CHAPTER 5 VISION OF QESHM ISLAND DEVELOPMENT FOR 2036

5.1 Vision and Objectives

A vision should be established for sustainable development of Qeshm Island and shared by all the stakeholders including local residents, immigrants, tourists, and investors. Sharing a vision helps muster efforts of many stakeholders in undertaking new socio-economic activities to realize the sustainable development with the sense of common purpose. Based on this idea, the vision for Qeshm Island was prepared as described below.

In December 2015, the JPT held the first consultation meeting with the local residents and QFZO as part of participatory process for preparing the ECO-QESHM Master Plan. The participants expressed their ideas on the needs and images of Qeshm Island, facilitated by QFZO and the JPT. The key words expressed in the meeting were analyzed and organized. The JPT attempted to find the most suitable development alternative for Qeshm Island through strategic environmental assessment (SEA), meanwhile it held a further consultation meeting. The JPT established four alternatives that reflected the ideas expressed in the stakeholder meetings by the representatives of local residents as well as the policy directions indicated by existing government documents. The Alternative D was selected as the most suitable alternative aimed at defining new paradigms. The selected development alternative pursues balanced, resilient and sustainable growth through community participation and careful use of local resources. The concept of resilient growth is aimed at redundant society against the socio-economic changes due to the external factors such as global economy, foreign relation and climate change, as well as the internal factors of societal shift. The resilience growth will furnish to the local residents the environment in which they can live in peace. Taking all these ideas into consideration, the vision for the sustainable development of Qeshm Island is proposed below.

Vision:
ECO-QESHM, Clean and Creative Island

On the island, we conserve and wisely use the natural resources, tradition, and culture.
We are pioneers in creating an Eco-Island with a new socio-economic model
to promote rich biodiversity and a diverse society for sustainable development.
Clean represents clean environment, beautiful townscape, transparent organizations,
and honest people. *Creative* represents setting new standards of value.

To make concerted efforts for the sustainable development involving all the stakeholders, it helps if they understand and share its concepts. The acronym, ECO-QESHM, represents the key concepts to be realized in the course of the development as described in Table 5.1.1.

Table 5.1.1 Key Concept and Description of ECO-QESHM

Key Concept	Description
***E**nvironmental management*	Local control and management of living and natural environments encompassing land, intertidal areas, and ocean for all the social and economic activities in a sustainable manner
***C**ommunity vitalization*	Vitalization of urban and rural communities
***O**utward orientation*	Outward-oriented development with tourism, trade, culture, information, and value-added products
***Q**uality infrastructure*	Development of high-quality hardware and software infrastructure including education and health
***E**conomic diversity*	A wide range of economic activities from traditional handcraft, fishery, trade, industry to knowledge and advanced industry
***S**atoyama/satoumi creation*	Application of the *satoyama* and *satoumi* principles to the land and ocean of Qeshm Island to enhance its biodiversity
***H**uman-oriented development*	Capacity development of government staff and community members through participatory approaches
***M**ixed culture society*	Respect to tradition, culture, and heritage with acceptance of cultural diversity and integration with foreign culture

Source: JICA Project Team.

Under this vision, the development objectives of ECO-QESHM are defined in terms of socio-economic and environmental conditions and human resources in Qeshm Island. They are as follows:

(a) Economic objective to increase employment opportunities by linking urban economy with rural economy, the east with the west, and livelihood activities with local and export industries, utilizing local resources in combination with limited import materials;
(b) Social objective to revitalize traditional rural and urban societies through increasing opportunities for communications between residents and visitors by tourism and trade, and diversifying socio-economic activities with traditional skills and wisdom enhanced by advanced technology;
(c) Environmental objective to create a natural environment rich in biodiversity through proper management of mangroves, and coastal and marine resources; and a comfortable living environment through improving sewage treatment and solid waste management; and
(d) Human resources objective to develop the capacity of all the stakeholders to become competent and responsible participants in sustainable economic development and conservation of local natural resources and tradition.

5.2 Sustainability Enhancement Strategy

The sustainability enhancement strategy has been formulated to support the attainment of the development objectives. It is divided into 4 strategic dimensions, containing 13 components, which will serve in different but complementary ways, as follows:

(1) Economic Enhancement Strategy
- (1-1) Provision of various tourism facilities in line with prospective circuit tours to be established
- (1-2) Fishery resources management and value-chain development
- (1-3) Encouragement of formal commodity trading with neighboring countries based on secondary towns
- (1-4) Use of mineral resources to enhance local living and economy as well as economic development

(2) Social Enhancement Strategy
- (2-1) Participatory development planning and implementation to facilitate collaboration between villagers and government
- (2-2) Strengthening of technical and vocational training to improve handicraft, fishery, trade, and tourism activities
- (2-3) Establishment of self-reliant geographic areas reflecting unique socio-cultural characteristics

(3) Environmental Enhancement Strategy	(3-1)	Participatory environmental management by communities to enhance biodiversity in line with satoyama and satoumi principles with application of integrated coastal management
	(3-2)	Capacity enhancement for development and environmental management through planning and implementation of development projects and enforcement of environmental regulations
	(3-3)	Effective wastewater and solid waste treatment with the most appropriate method for local conditions
	(3-4)	Control of harmful exotic plants and promotion of native plants to increase greenery
(4) Human Resources Enhancement Strategy	(4-1)	Improvement of support system for small and medium enterprises
	(4-2)	Enhancement of higher education and research and development to utilize local resources for tourism, fishery, marine environment, petrochemicals, dryland agriculture, and marine transport

5.2.1 Economic enhancement strategy

(1) Provision of various tourism facilities in line with prospective circuit tours to be established

Tourism resources are abundant in Qeshm in both rural and urban areas, and they come in various types such as the Qeshm Geopark and women's handicraft. Circuit tours should be designed to link these unique tourism resources that will bring economic opportunities to rural areas, specifically in the central and western parts of the island. Currently, most of the economic activities are concentrated in Qeshm and Dargahan in the east. Creation of tourist sites in the west and the central area is crucial for balanced development of the island. Eco-tours in the Hara mangrove forest and marine tourism in Dolphin Bay and Hengam Island are prospective tourist activities in the central area. Waterfront and fishery tourism development in Baseidou linking the geosites in Doulab to form a hub in the western part of the geopark is also worth considering for its potential to contribute to the balance development. Successful eco-tourism promotion will be effective in changing the image of the island from a place to shop inexpensive products for daily use and consumption to a destination of cultural and high-value tourism.

(2) Fishery resources management and value-chain development

Fishery is one of the most promising industries in the island though fishery products have not been fully developed to gain high economic return. To realize sustainable fishery, catches must not exceed the maximum sustainable yield, and the fish caught should be properly processed into a variety of products.

The domestic market in Iran is not mature enough to accept a variety of marine products due to the people's conservative food culture, particularly in the mainland. The first attempt to be made may be to find processed fish products that are relatively easy to introduce given the current food culture. Dried and cooked fish may be worth considering for prospective products. As the national economy continues to grow, the number of foreign visitors and middle-income and wealthy households will increase. These people are expected to contribute to diversifying the food culture in the island as they introduce new food items (with raw seafood as an ultimate case in point) to Iran. However, diversification of dietary habits will take time and its progress will be gradual.

Nevertheless, it makes developmental sense for Qeshm to grow as a production and supply base of fresh and processed seafood including seabream, shrimp, shellfish, and seaweed. Equipment and facilities for cold chain management should be improved as fishery products handled at the main fishing ports in Baseidou, Selakh, Mesen, Ramchah, Souza, and Dargahan become diversified. The cold chain management requires the integrated logistics to ensure optimal freshness of caught fishes in entire process staring from the fishing places to a port of landing and storage and distribution up to customers. Preservation of caught fishes in fresh conditions is the first step in the fishing places. The slurry ice technology is a useful means to supply the ice for fishing boats using the seawater.

(3) Encouragement of formal commodity trading with neighboring countries based in secondary towns

Qeshm Island is long and narrow extending east and west. Logistics relies on the seaports in Qeshm, Dargahan, and Laft. On the other hand, informal trade with neighboring countries is conducted in the central and western parts of the island. To realize balanced development of the entire island, sub-regional ports should be utilized to encourage trade in Baseidou and Selakh while formalizing the current informal trade. The sub-regional ports development will expand the opportunities of rural areas by improving their access to the mainland and foreign countries.

(4) Use of mineral resources to enhance local living and economy

Natural gas and oil are two mineral resources as well as the main natural resources found in the island besides marine resources. As these mineral resources, unlike marine resources, cannot be reproduced, they need to be conserved as long as possible by wise and careful use. If used for such purposes as power generation and desalination to increase power and water supply in the island, they can contribute to improving the people's lives and the local economy. Rapid development of natural gas and oil, however, may lead to excessive competition in similar mineral resource development across the country. Therefore, approaches should be taken at the same time to seek more effective and efficient use of these resources and investors willing to fund the development of next-generation energy-saving products, although such efforts will take time to see results. Effective use will include industrial development to create job opportunities and the capital to be used for development and management activities, which will help to enhance the comparative advantage of the island.

5.2.2 Social enhancement strategy

(1) Participatory development planning and implementation to facilitate collaboration between villagers and government

Currently, the islanders are used to depending on the government for support. They must change such attitudes and gain the sense of independence. Such a process will also take time, but it is hoped that while they take initiative in taking steps toward independence, the government will provide support where it is needed. For this to happen, the islanders and the government need to closely examine and identity the necessary and effective support.

There may be problems that cannot be overcome by one village but can be solved if several villages take action together. Management of the Qeshm Geopark, the Hara mangrove forest, and the coastal areas is one of those cases that requires cooperation and support of many stakeholders. In such cases, participatory consensus building will be a must. A village council is expected to serve to link villagers and the government and help the villagers reach a consensus.

(2) Strengthening of technical and vocational training to improve handicraft, fishery, trade, and tourism activities

Though Qeshm is rich in natural and human resources, they are still unexplored and unsophisticated. They are not competitive in the market. Technical training needs to be developed and provided for the present and prospective workforce to increase the value of the goods and services it produces. The following are proposed as the main industries in the island:

(a) Handicraft products that meet the market needs must be designed. That is, their designs should be based on the preferences of consumers, rather than the interests of producers. In this respect, the producers must seek sophisticated designs and production methods suitable for the market. For traditional craftwork, on the other hand, it is important to pass on the craft skills to the next generation.
(b) In fishery, environment-friendly fishing should be practiced to reduce excess catches and prevent overfishing. Mixed aquaculture such as integrated multi-trophic aquaculture (IMTA) should be considered for the utilization of the marine environment without increasing environmental impact.

(c) In tourism, comprehensive human resources development is required for the operations of tours, hotels, restaurants, and other tour service providers. Training for this development needs to focus on the shift of perspective from the provider's to the tourist's. This means that the workforce of the tourism sector must learn and practice what they are expected to do for the satisfaction of the tourists.

(3) Establishment of self-reliant geographic areas reflecting unique socio-cultural characteristics

Core villages should be established in the central and western areas that are less developed than the east to provide job opportunities and social services for the local residents. These villages will have economic activities reflecting the local conditions and potentials. Their social services will include education and health. Those remote villages served by the core villages will have networks to support each other and strengthen socio-economic relationships with the core villages.

The island will be divided into seven areas to identify the attractive features of each area that are conducive to balanced development. Table 5.2.1 presents the future perspective, possible projects, and cities and core villages.

Table 5.2.1 Future Perspective, Possible Projects, and City and Core Villages.

No	Area	Existing conditions	Future perspective	Possible projects	City and core village
1	Doulab–Baseidou	• Ice plant in Baseidou • Salt cave and Hawksbill sea turtle nesting site and Chahou Valley geo-site nearby • Long tidal land in northern coast	• Baseidou as strategic center for fishery and trade • Doulab as tourism hub for Chahou Valley and linking with surrounding geo-sites. • Doulab as UNESCO regional geopark center	• Port facilities upgrading with fish processing and distribution in Baseidou • Waterfront development with meetings, incentives, conferences, and exhibitions (MICE) facilities development • Luxury eco-villa development • Social facilities serving western areas • Water and power supply expansion • Satoumi creation linking with Geopark • Apiculture industrial cluster development • Baseidou, Doulab, and Kani settlement beautification	• Primary: Doulab and Baseidou • Secondary: Doustakou, West Chahou, and East Chahou
2	Tabl–Selakh	• Selakh: Active coastal fishery, informal commodity trade, and storage tanks for bunker oil • Table: Jetty and Roof of Qeshm and Statue Valley geo-sites along the Tabl-Selakh road • Dourbani and Sohil: Jetty in Hara mangrove • Gouron: UNESCO intangible heritage for Lenji boat	• Selakh as the strategic center for fishery and support for logistics • Tabl as gateway for the Hara mangrove tourism • Tabl-Selakh axis for island-wide transport facilities	• Upgrading of the Tabl-Selakh road • Water and power supply expansion for Selakh • Coastal shipping facilities • Selakh–Noghasha coastal road upgrading • Water-saving agriculture for fresh vegetables and herbs • Apiculture industrial cluster • Fish processing and distribution • Satoumi creation linking with Geopark • Selakh and Tabl settlement beautification	• Primary: Selakh and Tabl • Secondary: Dourbani, Gouron, and Sohil
3	Laft	• Laft: urban heritage of wind-catchers, mangrove reserve nearby • Kovarzin: Jetty, handicrafts, and natural gas processing	• Laft as the tourism base and the future gateway from the mainland • Kovarzin as the base for handicraft • Tonbon on the crossroad, near the airport, as commercial and social service center	• Laft gateway for cultural tourism • Cultural heritages restoration • Hara mangrove eco-tourism • Social facilities serving central areas • Satoumi creation linking with Geopark • Laft urban heritage enhancement • Logistic hub around airport	• Primary: Laft • Secondary: Kovarzin
4	Shibderaz–Hangom	• Shibderaz: Jetty for dolphin watching and turtle breeding area • Hangom: Crystal beach and specialty food • Direston: Rich in date trees	• Shibderaz as a base for tourism and social services • Hangom as a base for dolphin and marine tourism	• Marine park with aquarium in Shibderaz • Eco-friendly resort development in Shibderaz • Social facilities serving south-eastern areas in Shibderaz • Hangom Island resource inventory and development planning • Eco-lodge development in Hangom Island • Water saving agriculture for fresh vegetables and herbs in Direston • Gastronomy in Direston • Satoumi creation with integrated coastal management	• Primary: Shibderaz • Secondary: Hangom and Direston
5	Souza	• Souza: Scenic Naz	• Souza and Rigoo as a	• Expansion of water supply,	• City: Souza

No	Area	Existing conditions	Future perspective	Possible projects	City and core village
		island nearby and fishing port • Mesen: Fishing port • Borka Khalaf: Handicraft and entrance to Star Valley geosite	center of scenic tourism and marine sports, and regional logistics hub with export industries • Mesen as strategic center for fishery • Borka Khalaf as gateway to Geopark	power supply and urban infrastructure • Fish processing and distribution • Satoumi creation with integrated coastal management	• Primary: Mesen • Secondary: Borka Khalaf
6	Ramkon	• Endowed with fertile soil and heritage of traditional farming activities	• Tourion ecopolis of urban communities for heritage preservation and re-activation of traditional farming activities	• Water saving agriculture for fresh vegetables and herbs • Agro tourism promotion • Social and cultural facilities • Public transport to link Eco-polis in east of the island	• City: Ramkon
7	Qeshm–Dargahan	• Booming urban development with residential and commercial facilities	• Urban development for residential and commercial facilities • Suburban agriculture for fresh vegetables, fruits and dairy products	• High grade urban facilities and higher order urban functions development • Water and power supply expansion • Solid waste management with sanitary land fill • Industrial estates development • Public transport system within cities	• City: Qeshm and Dargahan • Primary: Holor and Towla

Source: JICA Project Team.

5.2.3 Environmental enhancement strategy

(1) Participatory environmental management by communities to enhance biodiversity in line with satoyama and satoumi principles with application of integrated coastal management

A local community is the most effective unit to promote conservation of natural resources on which its members' livelihood and living environment depend. The people of satoyama and satoumi communities in Japan are engaged in managing the local resources in and around them. UNESCO's Global Geoparks Network also insists on community empowerment being a criterion for promoting geoparks. A geopark can be a platform for community empowerment to realize terrestrial environmental management. Fishers' cooperatives and village councils play key roles in coastal environment management. Integrated coastal management will be required to facilitate cooperation between stakeholders in fishery, aquaculture, and marine tourism.

(2) Capacity enhancement for development and environmental management through planning and implementation of development projects and enforcement of environmental regulations

The preparation process of project and development plans should be made known to the public. Public consultation and exhibition may be useful as applied to environmental impact assessment (EIA) and strategic environmental assessment (SEA).

The division of responsibilities is an important issue in environmental management. For instance, the department of environment (DoE) has been established in QFZO and Qeshm County. The roles of the two departments, DoE QFZO and DoE County, need to be adjusted: DoE QFZO for environmental management in the free zone and DoE County for the rest. To evaluate the projects and development plans, DoE QFZO should be placed under the CEO of QFZO. The Hara mangrove forest should be designated under national and international agreements. Given the current situation, it is practical that the Iranian Department of Environment (DoE Tehran) takes charge of the protection of the Hara mangrove forest and QFZO of its on-site inspection and management. QFZO meets regularly with DoE County.

(3) Effective wastewater and solid waste treatment with the most appropriate method for local conditions

Effective treatment of wastewater and solid waste is fundamental for the implementation of industrial development in the island. Environmental regulations must be properly established and fully enforced to prevent serious environmental impact from these wastes. Construction waste is another issue to be tackled as it may also deteriorate the living environment.

As rural population increases (though not to the level of urban population, such as in Qeshm and Dargahan), so do wastewater and solid waste. Establishment of an island-wide water distribution network to deal with the population increase will also contribute to increasing wastewater. Villages with varying populations will be dispersed across the island. The population size and density are criteria to examine the most suitable treatment system for the island. A treatment system for wastewater and solid waste should be designed to comply with environmental and economic costs including initial, and operation and maintenance (O&M).

(4) Control of harmful exotic plants and promotion of native plants to increase greenery

There are native and exotic tree species in Qeshm Island. *Prosopis juliflora* is a harmful exotic plant that is tolerant to severe dry weather and high temperature. It invades areas where native plants grow. These alien species harmful to the native species should be removed and, if possible, used for beneficial purposes; if not weeded, they will flourish to dominate the native species.

Some non-native species coexist with the native species without harming the latter. Planting of such alien species should be promoted because it will reduce space for harmful alien species to survive. Appropriate tree species for the purpose such as *Prosopis cineraria* and *Acacia tortilis* need to be identified.

5.2.4 Human resources enhancement strategy

(1) Improvement of support system for small and medium enterprises

Human resources development is the key to promote small and medium enterprises (SMEs). Vocational and technical training programs tailored to satisfy the demand of SMEs should be developed. The public and private sectors should carry out the local human resources development to meet the common objectives for local economic enhancement. Large-scale companies such as in the oil and natural gas industries may assist and implement the human resources development. Various types of SMEs using local raw materials provide daily products to the island and its visitors. The competitiveness of local industries and their products and services should be increased. The more competitive their products and services become with those from the mainland and other countries, the more they can sell. As a result, the island will be less dependent on imported products and there will be more local employment opportunities.

For rural areas, access to support system will be improved as focal cities and villages with large populations and the market for remote villages are created. These cities and villages will provide financial resources, technical training, and market information.

(2) Enhancement of higher education and research and development to utilize local resources for tourism, fishery, marine environment, petrochemicals, dryland agriculture, and marine transport

Profits from oil and natural gas development will be used to support various environment-friendly industries targeting the market in both Iran and neighboring countries. Potential development of local resources for tourism, fishery, marine environment, petrochemicals, dryland agriculture, and marine transport will be examined in cooperation with foreign universities and under the finance of petrochemical groups.

5.3 Development Scenario

5.3.1 Development scenario with and without major limitations

In order to promote investment and development from overseas, Qeshm Island is designated as a free zone to promote an industrial hub using foreign direct investment, by being separated from the national legal system. However, Qeshm Island is regarded as a part of Iran from a diplomatic point of view. For this reason, it is influenced by foreign policy directed at Iran. In fact, the economic sanctions on the country imposed by Western countries resulted in stagnant economic growth. This slow rate of economic growth has cast a shadow over the economy on Qeshm.

Formulating the future of the island, two development scenarios are assumed: one with major limitations in which economic sanctions are applied and the other without major limitations. Table 5.3.1 compares the two scenarios. Tables 5.3.2 to 5.3.4 shows the development scenarios for agriculture, fishery and tourism to supplement the assumption of the two scenarios from the view of expected market, possibility of investment, possibility of realization, and potential risk.

With major limitations, domestic economies are stagnating due to the restrictions on overseas remittances and sluggish international trade. Tourism and fisheries will be the main livelihood activities of the island. Since domestic income will decline, the number of tourist arrivals and their purchasing power will decrease. As a result, the economic activities of the island are sluggish. In-migration from the mainland continues, for the purposes of seeking employment, but the number of jobs created on the island is not sufficient. The possibility of smuggling activities will increase in response to the need to find alternative income sources.

Without major limitations, the tourism sector and fishery sector will grow. The fishery industry will export products to foreign markets and major cities in Iran. The development of the chemical industry will generate income of considerable quantity. In order to convert this income into a financial source, the development of air routes and other economic activities will be promoted.

Table 5.3.1 Development Scenarios With and Without Major Limitations

	With major limitations	Without major limitations
Macro conditions	・Economic sanctions are the lead constraints on overseas remittance and international trade, which will cause high price escalations. ・International trade will be pursued with an economy that does not use USD for a key currency. ・Innovation will not take place in technology. Industrial activities will be limited to producing primary products. ・Domestic income will grow at a sluggish pace.	・Iran will be opened up to the global economy. ・Using Iran's mineral resource, economic development will be progressed at a fast pace. Meanwhile, industrial technology will be upgraded to an advanced level.
Development on Qeshm	・In-migration from the mainland will continue due to severe employment opportunities, but at a slow pace. ・Chemical plants will be developed to produce the primary product for a specific country. ・Domestic tourist arrivals will grow at a slow pace. Buying power will be decreased. ・Fishery and tourism will support the economy on the island. ・Agriculture will pursue activities linking tourism, such as honey, dates and leafy vegetables. ・Overseas markets will be China, Iraq, Kuwait, Oman, Qatar, Turkey and Vietnam. ・The tourism sector welcomes tourists from Europe.	・In-migration from the mainland will continue as economic development is realized on the island. ・Development of chemical products and steel will create job opportunities for domestic and international workers. This will generate the large amount of income. Food processing will start operations. ・As development progresses, service and banking businesses will grow. ・After a large amount of income is obtained, air route networks will be expanded. ・Tourism, mainly for domestic tourists, will be encouraged. Fishery will have market in major cities and overseas. ・Agriculture will pursue activities linking tourism, such as honey, dates and leafy vegetables. ・The tourism sector receives tourists from Europe, UAE, Asia and the US.
Investment	・Small to medium tourism facilities will be developed by domestic companies.	・The Persian Gulf bridge and chemical plants including LNG will be developed.
Risk	・Smugglers will increase due to the severe employment market.	・Negative reactions will be derive from resource-rich countries due to competition with them.

Source: JICA Project Team.

Table 5.3.2 Development Scenarios of Agriculture With and Without Major Limitations

	With major limitations	Without major limitations
Expected situation in each industry	・The target markets of Qeshm agricultural industries are mainly domestic markets (inland and on the island) for local production for local consumption. That is why the impact of economic sanction is minimized. ・Associated with ecotourism industries, the production of traditional herbal plants (and their processed products) and high value-added agro-products (such as mangrove honey), as local specialty products, contributes to domestic employment creation and the growth of the working population in the sector. ・Dates and several fresh (also perishable) leafy vegetables are grown via drip irrigation with the supplemental use of recycled water on a few exceptional individual initiatives. ・Agricultural produce, including staple food grains and forage, is mainly supplied from the mainland of Iran, as has been the case for the last two decades. ・Fodder crop cultivation is partially revived by using recycled water.	・Associated with ecotourism industries, the production of traditional herbal plants (and their processed products) and high value-added agro-products (such as mangrove honey), as local specialty products, contributes to domestic employment creation and the growth of the working population in the sector. ・Dates and several fresh (also perishable) leafy vegetables are grown via drip irrigation with the supplemental use of recycled water on a few exceptional individual initiatives. ・Agricultural produce, including staple food grains and forage, is mainly supplied from the mainland of Iran, as has been the case for the last two decades. ・•Fodder crop cultivation is partially revived by using recycled water. ・Utilization of Qeshm Island as an "export base" for agro-products, offering processing and quality control facilities (private companies) and an official quarantine station for exports, could be considered.
Expected market	・Souvenir sales for domestic tourism markets and domestic (island and inland) markets for local products for local consumption.	・Value-added agro-products such as mangrove honey and sun-dried fodder from barley on Qeshm are possible exports to the Gulf countries (Oman and UAE), as was the case decades ago. ・Souvenir sales for domestic tourism markets and the domestic (island and inland) market for local products for local consumption.
Possibility of investment	・Domestic (Iranian) investors and Iranians living in foreign countries (most in UAE).	・Receiving the benefits of inexpensive fuel-related costs and economic zones, agriculture-related manufacturing industries producing agricultural materials and equipment for water-saving irrigation/culture could be established via foreign investment (e.g., from China, India, Taiwan). ・Domestic (Iranian) investors and Iranians living in foreign countries (most in UAE).
Possibility of realization	・If domestic markets (inland and on the island) for local production for local consumption are set as the target for Qeshm agricultural industries, the impact of limitations including economic sanctions is minimized.	・Plant factories were already established in some Gulf countries (e.g., UAE) and the export of vegetables made in domestic factories would be recognized as rehashed products, unless they offer high value-added alternatives, such as "functional plants."
Risk	・No risk is assumed.	・No risk is assumed.
Conclusion (suitability as a priority industry)	・In the context of the "eco-island concept", agricultural development, depending on the utilization of fossil fuels and limited desalinated water, is not suitable for sustainable agriculture on Qeshm Island. ・Agriculture is not suitable to be a priority industry, although it can be linked to tourism sector.	・In the context of the "eco-island concept", agricultural development, depending on the utilization of fossil fuels and limited desalinated water, is not suitable for sustainable agriculture on Qeshm Island. ・Agriculture is not suitable to be a priority industry, although it can be linked to tourism sector. ・On the other hand, agriculture-related manufacturing industries producing agricultural materials and equipment for water-saving culture could be considered as a countermeasure for employment creation. ・The utilization of Qeshm Island as an "export base" for agro-products, offering processing and quality control facilities (private companies) and an official quarantine station for exports. could be considered.

Source: JICA Project Team.

Table 5.3.3 Development Scenarios of Fishery With and Without Major Limitations

	With major limitations	Without major limitations
Expected situation in each industry	・Fishery resources in nearshore areas are managed in a favorable manner by local communities through activities applying the *satoumi* concept such as habitat rehabilitation and ecofriendly aquaculture. Commercial farming of fish, shrimp, seaweed, etc. expands around Qeshm Island. As a result, coastal capture production recovers and aquaculture production increases. ・Processes along the value chain of fishery products are improved. Value-added seafoods are produced and sold in domestic and international markets. ・Local people's livelihood is diversified by linking the fishery industry with marine-related tourism activities (diving, recreational fishing, fishery experience tours, dolphin watching, mangrove tours, promotion of local gastronomy, etc.).	・Fishery resources in nearshore areas are managed in a favorable manner by local communities through activities derived from the *satoumi* concept, such as habitat rehabilitation and ecofriendly aquaculture. Commercial farming of fish, shrimp, seaweed, etc. by local communities and domestic/foreign companies expands around Qeshm Island. As a result, coastal capture production recovers and aquaculture production increases. ・Processes along the value chain of fishery products are improved. High value-added seafoods are produced and sold as branded products in domestic and international markets at higher prices. ・Local people's livelihood is diversified by linking fishery industry with marine-related tourism activities.
Expected market	・Potential export markets for Qeshmi seafood could be China, South Korea, Japan, India, Sri Lanka, Vietnam, Norway, Italy, France, UAE, Qatar, Kuwait, etc. ・Domestic markets for the sale of Qeshmi fishery products are mainly large cities in Iran targeting fish-consuming expatriate societies and Iranian nationals.	・Export markets: many countries all over the world (Asia, Europe, etc.) ・Domestic markets for Qeshmi fishery products: large cities in Iran targeting fish-consuming expatriate societies and Iranian nationals.
Possibility of investment	・The number of foreign investors with an interest in aquaculture, fishing and fish-processing may be limited. Investors could come from China, South Korea, Vietnam, Norway, France, Italy, etc. ・Domestic (Iranian) private companies could become investors and invest in local people's livelihood diversification by linking fishery with marine-related tourism.	・Investors from many countries show interest in the fishery sector such as aquaculture, fishing and fish-processing. ・Domestic (Iranian) private companies can be investors for fisheries and invest in local people's livelihood diversification by linking fishery with marine-related tourism.
Possibility of realization	・There is a possibility of investment by foreign and domestic companies in the fishery sector such as aquaculture, fishing and fish-processing. Global demand for fishery products is high. Some foreign companies will show an interest in Qeshmi fishery products and invest in the sector. If a stable supply of fishery products from fishing and/or aquaculture is assured in compliance with volume and required quality (freshness, shape, color, size, etc.), many companies will seek to invest in the fishery sector.	・Investment in the fishery sector, such as aquaculture, fishing and fish-processing is possible. Global demand for fishery products is high. If a stable supply of fishery products from fishing and/or aquaculture is assured in compliance with volume and required quality (freshness, shape, color, size, etc.), many companies will seek to invest in the fishery sector.
	・Investment in livelihood diversification by linking fishery with tourism is possible by domestic (Iranian) private companies.	・Investment in livelihood diversification by linking fishery with tourism is also possible by domestic (Iranian) private companies.
Risk	・Exports/imports of fishery products do not involve items prohibited by economic sanctions. However, many foreign companies could hesitate to invest in the Iranian fishery sector given the uncertain situation concerning sanctions. The difficulty in international money transfers between banks could be a significant barrier to creating new stable business involving foreign investors.	・Nil.
Conclusion (suitability as a priority industry)	・Global demand for fisheries products is rising. If a stable supply of fishery products from fishing and/or aquaculture is assured, some foreign companies will show interest and invest in the Iranian fishery sector. Whether or not economic sanctions are imposed, and even if opportunities for foreign investment are limited, fisheries development should be a priority area.	・Global demand for fisheries products is rising. Under the "without limitations" condition, many foreign companies can participate in investment in the Iranian fishery sector. Therefore, it is suitable to choose the fishery sector as a priority area.

Source: JICA Project Team.

Table 5.3.4 Development Scenarios of Tourism With and Without Major Limitations

	With major limitation	Without major limitation
Expected situation in each industry	・Ecofriendly tourism products are highly diversified. Ecotourism, which utilizes unique tourism resources including agriculture and fishery-related resources on Qeshm, becomes the core value. ・Small eco-resorts are established in the western part of the island in support of the balance pole of Baseidou. ・Ecotourism encourages local communities to be involved in SMEs related to the tourism business. ・The number of entrepreneurs and employment increase due to newly developed tourism and services. ・Medium-scale tourism facility development provides more employment opportunities. ・Ecotourism attracts domestic markets from higher socioeconomic groups. The expenditure spent by tourists relatively increases through diversified tourism products and facilities. ・The branding of Qeshm products is promoted to reinforce the local market. ・Since community involvement with tourism businesses is promoted, economic and cultural value exchanges between tourists and local communities are enhanced. As a result, tourism becomes one of the pillars of supporting the local economy and traditional culture.	・Ecofriendly tourism products are highly diversified. Ecotourism, which utilizes unique tourism resources including agriculture and fishery-related resources on Qeshm, becomes the core value. Selakh Port can be utilized for new tourism activities linked with the fishery sector. ・Small luxury eco-resorts are established in the western part of the island in support of the balance pole of Baseidou. ・Ecotourism encourages local communities to be involved in SMEs related to tourism business. ・The number of entrepreneurs and employment increase due to newly developed tourism and services. ・Medium-scale tourism facility development provides more employment opportunities. ・Ecotourism attracts domestic and international tourists from higher socioeconomic groups. Tourism expenditure spent by tourist increases through diversified tourism products and facilities. ・The branding of Qeshm products is promoted to reinforce the local market. ・Since community involvement with tourism businesses is promoted, economic and cultural value exchanges between tourists and local communities are enhanced. As a result, tourism becomes one of the pillars for supporting the local economy and traditional culture. ・Once the Persian Gulf Bridge is connected, MICE facilities are developed around Qeshm Airport. The number of domestic and international tourists increases. The number of families who are interested in learning about a unique culture and the environment also increases, as does the number of academics and researchers who attend meetings and conferences.
Expected market	・The domestic market expands by targeting higher socioeconomic groups (30s to 40s with a family, well educated). ・International markets such as Germany, Switzerland, Sweden, Austria, France and Poland.	・The domestic market expands by targeting higher socioeconomic groups (30s to 40s, with a family, well educated). ・Regional markets such as UAE, Oman, Qatar. ・International market such as ecotourists in Europe and East Asia.
Possibility of investment	・Domestic and local investors can invest in the establishment of medium- and small-scale tourism facilities, ecotourism activities utilizing nature, and marine-, agriculture and culture-related resources.	・Domestic and local investors can invest in developing ecotourism activities utilizing nature and marine-, agriculture- and culture-related resources. ・International investors can invest in establishing luxury eco-resorts with high-quality facilities and services. ・Relatively bigger investments such as in MICE facility construction and management can be expected.
Possibility of realization	・The establishment of a Qeshm brand as a unique destination by utilizing the UNESCO Geopark brand and network can attract other types of tourists and investors. ・Domestic and local investors have been investing in tourism businesses despite the limited conditions.	・The establishment of a Qeshm brand as a unique destination by utilizing the UNESCO Geopark brand and network can attract international/domestic tourists and investors.
Risk	・Rapid inflation leads to shrinking domestic markets and buying power of visitors.	・Unplanned development projects may lead to environmental deterioration.
Conclusion (suitability as a priority industry)	・To maintain the local economy and employment within limitations, the tourism sector should be more prioritized, since investment in other industrial sectors is highly improbably.	・Various kinds of tourism-related investment expand opportunities for local communities by establishing SMEs associated with the tourism business. Therefore, the tourism sector should be seen as a priority area for strengthening the local economy.

Source: JICA Project Team.

5.3.2 Development scenario by phase

A series of activities and events to be undertaken over the planning period up to 2036 are described in this section as the development scenario without major limitation for Qeshm Island. In a development scenario, the planning period is usually divided into a few phases, and activities and events in each phase are described. In the case of Qeshm Island, the terms of phases are planned to comply with the island's five-year development plans. The sixth five-year development plan will be approved in 2017, and it will be valid until the end of the Iranian fiscal year of 2021/2022. The development scenario for three phases up to 2036 is described below and detailed in Table 5.3.5.

The timeline for each phase is presented below but it is only indicative. The exact phasing should be established by the respective government organizations. The phasing should also be in line with the planning periods in official five-year development plans. Although the first year in Phase 1 is set in 2019 immediately after the completion of the Project, the proposed actions and activities should be started as soon as all the government departments concerned agree to the ECO-QESHM Master Plan.

- Phase 1 for preparatory stage in the short term (2019–2021)
- Phase 2 for transitional stage in the medium term (2022–2026)
- Phase 3 for sustainable growth stage in the long term (2027–2036)

(1) Phase 1: Preparatory stage

The sixth five-year development plan is enforced. The economic model represented by green economy and resilient economy is pursued toward sustainable development. The ECO-QESHM Master Plan including action plans for the priority sectors of tourism, fishery, solid waste management, and waste water treatment are approved in 2018.

Qeshm Island is recognized as an eco-tourism destination. The island becomes the first place in Iran with a geopark and the second in the Middle East. The image of the island starts to change from a place to shop to an area of genuine eco-tourism featuring complex natural environment. In this stage, key economic activities in the island are associated with tourism and linked to fishery and related industries to facilitate the local economy.

Following the formalization of the Master Plan, action will be taken to improve institutional arrangements for environmental management and investment promotion and to encourage investment in Qeshm Island. Living environment improvement projects are implemented. These projects are to provide more and better basic services to the residents of rural areas first, including education and health services, water supply, waste water treatment, and solid waste management. Through participatory approaches, the local residents are involved in the projects from the planning, implementation, to management. The capacity of village councils should be enhanced steadily during this stage. Meanwhile, public relations measures are underway to raise the awareness of the islanders about the global economy.

A feasibility study is carried out on key infrastructure projects, such as the Persian Gulf Bridge, a cargo port and chemical plants, including the LNG supply plant. Foreign companies become interested in investing in the island in the hope of gaining benefits from reasonable labor costs and mineral resources, while acknowledging the eco-island concept and respect local resources.

(2) Phase 2: Transitional stage

The domestic economy turns around and starts to grow. Local consumption needs in tourism and food culture gradually change. As foreign investment increases, the influx of foreigners increases. This further accelerates diversification of needs in tourism and food.

Collaborative and participatory efforts initiated in Phase 1 take root in the island, as the local people carry out eco-tourism activities and the communities manage marine resources. The supply system established in the island by such efforts, which meets the island's consumption needs, starts to operate. Qeshm acquires the status and recognition of eco-tourism and marine products in the domestic market.

After the opening of the Persian Gulf Bridge, improved access to the mainland expands trade and

communications with the mainland. Construction of the chemical plants starts. The population increases in the central area of the island.

(3) Phase 3: Sustainable growth stage

The domestic economy continues to grow steadily. Destinations for foreign tourists are diversified from natural attractions to experiential nature and cultural tours. Food culture is diversified in wealthy and part of middle-income households in the country.

Qeshm Island is well established and known as an eco-island with unique nature and culture based on a fine-tuned combination of fishery, agriculture, and industry. The local people recognize the satoyama and satoumi principles, as they become aware and cognizant of the importance of environmental conservation with the stable growth of the local economy. Efforts ensue to realize sustainable development.

Qeshm acquires international recognition as an eco-tourism destination in the world. The number of foreign tourists visiting the island has increased. Fresh fish products are distributed to the domestic market via the established cold chain. Qeshm Island's specialty products are shipped to the mainland and exported overseas.

A cargo port is opened to strengthen the island economy. The chemical and manufacturing industries have been established. Research and development results are applied to the implementation of sustainable development, especially in fishery, agriculture, industry and environmental management. The financial profits from industrial development is used to enhance the air route for domestic and international markets. Urban development is commenced in Shibderaz New Town. The population increase in the central and western areas is accelerated.

