

Bangladesh

**Preparatory Survey for BOP business on
Soft-Shell Mangrove Crab Farming in
Bangladesh
Final Report**

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Japan International Cooperation Agency (JICA)

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1. Executive Summary

1.1 Background & objectives of the survey and their consistency with development subjects

Though a plenty of mangrove crabs, used to be called as “Dotekiri”, inhabited in Kojima Bay, Okayama Prefecture in Japan, nowadays very few mangrove crabs are harvested due to the decrease of its number. TAMANO WO GENKI NI SURUZO CO., LTD. engages in tasks of regional development of Tamano City through producing the made-in Tamano “Dotekiri” products.



Figure-1 Photo of “Dotekiri”
(Mangrove Crab)
Scientific name: *Scylla serrata*

Bangladesh is one of the LDCs (Least Developed Country) in which there are about 50 million poor people equivalent to nearly one-third population of the country. Though in Bangladesh the number of the poor people has been decreasing because of the rapid economic growth during recent years, the economic gap between the cities and the rural areas has been getting wider. As there are also nearly 100 million people who belong to the BOP (Bottom Of the Pyramid) group in Bangladesh, this country offers a potential & significant market for BOP Business development.

With an aim to become one of the Middle-Income Countries by 2021, the Bangladesh government puts efforts into job creation, industrial development, governance reinforcement and social services provision in the 6th Five-Year Plan (2011-2015). In the foreign aid policies of the Japanese ministry of foreign affairs, the diversification of export goods & channels and the high added value of the agricultural products are identified as development subjects for Bangladesh.

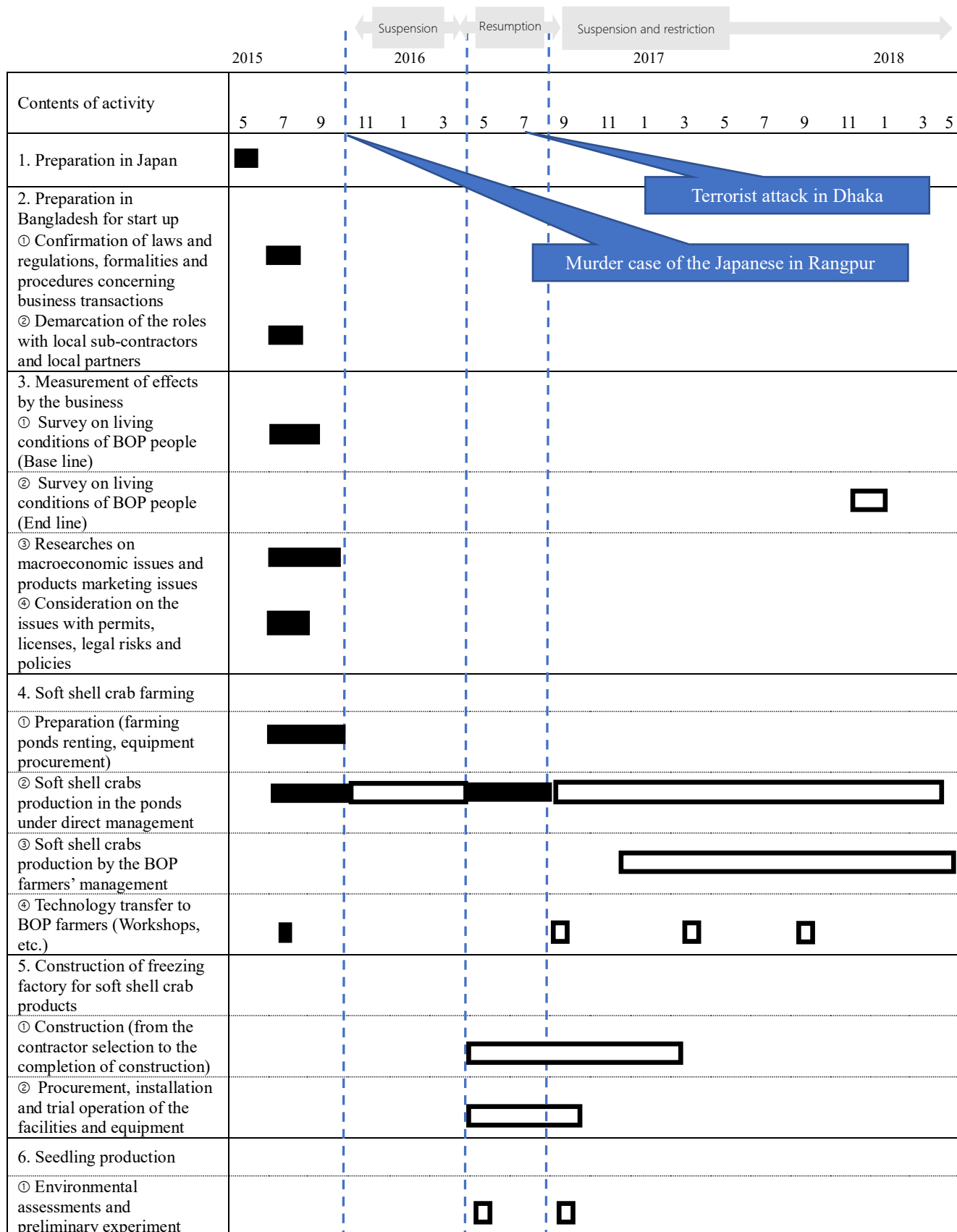
Bangladesh has the plentiful habitat for mangrove crabs with having the world-renowned largest mangrove forest. As the collection of the mangrove crabs depends on its natural resources due to the underdevelopment of necessary technology for seedling production and farming, there is a fear of decreasing its resources. This survey has been conducted in order to solve the matters of policy of Bangladesh and to examine the feasibility of the proposed BOP business throughout 1) stable production and adding value of the mangrove crabs (for economic development of local people) and 2) preservation of mangrove forest (as measures against deterioration of living conditions of local people).

