers to take up the occupation (Yokohama *et al*., 2013). Such a reverse flow of people has not happened in Thailand and Cambodia. In order to attract young fishers, there is a need to create a more supportive environment for fishing in these communities.

5.2.2. Safe migration and non-fishing occupations

In Cambodia, children, especially daughters, are migrating away from their villages as well as doing factory work near their villages in order to support their families who are engaged in fishing. This support is key to the continuation of the fishing as an occupation. This income allows older fishermen to continue fishing and maintain their identity as fishers. Safe migration and young people's upward social mobility while living in their own villages are essential for a vibrant and liveable fishing community where youths can aspire to a better future.

At the moment, the factory jobs that young women are going into are not considered "real" jobs – more of a temporary arrangement. Because workers in these jobs earn less than fishing in coastal areas, the status of these jobs is low, even though these make a crucial contribution to the household. Since it is considered to be a temporary job, the young women do not build a career through such work. There is a need to support these young workers and provide training so that they will be able to build a career in non-fishing work. It is also important to establish safe migration schemes.

5.2.3. Elderly care

There is no strong elderly care support from the government or community in all the study areas. There is no insurance and no pension for the elderly people to depend on. In Cambodia there is IDPoor, which provides support for the poorest households, but the amount and coverage is not enough to support the elderly in the communities. At the same time, older fishers are going to be the ones who will continue to uphold the fishing community and they are important if there is to be a vibrant fishing community.

In Thailand, there will be increasing need for support for the elderly in the fishing communities. Children have been able to receive a higher education because of their households' incomes from fisheries, and as a result they have moved and settled out of the community. For them, coming back to the community is not an option, since there is no work for them to do. It is not realistic to expect the children to provide both financial and physical care to the elderly.

Elderly fishers also do not have much savings since they usually invested all their income on their children as well as to support their fishing activities. There is a need to develop an elderly support plan, which consists of savings, pension and insurance schemes, as well as physical support provisions.

5.2.4. Recommendation for future studies

- Since the study was carried out in a very limited number of locations, it is not possible for the conclusions to be generalized. There is a need to conduct similar research in other fishing communities.
- The study did not include aquaculture, since there were hardly any aquaculture activities in the study area. However, with the diminishing fish resources as well as the lack of labour to go fishing over long distances, aquaculture can be an interesting option for diversification. Investigating how aquaculture can or cannot be a solution to the problems faced by ageing fishing communities is recommended for future studies.

Acknowledgements

We would like to thank Dr Susana Siar of FAO for her constant guidance, support and encouragement in completing the study. Dr Siar initiated the idea of this study and provided important advice and inputs throughout the study.

We would also like to thank Dr Derun Yuan of NACA as well as Dr Weimin Miao of FAO for their support in implementing this study. Mr Prak Sereyvath of the Cambodia Institute for Research and Rural Development (CIRD) facilitated the study in Cambodia. Mr Somphong Sakaew and Ms Tiwaporn Hemsakul of the Labor Protection Network (LPN) facilitated the study in Thailand. Mr Sam Ath Boromey and Mr Sam Ath Kanharith helped with the field work in Cambodia. Ms Yossayanee Chaisena as well as Mr Kata Srijoom, Mr Pacharapan Wanna, Ms Kason Khammuang, and Ms Wannee Kendchan of LPN supported the field work in Thailand. Mr Sirayuth Thongprasert worked on transcribing and translating the Thai interviews.

We are grateful to all our respondents in Thailand and Cambodia who spared their time to share their opinions and experiences with the research team.

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Chapter 4. Demographic change in marine fishing communities in India

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Introduction

Marine fisheries productively engage a vast majority of coastal populations across the globe, a significant proportion of which are small-scale fisherfolk who inhabit the developing world (FAO, 2018). With a coastline of about 8 129 km along its western and eastern borders, India is home to nearly four million coastal dwellers, for whom marine fisheries is the mainstay of livelihood, food security and income (CMFRI, 2012). Marine fisheries in India have undergone a dramatic change over the past seven decades in terms of the scale of fishing, energy and capital intensiveness as well as the socio-economic and demographic characteristics of the fisherfolk. Much of the transformation was driven by the "blue revolution" initiatives of the Government of India after independence (in 1947), that involved industrialization of the fishing fleet, the introduction of efficient fishing gears, the establishment of marketing and processing infrastructure as well as an emphasis on export-driven growth (Kurien, 1978; Salagrama, 2004).

The southern states of Tamil Nadu and Kerala were the epicenter of such initiatives, where mechanized fishing was introduced through foreign assisted programmes such as the Indo-Norwegian Project (INP) (Ghosh, 1998). The technological breakthrough achieved through the rapid adoption of trawl fishing during the 1960s and 1970s soon percolated to other parts of the country during the ensuing period. Capital investments in mechanized fishing fleet development, processing infrastructure and allied activities followed, leading to the entry of large business establishments to the sector by the 1980s and afterwards (Kurien, 1985). However, a substantial majority of the beach-dwelling coastal fisherfolk continued to engage in less capital intensive, traditional, non-mechanized fishing activities leading to the emergence of various groups of technologically polarized, mutually competing fisher groups. These small-scale fishers however managed to survive the intense competition through a series of low capital-intensive innovations that included the introduction of new vessel designs (propelled by outboard motors), gear types (purse seines and ring seines), and fishing practices (Bavinck, 2011; Bavinck and Johnson, 2008).

A large number of measures to regulate fishing, mainly in the form of a seasonal trawl ban and spatial zoning (demarcating the waters for mechanized and motorized fishing) was introduced to bring order to the fishing scene. The Government of India also commissioned several scientific and regulatory institutions to guide policies related to marine fishing during this period. Almost in parallel, major programmes were launched to utilize the fishery resources in

the offshore and deep sea areas that focused on importing commercial deep sea fishing vessels and forging international collaborations for developing deep sea fishing expertise (DADF, 2014). These efforts paid off in the form of steady enhancements in marine fish landings at the rate of 3.1 percent per annum between 1960 and 2018.

In contrast, the Indian marine fisheries sector is also facing a number of unprecedented challenges in recent times. Numerous studies have shown evidence of decline of several commercially important fish stocks and their vulnerability to external factors (Mohamed *et al*., 2010; Kripa *et al*., 2018; Rohit *et al*., 2018; Dineshbabu *et al*., 2020), overcapacity, destructive fishing practices and competition among fisher-factions leading to frequent conflicts (Bavinck and Johnson, 2008), vulnerabilities in fisheries governance system (Vivekanandan *et al*., 2003; Parappurathu and Ramachandran, 2017), rigidities associated with the fish value chains (Sathiadhas and Narayanakumar, 1994; Bino, 2015), low financial inclusion and liquidity constraints (Parappurathu *et al*., 2019), occupational hazards and limited coverage of risks and uncertainties (Suresh *et al*., 2018; Parappurathu and Ramachandran, 2017), ocean pollution (Glasby and Roonwal, 1995; Vikas and Dwarakish, 2015), climate change and associated extreme weather events (Roxy *et al*., 2017), to cite some of the most significant.

The continuing developmental initiatives over the past seven decades in the realms of technology, policy and institutions, coupled with changes in resource structure and ecosystem health have nevertheless driven extensive transformations in the demographic and socio-economic profile of the country's coastal fisherfolk. Dominant narratives in this context include: (i) changes in population size and structure because of ageing and fertility rate changes; (ii) outflow of people towards the non-fishing sector because of the expansion of the non-farm sector; (iii) inflow of migrants from non-traditional sectors/regions to join the fishing and allied labour force; (iv) inter-generational occupational mobility; (iv) interactions within and between fishing communities and with the coastal environment; and (v) a variety of socio-economic dynamics leading to changes in the standard of living and the welfare of the fisherfolk. These assume significance as the future trajectory of growth of coastal fisheries and the welfare of the fisherfolk depend considerably on how well such demographic and social processes and their implications are understood and used to plan and manage fisheries for sustainable development. This chapter therefore, presents a brief overview of the fisheries sector in India, delves deeper into the demographic change happening in coastal fishing communities over the past few decades, identifies the underlying opportunities and threats, and suggests strategies to address emerging challenges.