Table 5.3.5 Development Scenario 2019–2036

Stage		Preparatory Stage	Transitional stage	Sustainable Growth Stage
Characteristic		• Efforts are made to promote eco-tourism for a better image of Qeshm. • Investment environment that complies with environmental management and business operations is well established. • Feasibility studies are carried out for the Persian Gulf Bridge, a cargo port and chemical plants development.	• Qeshm dominates the domestic market for eco-tourism and fishery. Needs for tourism and food are diversified as the national economy grows. • The Persian Gulf Bridge is opened. Construction of chemical and manufacturing starts.	• Brand of Qeshm Island is well established. Specialty products of Qeshm Island are exported to the mainland and overseas. • People recognize the *satoyama* and *satoumi* principles and understand the importance of environmental conservation as the local economy enters a stable growth period. • A cargo port is opened to be a gateway to the mainland and inland countries. The Chemical and manufacturing industries start the operation.
Economy	Tourism	• Qeshm Island is recognized more as a destination with unique nature and culture rather than as a place to shop through public relations activities. • Management system is in place to establish eco-tourism in the island. • Entrepreneurs start businesses in lodging, handicraft, tourism, and services.	• The number of domestic tourists increases in eco-tourism, and tourism needs become diversified with increase in the regional revenue. • Qeshm is identified as the primary destination for eco-tourism in the country. • One-village-one-product activities are disseminated across villages in the island leading to the sixth sector industrialization.	• Qeshm is well recognized as a destination for eco-tourism in the international market. • Brand loyalty and identity of Qeshm for its nature and culture linked to a unique combination of fishery, agriculture, and industry are well established.
	Fishery	• Coastal management is established by villagers. • Export of aquaculture products and processed fish products to the overseas market is started. • Attempts are made to diversity processed fish products such as dried and cooked fish. Integrated multi-tropic aquaculture (IMTA) starts. • Collaboration with eco-tourism starts.	• With the influx of foreign immigrants, food culture is diversified in the country. • Aquaculture products and processed fish products capture the international market's attention.	• Food culture is diversified in wealthy and part of middle-income households in the country. • Fresh fish products are distributed to the domestic market via the established cold chain.
	Industry	• Effective institutional system for environmental management and business operations is established to promote the foreign direct investment (FDI).	• Good companies sympathizing with concept of the eco-island are selected to starts the study for investment. • Rental factories for SMEs are established.	• Chemical and manufacturing industries are established.
	Agriculture	• Agro-products including traditional herbs and honey products are promoted and linked to eco-tourism.	• Cultivation of leafy vegetables, date palms, and lotus trees with drip irrigation becomes popular. Such new agro-products are linked to eco-tourism.	• Agro-products including traditional herbs and mangrove/lotus honey products are well known in the country as Qeshm brand products.
Environment		• Environmental impact assessment (EIA) and environmental standards are established to prevent negative impact from in-	• Local residents initiated and continued the environmental management activities. The legal systems is established to support those activities.	• Local residents understand the satoyama and satoumi principles well, and they promote livelihood activities that comply with

	dustrial development. • Coastal management system is established.		environmental conservation in a sustainable manner.
Social	• Local history, culture, and tradition are reviewed to identify local assets. • Participatory approaches are applied to planning and implementation.	• Domestic immigration from the mainland increases. Immigrants (relocators) make efforts to fit into local communities; urban and rural residents start communicating with each other. • Local residents understand the concept of participatory approaches that they must take the initiative without depending on government support.	• Immigration from overseas increases. Foreign immigrants make efforts to fit into local communities. • Rural residents take action to encourage towns and villages on their own initiatives.
Human resources	• Human resources development including vocational training is promoted in environmental conservation and main economic activities such as tourism and services.	• R&D results are applied to fishery, agricultural, industrial, and environmental management.	• R&D are continued to achieve sustainable development, especially in fishery, agricultural, industrial, and environmental management.
Spatial development	• Development is implemented in Qeshm and Dargahan. • Perceptive villagers start to create model eco-villages.	• Development is implemented in Ramkon and core villages of Laft, Tabl, and Selakh in center of the island. • Efforts to establish eco-villages are made in different villages in the island.	• Development is implemented in core villages of Doulab and Baseidou in the west of the island. • Economic activities are encouraged in small and medium-size villages in the west of the island.

Source: ibid.

5.4 Planning Framework

A socio-economic framework is formulated for the future development of the island. The role of macro framework as a planning technique is to serve as a catalyst for coordinating and integrating sector-by-sector analysis and planning. It usually specifies the levels of socio-economic development expected to be attained by planned development in the target year and intermediate years. The level of development is measured by a set of socio-economic indices projected in a mutually consistent way. The indices commonly used are (1) gross regional domestic product (GRDP) and its composition by broad sector, (2) employment generated in each of the broad sectors, (3) urban and rural population, and (4) per capita GRDP.

Planning framework is formulated based on the Eco-Island concept. This framework puts some emphasis on environmental and social considerations, high value-added, appropriate technology, local residents' livelihood, eco-tourism, and fishery. An overview of the planning framework is described below.

(a) Eco-tourism utilizing the Hara mangrove forest and the Qeshm Geopark will be developed, so will new products and services such as souvenirs, boats, and guesthouses, based on traditional knowledge and skills.
(b) Sustainable fishery, aquaculture, and fish processing industries will be developed.
(c) High-quality "Qeshm brand" agro-products utilizing reclaimed water, hydroponics, and environmentally controlled cultivation will be distributed.
(d) The tourism and fishery sector will be developed, especially in the western side and the southeastern side of the Island.
(e) The industrial sector will be developed, especially SMEs and industrial parks, and job opportunities will be created for the local people.
(f) Oil and natural gas will be developed in consideration of environmental issues.
(g) The petrochemical industry will be the main industry in the island up to 2036; methanol, its derivatives and LNG with high value-added will be produced in the industry.

Two iterations of the planning frameworks are formulated, according to the scenarios with and without major limitations. A summary of both scenarios is shown in Table 5.4.1. The details will be explained by the following clauses. Population and population growth rate are actual values according to the 2016 census. GRDP, GRDP growth rate and labor force are estimated values based on the 2011 census.

Table 5.4.1 Summary of the Scenarios With and Without Major Limitations

Item	Unit	2016	2026		2036	
			With	Without	With	Without
Total population	Person	141,796	185,800	204,600	228,500	270,600
Annual population growth rate (%)	%	4.99	2.74	3.73	2.09	2.84
Immigrant population since 2016	Person	-	23,900	41,300	38,800	74,800
Share of immigrant population (%)	%	-	12.8	20.2	17.0	27.6
GRDP	IRR billion	11,332	14,832	19,551	19,811	37,464
GRDP growth rate	%	-	2.7	5.6	2.9	6.7
GRDP per capita	USD	4,998	4,989	5,972	5,419	8,653
Labor force	Person	39,100	51,500	60,100	61,400	81,000

Source: JICA Project Team based on National Population and Housing Census for 2011 and 2016.

5.4.1 Population projection

(1) Population projection with major limitations

With major limitations, the population on Qeshm is shown in the table below. The Qeshm population is projected to reach 185,800 in 2026 and 228,500 in 2036. The annual population growth rate will be

2.75% in 2026 and 2.09% in 2036. Compared to the scenario without major limitations, the annual number of immigrants will not increase much since significant economic development is not expected. According to the Qeshm County Master Plan, the fertility rate from 2006 to 2011 was 2.1%. Although the exact fertility rate from 2011 to 2016 is not identified, the average number of households at least decreased from 4.1 at 2011 to 3.7 at 2016 on the island. In addition, the total fertility rate in Iran has been on a downward trend. Thus, the natural population growth rate per annum on the island is assumed to be 1.8% between 2016 and 2026 and 1.6% between 2026 and 2036.

Table 5.4.2 Population Prediction With Major Limitations

Item	2016	2026	2036
Total population	141,796	185,800	228,500
Growth rate (%)	4.99	2.74	2.09
Immigrant population since 2016		23,800	38,800
Share of immigrant population (%)		12.8	17.0
Natural growth rate (%)		1.8	1.6

Source: JICA Project Team based on National Population and Housing 2011 and 2016 Census.

(2) Population projection without major limitation

As presented in Table 5.4.3, Qeshm's population is expected to reach 204,600 in 2026 and 270,600 in 2036. The annual population growth rate will be 3.74% in 2026 and 2.84% in 2036. Qeshm will receive immigrants, mainly for labor purposes, as the economic development continues. As a result, immigrants will account for 20.3% in 2026, and 27.7% in 2036. The number of immigrants is also expected to increase alongside progress in economic development. The same natural population growth rate as that for the scenario with major limitations is applied to this scenario.

Table 5.4.3 Population Prediction without Major Limitation

Item	2016	2026	2036
Total population	141,796	204,600	270,600
Growth rate (%)	4.99	3.74	2.84
Immigrant population since 2016		41,500	75,000
Share of immigrant population (%)		20.3	27.7
Natural growth rate (%)		1.8	1.6

Source: JICA Project Team based on National Population and Housing 2011 and 2016 Census

5.4.2 GRDP and employment projections

(1) Conditions of GRDP projections

Qeshm's GRDP and employment projections are based on the following conditions:

- Data on the working age population and labor force in 2011 are obtained from the 2011 Census; the 2011 Census data are used as the base data.
- There are both GRDP and workforce data in 2011 for Hormozgan Province but only workforce data for Qeshm Island.
- From the workforce data, the share (%) of Qeshm Island in the number of workers in Hormozgan Province was calculated. The GRDP of Qeshm was then calculated by multiplying the GRDP of Hormozgan Province and the share of Qeshm in the number of workers.
- Labor productivity is assumed to be the same for both Hormozgan Province and Qeshm Island.
- The economic growth rate refers to that of Iran. The national target rate is set at 8.0% in the fifth and sixth five-year plans, which should be used as the indicator of the GRDP growth rate.

(2) GRDP projection with limitation

As shown in Table 5.4.4, the GRDP in the scenario with major limitations is expected to increase moderately, i.e., by less than 200% from 2016 to 2036. The growth rate of the primary sector will be 2.0% up to 2036 due to the creation of value-added products both in the agriculture and fishery sectors. In the agriculture sector, local production for local markets will be pursued. In fishery sector, an increase in aquaculture production and exports of Qeshmi seafood to other countries is expected. The secondary sector will increase because of the reinforcement of existing industrial parks, the construction of planned industrial parks, the development of SMEs, and the development of fish and agriculture processing. In part due to the respective limitations, the gas and oil sector will not develop as much given its limited contribution to the economic growth of Qeshm. The tertiary sector will be the main driving force behind economic development with the highest GRDP share up to 2036. In particular, the tourism sector will take the leading part in the tertiary sector. GRDP per capita is not expected to grow much from 2016 to 2036.

Table 5.4.4 GRDP Prediction with Major Limitation

Item		2016	2026	2036
GRDP (IRR bill., base year = 2011)	Total	11,332	14,832	19,811
	Primary	799	974	1,187
	Secondary	4,661	5,966	8,018
	Tertiary	5,872	7,892	10,606
GRDP share (%)	Total	100.0	100.0	100.0
	Primary	7.0	6.6	6.0
	Secondary	41.1	40.2	40.5
	Tertiary	51.8	53.2	53.5
Annual growth rate (%)	Total	3.9	2.7	2.9
	Primary	2.5	2.0	2.0
	Secondary	4.0	2.5	3.0
	Tertiary	4.0	3.0	3.0
Per capita GRDP (US$, real)		4,998	4,989	5,419
Annual growth rate (%)		-	0.0	0.8

Source: JICA Project Team

(3) GRDP projection without major limitations

As shown in Table 5.4.5, the GRDP is expected to increase drastically, more than threefold from 2016 to 2036. The growth rate of the primary sector will be 3.0% up to 2036 due to the value addition to the fishery sector as linked to the eco-tourism sector and the diversification of agro-products such as traditional herbs and apiculture. With this projection, the share of the primary sector in the GRDP is expected to decrease accordingly. Gas and oil based industries such as ammonia and urea based industry, LNG production, and steel industry will develop drastically. Accordingly, the secondary sector will account for the 45.9% of GRDP share in 2036. The tertiary sector will have been the main driving force of the economic development with the highest GRDP share up to 2036. Per capita GRDP is expected to grow more than 1.7 times from 2016 to 2036.

Table 5.4.5 GRDP Prediction without Major Limitation

Item		2016	2026	2036
GRDP (IRR bill., base year = 2011)	Total	11,332	19,551	37,464
	Primary	799	1,073	1,442
	Secondary	4,661	7,961	17,188
	Tertiary	5,872	10,517	18,834
GRDP share (%)	Total	100.0	100.0	100.0
	Primary	7.0	5.5	3.9
	Secondary	40.6	40.7	45.9
	Tertiary	52.4	53.8	50.3
Annual growth rate (%)	Total	3.9	5.6	6.7
	Primary	2.5	3.0	3.0
	Secondary	4.0	5.5	8.0
	Tertiary	4.0	6.0	6.0
Per capita GRDP (US$, real)		4,998	5,972	8,653
Annual growth rate (%)		-	1.8	3.8

Source: JICA Project Team

5.4.3 Employment Projections

Conditions for employment projections are established as below.

- Data on the working-age population and labor force in 2011 are obtained from the 2011 census; the 2011 Census data are used as the base data.
- In 2011, the working-age population accounted for 67.1% of the population on the island, while the labor force participation rate was 40.6%. These data are used as the base data.

(1) Employment projection with major limitation

The rate of the working-age population is assumed to decrease up to 2036 according to the demographic shift in Iran. The labor force participation rate is expected to be 42.0% in 2026 and 2036, due to the increased number of immigrant workers. The inflow of immigrant workers is assumed to be limited. The labor force by sector is presented in Table 5.3.6.

Table 5.4.6 Employment by Sector with Major Limitation

Item		2016	(%)	2026	(%)	2036	(%)
Population		141,696	-	185,800	-	228,500	-
Working age population		96,400	-	122,600	-	146,200	-
Labor force	Total	39,100	100.0	51,500	100.0	61,400	100.0
	Agriculture	2,500	6.5	2,600	5.0	2,800	4.5
	Fishery	7,000	18.0	6,700	13.0	6,800	11.0
	Manufacturing	4,700	12.0	7,200	14.0	9,200	15.0
	Construction	5,500	14.0	6,200	12.0	8,600	14.0
	Utilities	600	1.6	1,000	2.0	1,800	3.0
	Oil and Gas	100	0.3	200	0.3	300	0.5
	Mining	200	0.4	200	0.3	200	0.3
	Service	16,500	42.2	23,000	44.4	25,600	41.7
	Tourism	2,000	5.0	4,600	9.0	6,100	10.0

Source: JICA Project Team

The agricultural sector will contribute to creating employment opportunities as linked to ecotourism industries and through the production of local specialty products, such as traditional herbs and related products and other value-added agro-products (e.g., mangrove honey). Yet, the main market will be the island and the mainland. Therefore, employment in the agricultural sector will not change in comparison with 2016. The fishery sector has already been active enough on the island and its marine resources are limited. However, diversification including aquaculture and fish-processing is likely to generate job opportunities in the manufacturing sector given the links involved. Under this scenario,

the most promising of all will be the service and tourism sectors since investment in other industrial sectors is expected to be limited.

(2) Employment projection without major limitation

The island's working-age population is expected to increase up to 2026 then gradually decrease up to 2036. The labor force participation rate is expected to increase to 42.0% in 2026 and 44.0% up to 2036, due mainly to the inflow of immigrant workers. The labor force by sector is presented in Table 5.3.7.

Table 5.4.7 Population, Working Age Population, and Labor Force

Item		2016	(%)	2026	(%)	2036	(%)
Population		141,696	-	204,600	-	270,600	
Working age population		96,400	-	143,200	-	184,000	
Labor force	Total	39,100	100.0	60,100	100.0	81,000	
	Agriculture	2,500	6.5	2,500	4.1	2,400	3.0
	Fishery	7,000	18.0	7,800	13.0	8,100	10.0
	Manufacturing	4,700	12.0	9,600	16.0	13,900	17.0
	Construction	5,500	14.0	10,200	17.0	15,600	19.3
	Utilities	600	1.6	1,200	2.0	2,800	3.5
	Oil and Gas	100	0.3	200	0.3	700	0.9
	Mining	200	0.4	200	0.3	200	0.3
	Service	16,500	42.2	23,600	39.3	29,200	36.0
	Tourism	2,000	5.0	4,800	8.0	8,100	10.0

Source: JICA Project Team

The agricultural sector will contribute to creating employment opportunities as linked to ecotourism industries and through the production of local specialty products, such as traditional herbs and related products and other value-added agro-products (e.g., mangrove honey). Accordingly, the sector's working population is expected to grow. This is not the case with the fishery sector because commercial fishing will develop in association with the manufacturing sector, with diversification including aquaculture and fish-processing likely to generate job opportunities. In addition, Qeshmi seafoods will be exported all over the world. The most promising of all is the manufacturing sector as represented by LNG and related manufacturing sectors. As population growth and economic development continue, the demand for labor in the construction sector will increase. The service sector will continue to have the largest share in terms of working population up to 2036. The service sector will increase job opportunities alongside population and economic growth. In addition, the number of jobs will increase because of the increase in international tourists.

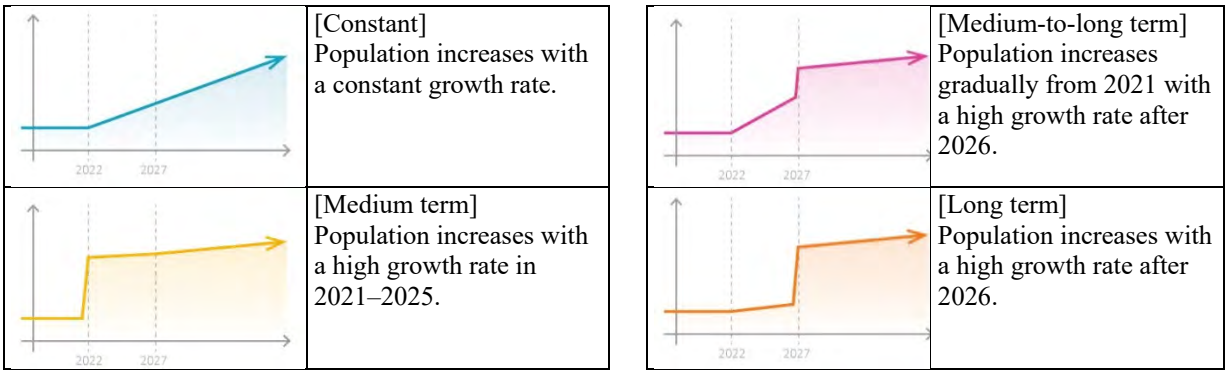
5.4.4 Population distribution

(1) Growth patterns and population distribution

The population of each city and village is estimated for 2021, 2026, and 2036. The estimated population can be a condition to formulate the future spatial structure and land use plan. The population estimate is based on the following conditions and assumptions:

- The planning period up to 2036 is divided into three stages as defined in Section 5.3: the preparatory stage up to 2021, the transitional stage up to 2026, and the sustainable development stage up to 2036.
- The current population increase will continue throughout the preparatory stage in which no significant change or large-scale project will take place and all the organizations concerned will take necessary action to implement the ECO-QESHM Master Plan.

- The population growth of villages and cities is examined in terms of four patterns, which spatially translates the different phases of development scenario explained in Sub-section 5.3.2. In *constant* growth, similar growth rates will be maintained throughout the three stages. *Medium-term* growth will have a high growth rate in the transitional stage. In *medium-to-long-term* growth, the growth rate will gradually increase from the transitional stage to the sustainable development stage. *Long-term* growth will have a high growth rate in the sustainable development stage. Figure 5.4.1 defines the four population growth patterns and shows the main reasons for attributing the growth patterns and Table 5.4.8 presents the estimated population by growth pattern. The *special* in the table represents the population of a new town development in Shibderaz, or Shibderaz New Town (SDNT) of which a growth pattern is different from the other patterns.
- In 2036, four cities of Qeshm, Dargahan, Souza, and Ramkon will have a population of over 10,000 to be established as eco-polis reflecting the characteristics of each city.
- There are 10 villages with a population of over 5,000 to be core villages. Baseidou, Doulab, Tabl, Selakh, and Laft are the ones for the central and western areas in the island. Ramchah, Giadon, and Holor receive the population due to their close location to cities. Kouvei and Towla have the population related to the industrial development.



Source: JICA Project Team.

Figure 5.4.1 Four Growth Pattern of Population Increase in City and Village

Table 5.4.8 Population Estimate by Four Growth Pattern

Growth pattern	Population			Growth rate (%/year)		
	2021	2026	2036	2021	2026	2036
Constant	110,724	127,016	161,724	4.7	2.8	5.0
Medium term	35,421	40,460	50,488	2.3	2.7	4.5
Medium-to-long term	12,778	15,064	22,897	1.7	3.3	8.7
Long term	11,577	12,261	15,140	1.8	1.2	4.3
Special (SDNT)	-	9,799	20,351	-	-	15.7
Total	170,500	204,600	270,600	3.8	3.7	5.8

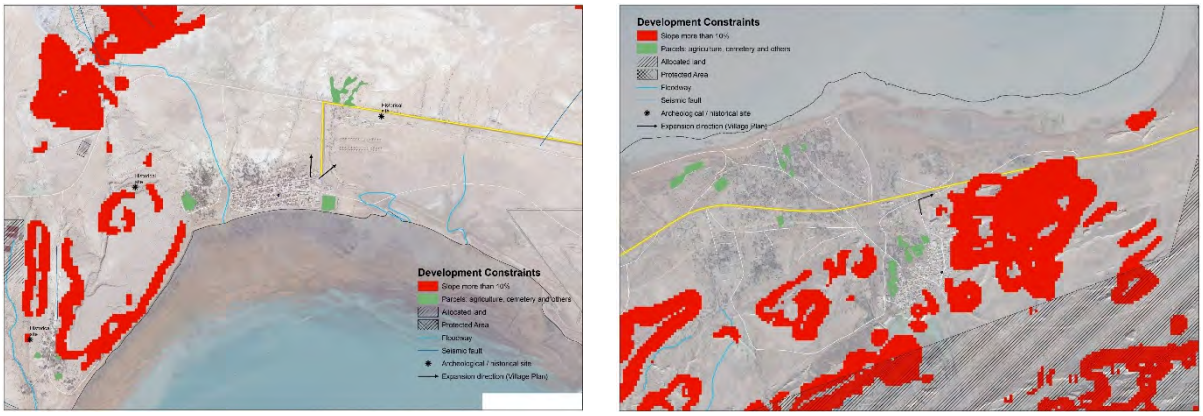
Source: ibid.

(2) Development constraints

Even though, in the main, Qeshm Island is known for having a large amount of available flatlands, some natural and cultural features located in the surroundings of human dwellings act as constraints on the future urban expansion of the cities and villages. This situation mostly derives from the fact that the quest for security (distance from the shore, sheltering in a valley or behind a mountain) has been a major factor in the establishment of human dwellings in the past. Thus, a fine-grained analysis of the direct surroundings of the cities and villages has been carried out and a development constraint score (DCS) has been established for each of them, as shown in Table 5.4.9.

The main criteria used to establish the DCS are as follows: distance from the limits of the urban area to the closest constraint, including slopes of more than 10%, cemeteries, agriculture and military parcels, already allocated zones, protected areas, floodways, which can potentially carry out rainwater,

seismic faults and archeological sites. Figure 5.4.2 below illustrates two villages with different levels of constraints.



Source: JICA Project Team.

Figure 5.4.2 Examples of Low DCS (Doustakou Village, Left) and High DCS (Chahou-East Village, Right)

Regarding the effects of the DCS rating on the allocation of population, the cities and villages with a high DCS, whose expansion is highly constrained, were restricted in their potential to welcome a new population by levelling their annual population growth rate to less than 3.5% and their 2016-2036 population increase to less than 50%.

Based on the statements explained above, Table 5.4.9 presents the estimated population of each city and village.

Table 5.4.9 Population Estimate by City and Village in 2021, 2026, and 2036

			Growth Rate (%/year)				Population by Target Year		
City/Village	Term	DCS	2011–16	2016–21	2022–26	2027–36	2021	2026	2036
Qeshm	Constant	M	7.30	5.33	3.25	5.27	52,741	61,899	80,022
Dargahan	Constant	M	10.88	6.34	2.76	6.09	19,747	22,623	30,402
Souza	Mid-long	L	3.91	1.82	4.25	11.49	6,246	7,690	13,247
Ramkon	Mid	M	4.40	3.33	3.25	9.40	5,268	6,181	9,686
Doulab RD		L							
Baseidou	Long	H	2.30	1.82	1.56	5.27	2,438	2,634	3,405
Derakou	Long	L	0.83	1.37	0.86	3.25	684	714	838
Doustakou	Long	L	2.61	2.31	1.27	5.26	723	770	995
Kani	Long	M	0.30	1.05	0.61	3.23	355	366	429
Konar Sia	Long	M	2.30	2.31	0.77	3.28	407	423	497
Gouri	Long	M	2.68	2.32	1.28	4.25	978	1,042	1,283
Moradi	Long	M	2.49	2.37	1.26	5.27	417	444	574
Tomgez	Long	H	3.85	2.31	1.29	5.25	241	257	332
West Chahou	Long	H	-0.65	1.33	0.86	3.23	640	668	783
East Chahou	Long	M	0.72	1.33	0.86	3.23	1,125	1,174	1,376
Doulab	Long	M	2.55	2.33	1.26	5.27	1,630	1,735	2,243
Sar Rig	Long	L	0.55	1.32	0.97	3.23	1,817	1,907	2,236
Aysheh-Abad	Long	M	-1.83	1.37	0.81	3.25	122	127	149
Souza RD									
Shibderaz	Mid-long	M	2.14	1.31	2.76	5.28	541	620	802
Mesen	Mid-long	L	1.55	1.12	2.26	4.86	2,286	2,556	3,240
Borka Khelaf	Mid-long	M	1.27	1.31	2.25	5.24	366	409	528
Rigoo	Mid-long	L	0.88	1.34	2.27	5.25	497	556	718
Zirong	Constant	L	3.16	1.83	2.25	5.27	1,445	1,615	2,088
Nakhl Gol	Mid-long	L	1.49	1.32	2.25	5.22	315	352	454
Direston	Mid-long	M	2.54	2.03	2.25	5.28	1,950	2,180	2,819
Saleh RD									
Dehkhoda	Mid	M	2.91	1.81	2.25	3.23	721	806	945
Sohli	Mid	H	2.51	1.93	2.75	3.24	2,089	2,393	2,806
Haft Rangou	Mid	M	3.84	1.82	2.75	4.24	765	876	1,078
Dourbani	Mid	M	1.35	1.32	2.28	3.23	789	883	1,035
Gomboron	Mid	M	3.76	2.31	2.95	3.22	639	739	866
Gouron	Mid	H	2.57	1.82	2.45	3.23	1,670	1,885	2,210
Melki	Mid	L	4.59	2.83	3.27	5.24	269	316	408
Tabl	Mid	M	3.93	2.63	3.25	3.23	4,632	5,436	6,374
Selakh	Mid	L	2.56	2.33	3.25	3.24	3,488	4,093	4,800
Noghasha	Mid	L	8.52	4.36	5.19	15.76	177	228	474
Shibderaz New Town	Special	L	-	-	-	15.74	0	9,799	20,351
Hangom RD									
New Hangom	Mid-long	M	4.82	2.35	4.04	9.40	557	679	1,064
Old Hangom	Mid-long	L	1.09	1.03	1.92	2.59	20	22	25
Howmeh RD									
Ramchah	Constant	M	0.01	1.32	1.26	3.24	3,931	4,186	4,909
Tourgon	Constant	M	0.00	1.55	0.73	2.06	108	112	124
Kouvei	Constant	L	0.09	1.32	1.27	2.83	4,530	4,824	5,547
Giadon	Constant	L	2.49	2.52	1.66	3.23	3,570	3,877	4,545
Tonbon	Mid	L	2.32	1.83	2.26	2.83	1,313	1,468	1,688
Kovarzin	Mid	L	2.74	1.82	1.76	3.24	1,994	2,176	2,552
Laft	Mid	M	2.60	2.32	2.26	4.25	5,236	5,855	7,210
Holor	Constant	M	0.84	2.32	2.26	5.27	6,537	7,310	9,451
Hamiri	Constant	L	15.12	6.26	4.23	7.35	126	155	221
Defari	Constant	L	13.56	8.34	3.23	3.25	812	952	1,117
Towla	Constant	L	17.63	6.84	3.25	3.24	8,176	9,595	11,251
Kabeli	Constant	H	-	0.74	0.36	1.05	55	56	59
Ramkon RD									
Bangali	Constant	L	0.92	1.22	0.83	2.46	119	124	140
Jijiyon	Mid	M	2.71	1.80	2.28	3.24	795	890	1,044
Gorvodon	Mid	M	4.64	1.82	2.25	3.24	1,204	1,346	1,579
Peyposht	Mid	M	4.62	1.82	2.26	3.24	2,652	2,965	3,477
Khaladin	Constant	M	3.26	2.82	1.26	3.24	1,604	1,708	2,003
Zeinabi	Mid	M	2.42	1.82	2.27	3.23	1,720	1,924	2,256
Karavon	Constant	L	5.20	3.34	1.76	3.25	1,122	1,224	1,436
Kousha	Constant	L	2.19	2.52	1.77	3.24	2,483	2,710	3,178
Kardova	Constant	L	5.45	3.33	2.29	5.20	192	215	277
Bagh Bala	Constant	L	5.95	3.31	2.24	5.32	333	372	482
Tomsenati	Constant	M	4.17	3.33	2.26	5.28	338	378	489
Tourion	Constant	M	3.50	3.33	2.26	5.27	2,755	3,081	3,983
Total			2.92	4.99	3.76	3.71	170,500	204,600	270,600

Source: ibid.

(3) Estimation of future household size

Based on the figures from the various censuses carried out by Statistical Center of Iran, the number of persons living together in one house (or household size) on Qeshm Island, decreased from 4.6 persons in 2006 to 4.1 in 2011 and 3.7 in 2016, a drop of approximately 20% during the last decade.

The drop in household size can be partially explained by the recent decrease in the total fertility rate (TFR) in Iran, which is a standard demographic indicator used internationally to estimate the average number of children that a woman would have across her childbearing years (i.e., 15-49 years of age). During the same period from 2006 to 2016, the TFR dropped by 10% from 1.92 to 1.72 children. However, the estimation of the future TFR suggests a relatively smaller reduction in the number of children by household in the near term, with a reduction of only 12% in the next 20 years (from 1.53 children in 2026 to 1.52 in 2036).

However, based on the ongoing demographic transition and changes in society, such as the increase in uniparental families due to the increase in divorces, it has been estimated that the number of household members without counting children will slightly drop by 10% from 2016 to 2026 and 10% again from 2026 to 2036 in urban areas, and by 5% from 2016 to 2026 and 10% from 2026 to 2036 in rural areas.

Combined with TFR estimations in Iran, the average household size on Qeshm Island is estimated to be 3.7 in 2016, 3.3 in 2026 and 3.1 in 2036. The average household size on Qeshm Island has been estimated for each city and for each rural district by using the average household size figures from the 2016 census. The figures for the intermediate year of 2021 has been calculated based on an annual linear proportional estimation between 2016 and 2026.

Table 5.4.10 below shows the calculation of average household size by city and rural district for the horizons of 2021, 2026 and 2036.

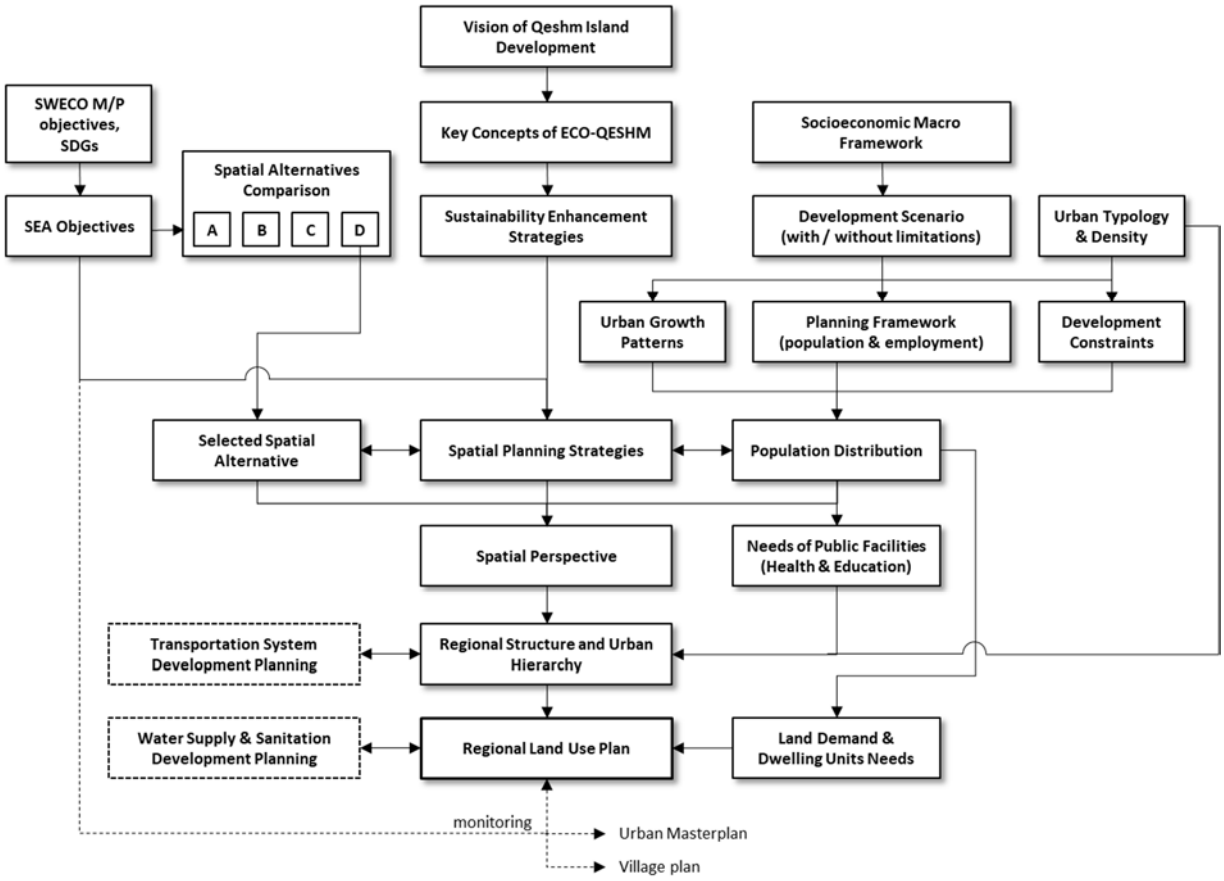
Table 5.4.10 Estimation of Future Average Household Size by City and Rural District (RD)

Year	TFR	Average Household Size on Qeshm	Qeshm City	Dargahan City	Souza City	Ramkon City	Doulab RD	Hangom RD	Howmeh RD	Ramkon RD	Selakh RD	Souza RD
2016*[1]	1.72	3.7	3.4	3.8	3.7	3.9	3.8	3.4	3.8	3.7	3.9	3.8
2021	1.63	3.4	3.1	3.5	3.4	3.6	3.6	3.2	3.6	3.5	3.7	3.6
2026	1.53*[2]	3.3	3.0	3.4	3.3	3.5	3.5	3.1	3.5	3,4	3,6	3.5
2036	1.52*[2]	3.2	2.9	3.2	3.1	3.3	3.4	3.0	3.4	3,3	3,5	3.4

Source: JICA Project Team based on Statistical Center of Iran and UN data
Note: (*1) Based on Statistical Center of Iran 2016 census figures
(*2) Based on the UN Department of Economic and Social Affairs Population Division data

5.5 Regional Spatial Plan

On the basis of the selected spatial development alternative (Chapter 4) and on the various elements discussed in previous chapters, the land use plan is formulated as presented in the following sub-sections, and according to the workflow shown in Figure 5.5.1 below.



Source: JICA Project Team.

Figure 5.5.1 Workflow for the Formulation of the Regional Land Use Plan

5.5.1 Spatial planning strategies

(1) Overall spatial development strategy

To embody the development vision and objectives towards Eco-Island, spatial development strategies are elaborated as the preparatory stage of the land use plan. In this stage, existing major spatial problems and potentials that may challenge and lead to the sustainable future of Qeshm Island are examined to determine land use patterns. The spatial development strategies are prioritized according to their importance in terms of economic, social, and environmental considerations and also to their complexity in terms of implementation of land use measures.

The Strategy for Integrated Coastal Land-sea Planning is firstly formulated. Then, the ES analysis is performed to clarify the environmentally sensitive areas to be conserved and the development-potential areas in order to avoid causing negative environmental impacts. A preliminary assessment is carried out to examine whether industrial development is permissible in the potential areas. Finally, two spatial strategies of avoidance of coastal light pollution and of traditional landscape protection complete the strategical spatial framework.

(2) Integrated coastal land-sea planning strategy

For Qeshm as an island, one of the most important spatial development strategies is coherent planning

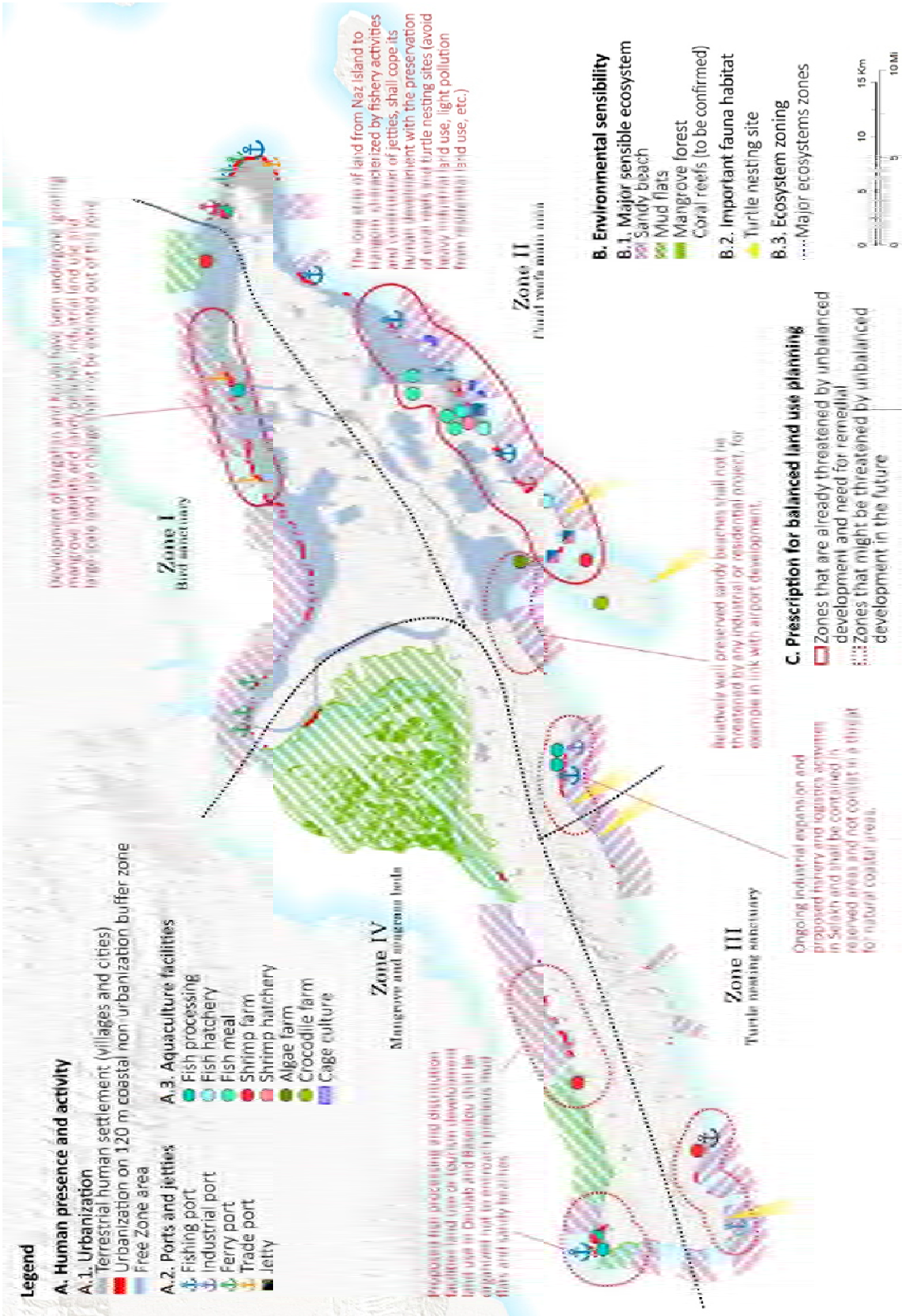
of its 400 km-long shoreline, both on the land and ocean sides. From coral reefs, mangrove forests, sandy beaches, to mud flats and seagrass beds, Qeshm Island contains a rich diversity of unique coastal and intertidal ecosystems that need to be preserved for environmental reasons. Also, in these coastal areas, a variety of economic activities associated with fishery, recreation and tourism, waterborne trade, energy, and industrial production are practiced. Thus, people are attracted to settle in the areas.

However, human activities on land have been known to threaten the integrity of natural coastal resources with pollution, runoff, erosion, etc. A directive adopted by QFZO in 2011 imposes a 120 m setback from the high-tide line on any building construction (60 m in other parts of Iran). Still, numerous cases of land grabbing and construction were authorized by the previous administration, leading to major changes in land use in the past decades.

Given the situation, it is proposed in the formulation of the land use plan to adopt an integrated land-sea planning approach. This planning approach helps mitigate many of the potential problems associated with increased human activities in coastal communities by addressing to the human use of land, freshwater, and marine resources while maintaining the integrity of terrestrial, aquatic, and marine ecosystems. Figure 5.5.2 summarizes the land and sea use conflicts in the coastal areas of Qeshm Island as well as some preliminary measures to be considered in the land use plan. It should be noted that the exact locations of key ecosystems such as coral reefs will be specified in the subsequent steps of the Project; the measures for the land and sea use conflicts will be more detailed afterwards.

The main propositions and planning restrictions of the integrated coastal land-sea planning strategy are the following.