1.2 Survey planning, target and period

Though this survey was planned to be conducted during three years from May, 2015 to May, 2018, due to the murder case of the Japanese in Rangpur in October, 2015 and the terrorist attack in Dhaka in July 2016, the prohibition and restriction of the travel and the restriction of the field activities in Bangladesh have been imposed because of the safety reasons. Therefore, this survey, of which field site located in an outside open space, had to shorten its survey period. The table-1 shows the original

survey plan and achievements since the beginning.

Table-1 Original plan and achievements of the survey



② Demonstrative experiment and evaluation						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Mangrove planting activities								
① Experimental planting of mangrove	<input checked="" type="checkbox"/>	(Trial)				<input type="checkbox"/>		
② Continuation of planting, monitoring and evaluation							<input type="checkbox"/>	<input type="checkbox"/>
③ Diffusion activities (Workshops, etc.)								<input type="checkbox"/>

■:Done, □:Undone or suspended (Local BOP people are voluntarily taking over these activities)



Figure-2 Field site (Mongla, Khulna Pref.)

1.3 Prospects for business creation at present and those consideration backgrounds

Though this survey had to be shortened and discontinued unfortunately, the proposed business is considered to show enough potential for future business creation judging from the following results of the survey.

1) Business environment

- Infrastructure : Two main networks of electric supply are available around the Field site under rare power failure condition. Arterial roads are good enough for transport though some parts of the local access roads are unpaved.
- Materials & equipment procurement : Procurement of materials & equipment necessary for soft shell crabs production are easy near the Field site or in the nearby towns such as Khulna. There is an EPZ (Export Processing Zone) near the Field site and it is possible to procure the equipment such as quick-freezing facilities.
- Competitor in business : As there are very few numbers of companies which have possibilities to enter into this business around the Field site, the potentiality of this business creation seems to be large.
- Mangrove crabs availability : As more than 30 mangrove crabs suppliers are identified around the Field site, it seems to be possible to purchase a plenty of mangrove crabs throughout the year.
- Feed availability : As the minced fish mixed with grains is a major feed for mangrove crabs, it seems to be possible to purchase freshwater fish as feed around the Field site.
- Mangrove planting : A survey was carried out for the protection activities of mangrove forest where mangrove crabs inhabit. In this survey the trial mangrove planting in the land of 0.5 acre was conducted, then the planted mangrove showed favorable growth in the beginning. Its growth has been monitored since then.