Fisheries sector of India: a brief overview

India is endowed with a diverse set of marine and aquatic resources thereby enabling it to support a thriving fish economy. Fisheries in India are highly varied and include marine fisheries, coastal aquaculture, inland fisheries, freshwater aquaculture, mariculture, cold water fisheries and recreational fisheries. The sector contributed 1.10 percent of the total gross value added (GVA) of the country during the triennium ending (TE) 2017–2018 (Table 1). Of the total fish production, estimated at 12.59 million tonnes, 71 percent was contributed by the inland sector and the rest by the marine sector. GVA from the fisheries sector grew at an impressive rate of 8.54 percent per annum during recent years (2011–2012 to 2017–2018) particularly catalysed by the high performance of inland aquaculture. The sector also contributes substantially to foreign exchange earnings of the country, which was about USD 7 081 million in 2017–2018. Fish and fishery products accounted for about 2.5 percent of total exports and close to 20 percent of agricultural exports from India (GoI, 2019a).

Table 1. Key indicators of the fisheries economy of India

Particulars	India
Gross value added (GVA) in fishing and aquaculture, TE 2017–2018 (million USD at current prices)	23 729
Share of fishing and aquaculture in agriculture and allied sector GVA at current prices (%), TE 2017–2018	6.24
Share of fishing and aquaculture in GVA at current prices (%) TE 2017–2018	1.10
Trend growth rate in GVA from 2011–2012 to 2017–2018 at constant prices (%)	8.54
Total fish production, 2017–2018 (million tonnes)	12.59
Share of marine fish landings in total fish production (%)	29.3
Export of fish and fishery products, 2017–2018 (million tonnes)	1.38
Value of export of fish and fishery products, 2017–2018 (million USD)	7 081

Source: Computed by authors based on data from Government of India (2018).

Among the various segments within the fisheries sector, marine fisheries is particularly important for India as it provides livelihoods to a substantial number of coastal inhabitants, the majority of whom are resource poor with no alternative sources of income and employment. Presently, India is the sixth largest producer of marine capture fish in the world, with total landings estimated at 3.49 million tonnes in 2018 (FAO, 2018; CMFRI, 2019). There are three obvious subsectors in marine capture fisheries, viz., mechanized, motorized and non-motorized,[28] broadly classified based on the type of vessel propulsion, level of mechanization of fishing gears and their type and the resources targeted. The mechanized subsector that contributes to about 82 percent of total landings is the dominant one that employed about 33 percent of the 0.99 million (2010) active fishers and operates fishing crafts that mainly target resources such as cephalopods, Indian mackerel, ribbon fishes, penaeid prawns, *priacanthus* spp., threadfin breams and croakers. The motorized subsector engages the maximum number of active fishers (62 percent) who mainly operate ring-seiners, motorized purse-seiners and bag netters that contribute about 17 percent to the total catch that predominantly comprises sardines, tunas, anchovies and seer fishes. The non-motorized sector that largely defined marine fishing in India till the early 1990s (now a minority), presently contributes only about 1 percent of catch and engages about 5 percent of the marine fishing workforce (CMFRI, 2012).

Coastal fishing communities in India

Traditionally, marine fishing in India is carried out by members of particular fishing communities who reside along the coasts and are distinct from the mainstream agrarian communities. These communities are however not homogenous, but include a number of distinctive ethnic groups which differ from each other in terms of religious and caste affiliations, social and cultural practices followed, and governance structures adopted. Technological changes that swept through the fishing arena over the past few decades have resulted in further polarization of these communities in terms of ownership of fishing assets and access to different types of

[28] Mechanized vessels are those which use machine power both for propulsion and gear operation and include trawlers, gillnetters, *dol* netters, liners, purse seiners, etc. Motorized vessels are propelled by inboard or outboard motors, but gears are operated manually. They include ring seiners, fibre glass/plywood/plank built boats that use various types of fishing gears. Non-motorized vessels mostly include traditional canoes/catamarans that use manual labour for both propulsion and gear operation.

fishing techniques. Most of these ethnic groups have limited geographic presence, with each coastal state home to one or more of them. For instance, Pattinavars are the dominant fishing community who reside along the Coromandel coast of Northern Tamil Nadu and follow a strong traditional fishery governance system with a network of *ur panchayats* (village councils) that discharge an amalgam of village affairs including management of fisheries and resolution of disputes (Bavinck and Vivekanandan, 2017). In contrast, the fishing villages of the Kanyakumari region of Tamil Nadu are dominated by the Mukkuvars who are traditional seafarers and are believed to have migrated from the neighbouring island country, Sri Lanka (Samuel, 1998). The Thoothoor fishers famous for their distant-water shark fishing skills are predominantly Mukkuvars. On the west coast, Kolis and Kharwas form dominant seafaring communities with several subcaste groups within them. Whereas Kolis dominate the *dol* net (a type of bag net) fishing sector, the Kharwas mainly operate trawl units (Johnson, 2014). In the Lakshadweep group of islands where fishing is the main livelihood, almost everyone is a fisher, and hence the idea of a separate fishing community is irrelevant. An indicative list of the major fishing communities that inhabit the costal stretches of India is presented in Table 2.

Table 2. Major ethnic groups engaged in marine fishing in India

Coastal State/Union Territory	Major ethnic groups
Tamil Nadu	Pattinavar, Mukkuvar, Parava
Andhra Pradesh	Vadabalaji, Jalari, Pattapu, Palle
Odisha	Jalari, Vadabalaji, Kalibarta, Khandayat, Rajbhansi
West Bengal	Kaibarta
Gujarat, Daman & Diu, Dadra & Nagar Haveli	Kharwa, Koli, Macchiyara
Maharashtra	Koli, Dhiwar, Bhoi
Goa	Kharvi, Gabit
Karnataka	Mogaveera
Kerala	Mukkuvar, Dheevara, Anjootty, Pooislan

Source: ICSF (2020).

Socio-demographic profile of fisherfolk

India's coast spreads over nine coastal states and four union territories (UTs). The socio-demographic features of fisherfolk in these coastal regions are captured through the All India Marine Fisheries Census carried out by the Indian Council of Agricultural Research-Central Marine Fisheries Research Institute (ICAR-CMFRI) based at Kochi, Kerala, with funding support from the Department of Fisheries, Government of India. The first such comprehensive census was conducted during 1980, followed by subsequent rounds in 2005, 2010 and 2016.[29] The census covers a variety of information such as fisher population, size and structure at household level, their educational and socio-religious status, gender-wise occupation in fishing and allied activities, craft and gear in the fishery along with major infrastructure facilities in the fishing villages. The censuses, however, do not cover inland capture fisheries. As per the Marine

[29] Census of 1980 excluded the state of Maharashtra and the UTs of Lakshadweep and Andaman and Nicobar Islands. The subsequent two rounds included Maharashtra, but still did not cover the above two UTs. The Marine fisheries Census, 2016 covers all states and UTs, but the report is still awaiting its official release (estimates are provisional).

Fisheries Census, 2016, there were 3 477 fishing villages with a total of 893.3 thousand fisher families, of which 818.5 thousand (92 percent) were traditional fisher families[30] (Table 3). The total population of fisherfolk is estimated to be 3.77 million in 2016. Between 1980 and 2010, the fisherfolk population in India exhibited an increase of 111 percent, but thereafter declined by 5.6 percent over the six-year period from 2010 to 2016.[31] The recent dip in population is not just in absolute terms but also in terms of the relative share of the fisherfolk population in total as is evident from Table 3. It is indeed a matter that requires thorough probing and could have resulted from multiple factors such as decrease in fertility rate, urban migration, non-farm employment diversification and subsequent shift within the rural areas, and so on. Interestingly, the number of fish landing centres also declined from 1 511 to 1 265 over the latter period.

Table 3. Profile of fisher folk population and changes over time in India

Particulars	1980	2005	2010	2016
Fisher villages (no.)	2 123	3 202	3 288	3 477
Fish landing centres (no.)	1 438	1 332	1 511	1 265
Fisher households ('000)	333.0	756.2	864.5	893.3
Average family size (no.)	5.68	4.65	4.63	4.22
Traditional fisher households ('000)	NA	NA	789.7	818.5
Total fisherfolk population ('000)	1 892.9	3 519.1	3 999.2	3 774.6
Fisher folk population as a share of total (%)	0.27	0.31	0.32	0.28

Source: Marine Fisheries Census, 1980, 2005, 2010 and 2016.
Note: The figures for 2016 are provisional.

The state-wise profile of the fisher folk population in 2016 is provided in Table 4.