(a) On the long strip of land from Naz Island to Hangom Island, characterized by numerous existing fishery activities and by the frequent construction of jetties, human development shall be pursued along with the preservation of the natural environment, especially coral reefs and turtle nesting sites. In this zone, heavy industrial land use and strong light pollution from various land use shall be avoided.
(b) Relatively well-preserved sandy beaches shall not be threatened by any industrial or residential project, where development is carried out in connection with the airport development in the area of Direston.
(c) Ongoing industrial expansion and proposed fishery and logistic activities in Selakh shall be contained in reserved areas and not pose a threat to natural coastal ecosystems.
(d) Land use for proposed fish-processing and distribution facilities or tourism development in Doulab and Baseidou shall be organized so as not to encroach on precious mudflats and sandy beaches.
(e) As the development of Dargahan and Kouvei has been undertaken while ignoring mangrove habitats and sandy beaches, industrial land use and large-scale land use changes shall not be extended beyond this zone.



Source: JICA Project Team.

Figure 5.5.2 Map of Qeshm Island Indicating Integrated Coastal Land-Sea Planning Strategy

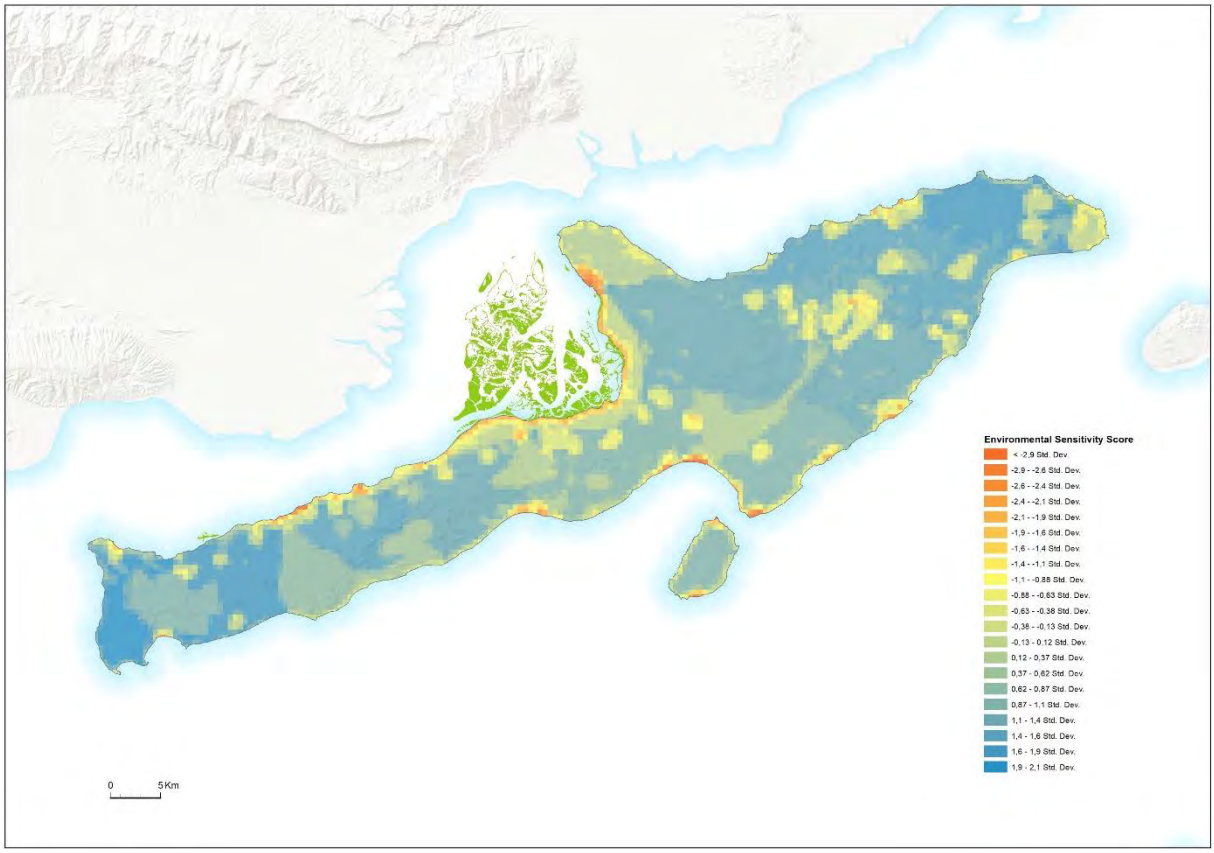
(3) Environmental sensitivity analysis of Qeshm Island

Conservation and wise use of the environment are key to realizing the envisaged vision on Qeshm Island. The ES of Qeshm Island has been analyzed based on a 500-m grid generated for the Project Area. According to the WLC aggregation method, all squares in the mesh receive an ES score calculated according to natural and social environment criterial; their weighting is shown in Table 5.5.1. Figure 5.5.3 shows the estimated ES.

Table 5.5.1 Criteria and Weight for Sensitivity Analysis

Criteria	Spatial influence	Weight (on a scale from 1 to 10)
Human settlements surroundings (500 m)	Overlap	10.0 (very high sensibility)
Ports surroundings (500 m)	Overlap	10.0 (very high sensibility)
Protected areas and surroundings (500 m)	Overlap	8.0 (high sensibility)
Indo-Pacific bottlenose dolphin habitat	Proximity	7.0 (high sensibility)
Sea turtle nesting sites	Proximity	7.0 (high sensibility)
Sandy beaches	Overlap	7.0 (high sensibility)
Mangrove areas	Overlap	7.0 (high sensibility)
Cultural heritage surroundings (500 m)	Overlap	6.0 (relatively high sensibility)
Geosites	Overlap	5.0 (relatively high sensibility)
Farmlands and natural local forests (acacia) areas	Overlap	5.0 (relatively high sensibility)

Source: JICA Project Team.



Source: JICA Project Team

Figure 5.5.3 Environmental Sensitivity on a 500-m Grid

In addition to the ES analysis of the terrestrial and coastal areas, an ES area is identified in the marine areas, given the focus on marine ecology and fishery. For this purpose, the JPT carried out an interview survey among fishermen in Souza, Kouvei and Selakh to clarify the location of fishing grounds and spawning areas. The JICA Iran office conducted a field survey from December 2017 to

February 2018 (in winter) to investigate the habitat of Indo-Pacific bottlenose dolphins, which are the main tourism resources on the island, and a fishing spot in Dolphin Bay. The identified ES area includes the following ones.

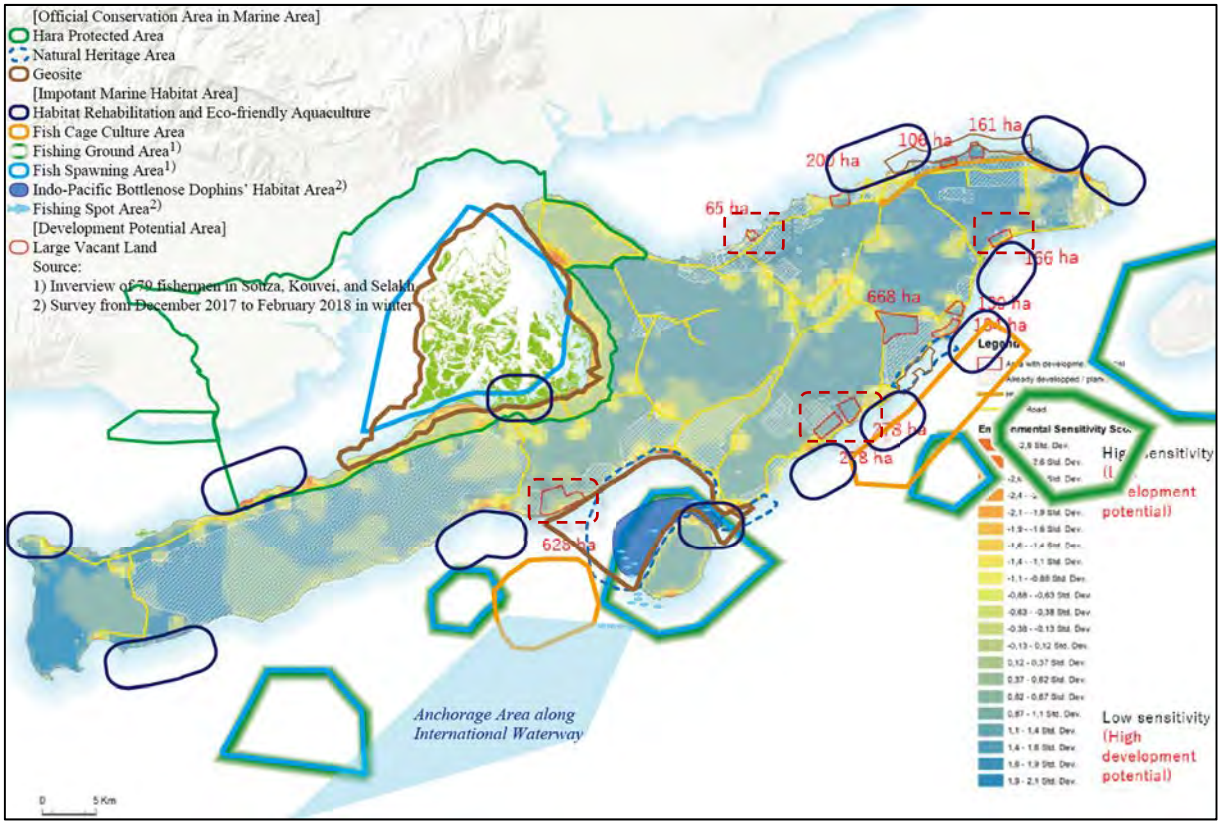
(a) Designated environmental conservation area
- ✓ Hara Protected Area
- ✓ Natural Heritage rea
- ✓ Geosite

(b) Fishery and aquaculture area
- ✓ Fish cage culture area proposed by the DoE in Tehran in accordance with the sixth FYDP
- ✓ Habitat rehabilitation and ecofriendly aquaculture proposed by the JPT in line with the concept of *satoumi*
- ✓ Fishing ground area and fish spawning area
- ✓ Fishing spot area using traps

(c) Habitat of Indo-Pacific bottlenose dolphin

Figure 5.5.4 presents an overview of the ES analysis for the terrestrial, coastal and marine areas. The fishing, sparing and fish cage culture areas are located from east to west in the south of the island. Areas suitable for ecofriendly aquaculture and *satoumi* are distributed along the coastal areas. Those areas need to be protected from development and environmentally negative impacts.

The figure also shows the vacant land covering a relatively large area, excluding the occupied areas, the ongoing project areas and the planned project areas. From the analysis, the development-potential areas are identified for Kouvei, north of Souza, south of Souza and east of Selakh.



Source: JICA Project Team

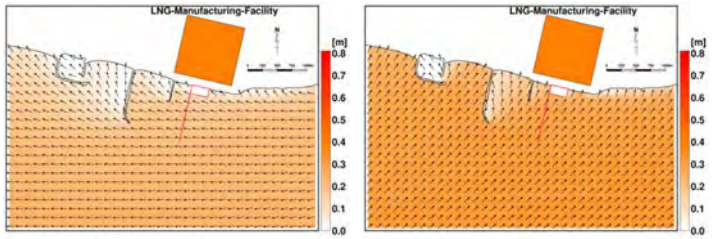
Figure 5.5.4 Environmental Sensitivity and Identification of Development-potential Area

(4) Preliminary assessment of industrial development in the development-potential area

The basic data used for the ES analysis are obtained from the interviews, literature and site visits by

the JPT and Iranian experts, with the aim of evaluating the island from a broad perspective. When a specific project is planned, an environmental survey should be conducted to assess whether any environmentally sensitive resources exist in the project areas, even though they would be the development-potential areas identified in the ES analysis.

Among the economic activities suitable for Qeshm Island, LNG development is examined as a case study to determine whether it causes any environmentally negative impacts on the development-potential areas. The LNG plant with an annual production capacity of 9.0 million ton will discharge thermal water at a rate of 10,000 m^3/h, leading to a temperature rise that is 10° higher than the sea temperature. A reclaimed area will be developed so that tag boats can be tied up. Other types of industries may lead to hot water and the need for reclaimed land for operational purposes. An assessment of the LNG plant is useful in order to determine whether thermal water and changes in the coastline lead to environmental impacts in other areas of industrial development as reference.



January to June/October to December July to September

Source: JICA Project Team.

Figure 5.5.5 Sea Current in Selakh

The JPT carried out an environmental survey to identify the existing natural conditions in the four potential areas in Kouvei, Souza North and Selakh. The surveyed species include seagrass, seaweed, coral reef, fishery and sea turtles. A simulation model of a tidal current is established for Souza North, Souza South and Selakh. Each of these locations has a beach in the surrounding areas, which may be affected by the development of the reclaimed area due to changes in the tidal current (Figure 5.5.5).

Figure 5.5.6 shows the simulation results for thermal water diffusion and coastal erosion linked to the LNG plant. Thermal water will influence seagrass and seaweed in Kouvei, Souza North and Selakh, as well as coral in Souza South, where the sea temperature is rising by 2° or higher. The reclaimed land will change the coastline in Souza North and Selakh. Table 5.5.2 shows the assumed environmental impact on the ecosystem caused by the LNG plant development.

Since fishing and fish spawning grounds are located offshore, based on the interviews with fishermen, the direct impact is not considered. However, a seaweed bed is growing in Souza North and Selakh. The fishing and spawning grounds could be indirectly impacted in the future if the seaweed bed disappears due to the influence of thermal water. In Souza South, corals were found during the field reconnaissance in April 2016, although their coverage rate is low. Therefore, some mitigation measures will be necessary if Souza South is considered as the construction site for the LNG plant. Kouvei is located on the northern side of the island and no fishing and spawning grounds are reported. Kouvei is considered less impacted among the candidate sites, although a seagrass bed was found.

Table 5.5.2 Environmental Impact on the Ecosystem Caused by the LNG Plant

	Kouvei	Souza North	Souza South	Selakh
Seagrass/seaweed	++	+++	-	++
Coral	-	-	+	-
Fishery/Spawning ground	-	-	-	-
Turtle Beach	-	-	-	-

Source: JICA Project Team.
Note: +++: major impact, ++: moderate impact, +: minor impact, -: the ecosystem does not exist.

Among the four candidate sites, Kouvei is considered the least impacted area. However, the area could potential see the growth of a seagrass bed, which usually develops in calm and silty waters. On the southern side of Qeshm Island, Souza South could be the least problematic area, although corals were found in a previous field survey. Therefore, even though any candidate site could be chosen as the construction site, a detailed survey is necessary. A recommended survey plan is summarized in Table

5.5.3.

Table 5.5.3 Summary of the Detailed Survey

Item	Methodology	Frequency	Note
Seagrass, seaweed	Distribution: diving observation, echo sounding	4 times/year	
Fish juvenile/egg	Net sampling, laboratory identification	4 times/year	
Coral	Distribution: diving observation	Once/year	
Sea turtle nesting ground	Distribution: interviews, observation	Every week (February-June)	In case a sandy beach is closer

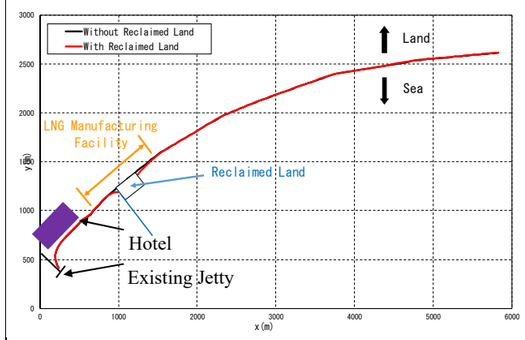
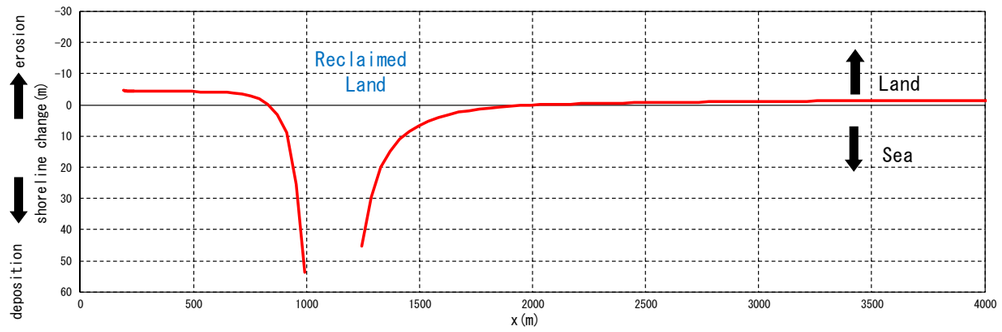
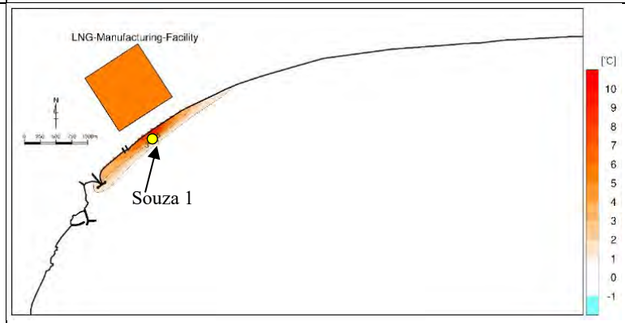
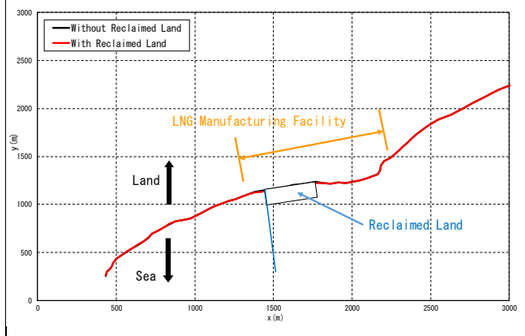
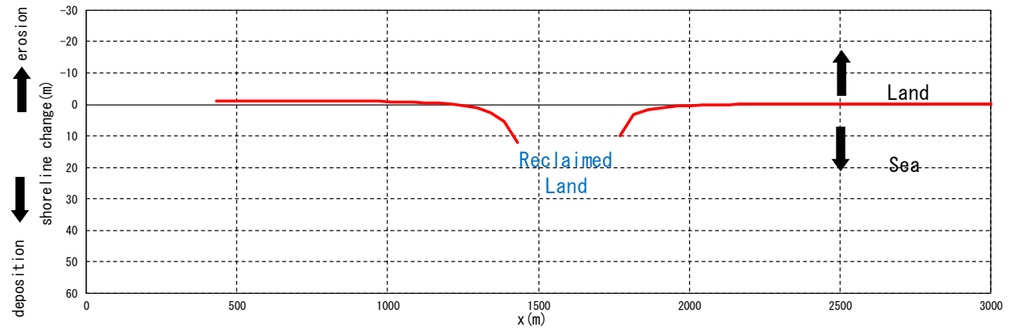
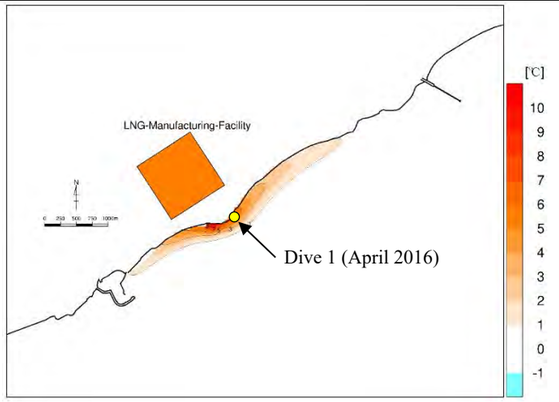
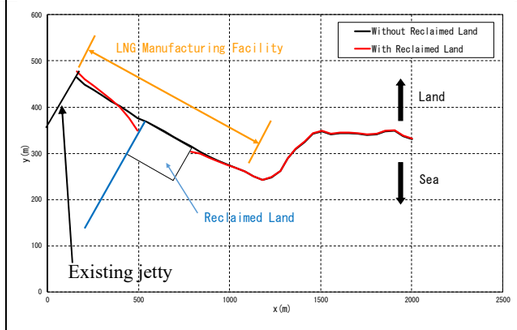
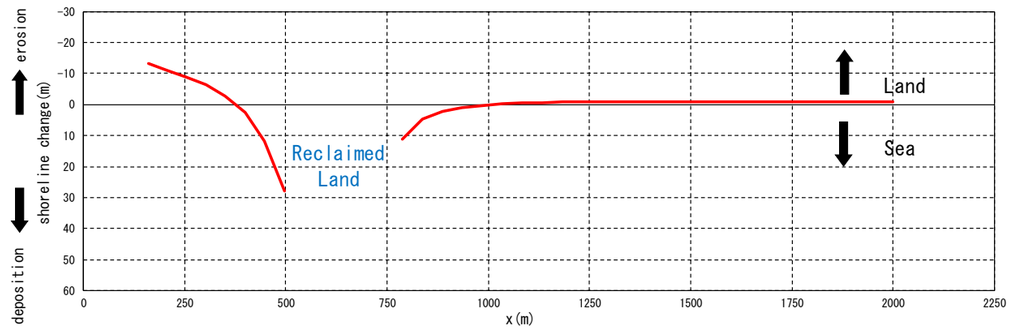
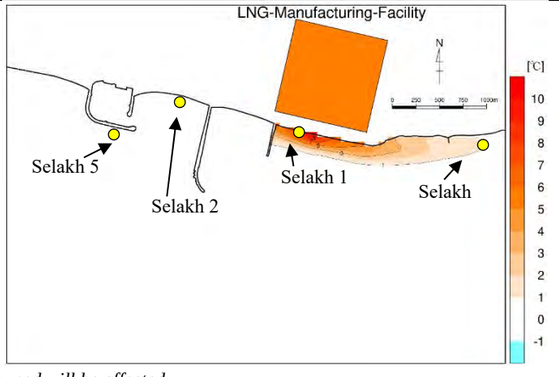
Source: JICA Project Team.

If the candidate area is considered ecologically significant, as well as important in terms of development of LNG, some mitigation and compensation measures will be planned. For example, the following measures can be applied to reduce the impact of thermal water:

- Long-distance discharge outlet to release the thermal water beyond the seaweed/seagrass bed or coral colonies
- Transplantation of corals to compensate for the lost area
- Installation of artificial adhesion basements for coral polyps or seaweed seeds
- Use of an air-fin system instead of a heat exchanger to reduce the effluent form thermal water, with the heat exhausted into the air

As for coastal erosion, the installation of a floating pier will secure the tidal current as there has been no change under current conditions and protect the coastline from erosion.

The maximum capacity of an LNG vessel (or Q-Max) has been expanded to approximately 260,000 m^3. Using Q-Max, the required number of trips to transport 9.0 million tons of LNG is 82 per year. If the maritime transport, including anchorage and dropping into a port, can be controlled, the negative impact of LNG transport can be avoided. For instance, an LNG vessel can be anchored in a designated international anchorage area in the southwest of Hangom Island. The guided LNG vessel will only be allowed to reach to the LNG plant. If the design is carried out to include the management of maritime transport, the LNG supply plant can be located without causing an environmentally negative impact on the development-potential areas.

	Calculated result for shoreline change	Shoreline change amount in future	Thermal Water Diffusion
Souza North		 *Costal erosion will occur at a depth of more than 5 m in front of the hotel along the beach. Use of a floating pier instead of reclaimed land is an option to prevent shoreline changes.*	 *Seaweed will be affected.*
Souza South		 *No considerable change will occur.*	 *The coral reef will be affected.*
Selakh		 *Costal erosion will occur at a depth of more than 10 m to the west of reclaimed land. Two countermeasures can be examined. The first option is to locate the reclaimed land adjacent to the existing jetty. The other option is to change the structure of the reclaimed land to a floating pier.*	 *Seaweed will be affected.*

Source: JICA Project Team.

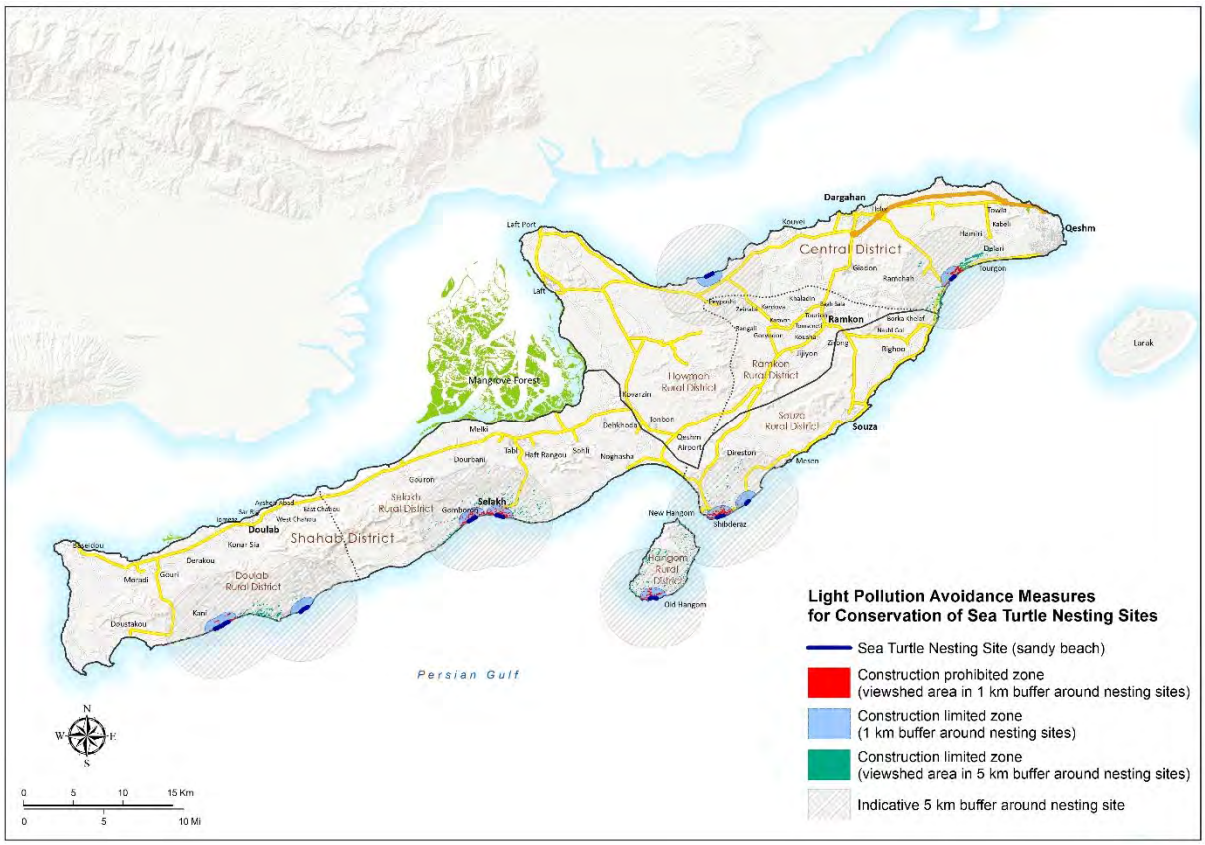
Figure 5.5.6 Environmental Assessment for LNG Development in Potential Area as Example

(5) Strategy of Avoidance of Coastal Light Pollution

In continuing the strategy for integrated coastal land-sea planning, as explained above, a strategy for the avoidance of coastal light pollution is to be established from the perspective of properly conserving sea turtle nesting habitats. Indeed, as explained above, since turtle hatchlings may be disoriented by artificial light when seeking to enter the sea, sandy beaches shall be conserved in their most natural state, with the lowest artificial light pollution possible.

As requested by SEA objective BIO-ME-t-03 "Preserve sandy beaches and especially sea turtle nesting sites from any light pollution", restrictive measures shall be applied to the construction of light-emitting buildings (in particular, resort hotels, marinas, restaurants or villas) and other amenities (public lights in coastal parks etc.).

Figure 5.5.7 below shows the proposed measures for coastal light pollution avoidance. A viewshed analysis has been performed using GIS in order to identify the areas that have direct visibility in relation to the sea turtle nesting sites. In those areas, at a 1-km distance from the nesting site, any light-emitting building or amenity shall be prohibited, whereas, at a 5-km distance, such construction shall be limited.

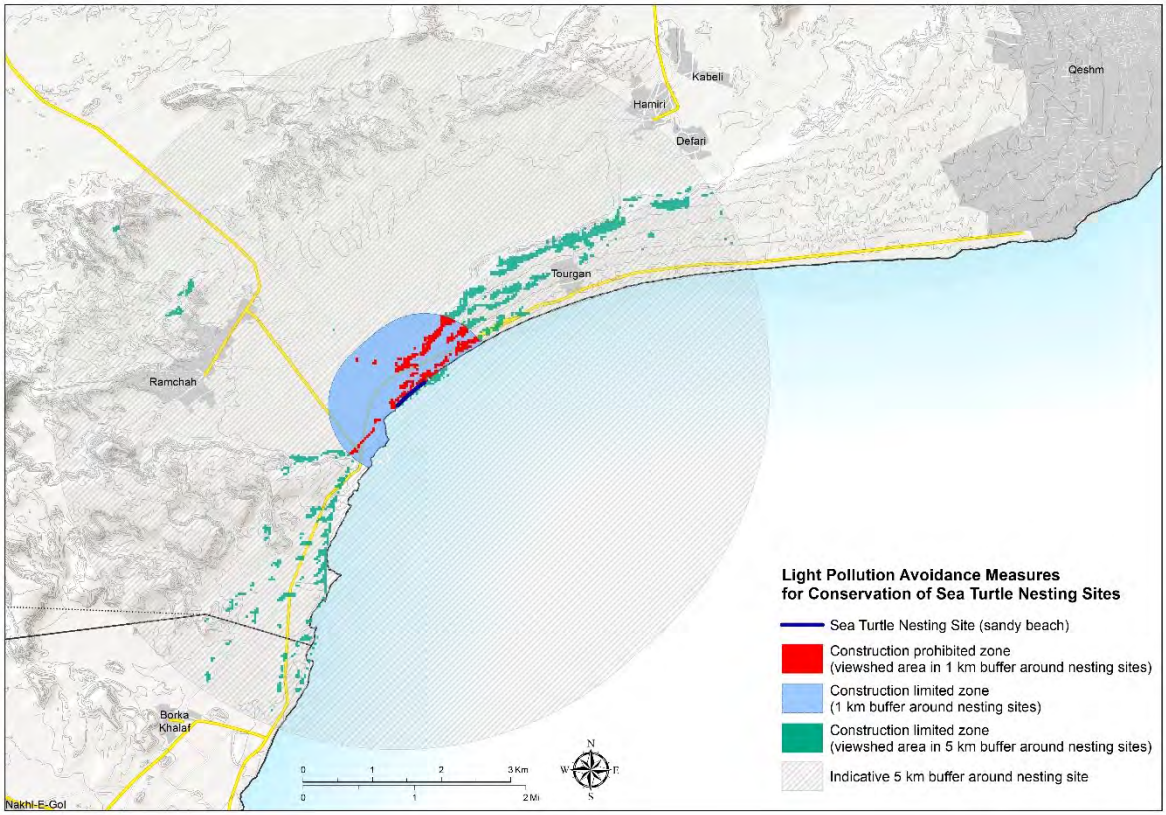


Source: JICA Project Team

Figure 5.5.7 Light Pollution Avoidance Measures on Qeshm Island

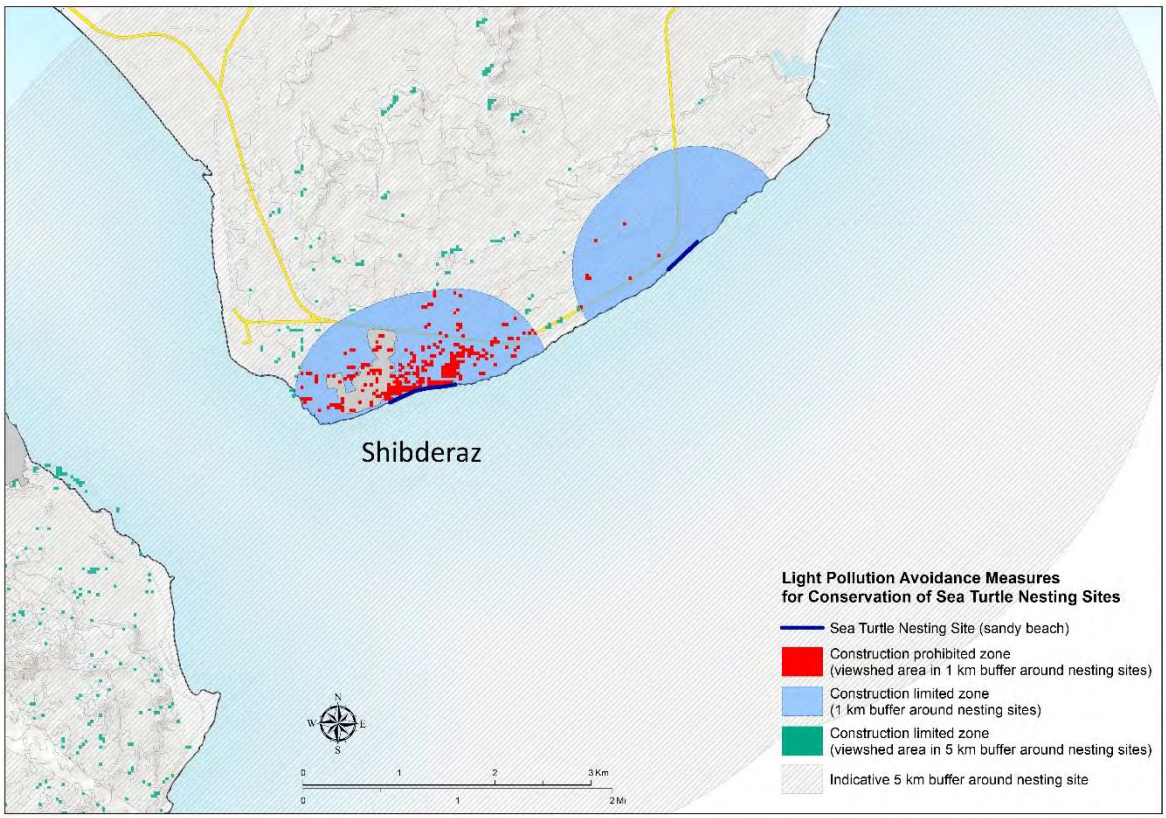
Figures 5.5.8 and 5.5.9 show, in more detail, the areas of Shah Shabib and Shibderaz, respectively. As confirmed by the first map, the heights surrounding Tourgon Village are visible from the sandy beach.

It is greatly advisable that the measures mentioned here will be technically detailed and legally enforced on the whole island in the form of regulations for all new construction projects as soon as possible. It is also greatly advisable that the elaboration studies on the future village plans for Selakh, Shibderaz, Old Hangom, Tourgon and Ramchah, which are all situated close to sea turtle nesting sites, integrate these measures in their land use plans. Finally, given the long-term urban expansion of Qeshm City, which is likely to spread to the southern part of the city, it is advisable that the next Urban Master Plan of Qeshm City addresses the issue of light pollution.



Source: JICA Project Team

Figure 5.5.8 Light Pollution Avoidance Measures on Qeshm Island (Shah Shahid Area)

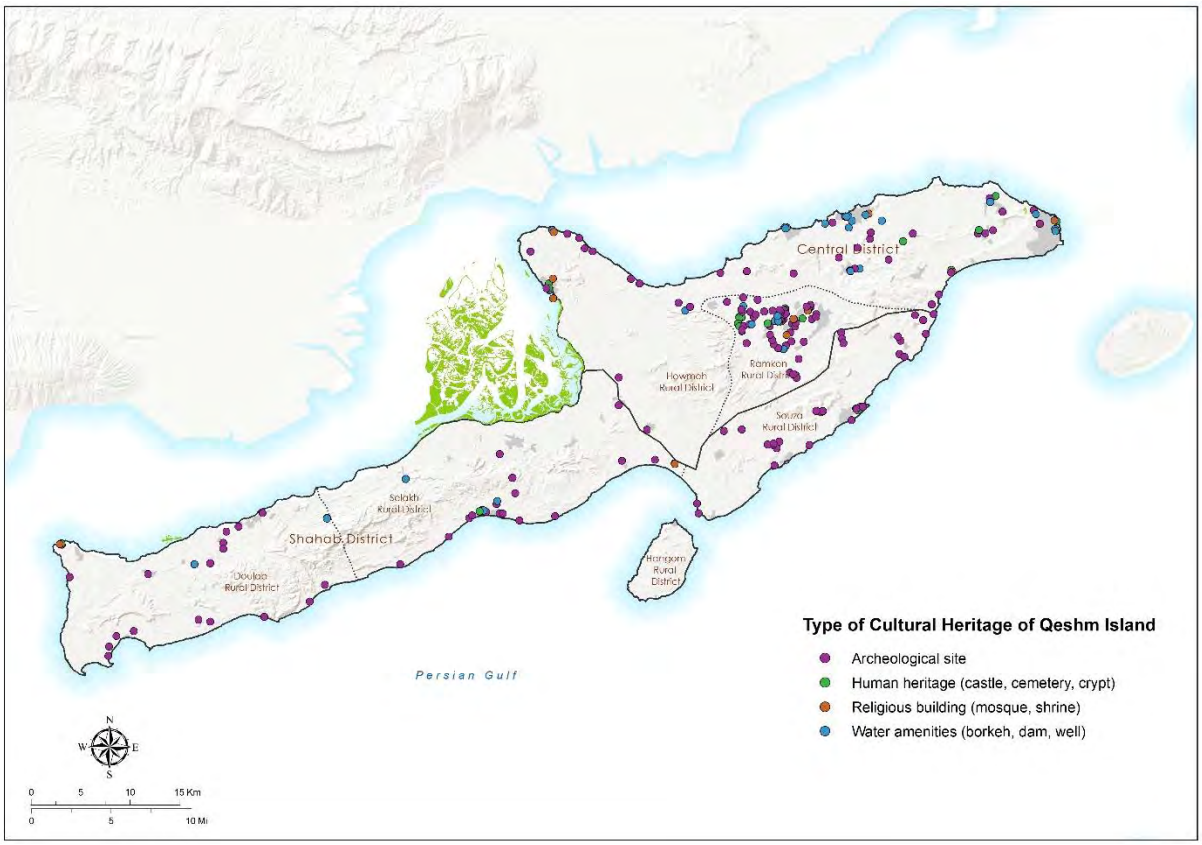


Source: JICA Project Team

Figure 5.5.9 Light Pollution Avoidance Measures on Qeshm Island (Shibderaz Area)

(6) Strategy for establishing a landscape promotion area

Being situated in a strategic position on the Strait of Hormuz, Qeshm Island has a rich and long history. Earliest evidence of a human presence on the island dates back to Paleolithic Period, and various tangible cultural heritage from both the pre-Islamic and Islamic eras still remain on the island, as shown in Figure 5.5.10 below.