2) Production technology

Prawns farming is active as a source of export in Bangladesh. The soft shell crabs farming has various advantages such as possibilities of co-farming in the antecedently developed prawns farming ponds, possibilities from small scale business to large scale one, relatively easy farming technology, relatively short period from mangrove crabs procurement to products shipment, low risk of fatality due to disease, etc. in comparison with other farming species. However, the value of the soft shell crabs products reduces when missing cultivation just after molting. Though the plenty of labors is necessary in order to monitor their molting, in Bangladesh its advantages of cheap and huge labor forces will

cover this necessity.

3) Distribution & markets

It is necessary to freeze soft shell crabs just after their molting. As the products are distributed and marked in the frozen form, the establishment of the cold chain becomes the precondition. As the unit retail price is high (for example from 4,000 to 5,000 yen per kg in Japan) and then the additional values of the products are also high, the soft shell crabs farming business expects a large contribution to the improvement of livelihood. Furthermore, as a whole of the products is edible, the products have the advantages of small extra work and cost for disposal.

4) Resources

The executing body of this business is JBEC (Japan Bangladesh Expanding Company), which was established in 2014 in Bagerhat by TAMANO WO GENKI NI SURUZO CO., LTD. with a business partner called Federal Group of Companies. TAMANO WO GENKI NI SURUZO CO., LTD. presented know-how including experimental production of mangrove crabs' seedling and soft shell crabs farming to JBEC during this survey on BOP business. On the other hand, throughout the collaboration with Okayama University of Science and a partner company OAFIC CO., LTD in Japan and Khulna University in Bangladesh, JBEC abilities in soft shell crabs farming have been strengthened. In the begging term just after its establishment, many miss recognitions occurred due to lack of communication in JBEC management. As these factors have been improved during this survey period, JBEC is expected to have capabilities to continue this business by his own efforts.