Although age is an important attribute that defines the demographic characteristics of a population, the Marine Fisheries Census of India does not cover this information. Therefore, no country-wide data is available on the age structure of active fishers in India to suggest whether the new generation in the fisher villages consider fishing as a desired livelihood option. India is presently experiencing a demographic dividend wherein its working-age population has numerically outstripped its non-working age population. Its population is among the youngest in the world with a median age of about 28 years. Estimates show that India's demographic dividend that commenced about 2005–2006 would last for close to five decades, which is a huge opportunity for the country (UNFPA, 2019). However, such a dividend does not seem to be favouring the marine fisheries sector as indicated by recent surveys conducted by ICAR-CMFRI.[32] Though not representative, these sporadic surveys point to an ageing workforce engaged in active fishing.

[30] Traditional fishers are those who hail from families that have been practicing fishing for several generations. They could be part of any of the three segments (mechanized/motorized/non-motorized) depending on the economic means at their disposal.
[31] These comparisons over time however overlook the differential coverage of states/UTs across census rounds.
[32] Socio-economic surveys conducted by ICAR-CMFRI during 2018–2019 in the fishing villages of India.

Table 4. Profile of marine fisherfolk population by coastal states, 2016

State	Length of coast (km)	Landing centres (No.)	Fishing villages (No.)	Fishermen families (No.)	Traditional fishermen families (No.)	Total fisherfolk population (No.)
West Bengal	158	49	171	81 067	56 447	368 816
Odisha	480	55	739	115 228	92 569	517 623
Andhra Pradesh	974	234	533	155 062	152 062	517 435
Tamil Nadu	1 076	349	575	201 855	196 784	795 708
Puduchery	45	22	39	14 347	14 328	50 270
Kerala	590	174	220	121 637	116 598	563 903
Karnataka	300	84	162	32 479	30 897	157 989
Goa	104	32	41	2 986	2 922	12 651
Maharashtra	720	155	526	87 717	80 906	364 899
Gujarat	1 600	103	280	67 610	64 395	354 992
Daman-Diu	21	8	12	3 163	3 094	15 836
Lakshadweep	–	–	10	4 163	3 003	27 934
Andaman & Nicobar	–	–	169	5 944	4 486	26 521
Total	6 068	1 265	3 477	893 258	818 491	3 774 577

Source: Marine Fisheries Census, 2016.
Note: The figures for 2016 are provisional.

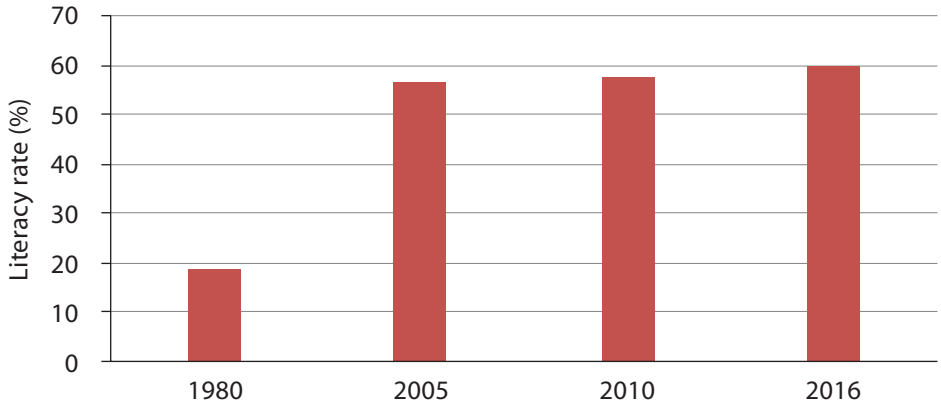
Table 5. Key socio-demographic attributes of fisherfolk population in India

Parameter	Fishing villages (2010)	All India (2011)
Average annual growth rate in population (%)	2.73	1.76
Average family size (no.)	4.63	4.91
Male literacy rate (%)	59.6	82.1
Female literacy rate (%)	55.8	65.5
Total literacy rate (%)	57.8	74.0
Percent of population below poverty line (%)[33]	61.0	29.5
Sex ratio[34]	928.0	943
Sex ratio among child population	944.0	914
Child population (%)	10.8	13.1

Source: Marine Fisheries Census, 2010; Rao *et al.*, 2016.

[33] As per the estimates of the 'Committee to Review the Methodology for Measurement of Poverty (2014)' chaired by C. Rangarajan.
[34] Sex ratio is defined as the number of female individuals per 1 000 numbers of male individuals.

A comparative assessment[35] of key socio-demographic attributes of the fisherfolk population with that of the general population indicates notable differences in terms of standard of living and other developmental indicators (Table 5). Out of all households enumerated in the year 2011, 29.5 percent were assessed to be falling below the poverty line. In comparison, 61 percent of fisher households were estimated to be poor in 2010, which is more than double the national average, and a clear indicator of the deplorable economic status of the fisherfolk in general. Excessive incidence of poverty in fishing communities could be the result of the predominance of smallholder fishers, fishing labourers and allied workers who get access only to a disproportionately lower share of the fishing pie because of the disparities existing in the sector in terms of scale and efficiency of operation. As is obvious from previous sections, about two-thirds of all fishers are employed in motorized and non-motorized segments which operate at much lower scales compared to their mechanized counterparts. Lack of alternative/ supplementary livelihood options because of a paucity of owned land and other assets, low credit worthiness, limited knowledge base, literacy and alternative skills and low institutional support, etc. are other major drivers of a high level of poverty among fishers. Moreover, lack of the habit of thrift, as is generally noticed, render these resource-poor fishers economically very insecure during lean seasons (Salagrama, 2006; Bene, Hersoug and Allison, 2010; Prathap, 2011). The literacy rate was another key indicator wherein fisherfolk fared less well compared to the general population. In 2011, the total literacy rate among the Indian population stood at 74 percent. In comparison, the overall literacy rate among fisherfolk was notably lower at 57.8 percent, with males (59.6 percent) marginally outperforming females (55.8 percent). The average size of fisher households in India was 4.63 in 2011, which is slightly lower than that of the general population (4.91). Sex ratio among fisherfolk was found to be skewed with 928 females for every 1 000 males, much more adverse than the all India estimate (943). Nevertheless, sex ratio among the child population within the fishing communities was found to be better (944) compared to that of all India (914).

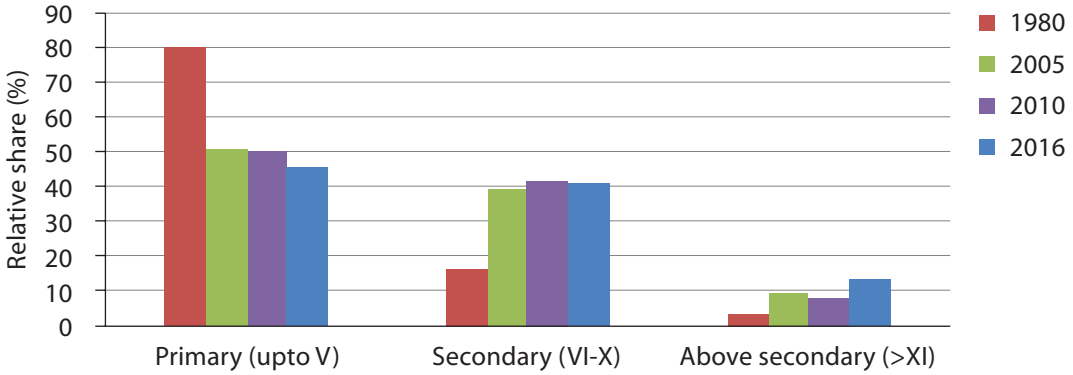


Source: Marine Fisheries Census, 1980, 2005, 2010 and 2016.
Note: The figures for 2016 are provisional.

Figure 1. Changes in literacy rate among fish folk in India over time

[35] The comparison is made based on the estimates from Marine Fisheries Census, 2010 and National Census, 2011 as these are the closest in time.

Notwithstanding this, it is indeed inspiring to note the improvements in literacy as well as educational attainments within the fishing community over the years. Literacy among fisherfolk in 1980 was as low as 18.6 percent and this gradually improved over time to reach 56.5 percent in 2005 and at 59.7 percent by 2016 (Figure 1). The educational attainments of fisherfolk also improved in tandem with the greater share of literates attaining higher educational qualifications in the later years (Figure 2). Evidently, 45.8 percent of the literates completed primary education, 41.1 percent completed secondary education and the rest (13.1 percent) qualified beyond secondary education by 2016.



Source: Marine Fisheries Census, 1980, 2005, 2010 and 2016.
Note: The figures for 2016 are provisional.