Source: JICA Project Team

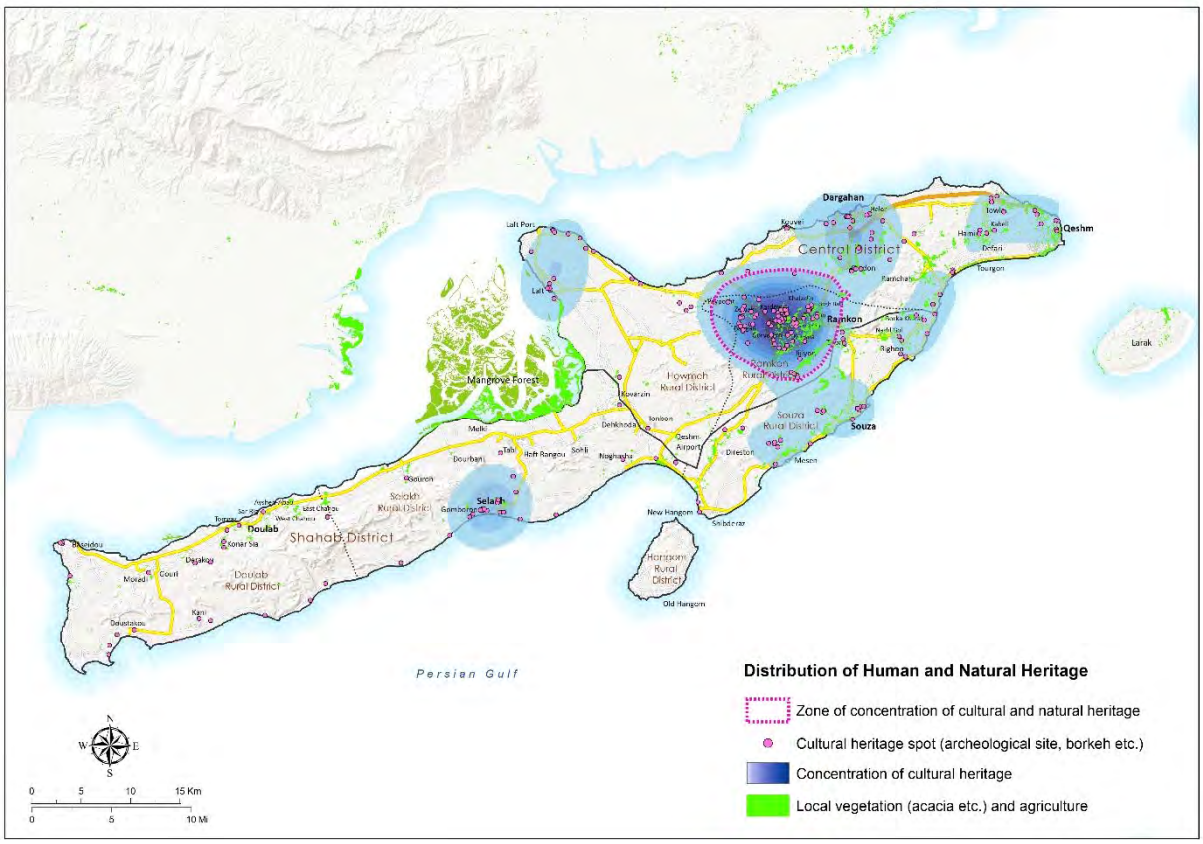
Figure 5.5.10 Distribution of Cultural Heritage on Qeshm Island (by Type)

The archeological sites and remains are widely spread across the island, as testified by the distance between the famous Portuguese Castle in Qeshm City to the extreme east and the British cemetery in Baseidou Village in the extreme west. However, as shown in Figure 5.5.11 below, there is a concentration of historical and cultural resources on the Tourion Plain around Ramkon, as proven by the results of a kernel density analysis, also known as interpolation, computed through GIS.

The distribution of natural heritage, namely, native tree species such as *P. cineraria* or *Acacia tortilis*, which, in recent years, have been threatened by the invasive species of *P. juliflora*, is also concentrated on the Tourion Plain. The latter region is also famous for its numerous old palm gardens and currently uncultivated farmlands.

It can thus be said that the area of the Tourion Plain gathers a concentration of both the human and the natural heritage of Qeshm Island. In this context, it is recommended to establish a special zone, called the Landscape Promotion Area, which would support the protection of living heritage on the island.

It is advisable that a more detailed comprehensive study be carried out on the Tourion Plain and that the Landscape Promotion Area impose regulatory restrictions on urban development so as not to encroach on the aforementioned heritage, while helping to boost the area in terms of tourism, agriculture revival and other economic functions, such as trade or sustainable infrastructure management.



Source: JICA Project Team

Figure 5.5.11 Distribution of Heritage and the Establishment of the Landscape Promotion Area

(7) Strategy to reduce population exposure to industrial risk

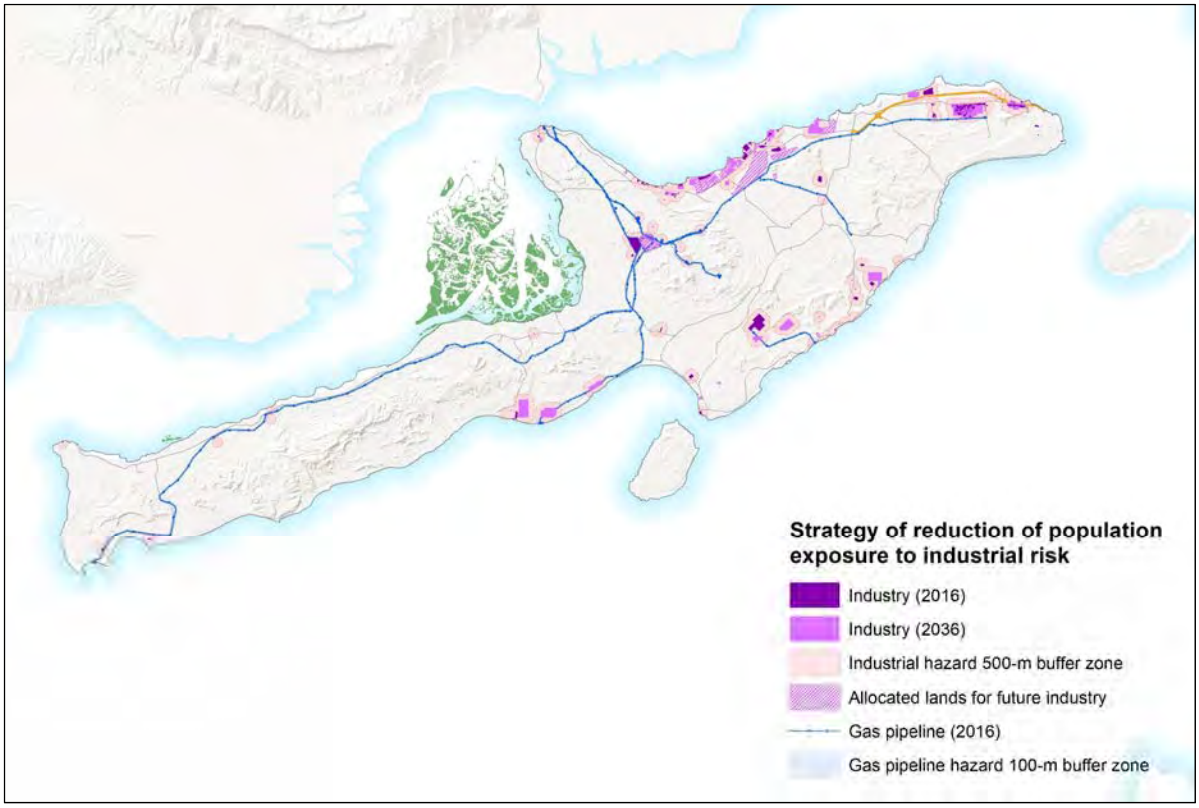
From the perspective of further urbanization and continuation of the island's industrialization, activities related to future industrial and residential land use shall be established so that they are kept apart from each other. Indeed, industrial activities, especially those of heavy industries, such as steel foundries or gas-processing plants, can have a negative impact on surrounding dwellings in their normal operational service mode (air and soil pollution, offensive odors) and even more so in the case of an accident (fire, explosion, dispersion of toxic products).

In order to clearly distinguish between industrial and residential land uses, and thus protect the population from potential industrial risk, a 500-m buffer zone around the main industries (more than 500 m^2 of the parcel area) has been established based on international standards. Inside this buffer zone, all residential land use will be prohibited.

In addition, a 30-m buffer zone has been established around the gas pipeline, which poses a risk of explosion. Inside this buffer zone, all residential land use will be prohibited. In any developed country, the width of a buffer zone is set at 15 m provided that the quality of a pipeline complies with the technical standards. Since the quality and technical standards used on Qeshm Island are unclear, the proposed width is set at 30 m.

Environmental protection involves passive approaches to allow for industrial development on the island. On the contrary, a proactive approach needs to be applied so that industrial development can contribute to an improved living environment on the island. To this end, a green coverage rate of 20-25% is established for land for industrial uses. A plot of land for a factory will be covered by plants and vegetation. Furthermore, a green belt with a width of 25 m will be located along the boundaries of the factory area.

Table 5.5.12 below shows the spatial aspects of the strategy to reduce population exposure to industrial risk.



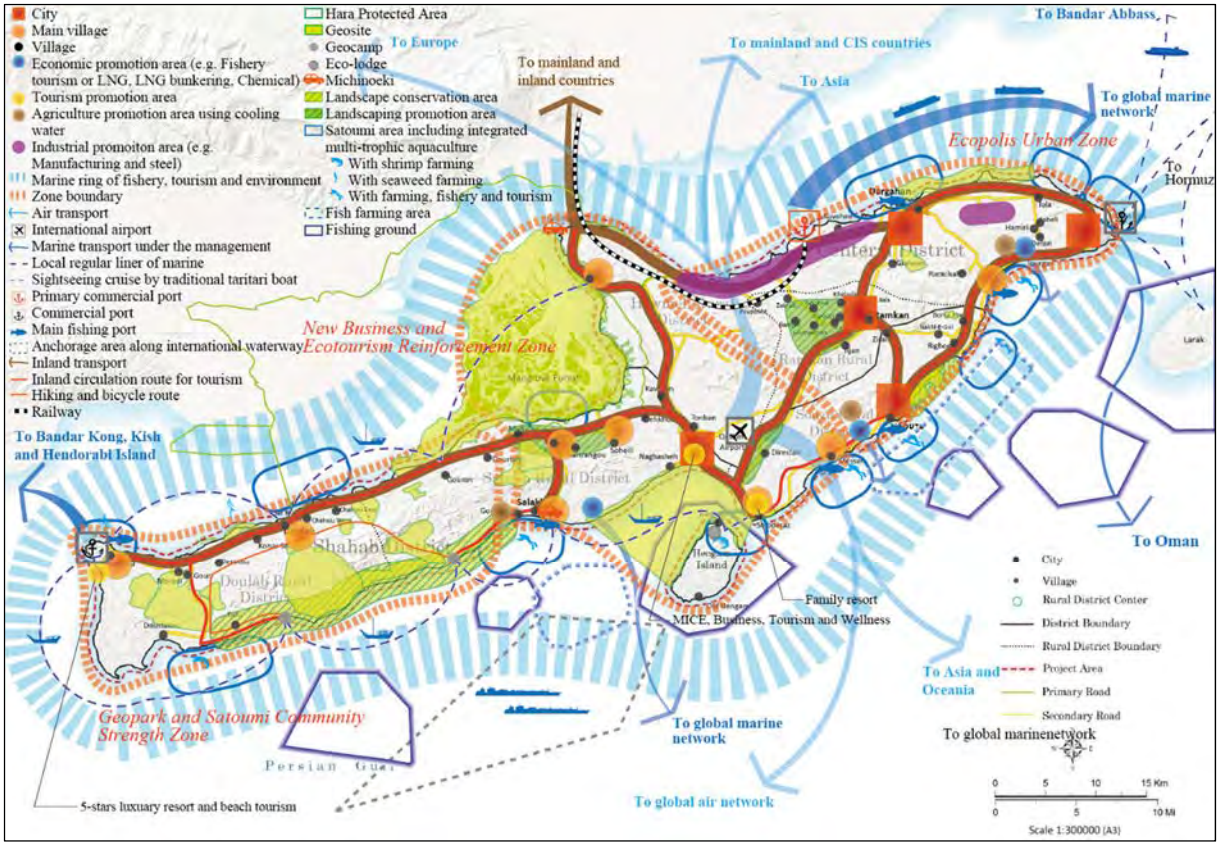
Source: JICA Project Team

Figure 5.5.12 Strategy to Reduce Population Exposure to Industrial Risk

5.5.2 Envisaged spatial perspective

An envisaged spatial perspective is formulated as shown in Figure 5.5.13, which seeks to realize a balanced development between the economy and the environment and between the rural west and the urban east. The spatial perspective is designed to meet the concepts highlighted below.

(a) The coastal and offshore area will be represented by *satoumi*, a fishery ground and a spawning area. Those areas represent the core for fishery, tourism and marine ecology. They are interlined socially, environmentally and physically with each other to create a marine ring. The marine axis is used for marine transport within the management framework.
(b) In the northeast, an industrial area with a deep commercial port will be developed in Kouvei, which has the topographic advantage of sufficient water depth and calm water. Kouvei Port will be located in a convenient place next to the railway from the mainland, when the Persian Gulf Bridge is completed.
(c) The central part of the island will be developed as a gateway to the mainland after the opening of the Persian Gulf Bridge. Taking advantage of convenient access to the international airport, an area next to Dolphin Bay will become an airport city, which will serve the finance, banking and hotel sectors with MICE facilities.
(d) In the west, Baseidou will be a focal point to be opened up to the mainland. Doulab will be a main village to support the lives of villages in the west. The two villages will be connected by land transport. A sightseeing cruise by *taritari* traditional boats will interlink Baseidou, Doulab, villages around the Hara Protected Area and villages in the south of the island.
(e) Three economic promotion areas are designated for Souza North, Souza South and Selakh. They will be promoted for tourism, fishery and industry, including LNG production, LNG bunkering and chemical plants.
(f) Four cities will be promoted in Qeshm, Dargahan, Ramkon and Souza in order to create the Ecopolis Urban Zone.



Source: JICA Project Team

Figure 5.5.13 Envisaged Spatial Perspective

5.5.3 Future regional structure

(1) Concept of Eco-Island structure: multipolar urban system

Classical models of regional structure propose a monocentric hierarchal organization of one large, central city on top and suburbs and countryside under it. Such structure has been proven unsustainable throughout the world: It has been found to result in accelerating the central city's urbanization while leaving the peripheral areas behind in development. The ECO-QESHM Master Plan proposes a multipolar, reticular and non-hierarchical regional system to create a sustainable organization of human settlements in the island and realize balanced development in both urban and rural areas.

Qeshm Island has a variety of human settlements from small, relatively new rural villages with only a few households, ancient villages around an old town, villages that are evolving into cities, to urban centers such as Qeshm or Dargahan. The evolution of Qeshm Island into a sustainable ecosystem depends on how the links and relationships between all those human settlements are organized.

The establishment of the multipolar urban system is guided by two principles: the reinforcement of each urban center in the polycentric system and the balance between the urban centers toward an overall equilibrium. The purpose of the principles is to prevent the system from turning into a hierarchical system, which leads to the dependency of the rural area on its central urban center.

(2) Reinforcement of multipolar urban system

Each center in the multipolar system reinforces and strengthens its reciprocal relationships with the other centers, as its functions are unique and different from the others'. The reinforcement of the whole polycentric system can be achieved through differentiation of each pole in terms of identity, functions, and complementarity with the other poles. As presented in Table 5.5.4, for the mutual reinforcement, each pole in the system will be categorized according to its spatial identity (urban, peripheral, and rural), main and secondary economical functions (trade, tourism, fishery, housing, etc.),

and relationships with the other poles (core, balance pole, and unit).

Table 5.5.4 Model of Classification of the Different Poles of the Multipolar Urban System

Spatial identity / Complementarity	Urban (Cities by administrative definition)	Peripheral (Villages by administrative definition but located in the vicinity of or at a strategic position between cities)	Rural (Villages by administrative definition)
Central core (Existing economic and residential center of attraction, self-sufficient)	 Urban central core (major category, cities being generally centers of attraction)	 Peripheral central core (average category, peripheral villages can become attractive and self-sufficient centers)	 Rural central core (minor category, villages not generally being centers of attraction)
Balance pole (Priority reinforcement of housing, social and commercial services in order to provide a positive input to the sub-region)	 Urban balance pole (average category, cities might need reinforcement of urban functions)	 Peripheral balance pole (average category, peripheral villages might need reinforcement to achieve a function of link between cities and villages)	 Rural balance pole (major category, villages are likely to need reinforcement to provide a positive input to the sub-region)
Unit (Passive unit with no strong complementarity role)	 Urban unit (minor category, cities generally have an active role)	 Peripheral unit (major category, peripheral villages have generally a passive role towards cities)	 Rural unit (major category, villages generally have a passive role)

Source: ibid.

(3) Equilibrium of regional system, areas of influence, and special urban constellations

The process of urban expansion should be considered in terms of overall equilibrium of the whole regional system. Also, to evaluate the expansion process, there are factors to be examined such as accessibility and proximity to social services, public facilities, and transportation; reduction of commuting distances; and reproduction capacity of urban metabolism (i.e., recycling of water, food, waste, and energies).

To achieve an equilibrium of the regional system, areas of influence and regional constellations need to be established. The areas of influence in the Qeshm County master plan consist of 4 *areas* and 16 *associated areas*, which cover the whole island. These areas and associated areas will be reviewed and examined from the Eco-Island perspective.

The county master plan introduced a concept of the relationship between a city (urban area) and the surrounding villages (rural areas), comparing it to a solar system, in which under-equipped stars depend on a well-equipped sun. Justification for this dependent relationship was the assumption that if the sun was given enough facilities and services, it would automatically benefit the stars around it and the solar system as a whole. The relationship would then evolve into solidarity.

However, such evolution in the relationship did not happen in reality. The question to be asked now is, how can the sun (city) guarantee the stars (villages) equal access to those facilities and services (e.g., public transportation, waste collection, etc.)? To respond to this question, the word "associated" in associated areas is replaced with "solidarity" hereunder. Also, the concept of reinforcement of the system through differentiation and complementarity is transposed to a smaller scale appropriate to the respective solidarity areas. For example, a solidarity area that consists of three villages and mainly focuses on tourism and housing development functions may have differentiation in these functions between the villages: one village (pole) strongly oriented to tourism development and the other two villages (poles) to housing development (e.g., hotels and guesthouses).

Finally, propositions will be made for the setup of special urban constellations. The urban constellations only cover specific areas with special spatial characteristics, such as Qeshm urban region (into which Qeshm City will be evolved to join Towla) and Tourion ecopolis (in which agricultural areas and multiple urban cores coexist). The contents of the propositions on the urban constellations are likely to change and be refined in the subsequent steps of the Project.

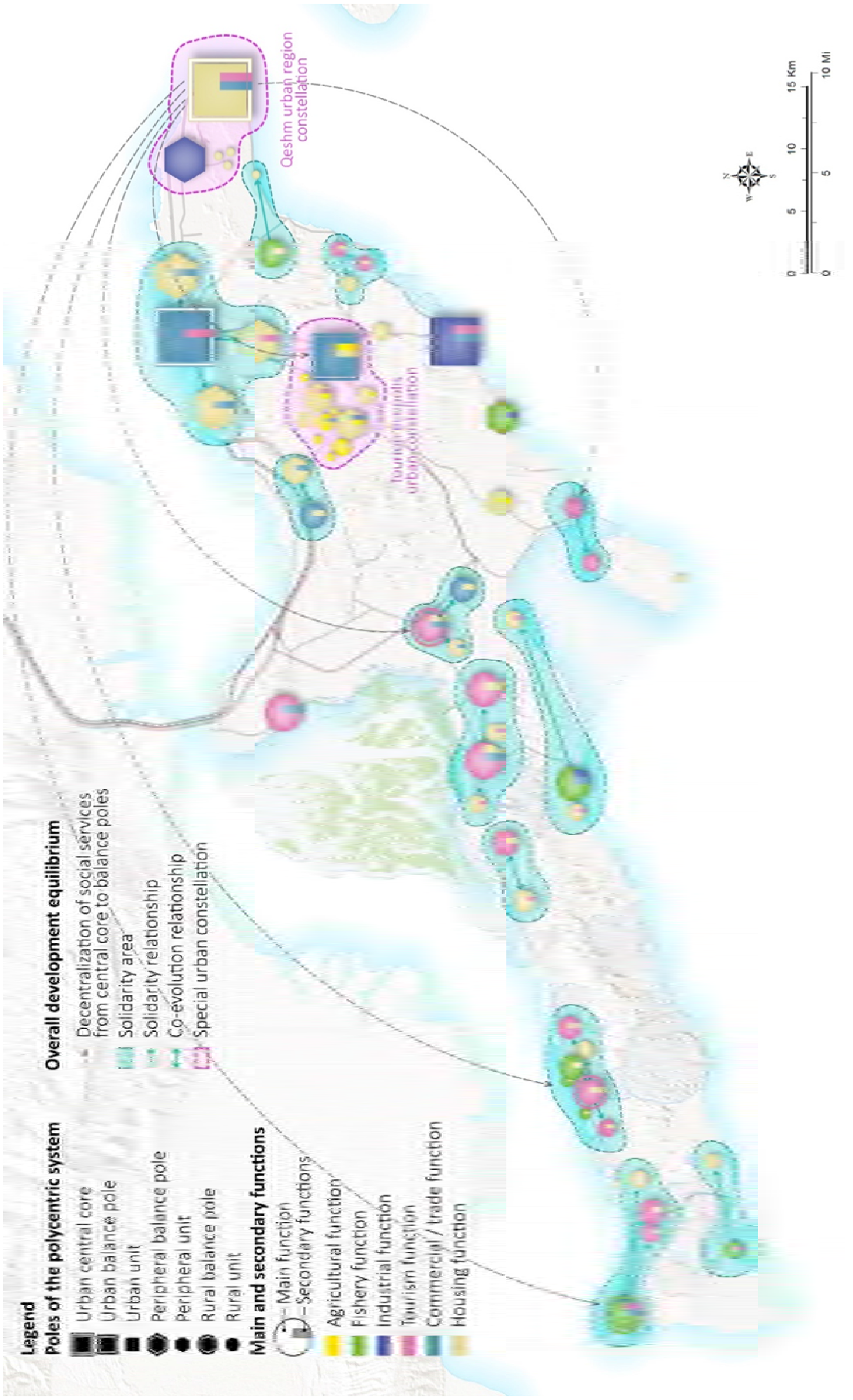
Table 5.5.5 and Figure 5.5.14 summarize the characteristics of the proposed regional structure of Qeshm Island organized as a multipolar urban system.

Table 5.5.5 Regional Structure of Qeshm Island as Multipolar Urban System in 2036 (To be updated)

Area	Solidarity area/Urban constellation	Cities and villages	Population (2036)	Spatial identity	Complementarity	Main function	Secondary functions
Doulab–Baseidou area	Doulab solidarity area	Doulab	2,243	Rural (traditional)	Balance pole	Tourism (Geopark, G08)	Housing
		Sar Rig	2,236	Rural (traditional)	Unit	Fishery	Housing
		East Chahou	1,376	Rural (traditional)	Unit-satellite	Tourism (Geopark, G06)	Housing
		West Chahou	783	Rural	Unit	Housing	-
		Konar Sia	497	Rural	Unit	Tourism (Geopark, G10)	Housing
		Aysheh-Abad	149	Rural (traditional)	Unit	Fishery	Housing
		Tomgez	332	Rural	Unit	Fishery	Housing
		Total	**7,616**				
	Baseidou solidarity area	Baseidou	3,405	Rural (traditional)	Balance pole	Fishery	Trade, Tourism (MICE)
		Moradi	574	Rural	Unit	Tourism (Geopark, G14)	Housing
		Gouri	1,283	Rural	Unit	Tourism (Geopark, G12)	Housing
		Derakou	838	Rural	Unit	Housing	-
		Total	**6,100**				
	Doustakou solidarity area	Doustakou	995	Rural	Unit	Fishery (port under construction)	Tourism (beach, turtle nesting, Geopark; G14)
		Kani	429	Rural	Unit	Housing	-
		Total	**1,424**				
	TOTAL		**15,140**				
Tabl–Selakh area	Tabl solidarity area	Tabl (Towl)	6,374	Rural (traditional)	Unit	Tourism (mangrove)	Commercial, housing
		Sohli	2,806	Rural (traditional)	Unit	Tourism (mangrove)	Housing
		Haft Rangou	1,078	Rural	Unit	Housing	Tourism (mangrove)
		Melki	408	Rural	Unit	Housing	Tourism (mangrove)
		Total	**10,666**				
	Selakh solidarity area	Selakh	4,800	Rural	Unit	Fishery	Logistics, industry
		Gomboron	866	Rural	Unit	Housing	Tourism (marine)
		Noghasha	474	Rural	Unit	Housing	Tourism (marine)
		Shibderaz New Town	20,351				
		Total	**26,491**				
	Gouron – Dourbani co-evolution area	Gouron	2,210	Rural	Unit	Tourism (shipbuilding)	Housing
		Dourbani	1,035	Rural	Unit	Housing	Tourism (mangrove)
		Total	**3,245**				
	TOTAL		**40,402**				
Laft area	-	Laft	7,210	Rural (traditional)	Unit-sole	Tourism (cultural)	Trade
	Kovarzin solidarity area	Kovarzin	2,552	Rural	Balance pole	Tourism (handicraft)	Trade, housing
		Tonbon	1,688	Rural	Unit	Trade (link with airport)	Housing
		Dehkhoda	945	Rural	Unit	Housing	Commercial (roadside)
		Total	**12,395**				
		TOTAL	**12,395**				
Shibderaz –Hangom area	-	Direston	2,819	Rural	Unit-sole	Housing	Agriculture
	Shibderaz solidarity area	Shibderaz	802	Rural	Balance pole	Tourism (marine)	-
		New Hangom	1064	Rural	Unit	Tourism (wildlife)	
		Total	**4,685**				
	-	Old Hangom	25	Rural	Unit-sole	Housing	-
		TOTAL	**4,710**				
Souza area	-	Souza	13,247	Urban	Unit-sole	Industry	Trade, tourism (marine)
	-	Mesen	3,240	Peripheral (trad.)	Unit-sole	Fishery	Industry
	Borka Khelaf solidarity area	Rigoo	718	Rural	Unit	Tourism (marine)	Housing
		Borka Khelaf	528	Rural	Unit	Tourism (Geopark, G01)	Housing
		Nakhl Gol	454	Rural	Unit	Housing	-
		Total	**18,187**				
	TOTAL		**18,187**				
Ramkon area	Tourion ecopolis urban constellation	Ramkon	9,686	Urban	Balance pole	Trade	Housing, agriculture
		Jijiyon	1,044	Rural	Unit	Housing	Agriculture
		Kousha	3,178	Peripheral (trad.)	Unit	Housing	Agriculture, trade
		Gorvodon	1,579	Rural (traditional)	Unit	Agriculture	Housing
		Karavon	1,436	Rural	Unit	Agriculture	Trade
		Tourion	3,983	Peripheral (trad.)	Unit	Housing	Agri., Tourism (gastronomy)

Area	Solidarity area/Urban constellation	Cities and villages	Population (2036)	Spatial identity	Complementarity	Main function	Secondary functions
		Khaladin	2,003	Rural (traditional)	Unit	Housing	-
		Tomsenati	489	Rural	Unit	Agriculture	Trade
		Bagh Bala	482	Rural	Unit	Agriculture	-
		Kardova	277	Rural	Unit-satellite	Agriculture	-
		Bangali	140	Rural	Unit-satellite	Agriculture	-
		Total	**24,297**				
	Zeinabi - Peyposht co- evolution area	Peyposht	3,477	Rural (traditional)	Unit	Trade	Housing
		Zeinabi	2,256	Rural (traditional)	Unit	Housing	Trade
		Total	**5,733**				
	-	Zirong	1,850	Peripheral (trad.)	Unit-satellite	Housing	-
		TOTAL	**32,118**				
Dargahan area	Dargahan solidarity area	Dargahan	30,402	Urban	Central core	Trade	Tourism (culture)
		Holor	9,451	Peripheral (trad.)	Unit	Housing	Trade
		Kouvei	5,547	Rural (traditional)	Unit-satellite	Housing	Trade
		Giadon	4,545	Peripheral (trad.)	Unit-satellite	Housing	Tourism (Geopark, G02)
		Total	**49,945**				
		TOTAL	**49,945**				
Qeshm area	Qeshm urban region constellation	Qeshm	80,022	Urban	Central core	Housing	Trade, Tourism (culture)
		Towla	11,251	Peripheral	Unit	Industry	-
		Defari	1117	Rural	Unit	Housing	-
		Hamiri	221	Rural	Unit	Housing	-
		Kabeli	59	Rural	Unit	Housing	-
		Total	**92,670**				
	Ramchah solidarity area	Ramchah	4,909	Rural (traditional)	Unit	Fishery	Housing
		Tourgon	124	Rural	Unit	Housing	-
		Total	**5,033**				
		TOTAL	**97,703**				

Source: ibid.



Source: ibid.

Figure 5.5.14 Structure of Qeshm Island as Multipolar Urban System in 2036

5.5.4 Preliminary regional land use plan

(1) Introduction and definition

Requirements for land use planning are derived from the socioeconomic framework, namely, population projection and distribution, and from the considerations of spatial development strategies. They are merged to establish the basis of the preparatory planning of land uses. Industrial development planning, extension and improvement of transportation network, and distribution of social services are underway in the framework of the ECO-QESHM Master Plan, and thus they will be integrated into its land use plan in the subsequent stages.

(2) Planning, land demand estimate and density setup for residential land use

As a preliminary component of the land use plan, the land demand for future residential land use for 2026 and 2036 is roughly estimated, based on the population projections and distribution described above. To accurately estimate the land demand to meet the future population, the average existing urban density of cities and villages will be used. However, for those villages with a low density under 1,000/km^2 (namely, Noghasha, 644; Old Hangom, 183; Tourgon, 607; Hamiri, 182; and Kabeli, 110), the standard urban density of 1,000/km^2 will be used in estimating the urban expansion.

In Qeshm Island as of 2016, its urban density is considered to be relatively homogeneous across the island at 2,605/km^2 on average of all the settlements. The average urban density of cities and villages with a population of more than 1,000 is 3,151/km^2, and that of villages with less than 1,000 is 2,094/km^2.

Regarding the land demand estimate for Shibderaz New Town, the density proposed here in the case of the 2026 horizon follows the prescriptions made in the study on the Shibderaz New Town project (Section 2.1.1.5 of the Scenario 2 Report), i.e. a gross urban density of 5,582 people/km^2.

Table 5.5.6 presents the estimated land demand for future residential land use in 2026 and 2036. In the subsequent stages of the Project, urban densities will be further examined and proposed in more qualitative terms reflecting ideal future lifestyles, public space, etc. and in the perspective of realizing urban and rural spatial strategies including densification and compact city.

Table 5.5.6 Land Demand Estimate for Residential Land Use

Cities/ Villages	Current situation (2016)			Expected situation (2026)		Expected situation (2036)			
	Population (2015)	Area (km^2)	Urban density (pop/km^2)	Population (2026)	**Urban expansion 16-26 (km^2)**	Population (2036)	**Urban expansion 26-36 (km^2)**	Additional population (2016–36)	**Total urban expansion 16-36 (km^2)**
Qeshm	40,678	9.80	4,150	61,899	**5.11**	80,022	**4.37**	39,344	**9.48**
Dargahan	14,525	2.94	4,943	22,623	**1.64**	30,402	**1.57**	15,877	**3.21**
Souza	5,707	1.77	3,227	7,690	**0.61**	13,247	**1.72**	7,540	**2.34**
Ramkon	4,473	2.81	1,589	6,181	**1.07**	9,686	**2.21**	5,213	**3.28**
Baseidou	2,228	0.72	3,115	2,634	**0.13**	3,405	**0.25**	1,177	**0.38**
Derakou	639	0.18	3,541	714	**0.02**	838	**0.04**	199	**0.06**
Doustakou	645	0.20	3,287	770	**0.04**	995	**0.07**	350	**0.11**
Kani	337	0.20	1,727	366	**0.02**	429	**0.04**	92	**0.05**
Konar Sia	363	0.15	2,411	423	**0.02**	497	**0.03**	134	**0.06**
Gouri	872	0.28	3,088	1,042	**0.06**	1,283	**0.08**	411	**0.13**
Moradi	371	0.14	2,705	444	**0.03**	574	**0.05**	203	**0.08**
Tomgez	215	0.12	1,855	257	**0.02**	332	**0.04**	117	**0.06**
West Chahou	599	0.23	2,588	668	**0.03**	783	**0.04**	184	**0.07**
East Chahou	1,053	0.19	5,543	1,174	**0.02**	1,376	**0.04**	323	**0.06**
Doulab	1,453	0.55	2,647	1,735	**0.11**	2,243	**0.19**	790	**0.30**
Sar Rig	1,702	0.59	2,865	1,907	**0.07**	2,236	**0.11**	534	**0.19**
Aysheh-Abad	114	0.05	2,378	127	**0.01**	149	**0.01**	35	**0.01**
Shibderaz	456	0.32	1,441	620	**0.11**	802	**0.13**	346	**0.24**
Mesen	2,162	0.69	3,136	2,556	**0.13**	3,240	**0.22**	1,078	**0.34**
Borka Khelaf	343	0.17	2,020	409	**0.03**	528	**0.06**	185	**0.09**
Rigoo	465	0.28	1,652	556	**0.06**	718	**0.10**	253	**0.15**
Zirong	1,320	0.49	2,668	1,615	**0.11**	2,088	**0.18**	768	**0.29**
Nakhl Gol	295	0.14	2,132	352	**0.03**	454	**0.05**	159	**0.07**
Direstan	1,764	0.75	2,352	2,180	**0.18**	2,819	**0.27**	1,055	**0.45**
Dehkhoda	659	0.21	3,176	806	**0.05**	945	**0.04**	286	**0.09**
Sohli	1,899	0.54	3,491	2,393	**0.14**	2,806	**0.12**	907	**0.26**
Haft Rangou	699	0.30	2,301	876	**0.08**	1,078	**0.09**	379	**0.16**
Dourbani	739	0.22	3,349	883	**0.04**	1,035	**0.05**	296	**0.09**
Gomboron	570	0.23	2,434	739	**0.07**	866	**0.05**	296	**0.12**
Gouron	1,526	0.41	3,742	1,885	**0.10**	2,210	**0.09**	684	**0.18**
Melki	234	0.13	1,783	316	**0.05**	408	**0.05**	174	**0.10**
Tabl (Towl)	4,069	1.79	2,276	5,436	**0.60**	6,374	**0.41**	2,305	**1.01**
Selakh	3,109	0.74	4,224	4,093	**0.23**	4,800	**0.17**	1,691	**0.40**
Noghasha	143	0.15	*1,000*	228	**0.09**	474	**0.25**	331	**0.33**
New Hangom	496	0.29	1,696	679	**0.11**	1,064	**0.23**	568	**0.33**
Old Hangom	19	0.10	*1,000*	22	**0.00**	25	**0.00**	6	**0.01**
Ramchah	3,681	0.97	3,813	4,186	**0.13**	4,909	**0.19**	1,228	**0.32**
Tourgon	100	0.16	*1,000*	112	**0.01**	124	**0.01**	24	**0.02**
Kouvei	4,243	1.49	2,856	4,824	**0.20**	5,547	**0.25**	1,304	**0.46**
Giadon	3,152	1.02	3,078	3,877	**0.24**	4,545	**0.22**	1,393	**0.45**
Tonbon	1,199	0.61	1,963	1,468	**0.14**	1,688	**0.11**	489	**0.25**
Kovarzin	1,822	0.58	3,130	2,176	**0.11**	2,552	**0.12**	730	**0.23**
Laft	4,668	1.75	2,670	5,855	**0.44**	7,210	**0.51**	2,542	**0.95**
Holor	5,828	1.34	4,351	7,310	**0.34**	9,451	**0.49**	3,623	**0.83**
Hamiri	93	0.38	*1,000*	155	**0.06**	221	**0.07**	128	**0.13**
Defari	544	0.18	2,970	952	**0.14**	1,117	**0.06**	573	**0.19**
Towla	5,874	1.42	4,145	9,595	**0.90**	11,251	**0.40**	5,377	**1.30**
Kabeli	53	0.25	*1,000*	56	**0.00**	59	**0.00**	6	**0.01**
Bangali	112	0.06	1,858	124	**0.01**	140	**0.01**	28	**0.02**
Jijiyon	727	0.29	2,551	890	**0.06**	1,044	**0.06**	317	**0.12**
Gorvodon	1,100	0.49	2,228	1,346	**0.11**	1,579	**0.10**	479	**0.21**
Peyposht	2,423	0.71	3,396	2,965	**0.16**	3,477	**0.15**	1,054	**0.31**
Khaladin	1,396	0.40	3,520	1,708	**0.09**	2,003	**0.08**	607	**0.17**
Zeinabi	1,572	0.55	2,854	1,924	**0.12**	2,256	**0.12**	684	**0.24**
Karavon	952	0.29	3,337	1,224	**0.08**	1,436	**0.06**	484	**0.15**
Kousha	2,193	0.53	4,131	2,710	**0.13**	3,178	**0.11**	985	**0.24**
Kardova	163	0.15	1,094	215	**0.05**	277	**0.06**	114	**0.10**
Bagh Bala	283	0.13	2,215	372	**0.04**	482	**0.05**	199	**0.09**
Tomsenati	287	0.06	5,148	378	**0.02**	489	**0.02**	202	**0.04**
Tourion	2,339	0.84	2,783	3,081	**0.27**	3,983	**2.21**	5,213	**3.28**
Shibderaz NT	0	0	0	9,799	**1.76**	20,351	**1.89**	20,351	**3.65**
TOTAL	**141,696**	**43.51**	**2,744**	**204,600**	**24.85**	**270,600**	**18.86**	**108,504**	**35.66**

Source: ibid.

(3) Estimation of future housing needs

Based on the estimated population distribution in the cities and villages, and on the average household size at the horizons of 2026 and 2036, as explained in Section 5.4, the future housing need in terms of dwelling unit has been estimated, as shown in Table 5.5.7 below.

Based on those figures, and on the approximate land demand estimate proposed above, public authorities should further examine, with more detailed plans, which urban form, density and typology are the most appropriate for each city and village, taking into account the proposed function in the structure of Qeshm Island as a multipolar urban system, which is explained above.

Since the important urban expansion of empty buildings can currently be observed, especially in the peripherical areas of Qeshm City, it is crucial for the future that public authorities in charge of urban planning reconnect housing supply with real demand, instead of supplying more and more land to private investors and real estate companies.

Table 5.5.7 Estimated Future Housing Need (Dwelling Units)

Cities/ Villages	Current situation (2016)			Expected situation (2026)			Expected situation (2036)		
	Population (2016)	Household size	Dwelling Units (DU)	Population (2026)	Household size	Additional DU	Population (2036)	Household size	Additional DU
Qeshm	40,678	3.4	11,964	61,899	3.0	7,074	80,022	2.9	6,249
Dargahan	14,525	3.8	3,822	22,623	3.4	2,382	30,402	3.2	2,431
Souza	5,707	3.7	1,542	7,690	3.3	601	13,247	3.1	1,793
Ramkon	4,473	3.9	1,147	6,181	3.5	488	9,686	3.3	1,062
Baseidou	2,228		586	2,634		116	3,405		227
Derakou	639		168	714		21	838		36
Doustakou	645		170	770		36	995		66
Kani	337		89	366		8	429		19
Konar Sia	363		96	423		17	497		22
Gouri	872		229	1,042		49	1,283		71
Moradi	371	3.8	98	444	3.5	21	574	3.4	38
Tomgez	215		57	257		12	332		22
West Chahou	599		158	668		20	783		34
East Chahou	1,053		277	1,174		35	1,376		59
Doulab	1,453		382	1,735		81	2,243		149
Sar Rig	1,702		448	1,907		59	2,236		97
Aysheh-Abad	114		30	127		4	149		6
Shibderaz	456		120	620		47	802		54
Mesen	2,162		569	2,556		113	3,240		201
Borka Khelaf	343		90	409		19	528		35
Rigoo	465	3.8	122	556	3.5	26	718	3.4	48
Zirong	1,320		35	1,615		424	2,088		139
Nakhl Gol	295		78	352		16	454		30
Direstan	1,764		464	2,180		119	2,819		188
Dehkhoda	659		169	806		41	945		40
Sohli	1,899		487	2,393		137	2,806		118
Haft Rangou	699		179	876		49	1,078		58
Dourbani	739		189	883		40	1,035		43
Gomboron	570	3.9	146	739	3.6	47	866	3.5	36
Gouron	1,526		391	1,885		100	2,210		93
Melki	234		60	316		23	408		26
Tabl (Towl)	4,069		1,043	5,436		380	6,374		268
Selakh	3,109		797	4,093		273	4,800		202
Noghasha	143		37	228		24	474		70
New Hangom	496	3.4	146	679	3.1	59	1,064	3.0	128
Old Hangom	19		6	22		1	25		1
Ramchah	3,681		969	4,186		144	4,909		213
Tourgon	100		26	112		3	124		4
Kouvei	4,243		1,117	4,824		166	5,547		213
Giadon	3,152		829	3,877		207	4,545		196
Tonbon	1,199		316	1,468		77	1,688		65
Kovarzin	1,822	3.8	479	2,176	3.5	101	2,552	3.4	111
Laft	4,668		1,228	5,855		339	7,210		399
Holor	5,828		1,534	7,310		423	9,451		630
Hamiri	93		24	155		18	221		19
Defari	544		143	952		117	1,117		49
Towla	5,874		1,546	9,595		1,063	11,251		487
Kabeli	53		14	56		1	59		1
Bangali	112		30	124		4	140		5
Jijiyon	727		196	890		48	1,044		47
Gorvodon	1,100		3	1,346		393	1,579		71
Peyposht	2,423		655	2,965		159	3,477		155
Khaladin	1,396		377	1,708		92	2,003		89
Zeinabi	1,572	3.7	425	1,924	3.4	104	2,256	3.3	101
Karavon	952		257	1,224		80	1,436		64
Kousha	2,193		593	2,710		152	3,178		142
Kardova	163		44	215		15	277		19
Bagh Bala	283		76	372		26	482		33
Tomsenati	287		78	378		27	489		34
Tourion	2,339		632	3,081		218	3,983		273
Shibderaz NT	0	-	-	9,799	3.3	2,969	20,351	3.2	3,298
TOTAL	**141,696**		**37,982**	**204,600**		**19,908**	**270,600**		**20,877**

Source: ibid.