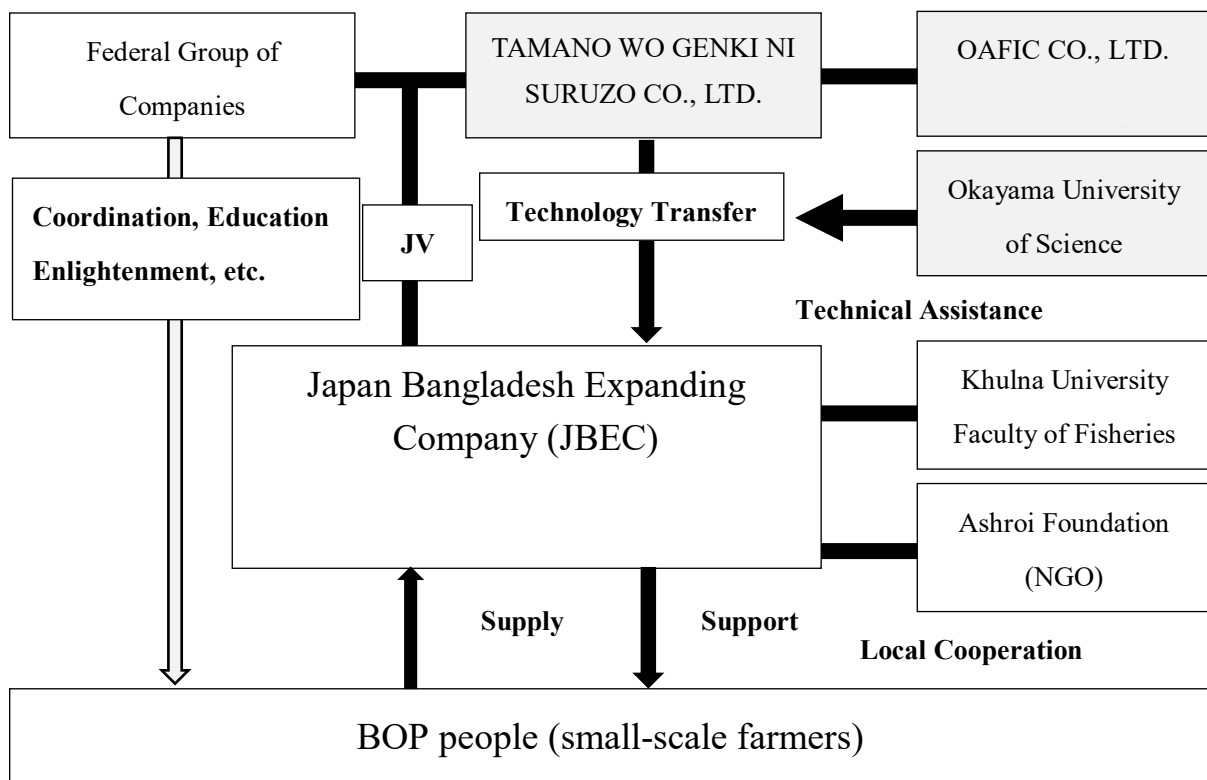


Figure-3 Organization Chart

5) Financial analysis

In this survey, the soft shell crabs production with participation of BOP farmers was achieved but the sales of the products was not realized. Therefore, it is difficult to set all necessary parameters for detail financial analysis. Then, the prospective profit-loss evaluations in the consequent years are examined in the table below in consideration of the results of an experimental soft shell crabs production conducted in this survey. In the begging phase of the survey, due to lack of smooth communication between Japanese experts and local farmers, relatively massive fatality of mangrove crabs occurred. In order to realize productivity expected in the original planning, a reasonable period of time will be necessary for accumulating experience and increasing the production results. As JBEC now operates one acre of farming pond, JBEC is preparing to expand another one acre of farming pond. Then, JBEC will start full-body scale of the soft shell crabs production and sales form the coming years.

Table-2 Planning of earnings and expenses

BDT (Bangladeshi Taka)

	First year	Second year	Third year
Sales (a)	6,227,312	15,568,280	21,795,592
Cost of sales (b1)	837,468	3,037,160	5,761,610
Other cost (Feed etc.) (b2)	294,000	588,000	588,000
Profit on sales (c=a-b1-b2)	5,095,844	11,943,120	29,652,040
Sales administrative expenses (d=e+f)	2,352,000	5,904,000	13,200,000
Personnel expenses, fixed cost (e)	1,152,000	2,304,000	2,304,000
Other variable cost (f)	1,200,000	3,600,000	3,600,000
Operating profit (g=c-d)	2,743,844	6,039,120	16,452,040
Breakeven sales volume	2,708,506	7,191,045	7,672,721
Safety factor	56.5%	53.8%	64.8%

6) Acquisition of licenses and permits

JBEC already obtained necessary licenses & permits such as imports and exports license, business license, certificate of tax payment number, certificate of value-added tax statement, etc.) for running this soft shell crabs production & sales business. JBEC hereafter has to obtain a permit for fishery products processing activities for freezing soft shell crabs for export.

7) Environmental and social considerations

The farming activities, construction of products processing factory of soft shell crabs and seedling production are considered as the activities which are expected to have an impact on environments in this business. The diffusion activities of soft shell crabs farming technology to BOP people is considered as the activities which are expected to have an impact on social matters in this business. As the items examined as environmental & social impacts are those which are possible to be reduced by the mitigation measures, it does not seem to be difficult to avoid serious influence.

8) Development subjects and business effects

- Raise in income among BOP people

(Base line index: former annual income of 36,000~60,000 BDT among BOP people)

The annual income among BOP people (8 participants), who joined in the training program by JBEC and participated in this business of soft shell crabs farming after the training, raised up to 96,000 BDT in May, 2015 and maintains at present from 36,000 ~ 60,000 BDT before participation in this business in April, 2015. (This is because that JBEC continued the business even during the period when Japanese survey members could not visit Bangladesh, and accordingly paid salary to the BOP people with regard to the soft shell crabs production and freezing processing.)

- Presentation of job opportunities

(Base line index: standard job retention rate of 50% in Bangladesh)

JBEC have already trained 8 small-scale farmers of BOP people who participated in the soft shell crabs farming. As one of them retired this business during one year, the job retention rate is calculated as 87.5% ($7 \div 8$).