Figure 2. Changes in educational attainments of fisherfolk in India over time

Amenities in fishing villages

This section takes a peek at the availability of basic amenities in the fishing villages in India. The Marine Fisheries Census, 2016 shows that 69.7 percent of fisher families resided in *pucca* houses that are designed to be solid and permanent, which means that still close to 30 percent of families live in vulnerable dwellings (*kutcha*) close to the shores (Table 6). In this context, it is worth noting that only 15.1 percent of all houses in the country were *kutcha* according to the All India Census, 2011. However, the share of *pucca* houses increased by about seven percentage points between 2005 and 2016, indicating gradual progress. Nearly 94 percent of the houses have electricity and 37 percent have three or more rooms. Only 59 percent of

Table 6. Housing and other amenities in fishing villages, India, 2016

Particulars	Number	Share (%)
Pucca houses	622 182	69.7
Houses with 3 rooms or more	330 505	37.0
Electrified houses	837 996	93.8
Houses with toilet	529 702	59.3
Total number of households	893 258	100.0

Source: Marine Fisheries Census, 2016.
Note: The figures for 2016 are provisional.

houses had access to toilets indicating that over 40 percent of households depended on common facilities or open spaces for their basic sanitary and hygiene requirements. Tap water served as the source of potable water for over half (51.6 percent) of fisher households in 2016 and the rest depended on wells, hand pumps, bore wells and other sources (Table 7).

Table 7. Households' access to different sources of potable water in fishing villages, India, 2016

Particulars	Number of households	Share (%)
Tap water	460 578	51.6
Well	85 148	9.5
Hand pump	177 859	19.9
Bore well	177 859	19.9
Other sources	78 755	8.8
Total number of households	893 258	100.0

Source: Marine Fisheries Census, 2016.
Note: The figures for 2016 are provisional.

Occupational profile

Out of the total fisherfolk population of 3.77 million in India, over 1.53 million were employed, mainly in capture fisheries, coastal aquaculture and allied activities in 2016 (Table 8). A visible decline in the number of people occupied in most of the above activities was noticed in 2016 over 2010. The majority of the occupationally active fisherfolk (60.7 percent in 2016) were engaged in fishing and fish seed collection. Whereas 13.8 percent of the occupied fishers were involved in marketing of fish, about 7.6 percent of them had livelihoods based on fishing and allied labour. A variety of other activities such as making and repairing of nets, post-harvest processing and peeling provided employment to the rest of the working fisherfolk. It is worth noting that only about 5.2 percent of active fisherfolk residing in the fishing villages were occupied in non-fishing and allied activities in 2016. Apart from these, recent estimates of CMFRI suggests that about seventy thousand coastal dwellers are presently engaged in various types of mariculture activities such as mussel and oyster culture, cage farming of fish, seaweed culture, marine ornamental fish culture and other auxiliary enterprises.

As in most other fisheries, only men are engaged in active fishing in India. This is because a woman engaging in active fishing is considered taboo among all fishing communities in the country. However, women constitute the major workforce in several of the allied activities such as fish seed collection (58.2 percent), marketing (86.4 percent), making and repairing of nets (52.2 percent), and post-harvest operations such as curing (90.3 percent) and peeling (94.6 percent) (Table 9). Even among labourers who engage in manual operations such as sorting, grading, weighing, loading and other logistic activities, women formed a majority (53.7 percent). Overall, nearly three-fourths of the total workforce in the sector is constituted by women who in terms of number dominate all activities except active fishing. Further, a combined assessment based on Tables 8 and 9 suggests the increasing feminization of the sector, wherein employment in peeling and other activities, which are dominated by women, have increased between 2010 and 2016.

Table 8. Occupational profile of marine fisherfolk population in India

Activity	2016		2010	
	Number	Share (%)	Number	Share (%)
Fishing and fish seed collection	927 081	60.7	990 083	59.5
Marketing of fish	210 237	13.8	223 306	13.4
Making/repairing of nets	54 663	3.6	86 704	5.2
Curing/processing	48 292	3.2	53 467	3.2
Peeling	46 158	3.0	31 699	1.9
Labourer	116 481	7.6	199 146	12.0
Other activities in fishing and allied sector	45 914	3.0	17 374	1.0
Non-fishing and allied	79 583	5.2	63 563	3.8
Total occupied	1 528 409	100.0	1 665 342	100.0

Source: Marine Fisheries Census, 2010 and 2016.
Note: The figures for 2016 are provisional.

Table 9. Gender-wise occupational profile of marine fisherfolk in India, 2016

Activity	Number		Share (%)	
	Male	Female	Male	Female
Fishing	902 447	0	100.0	0.0
Fish seed collection	10 298	14 336	41.8	58.2
Marketing of fish	28 551	181 686	13.6	86.4
Making/repairing nets	26 135	28 528	47.8	52.2
Curing/ processing	4 669	43 623	9.7	90.3
Peeling	2 514	43 643	5.4	94.6
Labourer	53 971	62 512	46.3	53.7
Others	19 726	26 187	43.0	57.0
Total	135 566	386 179	26.0	74.0

Source: Marine Fisheries Census, 2016; Note: "other than fishing" category is omitted.
Note: The figures for 2016 are provisional.

Fishing crafts in the fishery

The total number of fishing crafts in the fishery exhibited a steady increasing trend between 1980 and 2010 before showing the opposite in the subsequent years registering a 15 percent drop between 2010 and 2016 (Table 10). The decline in the total number of crafts seems consistent with the overall decline in the fisherfolk population and the number of fishers as well as a drop in the number of landing centres over the same period. This could be considered an indication of people migrating to urban areas or other parts of the rural-urban continuum in search of better opportunities in non-fishing/non-farm sectors but needs further analysis at the grassroots level to be more certain. There also have been considerable changes over time in the composition of fishing crafts. The most notable one is an overwhelming shift from the non-motorized segment to motorized and mechanized segments, which is quite obvious and

steady over time. However, the general pattern of an overall increase in the number of fishing crafts and a shift from non-motorized to motorized and mechanized crafts does not apply after 2010 as is indicated by the relative composition of crafts in 2016. One of the quite obvious observations is a shift away from mechanized fishing during the past decade which could be attributed to a host of reasons such as concerns regarding economic viability, resource decline, and so on, which again necessitates detailed inquiries.

Table 10. Fishing crafts in marine capture fishery in India: 1980 to 2016

Type of crafts	1980	2005	2010	2016
Mechanized	9 289	35 806	72 559	42 656
Motorized	134 741	52 971	71 313	95 957
Non-motorized		96 661	50 618	25 689
Total	144 030	185 438	194 490	164 302

Source: Marine Fisheries Census, 1980, 2005, 2010 and 2016.
Notes: The 1980 census does not provide separate estimates for motorized and non-motorized categories of fishing crafts. The figures for 2016 are provisional.

Fishery related infrastructure

The fish landing facilities in India presently include seven major fishing harbours (two in West Bengal and one each in Odisha, Andhra Pradesh, Tamil Nadu, Kerala and Maharashtra), 52 commissioned minor fishing harbours and 181 commissioned fish landing centres. Other than these, there are over 1 000 beach landing centres that mainly cater to the needs of artisanal fishermen. Except for the large fishing harbours, landing centres along the coastal belt in general have a dearth of modern facilities such as safe mooring areas, provision for utilities (water, fuel and workshops), fish handling infrastructure (ice supply, cold storage, sorting areas, processing facilities) marketing infrastructure and associated connectivity (GoI, 2019b). The fishing villages house a variety of fishery related infrastructure apart from fishing harbours and minor fish landing centres. These include ice factories, curing and drying yards, freezing plants, peeling sheds, processing units, fishmeal plants and oil extraction units. The majority of the post-harvest infrastructure is concentrated in certain coastal cities such as Kochi, Mumbai, Mangalore, Chennai, Tuticorin, Paradeep, Vishakhaptanam and Veraval, which have specialized over the years as major processing and exporting hubs. During recent times, the food processing industries have been stepping-up their investments to comply with mandatory food safety and quality requirements of high-end markets by placing emphasis on traceability and product certification.

India is one of the leading exporters of marine fish and fish products globally. Out of the total seafood exports, which is pegged at 1.38 million tonnes and valued at USD 7 081 million in 2017–2018, about 70 percent in terms of quantity and 44 percent in terms of value are contributed by marine capture fish. This translates to about 0.96 million tonnes in quantity and USD 3 115 million in value (MPEDA, 2019). However, it is worth noting that about 90 percent of all exports are either in live, fresh, chilled or frozen forms. This indicates that only about ten percent of seafood exports are in higher order value added forms. Because of this, the unit values realized on exported products are much lower, and many times lower than prices realized in domestic markets (Salim, Safina and Athira, 2015). The government presently

emphasizes augmenting processing capacity of export processing units towards tertiary processing (ready to eat products, heat and serve products, re-heated airline meals, canned/ tinned products, etc.) that match the requirements of importers in high-value markets.