(4) Urban growth direction and urban expansion morphology

As stated in the Strategy for Sustainable Urban Development Planning (in preparation), the most practical information already shared by the stakeholders has been utilized. Officially validated and in force, existing planning documents have been considered as priority and used as the basis of the spatial planning in the ECO-QESHM Master Plan. Thus, to establish the growth direction for future urban expansion as well as the expected general urban morphology of expansion, the recommendations contained in the existing planning documents, land use plans in particular, have been adopted.

For villages with expired or no planning documents or a population already exceeding the target, etc. the results of the socio-economic baseline survey have been utilized. The land use map has been confirmed with key informants, who have been asked to draw the desirable direction of urban growth.

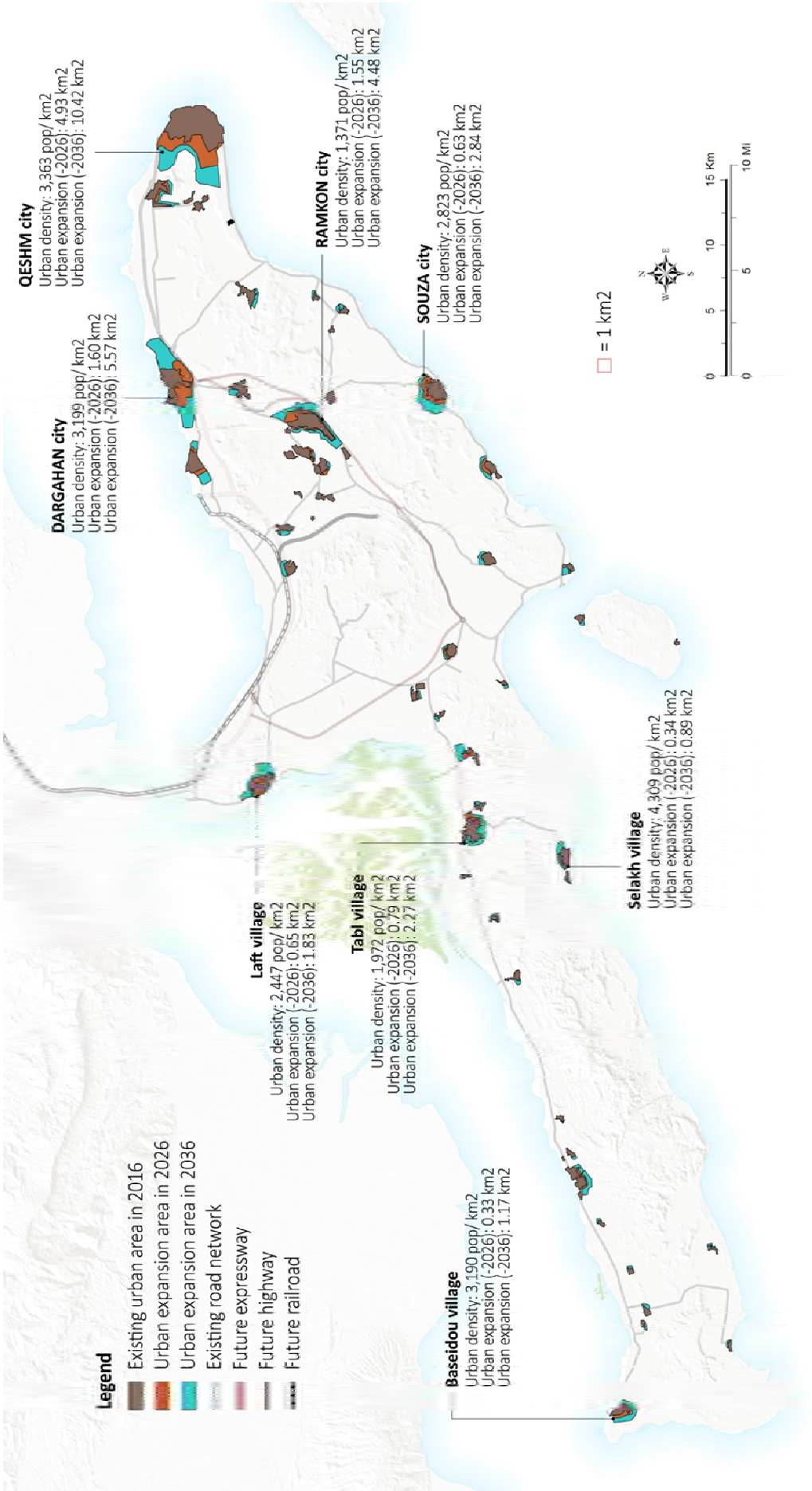
Figure 5.5.15 indicates the process of establishing urban growth direction and morphology. The urban growth direction and morphology are in part based on the recommendations of the existing planning documents, for example, Shibderaz Village (left), and also on the land use confirmed in the socio-economic baseline survey, for example, Defari Village (right). Limiting factors of urban growth are natural barriers and features such as slopes, rivers, protected native woodlands, and protected cultivated areas.

Source: ibid.

Figure 5.5.15 Establishment of Urban Growth Direction Based on Official Information

(5) Urban expansion perimeter

Based on the estimated land demand for future residential land use (ha) and the consideration of urban growth direction and morphology, an urban expansion perimeter has been drafted for all the cities and villages in 2026 and 2036 as shown in Figure 5.5.16.



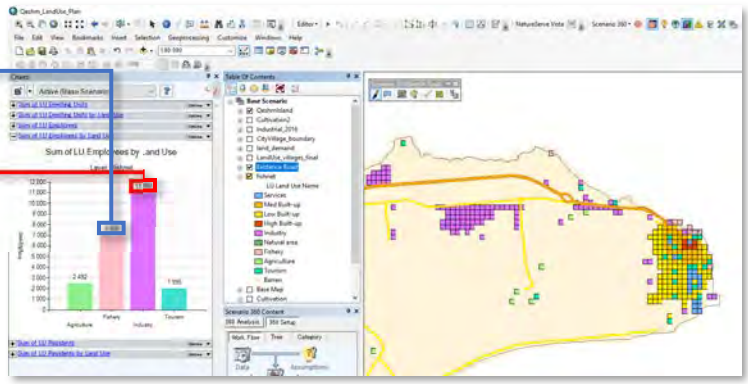
Source: ibid.

Figure 5.5.16 Draft Urban Expansion Perimeter in 2026 and 2036

(6) Preliminary regional land use plan

An integrated geographic information system (GIS) platform dedicated to the representation of several indicators has been set in order to be consistent with the socioeconomic frame of the project and thus to reflect the reality of the island. A 200 x 200 m grid-type schematic land use is created with unit values in terms of population and employment density, which recreates the reality of current and future socioeconomic frames (Figure 5.5.17).

Item	2016		2036	
Economically Active	Person	%	Person	%
Agriculture	2,500	6.5%	2,400	3.0%
Fishery	7,000	18.0%	8,100	10.0%
TOTAL Primary Sector	**9,500**	**24.5%**	**10,500**	**13.0%**
Manufacturing	4,700	12.0%	13,900	17.0%
Construction	5,500	14.0%	15,600	19.3%
Utilities	500	1.6%	2,800	3.5%
Oil and Gas	100	0.3%	700	0.9%
Mining	200	0.4%	200	0.3%
TOTAL Secondary Sector	**11,000**	**28.3%**	**33,200**	**41.0%**
Service	16,500	42.2%	29,200	36.0%
Tourism	2,000	5.0%	8,100	10.0%
TOTAL Tertiary Sector	**18,500**	**47.2%**	**37,300**	**46.0%**
Sub Total	39,000	100%	81,000	100%
Total Population	141,696		270,600	
Working Age Population	96,400		184,000	
Labor Force	39,100		81,000	



Source: JICA Project Team.

Figure 5.5.17 Integrated Approach to Formulate the Land Use Plan

The draft land use plan is formulated using the land use categories of built-up area, primary sector, secondary sector, tertiary sector and wild areas, along with 10 subclasses (Figure 5.5.18).

	Land Use Category		Number of Dwelling Units / ha	Average Population / ha	Number of Employees / ha
Built-up area		Low Intensity Built-up Area	10	50	-
		Medium Intensity Built-up Area	16	80	-
		High Intensity Built-up Area	32	160	-
Primary Sector		Agriculture	-	-	3.5
		Fishery	-	-	20
Secondary Sector		Industrial (including Oil and Gas)	-	-	10
Tertiary Sector		Commercial / Services	16	80	75
		Tourism	10	50	6
Wild areas		Local Woods (excluding Mesquite)	-	-	-
		Barren Area	-	-	-

Source: JICA Project Team.

Figure 5.5.18 Land Use Categories for the Regional Land Use Plan

Figure 5.5.19 shows a preliminary regional land use plan. Figures 5.5.20 to 5.5.24 show the land use plan for different regions of the island.

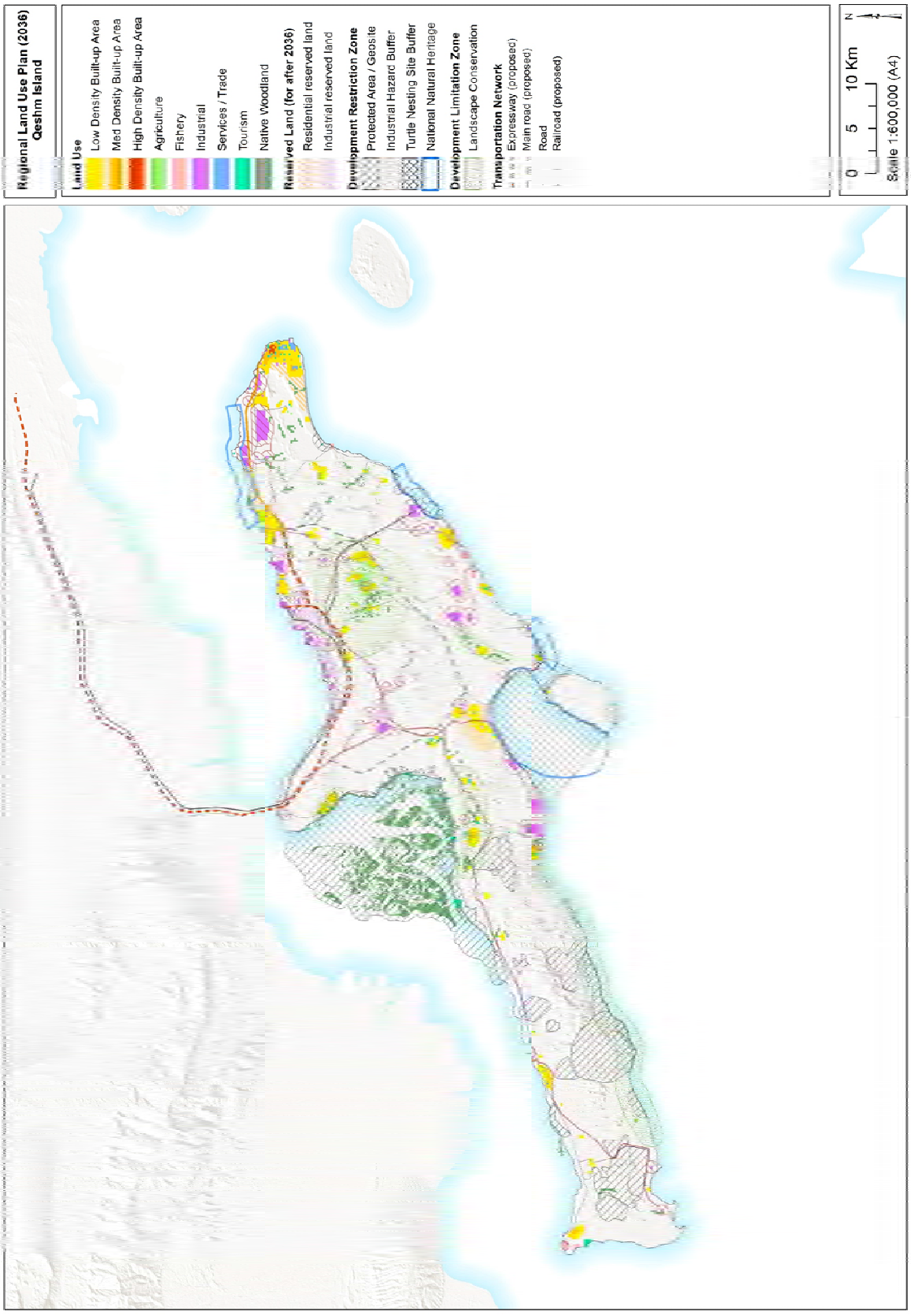
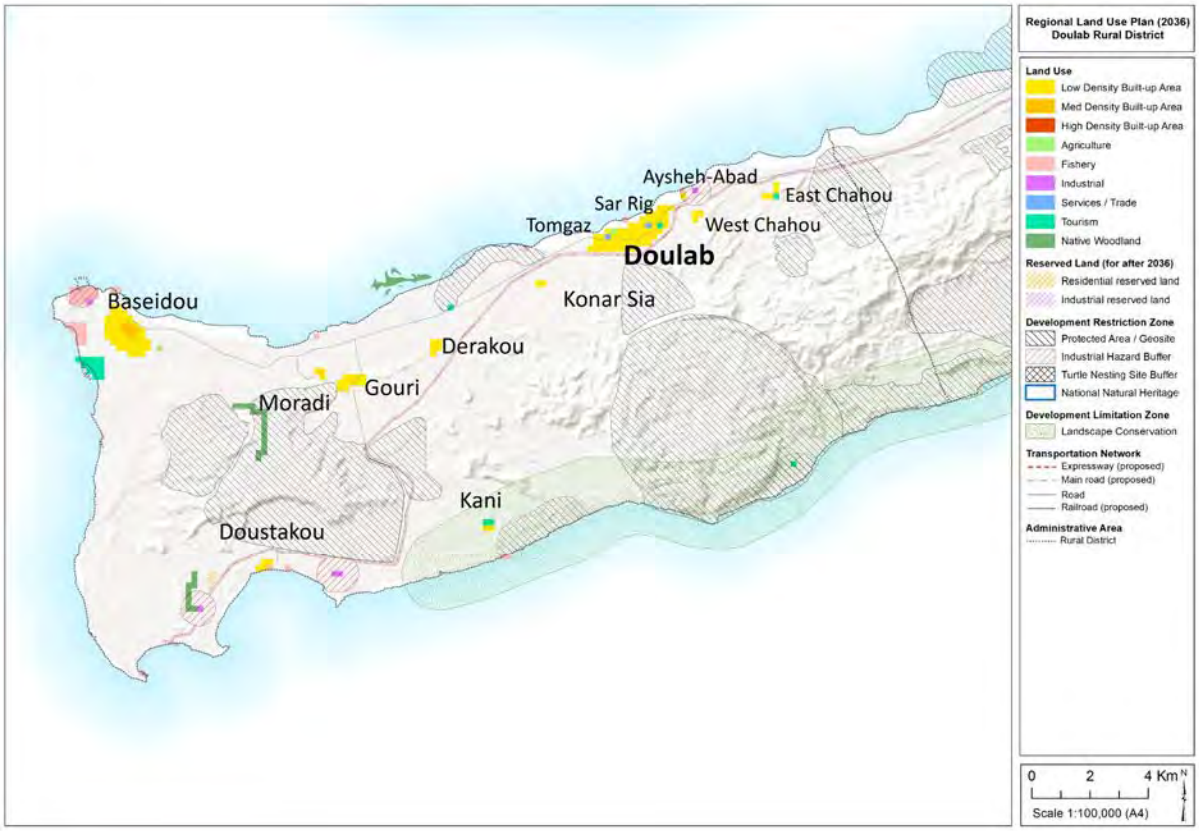


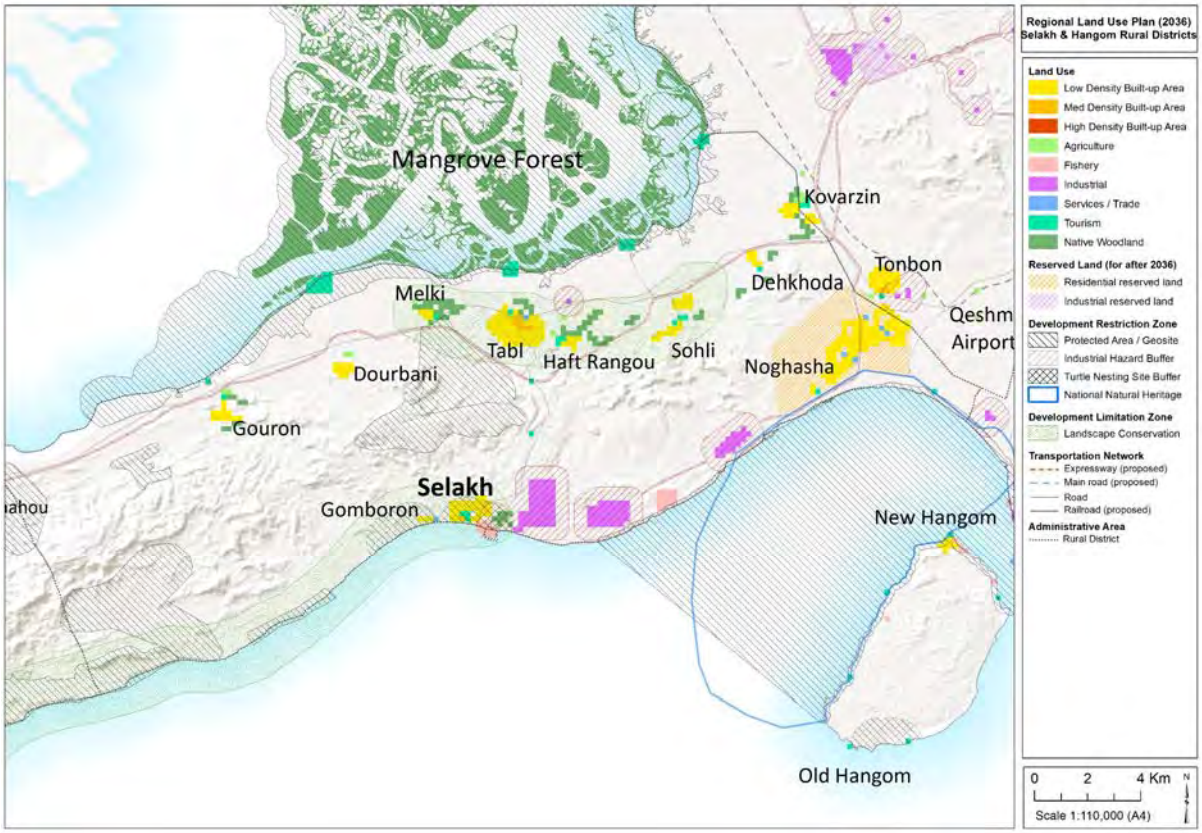
Figure 5.5.19 Preliminary Regional Land Use Plan in 2036

Source: ibid.



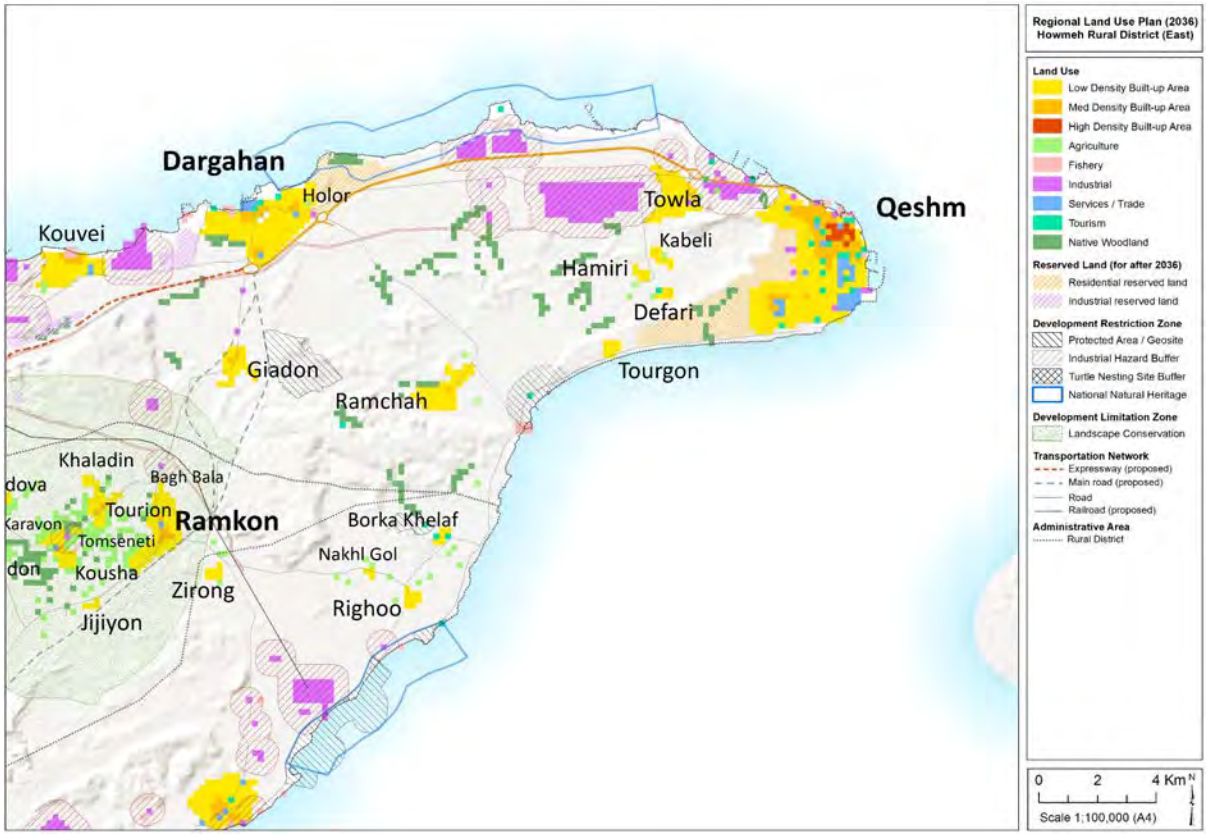
Source: ibid.

Figure 5.5.20 Regional Land Use Plan 2036 (Doulab Rural District)



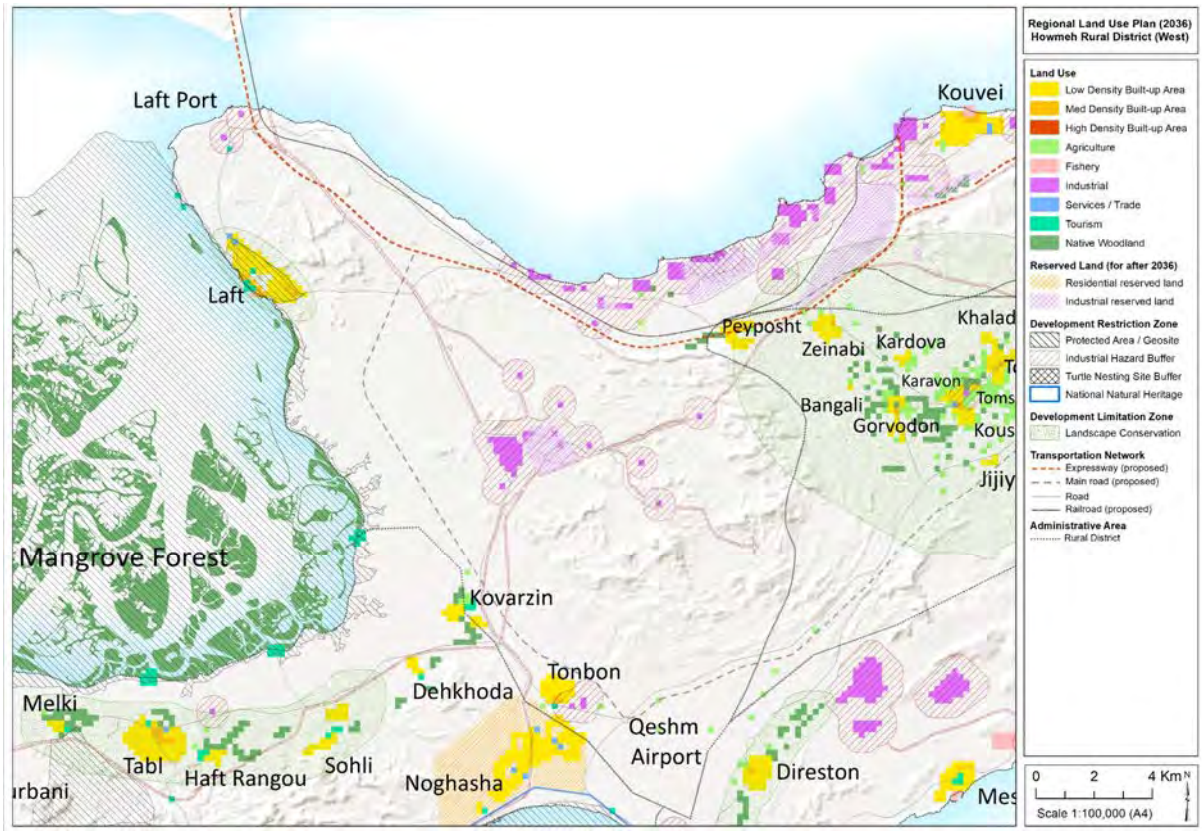
Source: ibid.

Figure 5.5.21 Regional Land Use Plan 2036 (Selakh & Hangom Rural Districts)



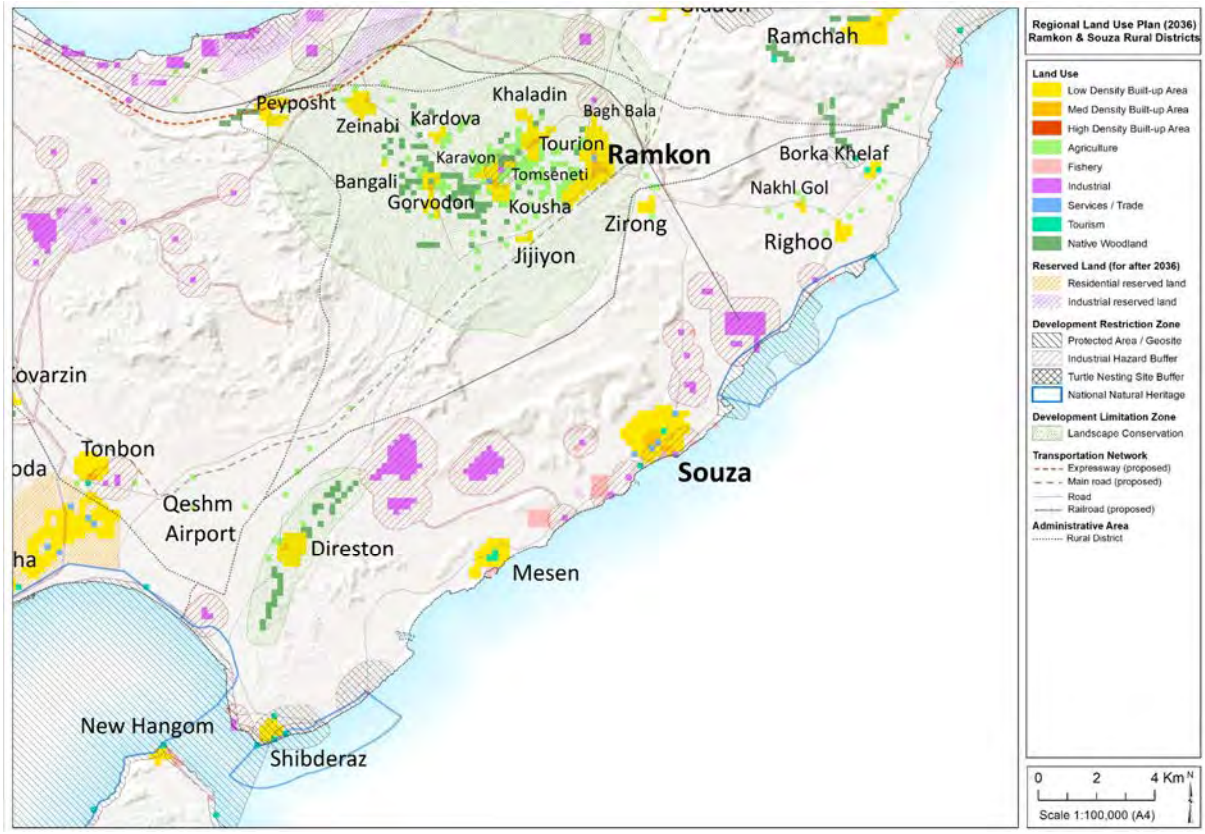
Source: ibid.

Figure 5.5.22 Regional Land Use Plan 2036 (Howmeh Rural District - East)



Source: ibid.

Figure 5.5.23 Regional Land Use Plan 2036 (Howmeh Rural District - West)



Source: ibid.

Figure 5.5.24 Regional Land Use Plan 2036 (Ramkon & Souza Rural Districts)

CHAPTER 6 ECONOMIC SECTOR DEVELOPMENT PLAN

6.1 Agriculture and Animal Husbandry Development Plan

6.1.1 Existing conditions

Given the natural restrictions, including scarcity of irrigation water and adequate soil, the agriculture sector on Qeshm Island has not flourished. In the past two decades, the average annual precipitations on the island have been less than 150 mm per year; meanwhile, the monthly average minimum temperature is around 8°C from December to February and the average maximum temperature in the months between June and August is over 40°C. Days when it is over 45°C are frequent in the summer time. In addition, the summer winds blowing from west to east are called "fire winds". There are no natural rivers or even streams on the island. About 450 wells are identified on the island; however, only 80 wells are officially licensed, with the remaining either unlicensed or dried. Either way, almost all of wells yield salty water due to overextraction in the past two decades. Although there are 14 desalinating units officially recorded, a few more facilities may exist. The surface soil of Qeshm Island consists largely of gypsiferous soils containing sufficient quantities of calcium sulfate, which interfere with plant growth. No forests and pastures moderating the local climate and regulating the water flow on the island have been found, while only scattered shrubs on the arid soil are observed. The County Division of the Ministry of Agriculture Jihad (MoAJ) provides public agricultural services, including research and extension services. The county office possesses experts in agricultural promotion and horticulture, while Hangom Island is also included in its service area. Veterinary services on Qeshm Island are relatively functional. On Hangom Island, crop production is hardly carried out and very few livestock farmers engage in animal husbandry.

(1) Land use

Cultivated land area has drastically decreased in the last two decades. The area under cultivation has been reduced to one quarter or less of what it was about 20 years ago. At the time when the SWECO master plan was prepared in 1994, only about 2.0% of the total area of Qeshm Island (3,064 out of 153,401 ha) was under cultivation. In addition, about 80% of 3,845 ha of existing arable land in 1994 was used for agricultural production. Vegetables were planted under irrigated conditions, while barley wheat was grown under rain-fed cultivation for animal feed. Orchards were usually filled with date palms, but in the past citrus fruit trees were more abundant in some villages. As of 2016, only about 0.47% of the total land area of Qeshm Island (725 out of 153,401 ha) is utilized for agricultural production.

Table 6.1.1 Land Use Characteristics of Arable Land on Qeshm Island by Source

Source (year)	Vegetables	Barley	Orchard/date palm	Total
SWECO master plan (1994)	354	1,898	812	3,064
Statistical Yearbook for Hormozgan Province 2012 (2003)	23	69	1,068	1,160
Interview in February 2016, County Division, MoAJ	15-25	70-100	200-330	Max. 555
Data from the QFZO by internal request 2016	15	N/A	710	725

Source: JICA Project Team

(2) Working population

As per the 1986 census, 851 (11%) out of 7,737 rural households were involved in the sector (according to the SWECO Master Plan). In 2003, the total number of agricultural operations in Qeshm County was reported to be 5,281 in the Statistical Yearbook for Hormozgan Province 2012. Among the 97,685 island population in 2006, approximately 5.4% were engaged in the agricultural sector.

Presently, the County Division of the MoAJ estimates that about 2,300 to 2,500 people are involved in the sector, mainly in livestock production. According to the latest census in 2011, the island population was 111,159, of which about 57% was located in the rural area. Hence, the rural population is estimated to be 55,704, with approximately 4.5% (2,500 out of 55,704) of the rural population engaged in agriculture. Most of them are so-called "part-time farmers" who have other major sources of income, while "full-time farmers" are found in very small numbers on the island.

The socioeconomic baseline survey for all villages in the Project Area identified the agricultural employment ratio in the villages. People in villages on the eastern half of the island, including two rural districts (Central and Souza) in Shahab District, are more involved in crop production and animal husbandry compared to the people on the western half of island. More than the half of villages in the Doulab, Selakh and Hengan rural districts have no villagers engaged in crop production. In Hamiri Village in Howmeh, 28% of people are engaged in farming, while, in Towla, Kardova and Nakhl-Gol, about 40% of villagers are engaged in livestock raising. However, 37% in Gouron Village and 22% in the Dourbani villages are involved in farming and livestock raising, respectively. On Hengan Island, crop production is hardly carried out and very few livestock farmers engage in animal husbandry.

Table 6.1.2 Proportion of Agriculture to Livelihood by Rural District

District		Livelihood (%)		
Rural district	Number of village	Farming	Livestock raising	Farm labor
Central District				
Howmeh	11	7	12	1
Ramkon	13	4	13	4
Shahab District				
Souza	7	6	12	0
Doulab	13	1	2	0
Selakh	10	5	8	1
Hengan	2	0	5	0
Overall (average)	56	4	9	1

Source: JICA Project Team

According to the field survey of six major villages in the Shahab and Central Districts, interviews revealed that no remarkable agricultural activity had been implemented in Selakh, Tabl and Shibderaz Villages in Shahab District and Laft Village.

(3) Production

Over the last two decades, there have been several improvements in the average yield per unit area (ha) of annual products, such as leafy and fruit vegetables. Since barley as a fodder crop is mainly grown under rain-fed conditions, the area under cultivation and its yields are unpredictable and totally dependent on unstable rainfalls. According to the County Division of MoAJ, common agricultural products of late are green leaf vegetables, including geshnese (coriander), hander (rucola), shevid (dill), taral (leek) and garga (turnip leaves), as well as garden vegetables including tomato, onion and eggplant. Date palm, lotus tree (*Ziziphus lotus,* or konor as it is called locally) and citrus are also popular among the farmers. The SWECO Master Plan envisioned the future yields of several horticultural crops to see a 50% increase, which seems to have been achieved. However, the productivity (yield per ha) of almost all of the produce on the island is less than half that for Hormozgan Province.

Table 6.1.3 Production (Average Yield) of Agricultural Crop

Source	Average annual yield (ton/ha)				
	Leaf vegetables	Fruit vegetables	Barley	Date palm	Fruits (lotus)
SWECO Master Plan (1994)	5.4		0.96	3.15 (15 kg/tree)	N/A
Estimated future yield	7.00 – 10.00		1.00- 1.50	(20-25 kg/tree)	N/A
Statistical Yearbook for Hormozgan Province 2012 (2003)	N/A	N/A	1.6	N/A	N/A
Data from the QFZO via internal request (2016)	20	15	N/A	2	7.00-10.00

Source: JICA Project Team

Rearing of goat dominates animal husbandry on Qeshm Island. Camels were originally introduced from outside of the island. The number of small livestock, including goat and sheep, has increased. There are only a few full-time livestock farmers; however, most of the 2,500 who make up the agricultural population on island are engaged in livestock farming. Animal fodder, including dried barley straw and alfalfa hay cubes from outside of island, are sold at an affordable price. Veterinary services including the dissemination of free vaccinations seem to be functional and contribute to the increase in the headcount. Domestic poultry is raised in the backyard by villagers. There were two commercial poultry farms (industries) on the island previously; however, the poultry farms have been closed due to the deterioration of management, led by excessive competition in the market.

Table 6.1.4 Numbers of Livestock

Source	Goat	Sheep (lamb)	Cow	Camel	Fowl
1971*	17,030	1,301	1,722	978	3,262
1986*	19,582		4,807	(1981) 608	N/A
1992*	15,500			217	N/A
1994 (SWECO)	27,000	N/A	4,800	N/A	N/A
2003 Stat. Yearbook for Hor. Prov. 2012	21,128	774	2,064	308	N/A
2016 MOJA	35,000		2,500	2,500	20,000

Source: JICA Project Team

In the vegetable shops in Qeshm City and/or the open markets in rural districts (areas), most of the fruits and vegetables from major agricultural production areas in the mainland, including Minab, Jiraft and even Shiraz, are sold at fairly reasonable prices compared to those on the mainland. Several vegetable/fruit retailers are under contract with wholesale dealers in Bandar Abbas, thus the fluctuation on prices caused by seasonal variation in production volume is minimized. Imported agricultural products are not only from Europe and Gulf countries, but from India and Pakistan via Chabahar. This produce is transported by various trucks and car ferry, while the transportation costs are expected to fall after opening the bridge that will connect to the mainland.

Vegetable shop in Qeshm City

Open market at Tourion

Figure 6.1.1 Retail Shop and Local Market on Qeshm Island

Table 6.1.5 Price of Agricultural Crop Produce in Retail Shops and Wholesale Markets

Unit: IRR/kg

Item		Retail shops in Qeshm City	Open market in Ramkon	Retail shops in Bandar Abbas	Bandar Abbas Wholesale Market	
					Max. wholesale price	Max. retail price
Leafy vegetables	Green leafs	30,000	20,000 (local)	20,000 – 25,000	---	25,000
	Cabbage	15,000	7,000-25,000	20,000	7,000	9,000
Fruit vegetables	Tomato	17,000	7,700	15,000	---	---
	Egg plant	15,000-20,000	20,000	15,000	11,000	14,000
	Zukkini	20,000	15,000	15,000	13,000	17,000
Others	Apple	35,000-60,000	25,000	37,000	22,000	28,000
	Water melon	10,000-13,000	10,000	---	15,000	20,000

Note: prices in April, May and August 2016
Source: JICA Project Team

There is no retail shop for agricultural inputs (planting materials, including seed, fertilizer and pesticide, and other agriculture-related goods and farm equipment) for farmers on the island. However, farmers can obtain such agricultural materials and farm equipment at retail shops in Bandar Abbas. There used to be a fertilizer plant on the island, but it is now closed.

The combination of the conditions described above negatively impacted agricultural development on the island.

6.1.2 Issues to be tackled

Conditions surrounding agriculture and animal husbandry have changed since the SWECO Master Plan was released in 1994. Some constraints and limitations affecting agricultural development, excepting natural restrictions including scarcity of sufficient quantity water and adequate quality soil, are identified as follows:

(a) A lack of concrete and feasible action plans for the crop production and animal husbandry development on Qeshm Island is reported by the MoAJ County Division Office.
(b) A reduction in actual cultivated area is observed, along with a decrease in farmers' motivation to retain their farm lands. The demand for agricultural land to convert into industrial and residential use has sharply increased in recent years.