- Soft shell crabs production technology

(Base line index : general mangrove crabs' molting rate as from 6 to 7%)

As 29 crabs shed off their shell and 10 crabs were dead (about 1/3 of shedding-off) during an experimental production trial with 380 pots during 7 days, the molting rate is estimated as 7.6% ($29/380 \times 100$).

1.4 The unsolved subjects for business creation and countermeasures

As mentioned above, the results of this survey suggest much potential for business creation. However, the biggest bottleneck for business creation is the matters of public security which influenced this business. Not only in the farming activities introduced in this business but also in the activities of the primary industries, the business activities are developed in the outdoor open space. Then, it is not possible to avoid risk perfectly in the business activities in the developing countries where anxiety against public security exists basically.

In those circumstances, the achievements of this survey and the future prospects of this business are shown in Table-3.

Table-3 Achievements and future prospects concerning the planned survey contents

Contents of survey	Status	Achievements	Unsolved subjects and countermeasures
Preparation in Bangladesh for start up	○	Laws and regulations, formalities and procedures concerning business transactions were confirmed.	-

		Demarcation of the roles with the local partner company was confirmed.	
	△	The permits necessary for export activities was partly obtained.	The remained permits necessary for export activities should be obtained.
Measurement of effects by the business	○	Base line survey on living conditions of BOP people, macroeconomic environment & marketing researches and confirmation of the necessary permits and licenses were conducted.	-
	△	The job retention rate is estimated as 87.5 % for the BOP farmers in the soft shell crabs farming business conducted in the JBEC ponds. The monthly income of the targeted BOP farmers was increased by 3,000 BDT between before and after the commencement of this business.	The further outcome of development effects should be promoted through regular creation and expansion of business of soft shell crabs farming by the BOP farmers independently. The end line survey should be conducted in order to measure the business effects in accordance with the progress of the business.
Soft shell crab farming	△	[Farming by JBEC] JBEC achieved the production of more than 8,500 pieces of the soft shell crabs per month.	With regard to the farming technology, the countermeasures should be examined to solve the bottlenecks such as massive fatalities of mangrove crabs, which will avoid stable production.
	△	[Farming by BOP farmers independently] BOP farmers participated in the trial farming of the soft shell crabs in the JBEC ponds. BOP farmers participated in the training of the soft shell crabs farming and started the production in a small scale.	The training programs should be conducted continuously for promotion of the realization and the expansion of the soft shell crabs farming by BOP farmers independently. JBEC should regularly purchase the soft shell crabs which are produced by the BOP farmers.
	△	[Export activities after farming] Quality control system was established by introduction of chlorine sterilization treatment, ozone disinfection arrangement, etc.	The export of the soft shell crabs products should be commenced after establishment of the necessary measures and trial shipping.
Construction of freezing factory soft shell crabs products	△	The freezing factory was rented and the trial freezing processing activities were conducted.	The freezing plant should be constructed after examining the adequate capacity of production in accordance with the progress of the business.
Seedling production	×	Not yet started.	The relevant technical information should be acquired from those engaging in the same business in Thailand and Myanmar.
Mangrove planting activities	△	The experimental mangrove planting (0.5acre) was conducted.	The selection of the adequate mangrove species and the proper plantation methods should be examined and the planting promotion activities should be executed with participation of local habitants.

Remarks: ○ shows achievement, △ shows partly achievement and × shows no achievement.

1.5 Future planning for realizing business creation

The value chain of the proposed business is shown in Figure-4.