Labour mobility in fishing communities

Labour mobility has been a major driver of demographic change within fishing communities in India. In the marine fisheries sector, it is varied in nature and needs to be understood based on the broad concepts of spatial and occupational mobility. Spatial mobility is manifested in the forms of commuting, circulation and migration characterized by fishers moving to other places for employment, such categories based on the duration and type of movement. Occupational mobility could be intergenerational, intrasectoral or intersectoral and involves mobility from one type of activity to another driven by better income prospects, changes in technology, or other attractions (Rajan, 2004). A thorough understanding on the entire gamut of labour mobility in India's marine fisheries sector is possible only through a comprehensive and systematic assessment and is not attempted here. Instead, the dominant forms of spatial and occupational mobility prevalent in India's coastal belt are discussed based on the findings from recent studies.

One of the most notable cases of seasonal interstate migration of labour is one observed along the northwestern coast in the State of Gujarat, for over the past two to three decades. The majority of these migrant fishers hail from the coastal districts of Vizianagaram, Srikakulam and Vishakhapatnam of Andhra Pradesh State, and migrate to the Veraval town of Gujarat district, one of the largest fishing hubs in India. They are hired by Gujarati vessel owners on annual contracts and payments are generally made in lump sum before commencement of the work. Most of them work in the trawlers as deck hands and skippers for about eight months in a year and return to their hometowns by the end of the fishing season, only to return in the next season. Poverty, lack of employment opportunities at home and guaranteed payments from the employers at Gujarat are the main drivers of such migration, which is of great significance for the Gujarat fisheries economy at present (Roshan, 2017). The state of Kerala has been another major destination for migrant fishers from eastern states such as West Bengal, Bihar, Andhra Pradesh, Odisha and Assam over the past two decades. Driven by conspicuously higher wage rates in Kerala, such seasonal migration has caused a significant amount of substitution of local fishing labour in the mechanized trawl sector by the migrant labour. The migrants mostly hail from coastal areas such as Sunderbans, Puri, Korda, Cuttack, Baleswar, Srikakulam and Vizhianagaram. However, there have been several cases of men migrating from the interior villages of West Bengal and Assam with no prior fishing experience. Most of them shift from low-paying farm jobs in search of better alternatives in other sector such as fishing (Peter and Narendran, 2017).

Bavinck (2011) throws light on a similar demographic transformation, attributable mainly to immigration, that is underway along the Palk Bay and Gulf of Mannar coasts of Tamil Nadu wherein, significant numbers of non-fisher people have joined the trawl fishing workforce inspired by the economic prosperity achieved by the fisherfolk of this region in recent times. The Paradeep fishing harbour on the Odisha coast is another preferred destination for migrants from Bihar, West Bengal and Assam because of the employment opportunities offered by a large fishing fleet operating from there. Similarly, fishers from Kanyakumari and Ramanathapuram districts of Tamil Nadu work in large numbers in the trawlers, gillnetters, long liners and ring seiners operating from the major landing centres in Kerala. However, these men

are not strictly migrants as they return quite frequently to their hometowns after coming back from long fishing trips in the offshore waters (Rajan, 2004). Over time, many of them have become business partners with local fishermen thus enhancing their economic stakes and involvement in the occupation.

Apart from fishing, migrant workers, many of them women, are also employed in the primary and secondary processing units along India's coast. For instance, the fish processing units in Veraval, Porbunder, Mumbai, Mangalore, Vishakhapatnam, Kollam and Kochi employ a considerable number of female migrants from almost all parts of the country who assist in pre-processing and processing activities. The majority of the women workers are drawn from Kerala because of their specialized skills, although women from Tamil Nadu, Andhra Pradesh, and Karnataka have also found employment in this segment (Jeyanthi *et al*., 2015; Warrier, 2001; Nishchith, 2000). Some of them find work in other allied sectors in the value chain as well (Sathiadhas and Prathap, 2009).

The above account mostly presents migration to the coasts from other regions and from other sectors. In parallel, there has been considerable movement of labour taking place away from the coasts as well, as is obvious from the discussion in the previous sections. Systematic studies that analyse the patterns and determinants of such occupational mobility are however scarce. Though most of such mobility is limited to within the country, as Sathiadhas and Prathap (2009) point out, numerous coastal fishers from Tamil Nadu migrate to overseas destinations, which include the coasts of Qatar, Saudi Arabia, United Arab Emirates and other Near Eastern and Caribbean nations mostly to work in the fishing vessels there. The trend is however not restricted among Tamil Nadu fishers alone, but prevalent along the coast, though not much is written about it. Certainly, more detailed studies are needed to fill the information vacuum on this topic.

Conclusions and policy implications

This chapter is primarily focused on understanding the nature of demographic transformation taking place in the coastal fishing communities in India over the past four decades. Broad patterns of change with respect to key socio-demographic parameters such as the size and structure of population residing in the marine fishing villages, number of fisher households, average family size, poverty status, sex ratio and literacy rate are analysed based on four rounds of the marine fisheries census. Furthermore, other auxiliary details such as the availability of basic amenities in the fishing villages, trends in occupational profile of fishers, gender-wise variations therein, changes in the number of fishing crafts and other fishery related infrastructure are assessed in detail. The predominant pattern of labour mobility, which is a key driver of demographic changes as well as socio-economic transformation within the fishing communities, is discussed based on evidence from recent studies.

The exercise yielded some noteworthy inferences and pointers, which could be useful in charting out the future development priorities for the target population. The major ones include: (i) a steady increase in coastal fisherfolk population over the period 1980 to 2010 followed by a sharp dip during the subsequent period until 2016, not just in absolute terms, but also as a share in total – this might be indicative more of an outflow of people from the coastal belt to urban areas and other parts of the rural countryside rather than an abrupt change in the vital parameters of the population; (ii) an observed decline in the number of fishing crafts and fish landing centres that further underscores an outward movement of labour force away

from the coasts; (iii) markedly lower economic status of fisherfolk compared with that of the general population as indicated by a near double poverty rate within the fishing community compared to the all India level in 2010/2011; (iv) that the fisherfolk are socially less empowered with a strikingly low literacy rate and adverse sex ratio compared to the rest of India; (v) on a positive note, however, visible progress in the state of fisherfolk can be seen over time as evidenced by improvements in literacy and access to housing and other amenities; (vi) greater participation of women in all fishing and allied activities, except in active fishing; (vii) overall trend of motorization and mechanization of fishing crafts over time, which however is somewhat offset by an abrupt decline in the number of mechanized fishing vessels post-2010; and (viii) continuing labour mobility within and across sectors and regions bringing about significant changes in the composition of the labour force engaged in fishing.

The above inferences are self-explanatory in outlining the need for placing a particular emphasis on and giving priority to designing programmes for catalysing growth and development in the coastal fishing economy in India. This is particularly true because the fishing communities are far more vulnerable to loss of livelihoods and habitat destruction given the deepening resource crisis in the coastal waters and incidence of frequent extreme weather events that hit the country's coasts on a recurrent basis. As is obvious from the nature of problems the community is presently grappling with, the solutions need to be comprehensive and all-encompassing with a specificity that matches local realities. The interventions should not only be multipronged, but also based on the broad pillars of sustainability, resource efficiency, gender-sensitivity, social justice, social security as well as good governance with community participation.

Acknowledgments

We would like to thank Dr Susana Siar of FAO for having initiated this study and for encouraging and guiding us throughout its course. We are equally grateful to Dr Derun Yuan of NACA as well as Dr Weimin Miao of FAO for their continued support. The participants of NACA/FAO Regional Consultative Workshop on "Strengthening Governance of Aquaculture for Sustainable Development in Asia-Pacific and Demographic Changes in Fishing Communities in Asia" deserve special appreciation for their expert comments on a presentation on which this chapter is based. We are also grateful to Dr T.V. Sathianandan, Head, Fisheries Resource Assessment Division, ICAR-CMFRI for sharing the census reports. The comments and suggestions of Dr R. Narayanakumar and Dr C. Ramachandran, SEETT Division, ICAR-CMFRI are gratefully acknowledged. The views expressed in this chapter are those of the authors and not the institutions they are affiliated with.