(c) Arable agricultural land has been segmentalized and fragmented by the succession of property deals in the last two decades. Fragmentation hampers corporate-style farm management with the consolidation of farmland for the intensive cultivation of crops and grazing animals by exemplary/outstanding farmers.
(d) The low competitiveness in the market is due to the high cost structure caused especially by the cost of desalinated water.
(e) There is a lack of specialty agricultural products on the island.
(f) There is a shortage of appropriate practical technologies in crop production and animal husbandry. Few new technologies have been introduced in horticultural crops and date palm cultivation. Several exemplary farmers obtain technologies by themselves and perform crop production through trial and error.
(g) On the other hand, the motivation and willingness in relation to farming among rural ordinary farmers have decreased, which explains the low participation rate of farmers at the technical workshops held by public and private agricultural service sectors.
(h) There is a lack of a business mind regarding farm management from the viewpoint of the farm household economy. In addition, farmers' awareness of the production costs related to cost-benefit performance and market demands concerning crop selections need to be fostered.
(i) A tendency among farmers to depend on government support was observed. Agricultural inputs (farming-related goods, equipment, materials, including seed, fertilizer, pesticide etc.) were provided free of charge/at a low price by the government about 15-20 years ago, which fostered farmers' tendency towards dependency.
(j) Only a few farmers have any intention of utilizing the farm loan because of the esoteric and intricate application process, as well as the harsh loan conditions for small-scale local farmers.
(k) There is a weak linkage among stakeholders concerning research, extension and dissemination of agricultural cultivation and farm management technologies (e.g., public and private sectors, research institutes, including universities, NGOs and NPOs etc.).
(l) The promotion of pasture production still remains important because the number of livestock has increased in reality, despite the shortage of forage and the absence of manual feeding. Nevertheless, any pasture promotion program has never seemingly been implemented.

6.1.3 Objectives and development target

In consideration of the above conditions and issues surrounding the agriculture sector on Qeshm Island, a new context for the development strategies should be evolved. Elderly native residents of the island who spent their childhood in villages and farms on Qeshm Island recognize agriculture as their hereditary occupation. On the other hand, the cultivated land area and working population have been gradually reduced every year over the last 20 years, mainly due to the depletion and salinization of the groundwater. Drought has lasted for over two decades and rain-fed cultivation has hardly occurred in recent years.

Since the time of the SWECO Master Plan, wheat, as the staple food crop, has not been planted at all in line with the food requirements of the Cereals Organization, which distributes wheat to the island from the mainland; farmers on the island are not worried in this respect. Common horticultural products from outside the island are affordable and without large seasonal and regional fluctuation in prices. The livestock industry has seen neither growth nor decline. In the context of a stable supply of foodstuff to the island, it seems the present situation of agricultural production and food supply may be acceptable. This situation of the stable supply would be more robust after opening the bridge, which will connect to the mainland.

There is no room for doubt that farming is one of the major means for improving livelihood in rural areas; however, the areas where the agriculture sector on this island can make a contribution are very limited due to severe natural conditions including scarcity of sufficient quantity water and adequate quality soil. It is obvious that comparative disadvantage, in terms of production costs in the context of agricultural productivity on the island, is due to high primary costs typified by expensive desalinated

water.

However, the value of the agriculture and animal husbandry sectors should be measured not only in economic terms but also environmental and sociocultural terms. Environmental terms refer to conservation and effective utilization of natural resources, while sociocultural terms include the review of the traditional landscape and eco-tourism. Objectives for agricultural development should be pursued alongside traditional and cultural aspects of the island.

Therefore, the new development objectives in the agricultural sector for the purpose of realizing the concept of the "eco-island" are described below:

(a) Objective 1: Economic aspect: livelihood improvement in local farm communities
- ✓ Target 1: Stabilization of partial food self-sufficiency in the region for the purpose of maintaining income generation
- ✓ Target 2: Facilitation of access to employment opportunities for local communities through the development of agricultural specialty products
- ✓ Target 3: Improvement in agricultural productivity and farm household management technologies for stable farm production and farm management
- ✓ Target 4: Promotion of the livestock industry through the partial self-sufficiency of forage crops

Indicators of Objective 1 are defined as below:

- ✓ Working population in the sector/proportion of agriculture to livelihood (slight increase)
- ✓ Productivity (yield per unit area and cost/input) (slight increase)
- ✓ Number of agricultural specialty products from the island supporting "eco-tourism" (five items)

(b) Objective 2: Environmental aspect: conservation of agricultural production resources
- ✓ Target 1: Protection from other usages of agricultural land in the context of natural land and vegetation conservation of the "eco-island"
- ✓ Target 2: Promotion of water-saving cultures in the context of environmental protection and product cost reduction
- ✓ Target 3: Effective utilization of existing resources in agricultural production
- ✓ Target 4: Promotion of pasture production for the purpose of protecting natural vegetation from overgrazing

Indicators of Objective 2 are defined as below:

- ✓ Land area for agricultural production (5% increase in cultivated land area)
- ✓ Rate of consumption reduction of irrigation water per unit area (10% reduction compared to the conventional irrigation methods)
- ✓ Percentage of cultivated land area by utilizing water-saving irrigation systems (e.g., drip irrigation systems/70% coverage of cultivated land area using water-saving irrigation systems)
- ✓ Amount of utilization of recycled water for agriculture/afforestation in the local area

(c) Objective 3: Sociocultural aspect: rediscovery/review of the traditional culture through agricultural production and activities in the context of tourism promotion
- ✓ Target 1: Raising awareness/emphasizing educational purpose of own culture/tradition in the country through the utilization of traditional agricultural products
- ✓ Target 2: Creation of agricultural specialty products from the island relevant to own culture/tradition and "eco-tourism"

Indicators of Objective 3 are defined as below:

- ✓ Number of agricultural specialty products from the island supporting "eco-tourism" (five items)
- ✓ Number of facilities/events to host exhibitions/demonstrations of traditional agricultural produce from the island (one demonstration garden in each rural district)

- ✓ Number of items/articles/information introducing agricultural products/activities on Qeshm Island and the country (five topics for publications)

6.1.4 Development plan

To meet the objectives and development targets mentioned above, the development plan for the agriculture and animal husbandry sector should balance economic development and environmental conservation. Major planning items comprising the development plan are listed below:

(a) Amplification of the introduction, adaptation and dissemination of water-saving culture
- Research on the installation and utilization of irrigation systems
- Development and modification of cultivation technologies
- Construction of demonstration fields
- Providing technical workshops
- Monitoring and feedback
- Trial of fodder crop production/regional greening by utilizing recycled water

(b) Tourism promotion by utilizing traditional agricultural products
- Research and identification of suitable/adoptable crop species/varieties
- Establishment of the demonstration gardens of traditional herbal crops
- Production and sales of traditional medicinal herbs at the garden/visitor center
- Providing workshops on herbal crop production
- Promotion of apiculture for mangrove honey as an island agricultural specialty
- Formulation of producer groups for coordination and management

(c) Development plans/projects presently under formulation and implementation regarding the agriculture and animal husbandry sectors
- Recentralization of the segmentalized farming lands
- Selection of salinity-tolerant plants for greening/afforestation
- Breeding of date palm
- Institution/foundation of a chicken treatment facility (slaughterhouse) on the island

6.1.5 Proposed project and cost estimate

The County Division of the MoAJ and the QFZO have been making several attempts to develop the agriculture and animal husbandry sectors and the livelihood of farmers in rural areas. They are implementing several agricultural development activities and formulating future projects.

The ongoing existing plan and proposed projects are reorganized based on the objectives and development targets as follows:

Objective 1: Livelihood improvement in the local communities

- Project 1: Providing technical guidance on cultivation techniques and farm household management including water-saving culture
- Project 2: Promotion of apiculture for mangrove honey as an agricultural specialty relevant to "eco-tourism"
- Project 3: Production and sales of traditional medicinal herbs at the demonstration garden
- Project 4: Finding investors for the foundation of a chicken treatment facility (slaughterhouse) on the island (under formulation)
- Project 5: Breeding of date palm (under implementation)

For the purpose of the stabilization of the local supply of common vegetables and orchard fruits, especially perishable green leaf vegetables, in support of the sustainable partial self-sufficiency in the villages according to the concept of "local production for local consumption", technical training on water-saving culture would be provided to willing local farmers. Technology in farm household management includes the methods/procedure of farm loan applications. The development and promotion of agricultural specialty products, such as mangrove honey and several traditional herbs, generate the local economy. The technical support for date palm cultivation/production would not only

contribute to the creation of employment opportunities but also maintain and expand the greening land area.

Objective 2: Conservation of the agricultural production resources

- Project 1: Recentralization of the fragmented/segmentalized farming lands (under formulation)
- Project 2: Dissemination of water-saving culture, especially the drip irrigation system
- Project 3: Promotion of forage crop production/regional greening by using recycled water in local areas (under implementation in Qeshm City)
- Project 4: Selection of salinity-tolerant crops/plants for greening/afforestation (under implementation)

In the recentralization project, public land (about 16 ha) with agricultural facilities, including a desalination unit and greenhouses, would be leased to a group consisting of eight farmers. Cash flow, including the initial investment cost, is analyzed, with the results utilized for the future projects. The introduction and dissemination of the drip irrigation system for local farmers is highly recommended for the purpose of the efficient use of limited/expensive irrigation water. The drip irrigation system, which simply utilizes gravity, is the better option for the novice/beginner farmers in terms of the technical feasibility and low initial cost of installation. Forage production and regional greening/afforestation using recycled water should be expanded to local areas.

Objective 3: Rediscovery/review of traditional culture through agricultural production and activities in the context of tourism promotion

- Project 1: Establishment of the demonstration gardens of traditional herbal crops, including the implementation of a training workshop on herb cultivation for neighboring farmers
- Project 2: Research and introduce island cultures/traditions relating to agricultural products/activities on Qeshm Island and the rest of Iran, including mangrove honey, rock cave honey, medical herbs and the qanat system

Taxonomic studies, including the identification and classification of the genetic resources of medicinal plants, are well documented by universities and research institutes in this country. The knowledge about traditional usage and cultivation methods are also well studied and accumulated. In the context of tourism promotion for the "eco-island", the traditional knowledge of indigenous agricultural products/activities of this island (and this country) could be wonderful resources through the production, exhibition and sales of such products at the gardens and visitor centers. The cost estimation for the proposed projects and their phasing have been estimated and are displayed below:

Table 6.1.6 Proposed Project and Cost Estimate for Agriculture and Animal Husbandry Development

Project title	Implementation organization	Phasing			Cost (USD million)			
		Short term	Mid term	Long term	Short term	Mid term	Long term	Total
Technical guidance on agricultural production and farm household economy	MOJA	X	X	X				
Promotion of apiculture/mangrove honey	QFZO	X						
Establishment of chicken slaughterhouse	QFZO	X						
Breeding date palm	MOJA	X	X					
Recentralization of farming lands	MOJA	X	X	X				
Dissemination of water-saving culture	MOJA	X	X	X				
Forage production using recycled water	QFZO	X	X					
Selection of salinity-tolerant greening plants	QFZO	X	X					
Establishment of medicinal herbal garden	QFZO	X						
Production of herbal plants	MOJA	X	X	X				
Sales of herbal products at visitor centers	QFZO	X	X	X				
Total								

Note: Short term = 2018~2021, middle term = 2022~2026 and long term = 2027~2036
Source: JICA Project Team

6.2 Fishery Development Plan

6.2.1 Existing conditions

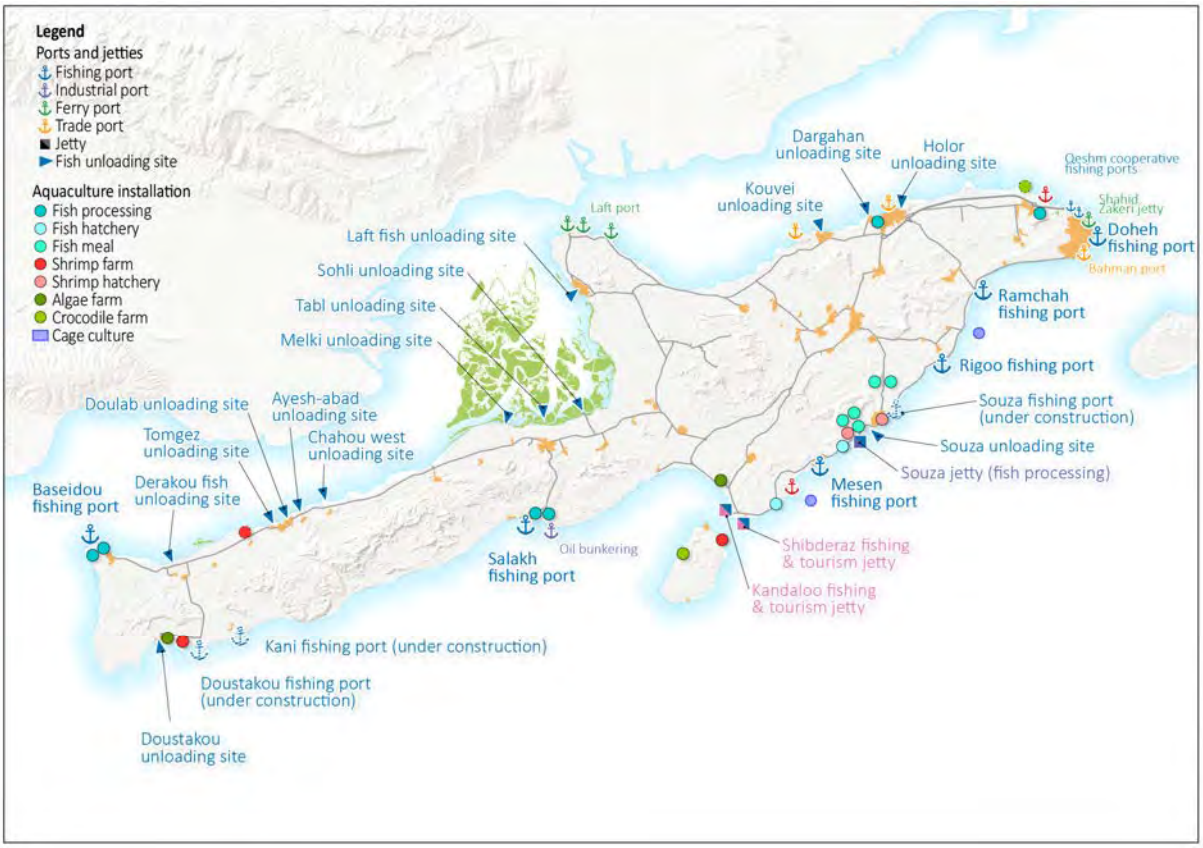
(1) Fishing

The fishery sector in Qeshm County is under the jurisdiction of the Hormozgan Provincial Office of the Iranian Fisheries Organization (IFO Hormozgan), which belongs to the MoAJ. The IFO Hormozgan has established a local office on Qeshm Island (Qeshm County Branch Office). On the other hand, the QFZO is involved in issuing permits for fishery-related business, fishing port construction, investment in the fishery sector and planning of rural area developments including fishing villages. The Agriculture and Fishery Department is planned to be established under the Economic and Investment Deputy of the QFZO, which will become responsible for fishery sector development on Qeshm Island.

On Qeshm Island and Hangom Island, about 6,000 fishermen earn their living through capture fishery. The fishing grounds of Qeshmi fishermen are in nearshore areas surrounding Qeshm Island and waters encompassing the islands of Lesser Tunb and Great Tunb through the islands of Hormuz and Larak (Figure 6.2.1). The fishing methods used are bottom trawl, purse seine, fish trap, set net, gill net, longline, trolling, hook and line, and beach seine. Shrimp bottom trawl is allowed for a limited period of the year for the purpose of resource management. Meanwhile, the fishing method using fish traps has recently expanded.

Figure 6.2.1 Location Map of Islands in the South of the Persian Gulf

There are nine active fishermen's cooperatives on Qeshm Island and Hangom Island: i.e., Qeshm, Dargahan, Kouvei, Ramchah, Mesen, Souza, Hangom, Basaeidou and Selakh, out of which Baseidou, Selakh, Ramchah, Qeshm and Darghahan are among the most important fishing cooperatives in terms of the number of fishermen who are members (Figure 6.2.2, Table 6.2.1). These cooperatives have fishing ports, except for Souza, where the Port and Maritime Organization (PMO) is currently constructing a new port (mainly breakwaters).



Source: JICA Project Team

Figure 6.2.2 Location of Ports, Jetties and Aquaculture Installation

Table 6.2.1 Number of Fishing Boats (Small and Lenj Boats) and Fishermen on Qeshm Island and Hangom Island

Name of fishing port and cooperative	Small fishing boats	Lenj*	Number of fishermen using small fishing boats	Number of fishermen using lenj boats	Total number of fishermen
Qeshm Ports (Doheh and Qeshm, cooperative)	180	10	720	70	790
Dargahan (port and cooperative)	120	25	400	170	570
Kouvei (port and cooperative)	70	10	250	80	330
Basaidu (port and cooperative)	80	65	300	900	1,200
Doustakou and Kani	30	0	110	0	110
Selakh (port and cooperative)	60	50	600	400	1,000
Messen (port and cooperative)	40	0	300	0	300
Souza (port under construction and cooperative)	50	2	200	17	217
Rigu Port (port)	10	2	100	18	118
Hangom Port (port and cooperative)	50	2	130	15	145
Direstan Port (port and cooperative)	13	0	100	0	100
Ramchah Port (port and cooperative)	115	4	900	27	927
Chahou Sharghi (port and cooperative)	20	5	80	40	120
Doulab (port and cooperative)	20	10	70	80	150
Tabl (port and cooperative)	50	0	150	0	150
Holor (port and cooperative)	10	0	30	0	30
Total	918	185	4,440	1,817	6,257

Note: Lenj boats are traditional fishing boats made of wood or FRP and larger than small fishing boats
Source: QFZO

Fish landing for Qeshm County amounted to about 56,000 tons in 2014 (Table 6.2.2), while the total capture production of Hormozgan Province and that of all the other provinces along the coast of the Persian Gulf and the Oman Sea (Bushehr, Khuzestan, Sistan Balchestan) were 217,000 tons and

535,000 tons, respectively. The capture production of Qeshm accounts for about 26% of the total catch for Hormozgan Province, which means that Qeshm County is an important base for coastal fishery in this province. However, the landing amount for Qeshm County in 2014, as shown in Table 6.2.2, exceeded the maximum sustainable yield (MSY) of fish, crustaceans and mollusks from Qeshmi waters, i.e., about 35,000 tons, which was reported in the SWECO Master Plan.

Table 6.2.2 shows that the landing amount of small pelagic fish (anchovy and sardine) in Qeshm County has drastically increased and reached an annual production level of 44,000 tons in 2014, accounting for about 80% of the total landing for Qeshm County. Furthermore, small pelagic fish caught by Qeshmi fishermen was 44,000 tons in 2014, which accounts for 67% of all small pelagic fish caught in the Persian Gulf and the Oman Sea (Iranian territorial waters), which totaled 65,632 tons in 2014 according to the FAO. Approximately 2,000 fishermen on the southern coast of Qeshm Island are engaged in the small pelagic fishery sector, while the total number of fishermen on Qeshm is about 6,000. Taking into consideration these facts, the small pelagic fishery sector is obviously the most important fishing activity on Qeshm Island. The SWECO Master Plan reported that the MSY of small pelagic fishery in Qeshmi waters was 18,000 tons, while the Persian Gulf and Oman Sea Ecological Research Institute has calculated the total allowable catch for sardine and anchovy from the waters of Hormozgan Province as 29,000 tons and 46,000 tons, respectively. Monitoring and assessment of fishing data should be necessary for sustainable fishery since the amount of small pelagic catch is increasing year by year.

Table 6.2.2 Fish Landing Amounts (Capture Production, Ton) for Qeshm County

Year	Benthic (demersal)	Small pelagic	Large pelagic	Shrimp	Other	**Total**
2014	1,286	44,024	9,972	768	-	**56,050**
2013	9,276	33,460	8,952	359	-	**52,047**
2012	11,940	20,520	11, 006	627	-	**44,093**
2011	9,875	20,428	10,782	458	-	**41,543**
2010	8,266	12,053	11,883	449	-	**42,439**
2008	9,786	14,783	7, 603	438	5,137	**37,747**
2006	5,125	12,262	6,323	777	1,116	**25,603**
2004	4,240	6,132	5,109	870	1,529	**17,880**

Note: "small pelagic" represents sardine fishery and mainly consists of anchovies and shads
Source: QFZO

Fish captured in Qeshmi waters comprise a variety of finfish, crustacean and cephalopod, out of which silver pomfret, large prawn, king mackerel and grouper are among the most valuable fish (Table 6.2.3). Above all, silver pomfret is the most expensive and highly demanded fish.

Table 6.2.3 Producer Price of Unprocessed Fresh Fish on Qeshm (2016)

Name	Price (IRR/kg)	Name	Price (IRR/kg)
Silver pomfret	700,000	Silver sea bream	150,000
Prawn (extra large)	550,000	Cuttlefish	150,000
King mackerel	240,000-450,000	Barracuda	150,000
Prawn (large)	300,000	Long tail tuna	150,000
Grouper	270,000-280,000	Red sea bream	130,000-150,000
Mangrove jack	250,000	Trevally	130,000
Prawn (medium)	250,000	Red snapper	130,000
Indian salmon	220,000	Halibut	100,000
Croaker	220,000	Horse mackerel	100,000
Yellowfin tuna	170,000	Sardine (*Sardinella spp.)*	50,000-100,000
Sweetlip	140,000	Hump-headed sea bream	80,000
Yellowfin sea bream	120,000	Kawakawa	80,000
Emperor	160,000	Blue swimmer crab	50,000

Note: The producer price of dried anchovies sold to fishmeal factories is low (IRR 40,000/kg)
Source: JICA Project Team

Due to limited employment opportunities, the number of Qeshmi people who are engaged in fishing increased from 2,000 in 1990 to 6,000 in 2014, due to a drastic increase in fishing demand. Fishermen

using fish traps state that their fishing grounds are getting farther out due to a decrease in fish catch in nearshore areas, resulting in the use of a greater number of fish traps with larger trap dimensions. They suspect that the decrease in the amount of catch is due to overexploitation caused by the use of small mesh-size nets (indiscriminate fishing), illegal fishing and intense fishing efforts (i.e., an increasing number of fishermen). They also think also that marine ecosystem is damaged by bycatch discard and destructive fishing methods, such as bottom trawl and ornamental fish catch. Furthermore, lots of fishermen complain that large domestic and international fishing vessels are depleting the resources and deteriorating fish habitats. According to the socioeconomic survey conducted by the present study in 2016, the average annual income of fishermen is about IRR 245 million (IRR 672,000/day) and their net revenue is IRR 23 million (IRR 63,000/day). Fishermen are seeking a better livelihood since their revenue is obviously very low. A comprehensive study to elucidate the decrease in fish catch and define a clear policy for fishery resource management is necessary to protect local fishermen's livelihood.

The Global Environment Facility and the IFO installed about 150 artificial reef modules off the coast of Selakh and Gomboron in 2002 and 2015, respectively, to enhance the abundance of fish habitats and promote the protection and wise use of fisheries resources. These projects had a good reputation among local fishermen and their interest in the continuous use of artificial reefs has grown. The fishermen of Souza installed small reef modules by themselves on the shallow sandy bottom in Souza to attract recreational divers. Their initiatives are expected to create *satoumi* (i.e., a coastal area where biological productivity and biodiversity increases through human interaction), which is a globally recognized concept of participatory fishery resource management that is now being practiced in many sea areas of Japan and other countries, such as Indonesia and Thailand.

(2) Aquaculture

Aquaculture development is considered to be a priority project in the draft of the sixth FYDP (2017-2022) of the Government of Iran. The goal for the total annual aquaculture production for Qeshm County, consisting of 84,000 tons of fish, 1,000 tons of shrimp and 200 tons of other aquatic species, is projected to be accomplished by the end of the 2022 fiscal year.

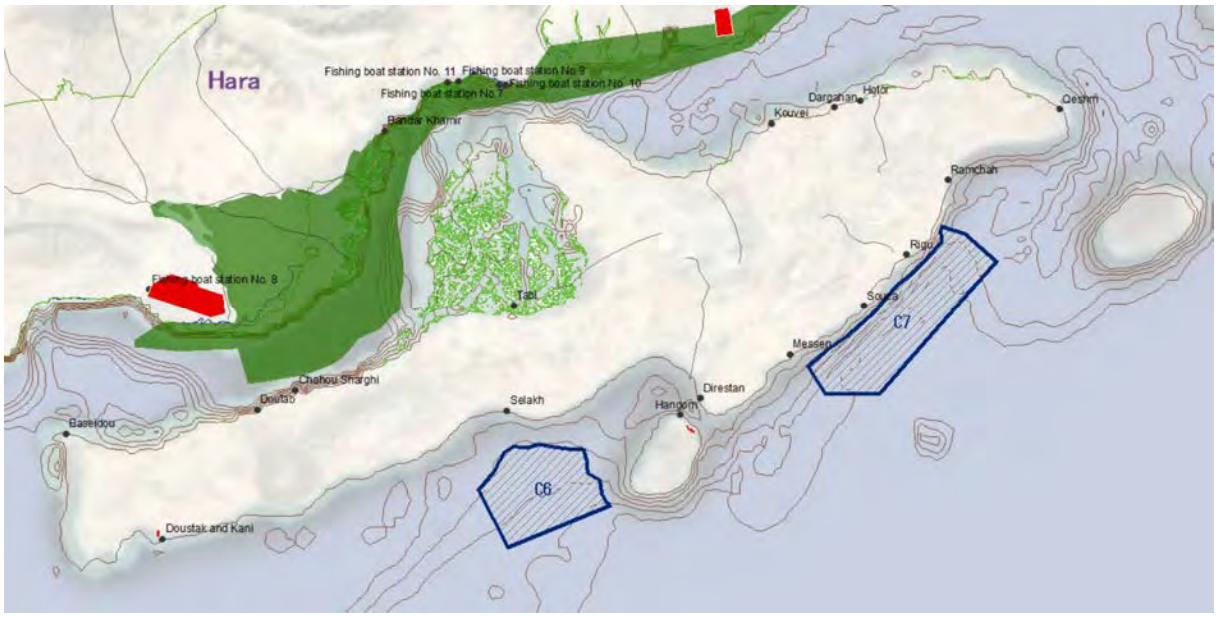
Table 6.2.4 shows fish farms and hatcheries that are in operation on Qeshm Island and Hangom Island, as of August 2016. Shrimp farming has been a successful form of aquaculture in Qeshm County. The next challenge for shrimp farming is the enhancement of productivity by introducing higher technologies. The prevention of problems originating from high-density farming, such as hypoxia and white spot disease (viral disease), as well as the reduction in eutrophicated wastewater discharge from shrimp ponds, will be required for sustainable development.

There are two seaweed farms on the southern coast of Qeshm (Noghasha and Direston near the Geopark). About 12 companies are planning to start farming marine fish, such as silver sea bream, grouper and sea bass (barramundi) in the Selakh, Shibderaz and Larak areas. The QFZO has already given licenses for fish cage culture to private companies with a total annual production capacity of 35,000 tons. According to the sixth Five Year Development Plan, the Departmen of Environment promotes the acquaculture promotion area which extends off shore areas infornt of Rigoo, Souza, mesen and Selak in south of Qeshm Island as shown in Figure 6.2.3.

Table 6.2.4 Aquaculture Farms in Operation as of July 2016

Type of farm	Location	Level of production	Note
Shrimp farm	Hangom Island	• 200 tons a year	• 37 ha shrimp ponds
Shrimp farm	Doustakou	• Just started	• 100 ha shrimp ponds • Operation just started.
Two shrimp hatcheries	Qeshm Island	• 40 million post-larvae (PL_{12})	
Fish hatchery and farm	Direston	• 10 million fingerlings • 1,200 tons (commercial size) a year (projected production)	• Franco-Iranian company • Silver sea bream are currently produced • Fingerlings are being grown in Lengue • Only the hatchery is in operation at the moment
Microalgae farm	Near Direston	• 150 tons a year (planned)	• Currently, *Dunaliella salina* is cultivated as raw material for healthy food (tablets), while *Spirulina platensis* and *Chlorella vulgaris* are also to be cultivated in the next phase

Source: JICA Project Team



Source: JICA Project Team

Figure 6.2.3 Location of Acquaculture Promotion Area proposed by Department of Environment

Local fishermen also think that aquaculture can provide an alternative income source, but they do not have enough information about how to launch an aquaculture business. In Qeshmi waters, inshore areas suitable for aquaculture are limited due to a relatively simple and straight coastline, disturbance by strong wave actions with prevalent southwesterly winds, inadequate water depth and the operation of large vessels. Taking into consideration these factors, a selection of appropriate sites for each farming species needs to be carefully conducted. An aquaculture development plan is recommended, which would promote aquaculture among local fishermen and balance the use of sea areas between private companies and local fishermen.

During 2008 to 2009, the long-lasting presence of red tide bloom caused the mass mortality of a variety of marine organisms. In the intervening years, extensive harmful red tide bloom has not occurred in Qeshmi waters. However, unaccountable mass mortalities of fish have been occasionally observed on the coast. Environmental monitoring, including that of toxic algal bloom, and information sharing with fish farmers are also essential for sustainable aquaculture development.

(3) Fish processing

Although there are six fish-processing factories on Qeshm Island, none of them is hazard analysis and

critical control point-certified. The best freezing store for fish processors on Qeshm Island is located in Selakh, with a freezing capacity of -40°C , while other processors' freezing stores have the capacity of about -20°C. There are five fish meal factories, one fish feed factory and 14 ice factories. One canning factory was in operation previously, but is currently bankrupt due to high interest payments on a loan.

The great majority of anchovies and sardines are dried in the sun by fishermen and local people, then sold to fish meal factories at IRR 40,000 /kg, which is a very low price compared with the price of other fish, as shown in Table 6.2.3. Small portions of fish, such as shark, ray and shrimp, are dried for the household industry and sold locally. Most other types of fish, such as demersal and large pelagic fish, are generally transferred to domestic and international markets via cold storage and/or fish-processing companies in the form of fresh and chilled (round, semi-dressed, dressed, fillet, loin) and frozen (round, semi-dressed, dressed) products, without further processing for value addition. Fish-processing companies now seek to create new value added products to gain higher economic return from Qeshmi fishery products, such as ready-to-eat and ready-to-cook seafood, as well as dried seafood, together with better packaging. Innovating Qeshmi fishery products should be a priority in view of the fact that the product lineup, such as chilled, frozen fish and traditional dried food, has hardly ever changed in a long time. Besides, fish processors need to supply quality food to consumers that comply with safety and hygiene standards, since consumers are becoming more and more educated about the quality and safety of fishery products. The exchange of ideas and information about the trend of recent fishery products and modern technologies is necessary for innovation. The value chain approach in relation to the whole distribution process, from harvesting to reaching consumers, will contribute to the development and supply of high-quality seafood.

Advanced fishermen are also seeking chances to start fish-processing businesses to improve their income. However, the lengthy and complicated procedures to get the copious amount of licenses from the relevant governmental offices for such businesses have been a constraining factor on them.

Artisanal fishermen, in general, have no sufficient capital for the renewal of facilities and equipment, nor for starting new activities, such as aquaculture, modern fishing methods and fish processing. A financial system, which offers preferential treatment to artisanal fishermen who are/will be engaged in environmentally friendly fishery, will be of great help in terms of the improvement of their income and resource management.

(4) Distribution and marketing

Fish caught by Qeshmi fishermen are landed on Qeshm Island, Hangom Island and nearby landing sites on the mainland, such as Bandar Abbas, Kong and Lengue, then stored temporarily in cold storage and/or sold onto wholesalers, fish processors and fish retailers. Fresh fish are sent to large cities, such as Tehran and Shiraz, by refrigerated truck. Commercially valuable fresh fish, such as silver pomfret, shrimp, king mackerel, emperor, sardine (mainly *Sardinella spp.*) and cutlassfish, are sent to international markets as well. The most expensive and highly demanded fish, silver pomfret, is exported to Kuwait. Exporters send fish through airports, which are located outside Qeshm Island; for instance, they export silver pomfret from Shiraz to Kuwait, because export procedures directly from Qeshm to Kuwait are complicated and time-consuming. Processors and exporters believe that simplification of the procedures will be of great help in improving the distribution channel.

Consumers on Qeshm Island buy fresh and dried fish at fish markets, fish landing sites and temporary stores on the streets. There are two fish markets established in the fishing ports of Qeshm City, which are Qeshm Fishing Port and Doheh Fishing Port. There is one establishment in Holor as well.

Fishing boats, especially lenj boats, have ice storage room(s) and carry block ice for four to seven days of fishing. On the other hand, although small fishing boats are not equipped with an ice storage room on board, fishermen often do not carry cold boxes with ice for fishing. Due to a lack of ice usage and inappropriate post-harvest handling, captured fish quickly lose freshness and become damaged. Fish transferred from the Persian Gulf region and sold at fish markets in Tehran are often damaged and do not look fresh, especially in the summer season, because the importance of freshness is still not appreciated in Iran. It is crucial to attract consumers, including international residents and visitors in large cities, where there is large potential to boost fish consumption. The cold chain management of

the whole distribution process, from the "fish catch stage in the sea" to the "sales stage at the fish market", is a big challenge with regard to the enhancement of the value chain. To this end, raising fishermen's awareness in terms of better cold chain management and improving the facilities and equipment in fishing ports and on board fishing boat, including landing stations, ice machines, cold storage, insulated fish boxes and fish pumps, are necessary.

6.2.2 Issues to be tackled

Based on document review and results of meetings with fishermen, local residents, fish processors and distributors in Qeshm County, the "problems" and "issues to be tackled" in the subsectors of fishing, aquaculture, fish processing, and distribution and marketing are identified and summarized in Table 6.2.5.

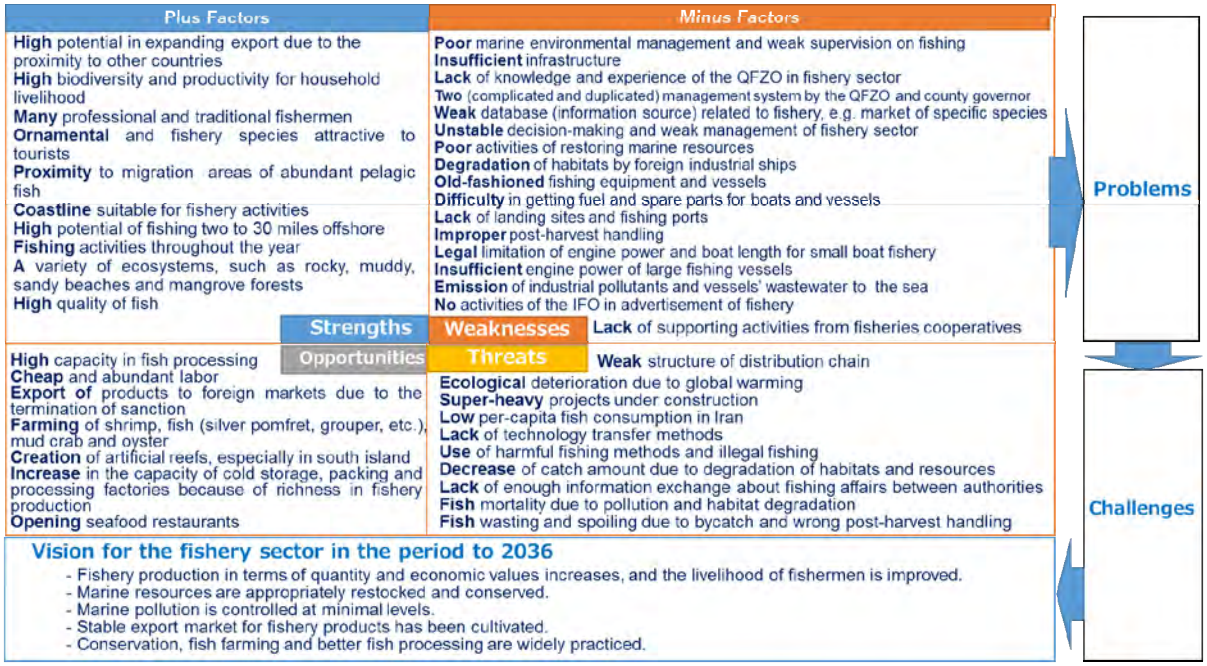
Table 6.2.5 Problems and Issues to be Tackled in the Fishery Sector

	Problems	Issues to be tackled
a. Fishing	**a1**: Decrease in catch due to overfishing and habitat degradation **a2**: Insufficient capital for the renewal of equipment and facilities and for starting fish-processing businesses **a3**: Lack of awareness about the importance of cold chain management **a4**: Lack of infrastructure/ facilities, such as fishing ports, landing sites, ice machines and storage of fishing equipment	**a1**: Preparation of a fishery management plan **a1**: Enhancing the abundance of fishery resource and biodiversity **a1:** Livelihood diversification to reduce fishing pressures on resources **a1:** Granting territorial user rights for fisheries to local fishermen in order to promote fishermen's autonomous actions for resource management in nearshore areas **a1**: Promotion of the clear understanding about the fishing activities of large domestic and foreign fishing vessels through persuasive explanations to artisanal fishermen **a1 and a3**: Facilitation of financing for activities of fishermen who are/will be engaged in environmentally friendly fishing **a1 to a4:** Establishment of a fishery section at the QFZO and the clarification of its role in fishery development, for example, the coordination, implementation, monitoring and evaluation of projects as recommended in the present Master Plan, in cooperation with relevant organizations, such as fishermen, universities and the IFO **a3**: Improvement in post-harvest handling **a4**: Improvement in fisheries facilities and equipment
b. Aquaculture	**b1**: Lack of experiences in fingerling/seed production and grow-out techniques for certain species, such as seaweed and shellfish, on a commercial scale **b2**: Insufficient technical dissemination system for local fishermen **b3**: Little information for fishermen to consider and start aquaculture businesses **b4**: Unclear aquaculture development plan for the local people of Qeshm Island	**b1**: Acquisition of techniques for stable production of fingerlings/seeds and grow-out of farming species by establishing strong technical partnerships with relevant institutions **b1 to b4**: Preparation of a plan for aquaculture development, including coastal space management and a technical assistance plan **b2**: Providing technical training opportunities to executive officers and fishermen in cooperation with relevant institutions **b3 and b4**: Establishment of an information service system for those who are interested in aquaculture businesses, including the preparation of a concise handbook providing key information, such as procedures to gain aquaculture license(s), recommended target species, biological and physicochemical characteristics of aquaculture-promoting sites, an example business model, and basic facilities and equipment required
c. Fish processing	**c1**: Lack of brainstorming opportunities among stakeholders about the creation of a brand identity for Qeshmi fishery products **c2**: Lack of advanced knowledge and technology for the creation of Qeshmi brands **c3**: Insufficient hygienic practices **c4**: Lengthy procedures for fishermen to start fish-processing businesses for the diversification of livelihood	**c1 and c2**: Multi-stakeholder dialogue for the creation of Qeshmi brand (stakeholders may be fish processors, fishermen, tourism planners, women's groups etc.) **c2**: Acquisition of advanced knowledge and technologies **c3**: Adoption of higher hygiene standards **c4**: Simplification of procedures and information sharing about the proper procedures for fishermen to quickly obtain licenses and start fish-processing businesses with the help of relevant governmental offices
d. Distribution and marketing	**d1**: Lack of awareness about the importance of the cold chain **d2**: Complicated procedures to export fishery products directly from Qeshm	**d1**: Development of appropriate refrigeration, transportation and distribution channels **d1**: Multi-stakeholder dialogue for supplying better fishery products **d2**: Simplification of procedures and/or information sharing about the proper procedures for exporting fishery products, with the help of governmental offices

Source: JICA Project Team

A SWOT analysis was conducted at the workshop held on May 4, 2016, with fishermen, fish farmers, processors, distributors and government officials. Figure 6.2.4 shows the results of the SWOT analysis and participants' vision for the fishery sector leading up to the target year of 2035. The results are used

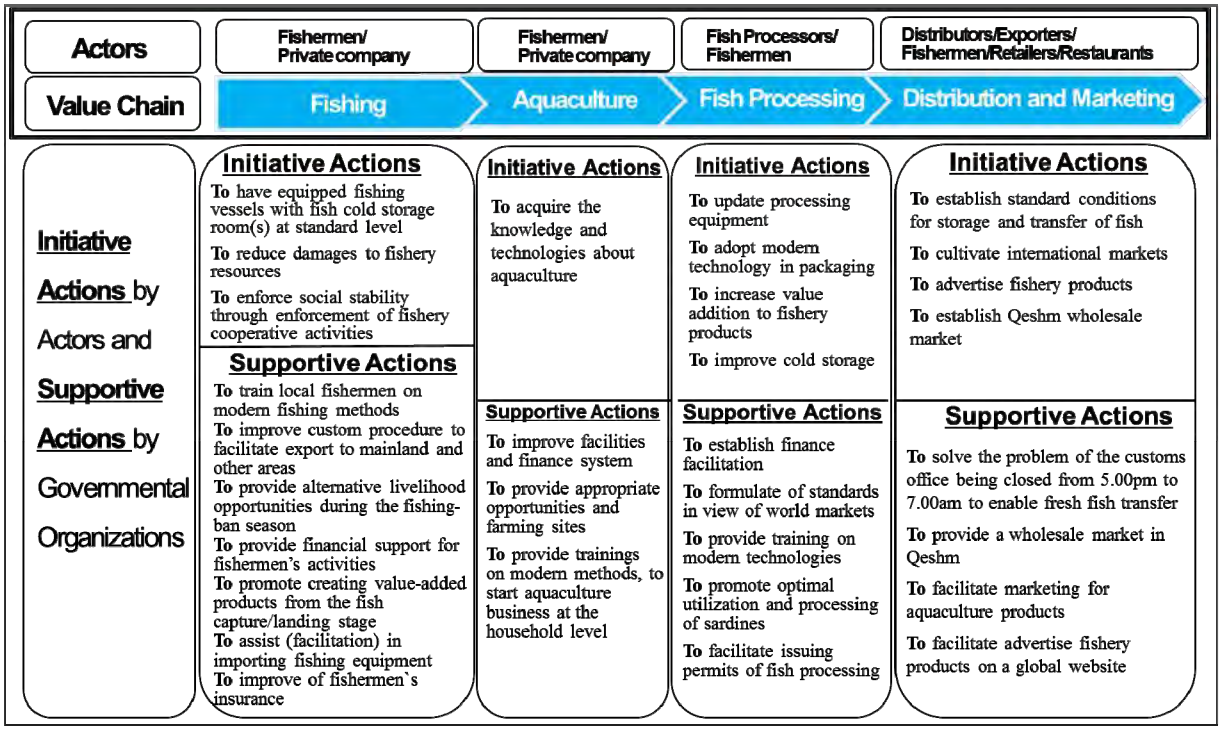
to identify problems and issues to be tackled, as shown in Table 6.2.4.