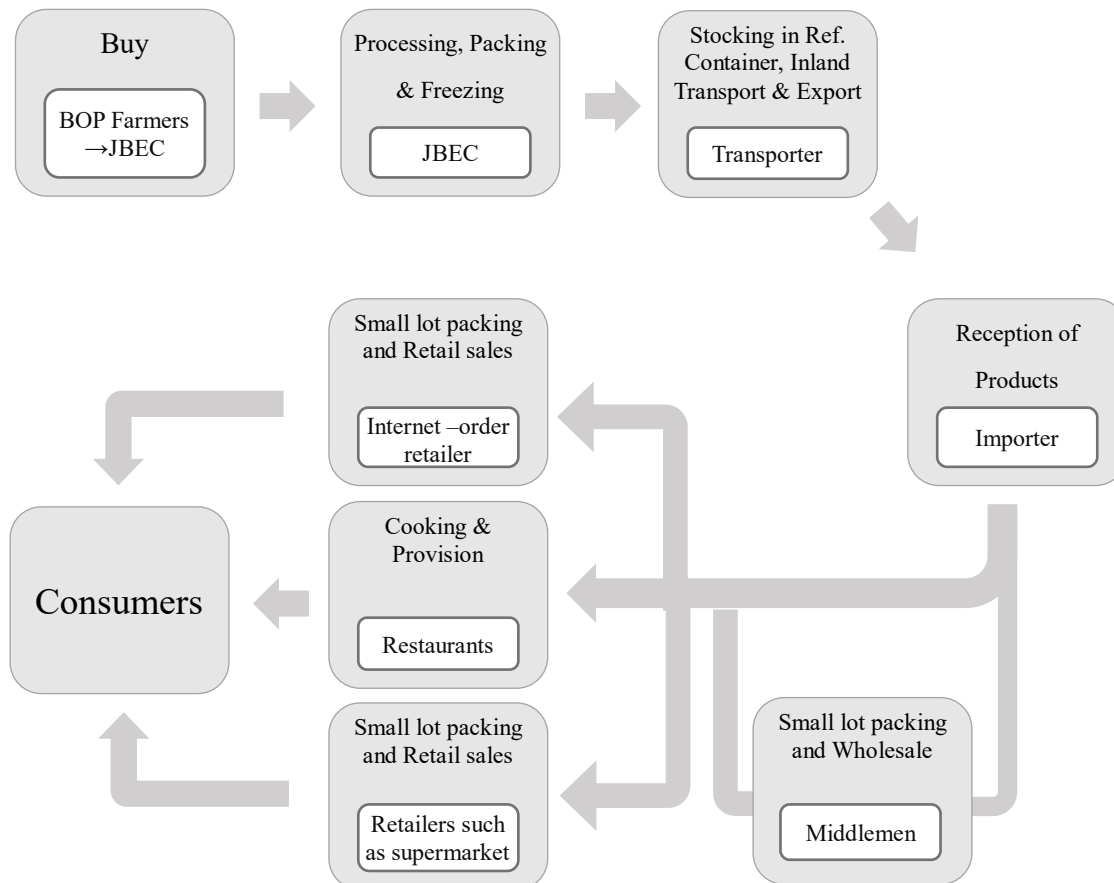


Figure-4 Value chain of soft shell crabs production business

JBEC will continuously engage in the following activities in order to establish the BOP business in accordance with the above value chain while taking security measures in accordance with the latest situation in Bangladesh, even after the completion of this survey.

- ① Continuation of soft shell crabs production and trial export by JBEC (Present~December, 2017)
 - Continuation of soft shell crabs production under remote guidance by JBEC staffs.
 - Presentation of the samples of the soft shell crabs products to the importers.
 - Contracting for construction of the soft shell crabs processing factory for full-blown operation and preparation of necessary procedures for export (acquisition of license of the processing factory designated for export).
- ② Export of soft shell crabs products by JBEC (January, 2018~)

- Commencement of the export of soft shell crabs products from a small lot gradually.
- ③ Commencement of soft shell crabs production by BOP farmers (January, 2018～)
- Implementation of the training for soft shell crabs production to BOP farmers by JBEC.
 - Implementation of the training for mangrove planting to BOP farmers by JBEC.
 - Expansion to BOP farmers of rental area of the farming ponds of JBEC.
 - Purchase and export of the soft shell crabs produced in the rented ponds by BOP farmers independently.
- ④ Organization of the soft shell crabs production community by BOP farmers and mangrove planting activity (2019～)
- Establishment of the soft shell crabs production community by BOP farmers and the continuation of the guidance to this community by JBEC.
 - Commencement and continuation of mangrove planting activities by this production community.
- ⑤ Promotion of marketing and consumption activities in Japan
- Improvement of awareness of the products and expansion of the sales channels such as internet-order sales and restaurants through the associated company in Japan. .
 - Participation in promotion events, such as food shows, and provision of new cooking recipes to restaurants.
 - Sales promotion activities through the improvement of the company website.