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Chapter 5. Highlights of the Regional Consultative Workshop on Demographic Changes in Fishing Communities in Asia

Susana V. Siar and Kyoko Kusakabe

Background

The Food and Agriculture Organization of the United Nations Regional Office for Asia and the Pacific and the Network of Aquaculture Centres in Asia-Pacific co-organized the Regional Consultative Workshop on 6–7 November 2019 in Bangkok, Thailand. Participants from Cambodia, China, India, Indonesia, Iran, Lao People's Democratic Republic, Malaysia, Maldives, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, and Viet Nam attended the regional consultative workshop (Annex 1). The Workshop agenda is found in Annex 2. The regional workshop had the following objectives: (i) share the results from the desk study, the case studies in Cambodia and Thailand, and the situation in other countries in the region; (ii) identify opportunities and threats in fishing communities under rapid demographic change; and (iii) recommend strategies and actions to prepare fishing communities to adjust to demographic changes.

Summary of presentations

Desk study

Gabrielle Groves Punyaratabandhu presented the findings of a desk study that served as a background paper to the regional consultative workshop.[36] The objective of the desk study was to understand the demographic changes, their drivers and the observed short-term and long-term impacts on fisherfolk and fishing communities. Her study showed a general demographic trend in Asia of a decreasing fertility rate (number of children per woman), increase in the population aged 60 and over with a majority of them being women, increase in migration from rural areas to cities, and greater inequalities faced by the rural poor in terms of access to education. The desk study also found out that there is limited long-term research on demographic transition and fishing communities, making it difficult to understand adaptive strategies and resilience. Knowledge gaps identified by the desk study include: (i) lack of linkage between demographics and socio-economic indicators; (ii) limited linkages between demographics, economic change and ecosystems; (iii) many previous studies were people-blind and gender-blind; (iv) information was out of date with a large number of reports on transition and change dating back to the late 1990s and the early 2000s; (i) previous studies on drivers of demographic transition largely focused on the agricultural sector; and (vi) limited availability of long-term research to enable the understanding of the impact of demographic change in the fishing sector.

Thailand and Cambodia case study

Kyoko Kusakabe reported on the case study of demographic changes in fishing communities in Thailand and Cambodia.[37] In both countries, fishing communities have a higher ratio of elderly people. The population ageing process is advancing faster in fishing communities but

[36] For more information, please refer to the paper in this publication.
[37] For more information, please refer to the report of the case study in this publication.

for different reasons. In Thailand, the average age of fishers is on the increase, since the younger generation is leaving fishing to work in urban areas. Labour shortages in fishing communities are filled in by cross-border migrant workers from Cambodia. New rules and regulations to combat illegal, unreported and unregulated (IUU) fishing have made it more difficult for medium-scale and small-scale fishers to comply with all the regulations. Thai fishing communities do not have any strong organization to represent them in negotiations with the state. In Cambodia, the decrease in fish resources especially in the inland area have made it more difficult for full-time fishers to maintain their traditional livelihood. The young generation has started to migrate to urban areas as well as cross-border to Thailand and the Republic of Korea. Cambodian fishing communities are organized into community fisheries (CF) to protect their fishing grounds, but their legal rights and their institutional strengths are not sufficient to be effective in protecting their fishery resources.

In all the study areas, in spite of the difficulty faced by fishers, they have a strong identity as fishers and the old fishers are determined to continue their occupation. However, it is getting difficult to maintain medium-sized boats in Thailand, and in all the study areas there is a heavier dependence on remittances and non-fishing income. It is often the case that children send remittances to support the fishing activities. For non-fishing wage work, in coastal Cambodia, it is mainly the daughters who go to work in garment factories and casinos in the area. Lack of labour in all the study areas also means that there is less labour for fish processing or any other activities to add value to fish products. Having fewer young fishers also affects the vibrancy of the fishing communities and that affects collective action, which is important if they are to solve their problems and negotiate with the state and other stakeholders. The population ageing in fishing communities also means that elderly care is going to be a challenge in the near future. In both Thailand and Cambodia, the government does not have any comprehensive elderly care support, and it is largely left to the elderly and their families to provide support. It is the women and daughters that are expected to fulfil care work responsibilities.

Cambodia

Sopha Lieng presented a case study of two community fisheries, Peam Popech and Phlong, in Kampong Chhnang Province, Cambodia. The study focused on demographic characteristics as well as the characteristics of the savings groups within these community fisheries. The study was conducted in 2016 and a total of 160 households was interviewed. Among the findings of the study were: (i) more than half of the respondents in both community fisheries did not finish primary school; (ii) households are partially dependent on fishing for their livelihoods during the dry and wet seasons, with the majority of them deriving less than 30 percent of their household income from fishing; (iii) during the wet season, households depend on rice and crop farming and other sources of employment such as factory work, construction, fish trade and fish processing; (iv) during the dry season, households are engaged in livestock rearing and other sources of income; (v) during the wet season, many households are engaged in two or three sources of income, compared with the dry season when many households are engaged in only one or two sources; (vi) fish consumption is higher during the wet season when more than half of the households consume fish daily and 40 percent consume it three to five days in a week; (vii) during the dry season, more than half of the households consume fish three to five days in a week, with 40 percent or more consuming fish daily; (viii) among the assets owned by the households are farm land and crop land; (ix) almost all households are members of the community fisheries association, and more than half in Peam Popech are members of a savings group and one-fourth are members of a women's group; and (x) many households are members of one or two associations.

India

Shinoj Parappurathu presented the demographic change in fishing communities in India.[38] The country is a major fish producer. For the period 2017–2018, India produced 12.59 million tonnes, of which 3.69 million tonnes were from marine fisheries and 8.9 million tonnes from inland fisheries. India has 1 265 fish landing centres, 26 major fishing harbours, and 38 minor fishing harbours. There were 16 million people involved in fishing and allied activities in 2017, of which 65 percent was male and 35 percent was female. There has been an increasing trend in the size of the marine fisherfolk population between 1980 and 2010, but a decreasing trend between 2010 and 2016. Family size has been decreasing and the sex ratio was skewed in favour of males. There has been an increasing literacy rate over the years as well as improvement in the level of educational attainment among fisherfolk. However, the literacy rate is slightly higher for males than females, and both are lower than the national average. The marine fisherfolk population living below the poverty line is higher (61 percent) than the national average (29.5 percent). There is a trend of male migration between states to work as fishing labourers and for women to work in shrimp processing factories. Small-scale fishers previously engaged in traditional non-motorized fishing are moving to mechanized trawl/purse seine as labourers, attracted by the timely payment of wages. Between 1980 and 2016, the number of non-motorized fishing vessels declined from 134 741 to 25 689.

Indonesia

Sonny Koeshendrajana, in his presentation on the demographic change in fishing communities in Indonesia, showed that Indonesian waters are divided into 11 fishery management areas (FMA). In 2017, the fishery production from the 11 FMAs was 6.6 million tonnes. His presentation showed that there has been a 51 percent decrease in the number of fisher households between 2003 (1.6 million) and 2013 (780 037). Data for 2013 showed that many of the fishers belong to the 40 to 49 age group, with more than half of them in the 30 to 49 age group. Furthermore, more than 30 percent of fishers with non-motorized fishing vessels belong to the age group 50 and above; one-fourth of the fishers using inboard-motorized vessels and 30 percent using outboard motors belong to the same age group. Data showed that the number of fishers between 2012 and 2016 was fluctuating, but there has been a decrease between the two periods, from 2.7 million in 2012 to 2.6 million in 2016. The presentation noted the following observations: (i) fishing is still considered as employment of last resort; (ii) fishing is a livelihood for coastal communities, but this may change in the near future; (iii) seaweed culture has been growing rapidly; (iv) an increase in economic creative activity related to the development of the tourism industry; and (v) an increase in non-formal business and online trading and services.

Maldives

Hassan Shakeel, in his presentation on the Maldives showed that the youth represented 68 percent of the working age population and 47 percent of the total population in 2014. Available data showed that people directly involved in fishing represented 3.6 percent of the working age population in 2014. Furthermore, the number of fishers has been decreasing since 2012 from 9 973 to 7 045 in 2016. The predominance of young people in the working age population has led to changes in the fishing industry, including: (i) operation of larger tuna fishing boats; (ii) use of modern devices on tuna fishing boats, such as fish finding devices, bird

[38] For more information, please refer to the chapter in this publication.

radar, global positioning systems (GPS) and vessel locating devices; (iii) operation of multiday fishing trips by tuna fishing boats; and (iv) increased participation of the youth in fishing, particularly in pole and line tuna fishing and handline large yellowfin tuna fishing. The overall increase in population, however, could put additional pressure on reef resources. The potential opportunities for the increase in the overall population and working age population, particularly the youth, include: (i) further expansion of the fisheries sector; (ii) diversification of the fisheries sector; (iii) reduction of expatriate labour; and (iv) use of advanced technology in fishing boats and fish processing.