Source: JICA Project Team

Figure 6.2.4 Results of the SWOT Analysis and Vision for the Fishery Sector

This sub-chapter has referred to the importance of the cold chain and the innovation of Qeshmi fishery products, which must be enhanced by involving a wide range of actors in the distribution process, from harvesting to the sale of fish, such as fishermen, private companies, fish processors, distributors, exporters, retailers and restaurant owners. The value chain approach can provide various hints in tackling the challenges faced by the fishery sector, especially in terms of value addition to fishery products, and help resource users think about how to effectively utilize fishery resources and gain higher economic return. In the workshop held on May 4, 2016, stakeholders (actors and government officials) also discussed 1) initiative actions that actors should take on by themselves and 2) supportive actions that governmental organizations should take on in order to solve the identified problems. Figure 6.2.5 summarizes the feedback from discussions that took place in the workshop.



Source: JICA Project Team

Figure 6.2.5 Initiatives and Supportive Actions to Realize the Value Chain

6.2.3 Objectives and development target

Taking into consideration the problems, issues to be tackled and results of the SWOT analysis mentioned earlier (Table 6.2.5, Figure 6.2.4 and Figure 6.2.5), the "objectives" and "development targets" of the fishery development plan, as well as "indicators" for evaluating the achievement of each objective, are listed below in Table 6.2.6.

Table 6.2.6 Objectives, Development Targets and Indicators for the Fishery Development Plan

Objectives of the Fishery development plan	Development targets	Indicators for evaluating the achievement of each objective
Objective 1: Management of the fishery resource and coastal ecosystem in the inshore areas is strengthened by autonomous actions of fishermen	**Target 1:** Sustainable capture production by improving the fishery management	• Capture production of each fish species/group • Fishery management measure(s) taken
	Target 2: Increase in capture production through improvement and creation of fish habitats	• Capture production of each fish species/group • Number and area of habitats created and rehabilitated
	Target 3: Promotion of *satoumi* activities	• Number of people involved in each type of *satoumi* activity
Objective 2: Aquaculture production increases in an environmentally friendly manner	**Target 4:** Aquaculture production accounts for at least 30% of total fishery production (capture and aquaculture production).	• Aquaculture production • Capture production
	Target 5: Eco-friendly methods, such as IMTA, are adopted	• Number and type of eco-friendly farming methods
Objective 3: Fishermen's income is improved through the diversification of livelihoods	**Target 6:** Increase in fishermen's income	• Average income of fishermen • Types of economic activity diversified
Objective 4: The value chain of the fishery sector, from harvesting (capture and aquaculture) through to sales (reaching consumers), is improved, which advances the fishery sector in turn as a whole	**Target 7:** Good reputation and good sales performance gained in relation to Qeshmi fishery products	• Capture production, aquaculture production, amount of processed fishery products and amount of exported fishery products • Price and sales volume of Qeshmi fishery products

Source: JICA Project Team

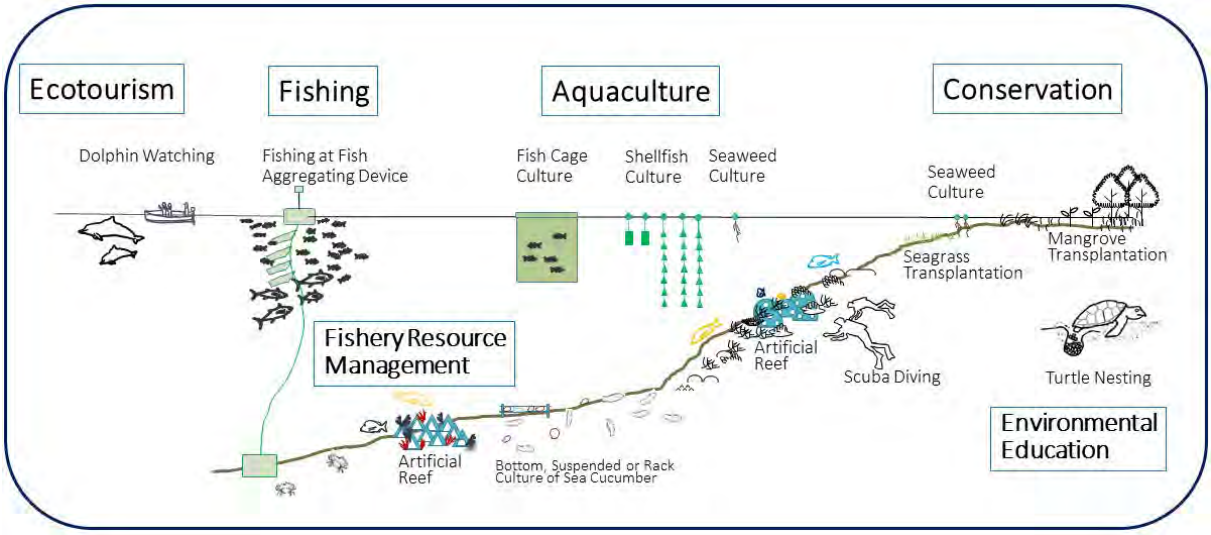
6.2.4 Development plan

Based on the above results, the **Vision Statement** for the fishery sector up to the target year of 2035 is defined as below:

(a) Fishery production increases in quantity and value
(b) Fishery resources are appropriately managed and wisely used
(c) Marine pollution is appropriately controlled and does not significantly cause negative effects on the marine ecosystem
(d) Stable export markets for Qeshmi fishery products are cultivated
(e) Integration of environmental conservation, fishery resource management, aquaculture and the innovation of fishery products bring about the sustainable development of the fishery sector
(f) Local fishing villages are socially and economically vitalized

There is a strong concern among fishermen about the decline in fishery resources due to inappropriate resource use as mentioned earlier. This is not only an issue for Qeshmi waters but also a universal issue. The FAO adopted the concept of "Responsible Fishery" in 1995 to tackle the issue, which included two important elements: "sustainable development" and an "ecosystem approach to fisheries (EAF)". The concept should be appreciated anew in relation to the sustainable fishery development of Qeshm Island, since the Project focuses on sustainable development in the name of the proposed "eco-island". *Satoumi*, which is a concept of coastal sea management and sustainable fishery, is also an expression of EAF. Figure 6.2.6 presents an example of the *satoumi* concept, which could be applied to Qeshm Island. *Satoumi* involves various activities, such as fishery resource management,

aquaculture, eco-tourism and conservation. The concept of *satoumi* is, thus, in line with the eco-island development and adopted by the ECO-QESHM Master Plan as an integral part of sustainable fishery development on Qeshm Island.



Source: JICA Project Team

Figure 6.2.6 Example of the *Satoumi* Concept

Two key programs that are necessary to achieve the objectives and development targets of the fishery development plan are identified and described below:

Program 1: Enhancement of biological productivity through the promotion of *satoumi*

The promotion of *satoumi* can assure the enhancement of biodiversity and biological productivity in marine ecosystems, including fishery resources, provide profit-making opportunities and raise people's awareness of the importance of marine ecosystem conservation. This program is ultimately aimed at the socioeconomic empowerment of the local community as well. Promotional projects for this program are as follows:

(a) Project 1: Aquaculture development
- ✓ 1-1: Market-based aquaculture development plan
- ✓ 1-2: Dissemination of aquaculture among local communities
- ✓ 1-3: Development of offshore farming and land-based aquaculture

(b) Project 2: Habitat rehabilitation
(c) Project 3: Community-based fisheries resource management

Program 2: Value chain enhancement

The program promotes the manufacture of value-added products, the effective use of fishery resources and a higher economic return for fishermen's communities through value chain enhancement. Value-added products are created by upgrading post-harvest handling, fish-processing and distribution in such a way that the products sell in greater numbers at higher prices in domestic and international markets. Priority will be given to activities that develop quality products, branded products, modern facilities and sales and services, as well as demonstrate a desirable form of partnership among fishermen, processors and distributors. Strenuous efforts will be made by governmental and private organizations to support and promote these activities. Promotional projects for this program are as follows:

(a) Project 4: Development of value-added products: This project will promote the manufacture of value-added products for the activation of the local economy through: a) brainstorming among stakeholders about the differentiation and commercialization of Qeshmi seafood, b) adopting better processing operations, c) improving facilities and equipment and d) complying with international standards for sustainable fisheries and food safety, such as those issued by the Marine Stewardship Council (MSC) and the Aquaculture Stewardship Council (ASC). This project will contribute to improvements in cold-chain management and develop value-added anchovy products for human consumption.
(b) Project 5: Improvement in fish-landing facilities: This project seeks to improve the quality maintenance of anchovy and other fish captured by fishermen, with the goal of supplying better products to markets through improved landing facilities and equipment at major fishing ports and/or fish-landing places on the coast of Qeshm Island, such as Selakh, Messen, Ramchah and Souza.

6.2.5 Proposed project and cost estimate

The table bellows shows the proposed programs and projects in the short, middle and long terms:

Table 6.2.7 Proposed Project and Cost Estimate for Fishery Development

Project title	Implementation organization	Phasing			Cost (USD million)			
		Short term	Mid term	Long term	Short term	Mid term	Long term	Total
Program 1: Enhancement of biological productivity through promotion of *satoumi*								
Project 1: Aquaculture development								
Project 1-1: Market-based aquaculture development plan	QFZO/ IFO	X			-	-	-	-
Project 1-2: Dissemination of aquaculture among local communities	QFZO/ IFO	X	X	X	-	-	-	-
Project 1-3: Development of offshore farming and land-based aquaculture	QFZO/ IFO	X	X		-	-	-	-
Project 2: Habitat rehabilitation	QFZO/ IFO	X	X	X	1.9	3.8	7.5	13.2
Project 3: Community-based fisheries resource management through the *satoumi* concept	QFZO/ IFO	X	X	X	0.5	0.1	0.6	1.2
Program 2: Value chain enhancement								
Project 4: Development of value added products	QFZO/ IFO	X	X		-	-	-	-
Program 5: Improvement of fish landing facilities	QFZO/ IFO	X	X	X	10	20	40	70
Total					12.4	23.9	48.1	84.4

Note: short term = 2018~2021, middle term = 2022~2026 and long term = 2027~2036
Source: JICA Project Team

6.3 Manufacturing Sector Development Plan

6.3.1 Existing conditions

According to the Statistical Yearbook for 2012/13, there were 23 manufacturers with 10 workers or more, and 1,492 workers in Qeshm County. The larger shares in the number of establishments and the number of employees of manufacturers in Qeshm County (12.7% and 11.3%, respectively, for Hormozgan Province, compared to 8.2% for the overall population) indicate an above-average accumulation of industries on Qeshm Island.

On the other hand, seven industrial parks are developed, being developed or planned on Qeshm Island. The total land area of industrial parks, including planned areas, exceeds 5,700 ha. According to the QFZO, there are currently just under 90 companies in operation. The major industrial subsectors are non-metallic mineral industries (construction materials), wood products, storage of petrochemicals and fish processing.

6.3.2 Issues to be tackled

(1) Industrial parks

Further development is required for the on-site infrastructure of existing industrial parks (e.g., stable electricity distribution, and information and communication network).

It is important to strengthen the functions of investment promotion by central and local government and the QFZO in order to introduce investors or tenants through public-private partnership (PPP) or private sector-oriented schemes since several industrial zones are still vacant.

(2) SMEs

On Qeshm Island, it is difficult for SMEs to (i) expand markets or the value chain due to being located on an island and the need for imports of raw materials or parts, and (ii) upgrade or introduce new technology due to limited accumulation of financial resources.

The linkages among SMEs and among other sectors, such as fishery and tourism, are not strong, since associations of private enterprises either do not exist or function well.

(3) Vocational training

Vocational training schemes on Qeshm Island are still weak due to a limited number of training courses based on the demand of the private sector. From the viewpoint of human resource development, technical and vocational education and training (TVET) should be expanded.

6.3.3 Objectives and development target

(1) Objectives and strategies

The objectives of industrial development are to (i) introduce foreign and domestic investment, (ii) expand foreign trade, (iii) enhance technology transfer, (iv) develop human resources and (iv) secure employment. In other words, the industrial sector on Qeshm Island is expected to boost the local economy. The strategies for industrial development are discussed as follows:

<u>Strategy 1: Reinforcement of the infrastructure in existing industrial parks and the materialization of planned industrial parks</u>

(a) Reinforcement of the infrastructure system (internal and external to zones), in terms of power supply, telecommunications, water supply, sewerage, drainage and solid waste, on the existing industrial parks or zones
(b) Materialization of planned industrial parks with the integration of FZ benefits in consideration of the potential of industries
(c) Strengthening the promotion to attract foreign investors

<u>Strategy 2: SME development</u>

(a) Development of the industrial cluster through the enhancement of linkages especially among SMEs, handicrafts and other sectors, including fishery and tourism
(b) Provision of rental or ready-made factories on the industrial parks
(c) Formulation of appropriate policies, guidance and training for SMEs with financial assistance

(d) Appropriate technology transfer

Strategy 3: Human resource development

(a) Enhancement of TVET in response to the demand for a skilled labor force in industries such as construction materials, petrochemicals, fish processing and metals through provision of diversified and customized training courses
(b) Preparation of TVET facilities on industrial parks in cooperation with the private sector

(2) Establishment of a development target

Based on the eco-island concept, an economic framework for the secondary industry on Qeshm Island includes estimates for the GRDP and the number of employees for 2026 and 2036, as shown in Table 6.3.1.

Table 6.3.1 Economic Framework for the Secondary Industry

Items	Unit	2011	2021	2026	2036
GRDP	IRR billion (2011 prices)	4,691	10,605	15,947	31,369
Employment	Persons	5,280	15,930	28,750	47,410

Note: The secondary industry is composed of mining, manufacturing, construction and utilities
Source: JICA Project Team

6.3.4 Development plan

As conditions pertinent to developing an industrial plan, the potential, viability and impact regarding local employment are analyzed for each industrial subsector. Table 6.3.2 shows the result of the analysis. This analysis was made along with a review of the discussions relating the SWECO Master Plan.

Table 6.3.2 Potential, Viability and Impact of Employment by Industrial Subsector

Type of subsector	Potential and viability	Phasing	Impact on local employment
Labor intensive manufacturing, such as: (1) textile, wearing apparel and leather, lace, embroidery, weaving and wig making, shoes and bags; (2) parts of electric and electronic appliances; (3) assembly of motorbikes and bicycles; (4) precision apparatus and medical equipment	As discussed by the SWECO Master Plan, labor-intensive midstream and downstream manufacturing is not considered to offer any particular potential in view of the labor costs in Iran. However, these industrial subsectors may be located on Qeshm Island since clothing apparel and leather industries are already located on Towla Industrial Park. Final inspection activities and functions may also be introduced in factories near the seaport or airport. Evaluation: low/medium potential	Medium term	High
Food and beverages, cold chain	Essentially, the analysis by the SWECO Master Plan, which indicates that this sector does not contain much in the way of prospects due to its reliance on locally grown agricultural products, is appropriate. However, fish processing offers potential. On the other hand, the development of a cold chain is needed for fish to be kept at low temperatures in the process of production, transportation and consumption. Evaluation: medium/high Potential	Short/medium term	Medium
Wood and wooden products	Considering the lack of forests on Qeshm Island, the wood and wooden products sector does not present a major opportunity. However, some small-scale industries producing wood doors, windows frames and floors for the local construction industry are likely to be established. The existing launch (or dhow) shipbuilding industry also offers some scope in terms of further development. Evaluation: low/medium potential	Short/medium term	Low
Chemical products	As recommended by the SWECO Master Plan and designated in the Investment Opportunities booklet produced by the QFZO, the following subsectors seem to be competitive: (1) A complex for methyl tert-butyl ether (MTBE) and methanol production, a nitrogen fertilizer project, a polyolefin project, a petroleum refinery and so on. The production of synthetic soda ash may be an interesting alternative for Qeshm Island considering the fact that appropriate raw materials, primarily salt and limestone, exist on the island. (2) About 40% of pharmaceuticals are imported into Iran. Thus, it will be justified to introduce international pharmaceutical firms on Qeshm Island. (3) An LNG project has been considered, although more profitable alternative uses of natural gas, as well as the priority and timing, should be carefully assessed. Evaluation: medium/high Potential	Long term	Medium
Plastic products	Manufacturing of plastic products for daily use, such as kitchenware and plastic footwear, seems to be promising, although there is keen competition from imported goods. Evaluation: medium potential	Medium term	Low
Non-metallic minerals	Qeshm Cement Company is currently operating with a capacity of 250,000 metric tons. Construction material industries, such as concrete, block and brick producers, are promising. Evaluation: high potential	Medium term	Low/medium

Basic metal	The introduction of basic metal industries relies on international market demand as designated in the SWECO Master Plan. (1) The hot briquetted iron project demonstrates many attractive features considering the availability of low-cost natural gas, electricity at a competitive price and a positive international market outlook. (2) Ferroalloys present an area of interest to Qeshm Island considering the energy-intensive nature of the production of these products. (3) As for aluminum smelting, there may emerge a sufficiently large regional market to justify a large-scale aluminum refinery on Qeshm Island. Evaluation: medium potential	Long term	Medium
Airport site-oriented industries	The airport site-oriented industries are mostly those producing small- and high-value added goods, such as precision machines, electronic parts, pharmaceuticals, gems and software. In other words, they can absorb transportation costs by airplane and be located on an island. Evaluation: medium potential	Medium/long term	Low/medium
Handicrafts	On Qeshm Island, there are various kinds of handicraft, such as basketry, kilim, carpet weaving, marine crafts, veil sewing, and lute making. In collaboration with tourism, the handicrafts industry has potential. Evaluation: medium potential	Short/medium term	Medium

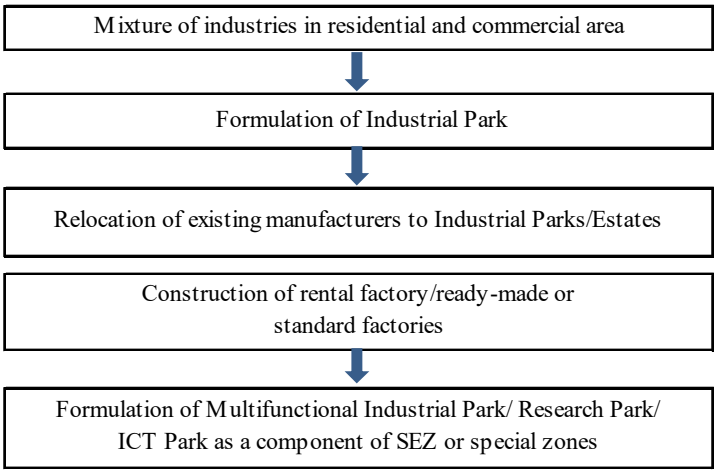
Source: JICA Project Team and SWECO Master Plan 1994

Based on the above-mentioned discussion and analysis, the following industrial development plans are proposed:

(1) Reinforcement and materialization of existing or planned industrial parks

The Iranian Government and the QFZO have taken a step to formulate the industrial parks as an important tool for attracting investors, as they are integral to economic growth. The development of industrial parks is an authentic approach to industrial development. Currently seven industrial parks or zones are developed, being developed or planned on Qeshm Island.

As shown in Figure 6.3.1, the stages of industrial location generally shift from a mixture of industries on residential and commercial areas to multifunctional industrial parks, research parks and ICT parks via ordinary industrial parks. On Qeshm Island, only a small number of industries, mainly SMEs, are mixed with residential areas, as many factories are already located on industrial parks. In the future, functions for a high-technology industrial park, an industrial research park or an ICT/software park may be introduced.



Source: JICA Project Team

Figure 6.3.1 Transition and Development of Industrial Locations

The proposed reinforcement and materialization of industrial parks, most of which are already developed or planned by the QFZO, are discussed below. An introduction of a PPP scheme for the development of industrial parks is an important option, which could attract domestic or foreign private developers to develop and manage the zones.

1) Reinforcement and development of Towla Industrial Park

Towla Industrial Park features the most active industrial activities on Qeshm Island with 27 operating factories, including a manufacturer of multilayer polymer tubes (Super Pipe International Company), an engine oil manufacturer (Castrol Company), power and electricity industries, textile, clothing and leather industries, non-metallic mineral industries, food and tobacco manufacturers (e.g., Qeshm Tobacco Company), and a recycled PET manufacturer.

However, some lots in the park are still not occupied nor operated by investors. Consequently, it is important to reinforce the infrastructure system (internal and external to zones) comprising power supply, telecommunications, water supply, sewerage, drainage, and solid waste on the site.

The construction of rental factories or readily available and fully serviced industrial apartments for rent on industrial parks should be an option, particularly in order to attract SMEs, which do not have enough capital to construct their own facilities. Figure 6.3.2 shows a typical image of a rental factory, which was developed in Vietnam.

Source: website for Thang Long Industrial Park II near Hanoi city in Vietnam
http://tlip2.com/

Figure 6.3.2 Image of a Rental Factory Building

2) Development of Kouvei Industrial Park

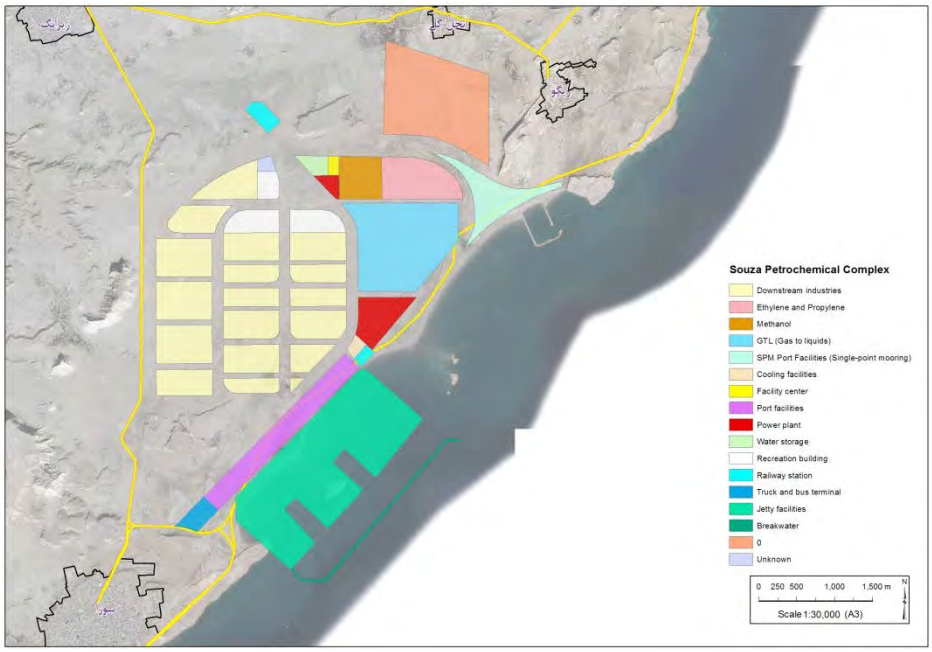
Currently five companies are operating with regard to the storage of metals and non-metallic minerals, marine industry storage, petrochemical storage and launch making (construction of traditional types of vessels). The Zinc Smelting Co., which is a zinc and lead ingots manufacturer, is located to the west of Kouvei Industrial Zone.

Some lots in the park are still not occupied nor operated by investors. Consequently, it is import to attract more domestic and foreign investors through the PPP system or private developers. The candidate subsector types, some of which are already shown in Table 6.3.1, are fish processing, food (including cold food storage and frozen food), wood and wooden products, chemical products, basic metal and non-metallic minerals, or construction materials, such as electric furnace steel, galvanized steel plate, cement and hume pipes.

3) Development of Souza Industrial Park

In response to the SWECO Master Plan, it is highly expected that the Souza Industrial Park will develop as the base for a petrochemical complex, including a petroleum refinery and oil storage, as shown in Figure 6.3.3.

As shown in Table 6.1, the introduction of MTBE and methanol production, a nitrogen fertilizer project, a complex polyolefin project, synthetic soda ash, pharmaceuticals and so on will be expected. A liquefied natural gas (LNG) project has been considered, although more profitable alternative uses of natural gas should be carefully assessed in Section 6.4.



Source: Qeshm Free Zone Organization

Figure 6.3.3 Development Plan of the Souza Petrochemical Complex

4) Development of the Fishery Industrial Park

Although the area size of the Fishery Industrial Park amounts to only 13 ha, fish-processing manufacturers (12 factories), which represent one of most appropriate types of industries on Qeshm Island, will play an important role in support of the local economy. It is highly expected that this zone will be expanded to become the core of the local economy and to secure local employment.

5) Development of other industrial parks

It is expected to develop the Alvand Industrial Park near the airport to attract airport site-oriented

industries, such as those producing small- and high-value added goods or high-technology products, such as precision machines, electronic parts, pharmaceuticals, gems and software.
Moreover, it is important to develop the Masaaleh Industrial Park as a center for construction material industries, such as concrete, block and brick producers, in relation to the development of Qeshm Island.

6) Strengthening of capacity of the QFZO through managerial and technical training based on lessons learnt in other countries

The components of this plan are as follows:

(a) Capacity development of the QFZO
   i) Strengthening of the planning capability for industrial park development
   ii) Intensive training on investment promotional activities including marketing and public relations
   iii) Enhancement of overseas networks of the QFZO, including associations with industrial and free zones in the Middle East and Asia
   iv) Enhancement of management and monitoring capabilities of developers/tenants on industrial parks
   v) Preparation of a guideline for developers on industrial parks or a PPP scheme to ensure the quality of the infrastructure and facilities

(b) Legal and institutional arrangements
   vi) Strengthening of the legal section of the QFZO in order to hold seminars to disseminate the information on laws and regulations for developers and investors, as well as to review incentives and non-fiscal incentives for industrial parks and FZs

7) Formulation of comprehensive SME development program

On Qeshm Island, there are numerous SMEs, such as manufacturers of handicrafts, food, building materials and wooden furniture. Based on the interview survey, issues concerning access to the markets (local, import, export) and financial constraints are raised among SMEs. These issues are interrelated and difficult to solve independently. Consequently, a comprehensive SME development program should be formulated by the QFZO and other relevant agencies, since SMEs contribute to the stability of the local economy and job security. The program should cover the following areas:

(a) Business development: This component includes business development services, the promotion of marketing, capacity building and the strengthening of business associations. Some international NGOs and donor agencies may assist in these tasks.
(b) Development of the finance system: The establishment of an official fund or bank for SMEs should be taken into account in the program. A fund or bank that provides a loan with preferential interest rates can support firms with an expansion or rehabilitation program on a long-term basis.
(c) Cooperation with legal and institutional reforms: The Iranian Government makes efforts to construct legal and regulatory frameworks, such as investment law and other commercial laws for private sector development. The program should incorporate the progress of legal and institutional reforms.

8) Strengthening of vocational training system

The Super Pipe International Company constructed a vocational training school in Qeshm City in 2014 and donated it to the Provincial Government. Currently, this school provides several training courses on topics such as piping, computer, electronics and welding to about 800 trainees.

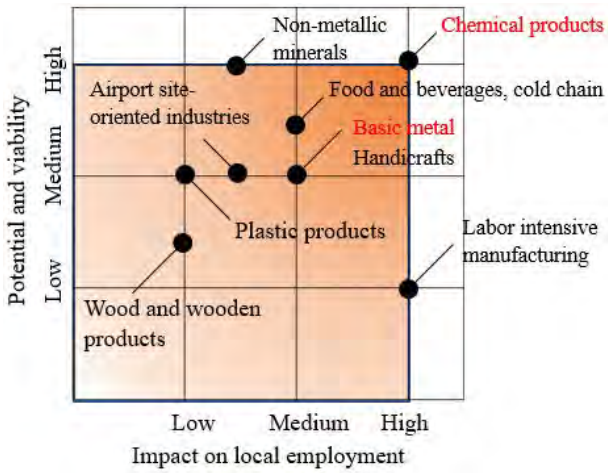
However, in response to the economic development of Qeshm Island, the vocational training system should be strengthened to provide more varied types of courses, as well as raise technical skill levels

based on the needs of the private sector in cooperation with the QFZO, local government and private enterprises.

The establishment of a skills development fund (SDF) is an option regarding the provision of technical training. The SDF should aim to provide financial assistance to employers in SMEs in order to encourage them to train and upgrade the skills of their workers. Financial resources of an SDF may be supported by the government and the private sector.

9) Suitable industry for Qeshm Island

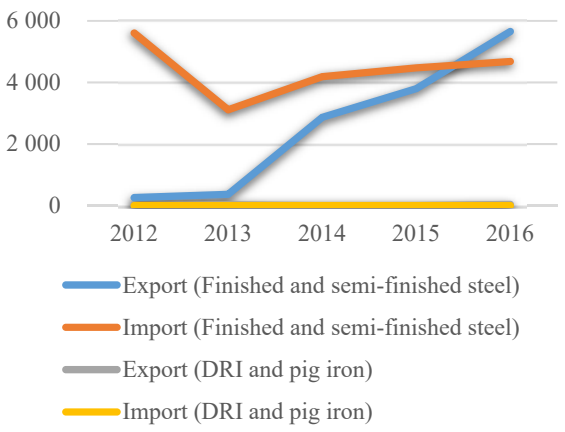
The SWECO Master Plan studies the manufacturing and oil and gas industries. Proposals for manufacturing include eight subsectors: i) food and beverages, cold chain, ii) wood and wooden products, iii) plastic products, iv) chemical products, v) labor intensive manufacturing, vi) nonmetallic minerals, and viii) basic metal. Each subsector, together with airport site-oriented industries and handicrafts, is assessed according to two criteria (potential and viability, and impact on local employment) by the JPT. Among them, chemical products, basic material, handicrafts, and food and beverages are evaluated as preferable to a medium or higher extent according to both criteria (Figure 6.3.4). From the four subsectors, chemical products and basic material are chosen as candidates for further analysis because their development may require FDI in line with the envisaged function of an FZ.



Source: JICA Project Team.

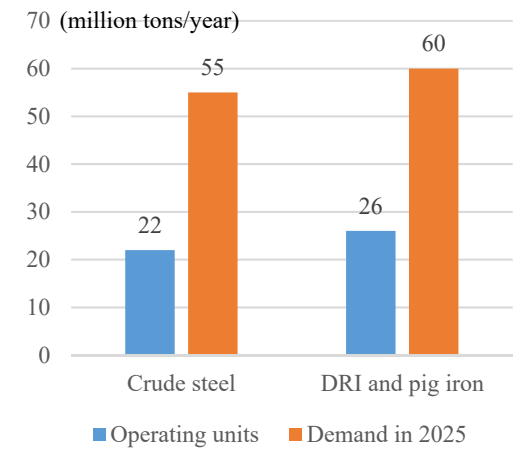
Figure 6.3.4 Potential, Viability and Impact of Employment by Industrial Subsector

The export of finished and semi-finished steel surpassed the amount of imported steel in Iran in 2016 (Figure 6.3.5). The IMMIDRO estimated the domestic demand and existing capacity of crude steel and DRI in Iran until 2025 (Figure 6.3.6). Production capacity is insufficient by 34 million tons per year for DRI. The IMMIDRO also carried out a study to identify a suitable area for the steel plant development, by considering evaluation criteria including environmental limitations, material availability and transport access. The suitability analysis revealed that the southern area is relatively good for steel production (Figure 6.3.7).



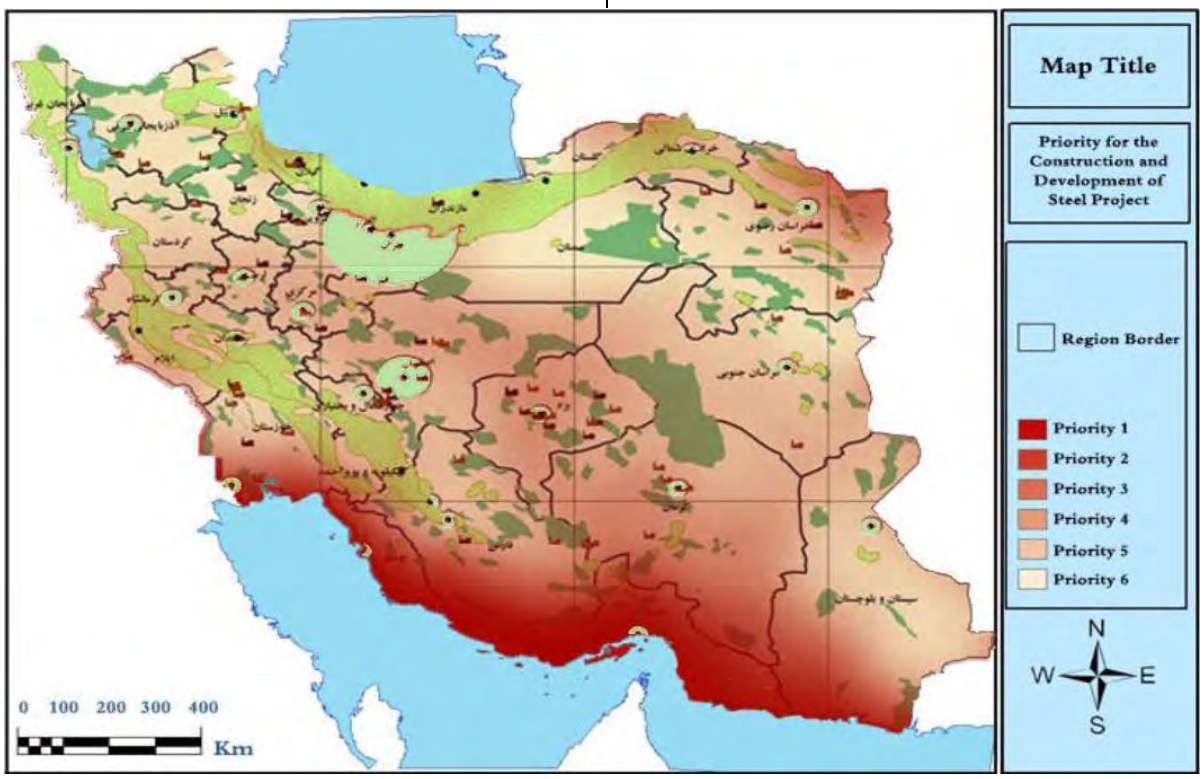
Source: Steel Statistical Yearbook 2017, World Steel Association.

Figure 6.3.5 Iranian Export and Import of Steel



Source: An Abstract of the Integrated Steel Project for Fulfillment of the Country's Prospective Aim in the Horizon of the Year 2025, Iranian Mines and Mining Industries Development and Renovation Organization.

Figure 6.3.6 Demand and Existing Capacity of Crude Steel and Direct-Reduced Iron in Iran in 2025



Source: Iranian Mines and Mining Industries Development and Renovation Organization.

Figure 6.3.7 Suitability Analysis for the Steel Plant Development

Article 35 of the sixth FYDP demands that water consumption efficiency be improved in steel production. This is due to a severe lack of water availability on the mainland, which will impose a burden on the expansion of existing steel plants.

Under these circumstances, steel plants using the DRI process are recommended for Qeshm. The study to identify prospective chemical products is examined in Section 6.4.

(2) Proposed projects

1) Short term: Strengthening of the vocational training system

As discussed above, it is important to strengthen the vocational training system on Qeshm Island. The vocational training system should provide more varied types of courses on topics such as fishery and tourism, as well as raise technical skill levels based on the needs of the private sector.

The provision of on-demand training to companies' employees via technical and vocational training schools is an option. The coordination and linkage with technical and vocational schools or colleges outside of Qeshm Island should be taken into account.

In the medium or long term, the construction of technical and vocational schools on industrial parks, such as Towla, Kouvei or Souza, will be expected in accordance with the industrial accumulation.

2) Medium term: Construction of rental factories or readily serviced industrial apartments

The construction of rental factories or readily available and fully serviced industrial apartments for rent on industrial parks are proposed as a priority project to attract SMEs in particular. The candidate sites for rental factories are Towla and Kouvei Industrial Parks.

Targeted subsectors are wood products and furniture, plastic products, clothing apparel, metal workshops and on. The site area will occupy several hectares. The standard lot size will be 100-200 m^2 and the number of lots will be 20-40 per factory building.

6.4 Oil and gas sector

6.4.1 Existing conditions

The QFZO has contemplated developing the petrochemical industry in terms of using oil and gas production facilities in onshore fields and offshore fields in Qeshmi waters (Table 6.4.1). The existing facilities supply natural gas from the Siri Gas Offshore Field and the Kovarzin Onshore Gas Filed to the mainland. Oil-related facilities are installed for bunkering in Selakh and storage in Alvand.