Myanmar

Maw Maw Than and Ye Pyae Naing presented general information about the fisheries sector in Myanmar, noting that there are 3.2 million people employed in the sector and that 1.9 million households are located in the coastal zones of Myanmar and dependent on marine and coastal resources. They also noted that roughly 25 percent of the population in Myanmar is below 15 years old, but the proportion of young people in the population has been decreasing steadily owing to declining birth rates and increasing life expectancy, with most men and women living into their sixties. Between 1973 and 2014, the number of people aged 60 and over increased from a little over 1.5 million to 4.5 million, with more females than males. In terms of migration, males in the 40 to 54 age range have higher migration rates than women. The authors did not present data specific to fishing communities. However, the implications of an ageing population, for example, the need for a supportive environment for older persons such as social protection, affordable access to basic primary health care services, sufficient universal pension schemes, work opportunities for older persons, and infrastructure that will ensure their well-being, are a common concern.

Sri Lanka

Shivatharsan Sivasithamparam presented on fisheries community development in Sri Lanka and informed that there are 185 775 active fishermen in the country, with 156 096 fishing families, and a fisheries population of 619 787. The fishing industry contributes 1.8 percent to the gross domestic product and 2.4 percent to the total export earnings. The author presented information about the fishing fleet composition, available infrastructure for fisheries, and fisheries districts. The present fish consumption in the country is 15.8 kg per person and the target is to increase this to 22 kg per person. The issues in the fisheries sector include: overexploitation and depletion of fish stocks; overcapacity and illegal, unreported and unregulated (IUU) fishing; poor handling, high losses, low quality, low prices, low income; excessive bycatch and discards; poverty, no savings for future, limited access to microfinance and insurance; low living standards (health, housing, education); and user conflicts (with large-scale, industrial and other developments). Actions to address these issues include: diversified or strengthened income opportunities, increasing awareness of opportunities, and capacity building; improving the quality of fishery products and the market chain; introducing new technology and increasing awareness of their benefits; improving safety, reducing vulnerability and facilitating access to microfinance; improving welfare facilities; implementing co-management mechanisms for sustainable utilization of fishery resources; and development of community-based disaster management plans. The author also presented information about specific projects being implemented in the sector such as alternative livelihoods, social security and welfare, accident and health insurance, and low-interest loan schemes.

Thailand

Suthasinee Sontitirat identified three changes happening in fishing communities in Thailand, which are: change in the number of fishers and fishworkers; population ageing; and migration. These changes are bringing about changes in fishing activities, such as commercial and artisanal vessels going out of business; gradual disappearance of the fishing occupation as fishers get older; and strict fishery and labour laws making labour migration more difficult. The potential threats to fishing and fishing-related activities include owners of fishing vessels going out of business, loss of income by fishers, and decrease in fisher livelihoods and well-being. In small-scale Thai fishing communities, women tend to participate in fish processing, selling and repairing fishing gears, whereas men tend to participate in fishing activities. Her presentation provided the following recommendations to address the impacts of demographic change: promote cooperation between small-scale fishermen; promote sustainable fisheries in small-scale fishing communities; and introduce low-labour intensive, high-technology vessels for commercial fishing vessels.

Working group session

The participants were divided into two groups to discuss the following questions:

- Which of the demographic changes in fishing communities are significant? Why?
- What are the positive and negative impacts of such changes on fishing communities and the fishing industry?
- How do such changes affect men and women differently?
- How can we prepare fishing communities and the fishing industry to face such changes?

A consolidation of the outputs of the two working groups follows.

Which of the demographic changes in fishing communities are significant? Why?

Changes	Why significant
Group 1	
Education	High education background → move out of fishing → fewer fishers
Age composition (population ageing)	Young generation move to urban area/other occupation Capacity of fishing reduced
Migration (out)(not much in)	Less infrastructure and fewer facilities/job opportunities/social services Low catch/fish production Population composition becomes polarized
Employment opportunity	Higher out-migration Fishing efficiency decrease → look for other job

Group 2	
Migration/Greater labour mobility	Causes labour shortage
Ageing/Increase in age of active fishers	More older persons in fishing community
Young generation not interested in fisheries	
Only marginal groups join fisheries	
Gender	
More opportunity outside fishing business for younger generation	

What are the positive and negative impacts of such changes on fishing communities and the fishing industry?

Changes	Positive impacts	Negative impacts
Group 1		
Number of fishers decreases (community/industry)	Reduced dependence on natural resources/protect natural resources Stock enhancement increases Catch per effort increases	Fishing industry damaged because of lack of fishers (low supply)
Education	Can use new technology Better knowledge on natural resources management/ conservation/sustainable practices	Move to another job when educated
Age composition	Use new technology Better fisheries management	If catch per effort decreases, industry will be short of supply Size of boats polarized (only small or large boats) (less medium-sized boats)
Migration	Remittances New opportunity for women to replace men in fisheries? (Do women start going fishing?)	Labour shortage Low catch (low supply) Catch per fisher increases? (only old fishers?) Women have less opportunity for fish processing/trade because not enough fish
Diversified employment opportunity (less dependency on fisheries)	Less pressure on aquatic resources Fewer fishers Catch per person increases Increased nutrition level	Not necessarily more opportunity for all (employment opportunity is in outside community) Impact on community Lose tradition/culture indigenous knowledge

Group 2		
Migration/Greater labour mobility	Increase in assured income Interstate migration covers shortage in labour force Foreign workers migration covers shortage of labour Young fishers fully used mechanization	Causes labour shortage Alienation of family Fisheries production decrease because of less human resource availability Increase in cost of production Influx of foreign workers
Increase in average age of active fisher (ageing)	Experience makes for better catch	Fewer young persons in fishing community Potential decrease in fish catch Ageing fishers cannot fully adapt to mechanization
Young generation is not interested in fishing activity	Mechanization compensates for lack of participation of the younger generation	Ageing fishers use some form of local customization to continue fishing (unsafe practice) but not considered as negative
Only marginalized people enter the fishery	The only choice to earn a livelihood (as fishing is a legal activity for them) Some areas are designated for marginal people to fish.	

How do such changes affect men and women differently?

Changes	**Impact on men**	**Impact on women**
Group 1		
Decrease in number of fishers	Fewer men doing fishing More pressure on men (fewer fishers in household)	Women lose opportunity to do fish processing/trade
Education	Use more advanced fishing technology Undertake migration (move to urban jobs) Get more exposure to outside world → learn new info/ knowledge	Use more advanced fishing technology/post-harvest activities Women might not go out → education does not lead to more exposure Higher (expected) income for family
Age composition	Young men move out Older men remain in fishing	Young women move out (if government provides elderly care → burden does not go to women)

		Elderly also move to urban area → "empty village"
Migration	More men go out Less men in community	More women stay in community
Employment opportunity	High income	High income
Group 2		
Migration/Greater labour mobility	Need to get foreign workers to cover other fisheries job (processing, packaging, marketing)	Improved self-sufficiency in women Economic empowerment
Increase in average age of active fisher (population ageing)	Increases in drudgery of old fishers in non-mechanized sectors Decrease in income Decrease of competition of male youth in other occupations	Decrease in opportunity in fishing industries Decrease in income
Young generation is not interested in fishing	Labour shortage	Labour shortage
Only marginalized people enter the fishery	Increase in self-employment	Increase in self-employment

How can we prepare fishing communities and the fishing industry to face such changes?

Group 1

- Government to create job opportunities in the local area
- Political will to support small-scale fishers through restructuring of fisheries
  - well-organized fisheries needed particularly in the form of government policy to reduce number of small vessels
  - sectoral planning needed
  - give rights of resources to community (co-management)
    - capacity building; promote fish production
  - apply improved technology to increase efficiency (to support ageing fishers) (attract young to stay in fisheries)
- Diversify livelihoods through participatory approach
  - capacity building; community building
  - e.g. eco-tourism
- Maintain resources (management/protection)
- Create a decent work environment for fishing
  - so that fishers will stay in the occupation (better working conditions)
- Institutionalize rural elderly citizens' care
  - social security/insurance scheme should not ignore rural communities
- Encourage investors in fishing to introduce new technology
  - need to ensure that this benefits small-scale fishers (maybe through creation of employment?).

Group 2

- Government needs to take action on gathering/prepare information in aquaculture sector to promote fisheries based opportunity
- Policies should be adapted to generate job opportunities
- Diversify livelihoods in fisheries industry
- Create value added products in fisheries (post-harvest)
- Explore the synergy between fisheries and aquaculture sector
- Encourage awareness of environmental conservation
- Create legislative instruments for ensuring well-being of migrant fishers
- Provide more subsidies from the government
- Protect fishing area and exclusive economic zone
- Prepare and provide for ageing fishers such as social protection, well-being and facilitate their physical and social activities.

Chapter 6. Overall conclusions and recommendations

Kyoko Kusakabe and Susana V. Siar

Demographic change is happening in many countries in Asia, through population ageing, migration or both. The chapters in this publication as well as the regional consultative workshop have demonstrated the ways in which fishing communities experience demographic change. For example, some countries such as Maldives and Myanmar are still not experiencing population ageing, whereas other countries such as India, Indonesia and Thailand are experiencing both population ageing and out-migration.

Even though the demographic change is experienced differently in different countries, fishers in many countries in Asia are experiencing a decrease in the fish catch. In India, there was a higher incidence of poverty among fishers compared to other occupations. In Cambodia's coastal areas, the decrease in fish catch has been offset by the increase in fish prices. Reduction in fish catch resulted in, or has been accompanied by, a decrease in the number of fishers. The decrease in catch as well as the mechanization of fisheries has made it more difficult for small-scale fishers to make a living from fishing, and they have either quit being fishers or become fisheries labourers. During the regional consultative workshop, participants noted the overall decrease in the number of fishers. Such a decrease is not only because of population ageing. For example, in the Maldives where the ratio of the youth population to the overall population is over 60 percent, a decrease in the number of fishers is still evident. The decrease in fishers was also exacerbated by the labour demand and higher wages in urban jobs and other sectors. The reduction in fish catch has affected small-scale full-time fishers who had difficulty in making a living. This has led to polarization in fishing communities, where the possible ways to survive are to work as fisheries workers in larger mechanized trawlers or stay as small subsistence artisanal fishers, given that the medium-scale fishers have difficulty sustaining themselves.

Women remain a hidden workforce in fisheries. Women make up 80 percent to 90 percent of fish processing sector globally (Bennett *et al*., 2020), and also carry out much of the retail activities in many countries. A decrease in the fish catch as well as a decrease in small-scale fishers will hurt women in fisheries since they will have less access to fish for processing and for retail. With men leaving fisheries for labour elsewhere, women are left in the village to either do gleaning or become engaged in micro-scale coastal fishing. In one sense, the feminization of fisheries seems to be happening with the decrease in male fishers through migration and ageing. In the face of decreasing income from fishing, women are becoming engaged in fish processing and non-fisheries jobs in order to support the fishing households.

A decrease in the fish catch as well as a decrease in the number of fishers, and population ageing of fishers have led to diversification of livelihoods in fishing communities. Aquaculture and tourism are two avenues that are often cited as the way forward, which are led by women in many places where men are migrating out. However, women face limitations in terms of capital and information, as well as education levels making it difficult to adjust to new livelihoods. For example, in India, fishers have lower literacy rates than the average population. In addition, it was also noted that in fishing communities, the adverse sex ratio is higher than the national average, indicating greater gender discrimination in fishing communities.

The studies in this publication and the workshop were conducted before the outbreak of the COVID-19 pandemic. The drastic changes in production and consumption patterns as well as travel and logistics challenges under the pandemic have affected fisheries livelihoods (FAO, 2020a; FAO, 2020b). Bennett *et al*. (2020) noted that small-scale fishers were not able to go fishing because of the requirement of social distancing, which did not allow them to have crews on their small boat. The lockdown led to a decrease in fish demand as well as a decrease in fish prices (FAO, 2020).

It has been pointed out that the COVID-19 pandemic put more strain on women than on men, and fishing communities are not an exception. Aodha (2020) noted that women are more exposed to the virus because of their concentration in the seafood industry and in the retail market. They usually have to work in closed conditions that can cause them to be vulnerable to infection or at risk of not being able to work because of closure of the workplace. Women feel the need to continue to work even by bearing the risk of infections in order to earn income for the family. Factory workers were vulnerable to lay off, and women workers are more vulnerable because of the temporary nature of their work status as well as the sector that women work in. Johnstone *et al*. (2020) argued that the health crisis affected women more since they are the ones to take care of the sick and also because access to health services has become more and more difficult because of the pandemic. A potential food crisis has also been pointed out because of the disruption in fishing activities and in the food supply chain, and delay in stocking of aquaculture systems. Violence against women increased in many countries under the pandemic. In Thailand, cases of domestic violence doubled during the lockdown (Charoensuthipan, 2020); in France it increased by 30 percent, and in Argentina, by 25 percent (UN Women, 2020). Philippines and India have shown increase in sexual violence in public spaces because the streets are empty under lockdown. Such drastic increase in violence against women have made UN (2020) refer to it as a shadow pandemic.

There has been some positive effects of COVID-19, such as the development of direct delivery that allowed the small-scale fishers to be connected directly with consumers (Bennett *et al*., 2020). The demographic change of a decrease in the number of fishers as well as COVID-19 pandemic are perceived to have been good for aquatic resources owing to the reduced pressure on natural resources. However, overall, there have been more reports on the negative effects experienced in fishing communities. The diversification efforts that the fishing communities were making such as tourism and aquaculture have also been damaged considerably during the COVID-19 pandemic. There are no clear indications yet on the impact of the pandemic on fisheries resources. However, reliance on fishing for food and nutrition during the lockdown may have increased in coastal and inland fishing areas, particularly with the return of migrant workers to their home villages.

Demographic change and reduction in fish catches have started the trend of feminization of fisheries, where men move out of fisheries and women fill the gap, either by fishing themselves or by earning income to support fishing households. However, COVID-19 seems to have hurt such efforts of women more than those of men. Their diversification efforts as well as their cash income source have been affected severely, and they are burdened more by increased unpaid care work as well as by becoming victims of domestic violence. Even before the pandemic, fishing communities were strained by their effort to adjust to environmental and technological changes. However, with the pandemic, further close monitoring of the changes needs to be done, because women might become even more vulnerable than before. Women in fishing communities also suffer because of IUU – being ignored, unrecognized and unprotected.

The studies and the regional consultative workshop have underlined the importance of recognizing the linkage between demographic change and fisheries-based livelihoods. The following actions are recommended to cushion the negative impact of demographic change in fishing communities:

- Include age- and gender-disaggregated information in all data collection so that changes can be monitored accurately.
- Provide social protection for fishers and fish workers in all stages of the fish supply chain.
- Ensure access to health, education, and financial services for fishers and fish workers and their household members.
- Identify livelihoods diversification opportunities using participatory approaches and implement capacity development, taking into consideration the different needs of youth, women, and ageing fishers and fish workers.
- Facilitate collaboration between the fishers, the private sector, government, civil society especially women's organizations, and academics for a holistic approach to understand and monitor the impact of demographic change, decreasing fish catch, and effects of COVID-19 and future pandemics. Women's invisible and unrecognized role in fisheries makes it more difficult to assess the impact of demographic change and sudden shocks such as the COVID-19 pandemic.
- Organize fishers and fish workers or strengthen their existing organizations to enable them to participate effectively in decision-making processes and increase their bargaining power.
- Support women fishers and fish workers to organize to ensure their visibility and increase their voices.

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Annex 2. Workshop agenda

Regional Consultative Workshop on Demographic Changes in Fishing Communities in Asia

6–7 November 2019

Workshop agenda

6 November 2019	
10.50–11.00	Introduction to the session
11.00–11.15	Desk study on demographic changes in fishing communities in Asia
11.15–12.15	Demographic changes in fishing communities in Thailand and Cambodia: the study
12.15–13.25	Lunch
13.25–14.45	Country presentations
14.45–15.05	Break
14.05–16.05	Country presentations
16.05–17.00	Plenary discussion and introduction to the group work
7 November 2019	
08.30–09.00	Recap and introduction to the group work
09.00–10.20	Working group session
10.20–10.40	Break
10.40–12.00	Reporting back and plenary discussion
12.00–12.30	Wrap-up and closing session

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ISBN 978-92-5-133529-1
9 789251 335291
CB1752EN/1/11.20