Table 6.4.1 Daily Production and Estimated Deposit by Oil and Gas Fields

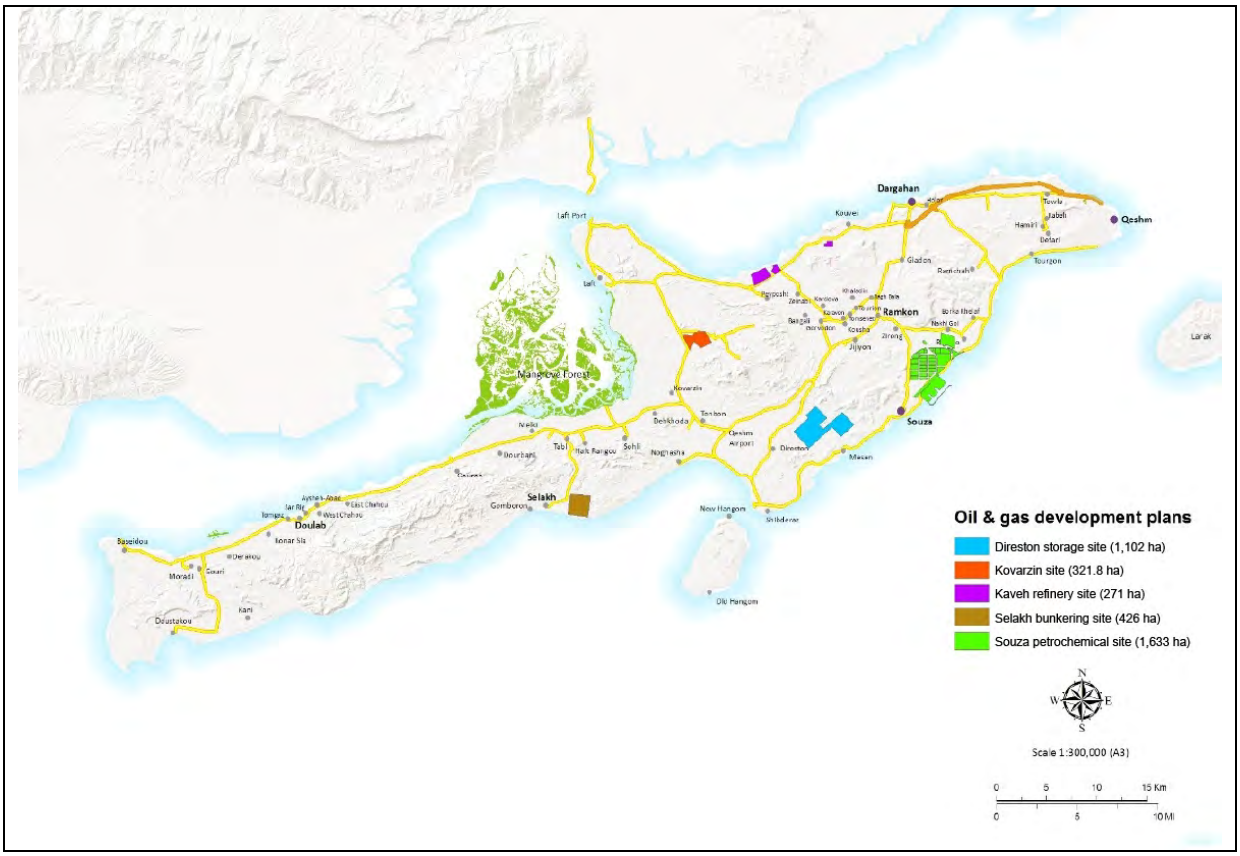
Field	Daily production (million m^3/day)	Estimated deposit (billion m^3)	Daily production (barrel/day)	Estimated deposit (million barrel)	Current status
Kovarzin (gas)	2.8	35-40	-	-	Operated
Siri (gas)	14	NA	-	-	Operated
Hangom (oil)	2.5-14	70	80,000	700	Under construction
Farouz B (gas)	30	NA	-	-	Waiting for investment
Selakh (gas)	3.0	35-50	-	-	Under study

Source: QFZO

The QFZO envisaged implementing the oil and gas projects as listed below. Figure 6.4.1 shows the location of the oil and gas development projects:

(a) Natural gas development in the Hangom Field and the Forouz B Field
(b) Oil refinery of 35,000 barrels/day x 4 units in Kouvei
(c) Oil storage of 20 million barrels for crude oil and 10 million oil products in Kouvei
(d) Oil bunkering terminal with a capacity of 550,000 tons/month in Selakh and 150,000 tons/month in the south of Qeshm – the Selakh Bunkering Terminal will be the largest in the Middle East and provide services such as drinking water, food, washing facilities, repairs, hotel accommodation and medical treatment

(e) Gas transmission pipeline to link the section of Kovarzin-Souza-Kouvei-Towla by 20" and 16" pipelines and the section to Towla Industrial Park by 16" pipelines – the first section has already undergone a procurement process with the aim to complete within 12 months.
(f) Gas condensate refinery
(g) Crude oil refinery
(h) Heavy oil refinery for bitumen production
(i) Gas to LNG production
(j) Petrochemical complex to produce methanol, ethylene and polyethylene next to a new deep seaport in Souza, with a 40m depth, enabling access by oil supertankers (300,000 DWT class)



Source: QFZO

Figure 6.4.1 Location of Oil and Gas Development Projects on Qeshm Island

6.4.2 Issues to be tackled

A large amount of foreign investment is required to develop oil, gas and petrochemical industries against the backdrop of unforeseen global economic situations.

It is important for the QFZO to strengthen the functions of investment promotion, operate a variety of projects, and control and manage the precious natural environment on Qeshm Island.

6.4.3 Objectives

The objectives of FZ development, as designated by the QFZO, are to (i) increase foreign currency earning, (ii) support the development of the nation's industry, (iii) develop new technological approaches, (iv) increase employment opportunities, and (v) train specialized and technical qualified personnel.

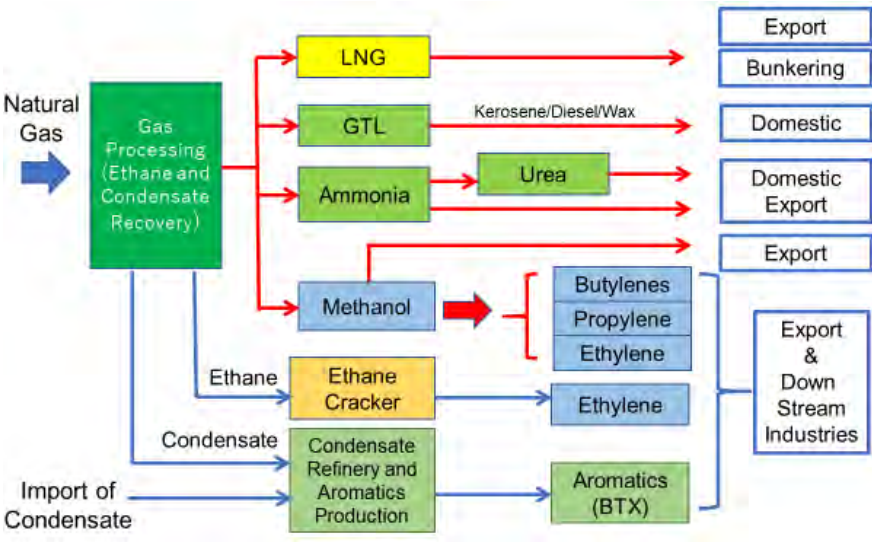
The objectives for the development of the oil and gas sector and petrochemical projects are essentially

the same as those for the development of the entire FZ.

6.4.4 Development plan

(1) Development plan for gas chemical products

All gas chemical products are manufactured from syngas, which is produced from natural gas, coal or oil via the auto-thermal or partial oxidation process. Natural gas, which is traded at the oil equivalent value in terms of heating value, is not necessarily competitive feedstock for manufacturing petrochemical products. China has introduced technology to generate syngas from coal, which has become a price leader in the petrochemical industries due to competitive feedstock costs and having the largest amount of production. An overview of gas use in the chemical industry is illustrated in Figure 6.4.2.



Source: DEP.

Figure 6.4.2 Gas and Gas Chemical Complex Configuration

All potential petrochemical options are reviewed as below.

Aromatics (BTX):

Assuming that feed gas is treated in a gas refinery near the gas field, condensate, ethane, propane and butane are extracted from the gas. Allocated gas will be pipeline-grade methane-rich gas. No feedstock suitable for manufacturing aromatics is included. If it is necessary to expand the petrochemical product range, aromatics will need to be imported.

Ethylene from ethane crackers

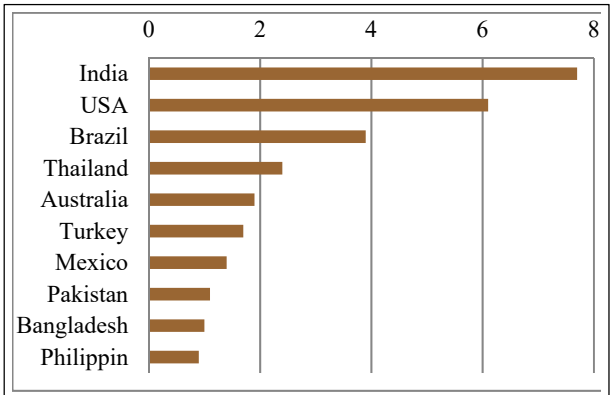
Similarly, allocated gas will not include ethane fraction. Recovered ethane in the gas refinery is converted to ethylene and injected into the West Ethylene Pipeline in order to supply gas to regional polyethylene plants in Iran.

GTL

Under current gas pricing conditions, GTL will not be economically viable. The market for GTL products (naphtha, kerosene, diesel) is very limited and it is difficult to find a market that will buy at premium prices.

Ammonia/urea synthesis

Urea is a very important basic chemical component used in fertilizer manufacturing. Urea is also used for manufacturing resins such as urea and melamine resins. The demand for urea is considered steady and continues to grow. Among



Source: International Fertilizer Association.

Figure 6.4.3 Top 10 Urea Importers in 2013 (Unit: Million Tons)

the major urea-importing countries is India; although a number of urea-manufacturing plants has been constructed in India, a shortage of natural gas has limited production. Bangladesh also suffers from a shortage of gas and has become a urea-importing country (Figure 6.4.3).

World urea exporters are mostly from gas-producing countries, including Iran. Chinese urea production relies on coal-based syngas synthesis. However, environmental concerns remain due to the use of coal. Ukraine was the largest urea-exporting country in the last decade; however, its gas deal with Russia trimmed down urea production and affected production for export. Indonesia and Malaysia will be a net importer of urea.

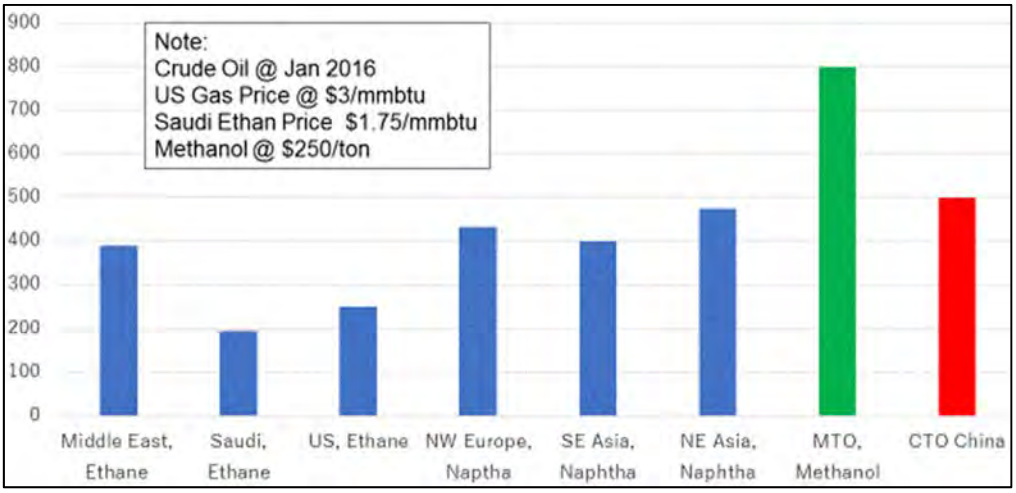
The Ministry of Petroleum has a policy to reduce the number of urea and ammonia plants in the country because supply capacity exceeds demand. However, there will be demand from the international market.

Production could be an option for Qeshm. The ammonia/urea synthesis process requires significant water for the auto-thermal reforming and CO shift process. A large-scale desalination plant will also be required on Qeshm.

GTO via methanol production

One of the major products from GTO is ethylene, which is also manufactured from ethane via ethylene crackers and economically more competitive than ethylene derived from the GTO process. Under current oil price levels, product from the naphtha cracking process is also competitive and shows better economics than that of GTO.

Ethane is the most efficient feedstock for producing ethylene. In terms of wt%, 76% of ethane can be converted into ethylene, while the yield by propane is 42%, 31% by naphtha or condensate and 23% by gas oil. Ethane-based ethylene production will be the most competitive option compared with naphtha cracking, MTO and CTO, as reflected in the indicative competitiveness of ethylene production costs, provided by Platts and reviewed by the JPT (Figure 6.4.4). Saudi Arabia raised the ethane price from 0.75 USD to 1.75 USD/MMBTU in 2016, but its ethylene price will still be the lowest in the world. The US ethylene price is the second lowest, due to the low US gas market price. In January 2016, the natural gas market price was just above 3 USD/MMBTU. Due to a recent low oil price situation, the naphtha-based ethylene price is also down and now competitive enough to match the coal-based ethylene price from China. Although gas and crude oil prices will fluctuate, price changes can be reduced when estimating the net present value. This does not mean changing the cost-competitiveness of ethylene production among the different types of feedstock. MTO is less cost competitive than ethane, naphtha and coal for producing ethylene due to the chemical process involved. Thus, MTO is not recommended for Qeshm.

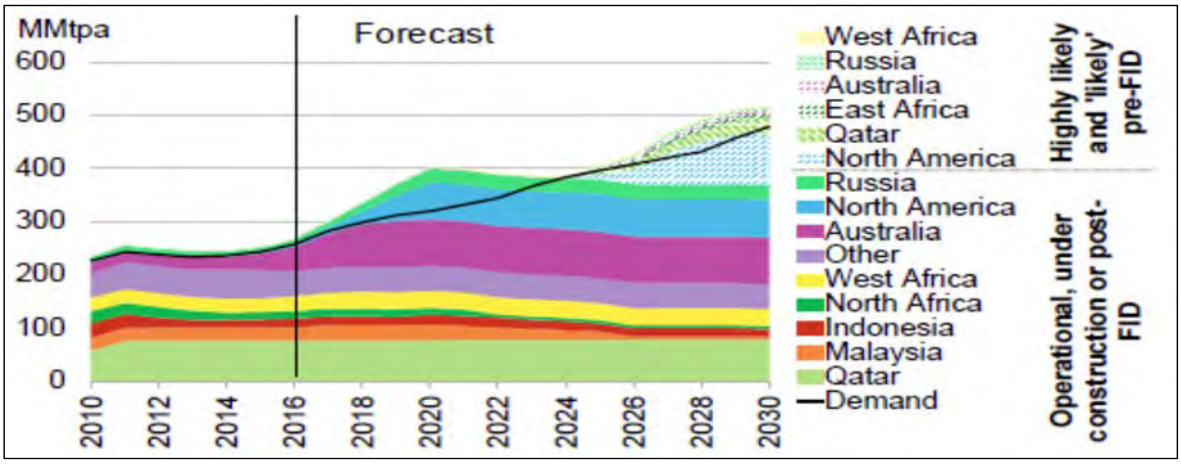


Source: Reproduced from Oxford Institute for Energy Studies. LNG Plant Cost Escalation. Oxford Institute for Energy Studies, 2014.

Figure 6.4.4 Ethylene Production Cost (USD/Ton)

LNG production

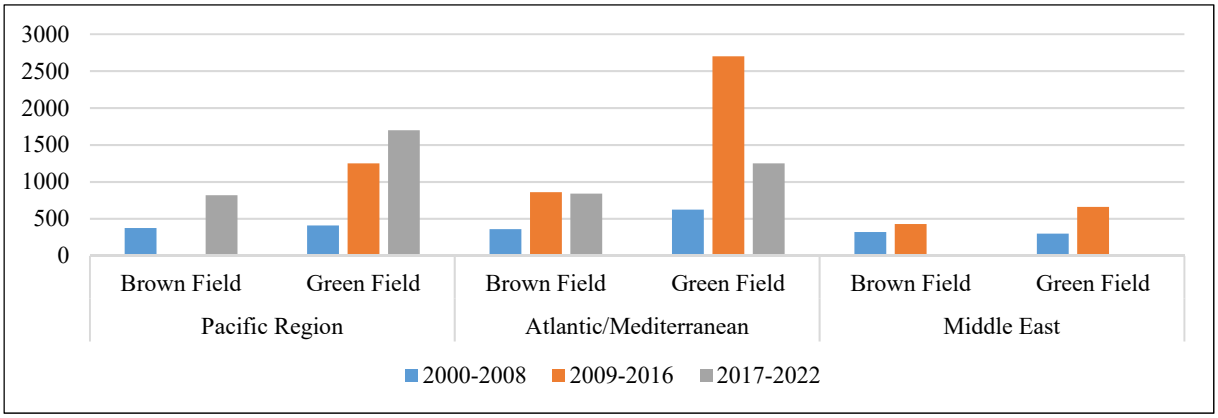
According to the long-term LNG demand forecast by Bloomberg and New Energy Finance, the 2016 LNG demand of 258 million tons will increase to 479 million tons in 2030. A significant increase is expected in Asian countries, including Thailand, Vietnam and Bangladesh, in addition to existing import countries, such as China and India. LNG supply capacity will reach 400 million tons/year in the world by 2020. This overcapacity situation will continue until 2022-2024, but new additional capacity will be required after 2022 (Figure 6.4.5). The planned LNG development projects carry risks if they are implemented as planned due to unpredictable changes in financial and social conditions. Thus, the estimated future supply capacity may be different from the actual situation in the future.



Source: Bloomberg and New Energy Finance.

Figure 6.4.5 LNG Supply Forecast

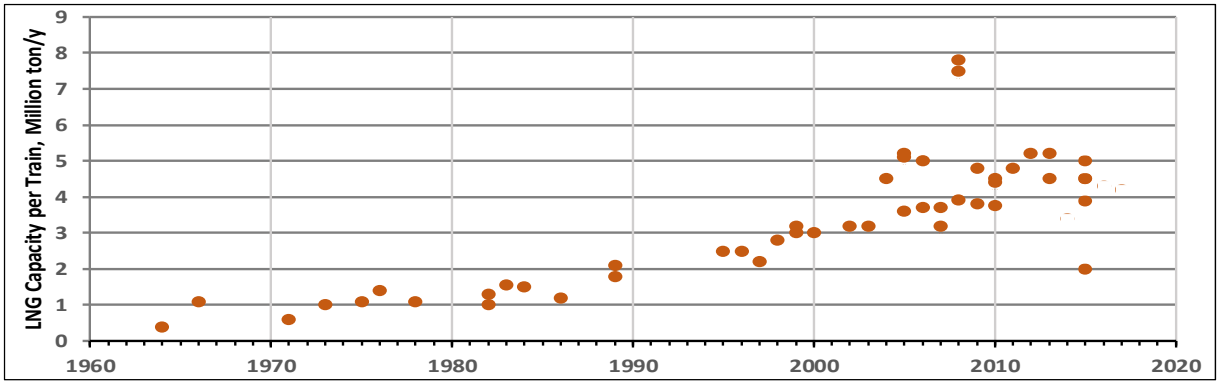
LNG production cost differs from project to project. Cost-competitiveness will also impact the LNG supply project. The scale of the spot market is expanding and 29% of LNG is traded on a spot basis in the global LNG trade market. Under the circumstances, the production cost will become more important in order to be competitive in the market than ever before. Thus, a gas field that requires low development costs and has a huge recoverable reserve will attract an investor. To this extent, production costs in the Middle East are competitive (Figure 6.4.6). Thus, it is worthwhile considering LNG development on Qeshm.



Source: IHS/International Gas Union.

Figure 6.4.6 Average Liquefaction Plant Costs by Region

LNG production capacity per train was increased in the range of 3.5-5 million tons per year in the world (Figure 6.4.7). A production capacity of 2 x 4.5-million-ton trains is recommended for Qeshm. This will require a gas feed with the rate of 40 million m^3 per day, which is larger than the allowable gas feed of 25 million m^3 per day declared by the Ministry of Petroleum.



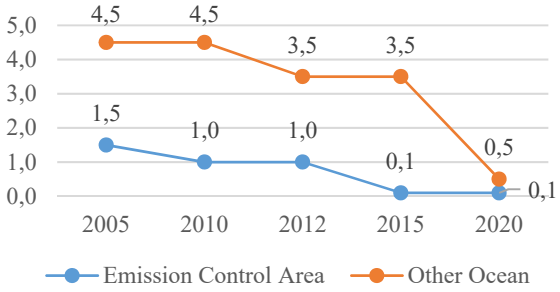
Source: Reproduced from Oxford Institute for Energy Studies. LNG Plant Cost Escalation. Oxford Institute for Energy Studies, 2014.

Figure 6.4.7 Trend of LNG Production Capacity per Train

It is recommended to manufacture methanol rather than manufacturing olefin to avoid competition in the ethylene market. Note that the MTO process is endothermic process and significant heat needs to be removed via a cooling system. Sea water will be used as a cooling medium, which could impact the sea environment on Qeshm. The methanol, urea and ammonia projects require huge investments of more than 10,000 billion IRR. LNG remains a major option for Qeshm.

(2) Development plan for bunkering business

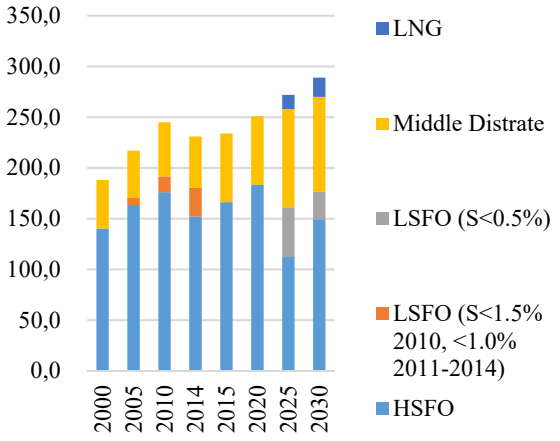
The IMO constitutes 174 member countries including Iran. At the 71st session of the MEPC of the IMO, it was agreed that the sulfur concentration in marine fuel will be further tightened from 2020. Following the agreement, the MARPOL Treaty was revised (in Annex VI: Regulations for the Prevention of Air Pollution from Ships), such that the specify that the sulfur limit should by reduced to 0.1% in ECAs from 2015 and 0.5% in the ocean excluding ECAs from 2020 (Figure 6.4.8). The countermeasures to comply with the revised limits could potentially involve four options: i) use of marine diesel oil and marine gas oil, ii) use of blended marine fuels, iii) use of LNG for marine fuel and iv) installation of scrubber in a vessel.



Source: MARPOL Treaty.
Note: The established ECAs are as follows: Baltic Sea, North Sea, and North American and US Caribbean Sea.

Figure 6.4.8 Marine Fuel Sulphur Limits Set by the IMO (%)

In the short term, the demand for middle distillate oil (gas oil and diesel) and LSFO will be increased (Figure 6.4.9). Their blended oils will be fully expected to comply with the new MARPOL requirement. After installing scrubber in vessels, the demand for HSFO will be regained, but will not be more than that that in 2020 and before. The pricing of HSFO will become lower to compensate for the cost of scrubbers owned by shipowners. The refinery system must be upgraded to produce middle distillate oil and LSFO. However, upgrading requires significant investment. Cracking and desulfurization are more feasible than upgrading. Oil bunkering will not be particularly profitable.



Source: Japan Petroleum Energy Center

Figure 6.4.9 Marine Fuel Demand Forecast

The MEPC set a target to reduce the total annual GHG emissions by at least 50% by 2050m compared to 2008, at its 72nd session in 2018. The demand for LNG as marine fuel will increase to meet this requirement.

The bunkering business is considered to be one of the suitable industries for Qeshm Island due to its geographic advantages. LNG bunkering will be more preferable that oil bunkering in view of marine fuel demand to meet the sulfur limits and restrictions on GHG emission.

LNG bunkering will require a partnership with financial institutions in order to trade LNG for bunkering on the physical and financial market. The sales mechanism for marine fuel has changed since the development of the marine fuel physical market and opening of the futures market. The price of marine fuel varies hourly and daily. Buyers of marine fuel need to buy from an ever-changing market, which affects their transportation costs. Chemoil and the investment bank JP Morgan Chase agreed in November 2007 to provide long-term supply services to the futures market at a flat rate using the hedging mechanism. In the agreement, Chemoil is responsible for physical trading and JP Morgan Chase is involved in financial trading. Their business arrangement has been successful and the business has developed into the world's largest marine fuel supplier. Therefore, a financial mechanism should be developed to participate in the global marine fuel market.

Qeshm is also known as for the geological uniqueness as a Geopark and its wildlife, which will attract vessel crew members. Once the bunkering business expands, vessel crews will be spending one or more nights on the island during fueling, which will benefit the following industries and businesses.

(a) Tourism
(b) Food and water supply and agrobusinesses
(c) Accommodation
(d) Shopping (tax-free)

6.4.5 Proposed projects

The development of the above-mentioned projects will be expected in the long term. Among many projects, the LNG, methanol, urea and ammonia projects are prioritized due to their importance.

6.5 Tourism Development Plan

Qeshm Island has abundant tourism resources, such as a mangrove forest (the largest along the Persian Gulf), marine and terrestrial mammals and a coral reef. There are also multiple unique geological sites in the terrestrial area, which resulted in Qeshm being registered as the UNESCO Global Geopark in 2017. Additionally, Qeshm has a unique traditional culture, which was highly influenced by the surrounding Arabic countries because of their proximity. However, due to the lack of proper planning and management, these potential tourism resources have not been fully utilized. Consequently, the benefits of tourism have been quite limited, especially for local communities and the local economy. The significant focus on development has also led to some environmental deterioration.

Qeshm has a comprehensive master plan, which was developed by SWECO in 1994, and a tourism strategy, which was developed by KPMG in 2003. Both the master plan and the tourism strategy determined that tourism should become an important source of income and job opportunities on the island, as well as one of the economic pillars of Qeshm. Chapter 2 of this report reviewed the objectives and achievements of the tourism sector in the SWECO Master Plan and proposed that the new master plan should incorporate not only economic aspects of tourism, but also sociocultural and environmental aspects, in order to achieve sustainable tourism development.

6.5.1 Existing conditions

(1) Spatial development and development target

The tourism development plan, which was developed as the part of the SWECO Master Plan in 1994, identified potential development requirements, since the available statistical data and information were

limited. A decade after the SWECO Master Plan, KPMG developed a tourism strategy in 2003, proposing the development of tourism precincts to connect several types of tourism resources and services within and promote the uniqueness of the area. However, considering the existing conditions of tourism development, each tourism resource has been promoted independently based on its merits.

The table below compares the spatial development proposed by the SWECO Master Plan and the KPMG tourism strategy with the existing conditions, according to the division of seven areas proposed in Chapter 5.

Regarding the development target, KPMG projected that 1.3 million visitors could be achieved by 2010. Qeshm Island received 3.7 million visitors from March 21, 2015 to March 20, 2016 (1394 in the Iranian calendar). The QFZO has set a target to achieve an additional one million visitors, of which 0.1 million are international visitors and 0.9 million are domestic visitors, from March 21, 2016 to March 20, 2017 (1395).

Table 6.5.1 Spatial Development Plan and Existing Conditions

	SWECO (1994)	KPMG (2003)	Existing conditions
Doulab-Baseidou	【Resources】 • Salt Dome Mountains • Areas with particular scenic views • Geopark conservation area • Scenic coastline • Breeding area for green turtles • Dolphin habitat	【Precincts】 • National Park for: ・trails, guided tours ・low-impact coastal and marine-based activities (south coast) ・turtle observation areas (south coast) • Baseidou for: ・historical/cultural attraction	【Resources】 • Chahou Valley (G6), Salt Cave (G7) and 10 other designated as geosites • Sandy beach, hawksbill turtle nesting beach and dolphin habitat along south coast
	【Facilities】 • Guest houses in Doulab and Baseidou • Three campsites	【Facilities】 • National Park headquarters • Information center • Small infrastructure	【Facilities】 • Guest house in Doulab, Chahou, and Kani • Information point at G6 • Signage at G6 and G7
Tabl-Selakh	【Resources】 • Hara Protected Area • Bird habitat • Dolphin habitat	【Precincts】 • Hara Protected Area for: ・educational/experiential tours ・birdwatching, dolphin sighting	【Resources】 • Roof of Qeshm (G4) and Statue Valley (G3) • Hara Protected Area (G20) for: ・boat tour for birdwatching and dolphin sighting ・lenj boat building (Gouron) watching
	【Facilities】 • Guest houses in Tabl and Salakh • Hotel in Salakh	【Facilities】 • Information center • Small infrastructure	【Facilities】 • Information center in Sohil and Tabl • Guest houses in Gouron, Tabl, Haft Rangou, Sohil, Dekhoda, Tonban and Selakh • Signage at each geosite
Laft	【Resources】 • Hara Protected Area	【Precincts】 • Laft Port including cultural heritage sites • Persian Gulf Bridge	【Resources】 • Laft (G23) for cultural heritage sites (First ecomuseum in Iran) • Hara Protected Area
	【Facilities】 • Visitor center for the Hara Protected Area • Guest house in Laft	【Facilities】 • Visitor information service	【Facilities】 • Ecomuseum • Signage for cultural heritage sites
Shibderaz-Hangom	【Resources】 • Scenic coastline • Breeding area for green turtles • Coral reef	【Precincts】 • Shibderaz for leisure resort development • Hangom for day trips • Airport for enhancing visitor experiences	【Resources】 • Shibderaz as a gateway to Hangom boat trip • Shibderaz for turtle beach (G21) • Hangom for dolphin bay (G19) • Coral reef
	【Facilities】 • Hotels in Shibderaz and at the airport • Tourist office in Shibderaz	【Facilities】 • Four-star resort hotel • Recreational infrastructure • Information center	【Facilities】 • Shibderaz jetty • Guest houses in Hangom, Shibderaz and Noghasha • Local restaurant,

			• Parking and campsite • Local market in Hangom
Souza	【Resources】 • Stars Valley	【Precincts】 • Recreation hub (low-key)	【Resources】 • Naz Island (G15) • Crabs Rock (G22) • Stars Valley (G1) • Crocodile Park
	【Facilities】 • Guest houses in Souza and Mesen	【Facilities】 • Recreational infrastructure	【Facilities】 • Visitor center at G1 • Guest houses in Borka Khelaf and Souza • Local restaurant and handicrafts shops
Ramkon	【Resources】 • Korkura Kooh	【Precincts】 • Agriculture/education hub	【Resources】 • Desert landscape with greenery • Korkura Kooh (G2)
	【Facilities】 • Guest houses in Ramchah, Tourion and Peyposht		【Facilities】 • Local restaurant
Qeshm-Dargahan	【Resources】 • Geopark Museum • Kharbas Cave • Scenic coastline	【Precincts】 • Qeshm Town (shopping and entertainment) • Recreation hub (intensive)	【Resources】 • Geopark Museum (G9) • Kharbas Cave (G25) • Dokhuk (G24) • Coral reef
	【Facilities】 • Hotels in Qeshm and Dargahan • Tourist offices in Qeshm and Dargahan	【Facilities】 • Hotels and restaurants • Tourist information • Signage • Recreational activities	【Facilities】 • Hotels and restaurants • Guesthouse in Defari • Golden Beach Hotel • Campsites • Diving shop • Shopping mall

Source: JICA Project Team

(2) Tourism administration

The Cultural, Social and Tourism Deputy is responsible for tourism development in the QFZO. There are four departments under the Cultural, Social and Tourism Deputy: (1) Cultural Arts and Training Affairs Department, (2) Cultural Heritage, Handicrafts and Tourism Department, (3) Health, Sport, Sociality and Youth Department, and (4) Geopark and Environment Department. The Cultural Heritage, Handicrafts and Tourism Department and the Geopark and Environment Department are currently the main bodies for planning and developing the tourism sector on the island. The Public Relations and International Affairs Department is responsible for the management of promotional activities for Qeshm, such as its website. Meanwhile, the Geopark and Environment Department operates its own website which focuses on promoting the Geopark.

(3) Basic components of tourism

1) Accessibility

Refer to the Transportation Development Plan for further details. The existing conditions regarding accessibility issues related to tourism are summarized below.

Air transport

Qeshm Airport commenced its operation as an international airport in 1997. An international flight

route connects it with Dubai, while domestic flights link it with Tehran, Mashhad, Shiraz and Isfahan. Comparing data related to the Iranian calendar[1] between 1393 (2014) and 1394 (2015), the number of domestic flights decreased by 0.6%, while international flights increased by 5.3%. Observing the number of passengers, domestic passengers increased by 5.1% and international passengers accounted for a 29.5% increase. A trend has changed since 1395 (2016). Domestic passengers increased by 32.2% between 1394 (2015) and 1395 (2016) and continuously increased by 14.0% in 1396 (2017). On the other hand, international passengers decreased by almost half (45.9%) in 1395 (2016) and still decreased by 8.9% in 1396 (2017). It is necessary to observe the transition and collect the statistics in order to determine the reason for the change of the trend; however, it is assumed the number of passengers whose objective was to extend the visa decrased due to the policy of Iranian Government.

In total, the number of the flights decreased; however, the number of passengers increased by 9.8%. Comparing the number of domestic flights on a monthly basis in 1393 (2014) with 1394 (2015), the number of flights during the low season decreased, while the number during the peak season increased. This implies that the operation of aircrafts has become effective for peak season travel. Comparing 1395(2016) with 1396 (2017), the number of domestic flights increased intensively during peak season from January to April in 1396 (2017). As for international flights, a total number of flights decreased, however, it increased during the month of February 20 to March 20 in 1396 (2017) which is peak season.

Observing the attributes of passengers, which were recognized through the results of the tourist interview survey conducted in 2016, more than half of the passengers are in their 20s to 30s, and tend to travel with family during the peak season. 50% of passengers depart from the island for sightseeing, 28.4% for shopping and 13% for business. During the low season, the passengers who visit for business purposes and who travel independently increase.

Table 6.5.2 Aircraft Movements and Passenger Arrivals at Qeshm Airport

Iranian year	Aircraft movements			Air passenger arrivals		
	Domestic	International	Total	Domestic	International	Total
1393*	1,974	636	2,610	158,179	37,362	195,541
1394**	1,857	670	2,527	166,320	48,391	214,711
1395***	2,291	483	2,774	219,828	26,178	246,006
1396****	2,559	397	2,956	250,625	23,838	274,463
1394/1393	-0.6%	+5.3%	-3.2%	+5.1%	+29.5%	+9.8%
1395/1394	+23.4%	-27.9%	+9.8%	+32.2%	-45.9%	+14.6%
1396/1395	+11.7%	-17.8%	+6.6%	+14.0%	-8.9%	+11.6%

*1393 = from March 21, 2014, to March 20, 2015; **1394 = from March 21, 2015, to March 20, 2016
***1395=from March 21, 2016 to March 20, 2017; ****1395=from March 21, 2017 to March 20, 2018
Source: QFZO on April 27, 2016 and April 8. 2018

Ports

Zakeri Port and Laft Port are regular entry points for passengers from the mainland. Zakeri Port only receives passengers, while Laft Port handles car and passenger traffic. Dargahan Port has also started an operation to connect the mainland and the island twice a day. Additionally, Bahman Port began operating an international ferry service between Khassab, Oman and Qeshm Island, as of July 2016. In 1396 (2017) a cruise line has started its operation between Kaveh port and Kish island. Comparing the total number of passengers through the ports in 1393 (2014) and 1394 (2015), there was a slight decline of 7.3%. In particular, the decline in passengers was mostly in relation to Zakeri Port, which saw a decrease of 191,280 passengers. This decrease continued in 1395 (2016); however, the number of passengers in 1396 (2017) increased by 0.8%. On the other hand, the number of passengers by car through Laft Port has been increasing, which suggest that the number of visitors for cheap shopping is also increasing.

[1] In the Western calendar: 1393 = from March 21, 2014, to March 20, 2015; 1394 = from March 21, 2015, to March 20, 2016.
1395 = from March 21, 2016, to March 20, 2017; 1396 = from March 21, 2017, to March 20, 2018.

The Persian Gulf Bridge, which will connects Bandar-e Pol and Qeshm, is still under construction. Once the construction of the bridge is completed, the number of the arrivals will definitely increase.

Observing the attributes of passengers who arrive at ports, in the same way as airport passengers, 60% to 70% of passengers are in their 20s to 30s, and tend to travel with family during the peak season. During the low season, they tend to travel individually. For 46.6% of passengers who depart from the island through ports, the purpose of their visit is sightseeing, while 40% of passengers visit for shopping, and less than 10% for business. Comparing the passengers at the airport to the passengers at the ports, the purpose of the visit by passengers using the ports tends to be more focused on shopping. Comparing the passengers at Laft Port with those at Zakeri Port, the ratio regarding sightseeing is less and that for shopping is higher at Zakeri Port.

Table 6.5.3 Number of Arrivals at Each Port

Iranian year	Arrivals at Each Port						
	Zakeri Port	Laft by boat	Laft by car	Bahman	Dargahan	Kaveh	Total
1393	1,482,339	206,717	2,084,472	19,053	-	-	3,792,581
1394	1,291,059	162,424	2,063,264	-	-	-	3,516,747
1395	1,203,211	129,471	2,353,102	759	6,407	-	3,692,950
1396	1,213,006	142,303	2,487,554	351	7,931	679	3,851,824
1394/1393	-12.9%	-21.4%	-1.0%	-	-	-	-7.3%
1395/1394	-6.8%	-20.3%	+14.0%	-	-	-	+5.0%
1396/1395	+0.8%	9.9%	+5.7%	-53.8%	+23.8%	-	+4.3%

Source: QFZO on April 27, 2016 and April 8, 2018

Land transport

Public transportation is not available on Qeshm. According to the tourist interview survey, a great deal of visitors expressed dissatisfaction with the transportation services. Those who come to the island with their own car through Laft Port can access anywhere on the island, but those who do not come by car must utilize taxi services or transportation services arranged by tour operators, such as travel agencies and hotels.

2) Accommodation

In 2011, there were 14 hotels, of which only one had a three-star rating, as well as 12 apartment hotels and 23 motels. During the last five years (by 2016), the total number of the hotels has increased to 34, twelve of which are three-star hotels. There are now 17 apartment hotels, but the number of motesls has decreased from 23 to 19. Altogether, the number of hotel rooms increased from 539 to 1,258, the number of apartment hotels rooms increased from 183 to 257 and the number of hostel rooms decreased from 241 to 179. It is assumed that motesl are being replaced by local guest houses owned and operated by local communities, which have recently been promoted. The total number of rooms and beds, which shows the overall capacity to receive tourists, has increased by 1.8 times for rooms (from 963 to 1,757) and 1.5 times for beds (from 3,998 beds to 5.978 beds). In 2017, the number of hotels has increased from 34 to 40, the apartment hotels remain the same, and the numbr of motels has decreased to 15.

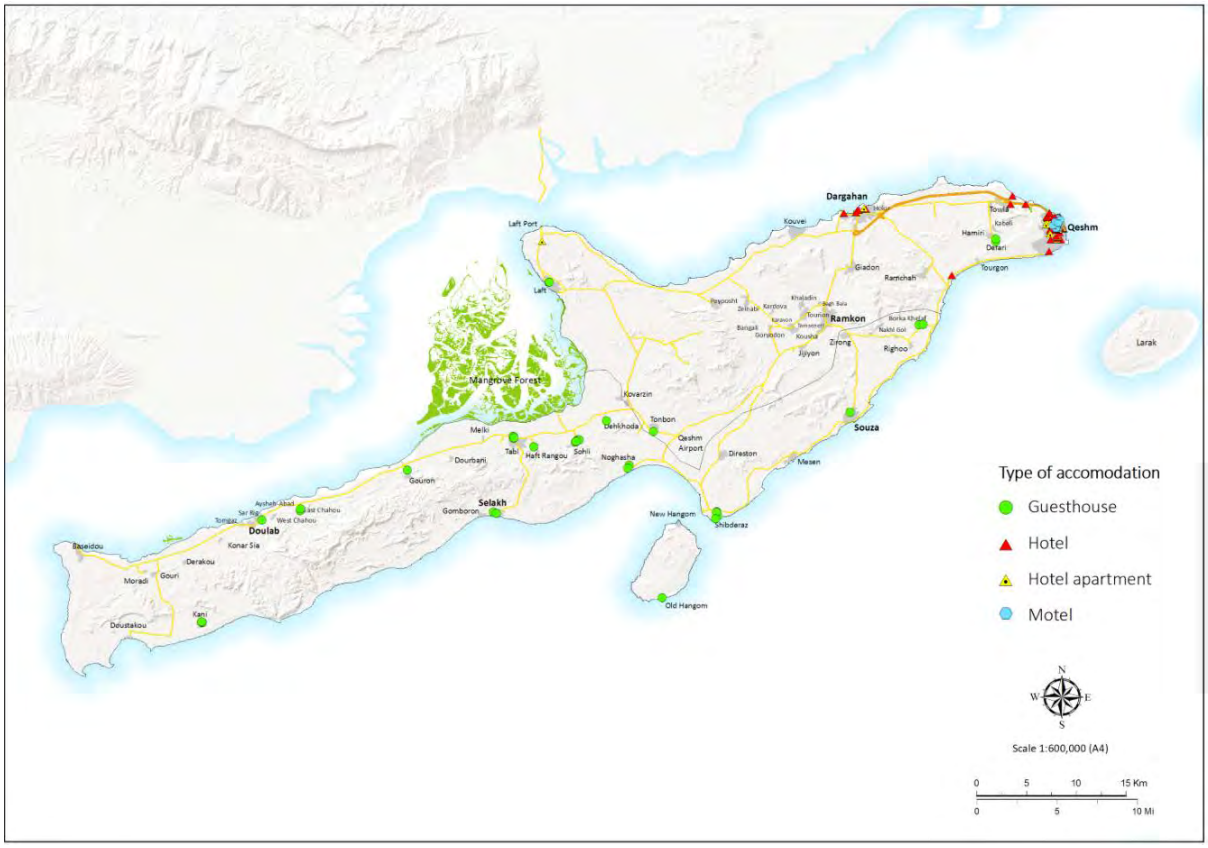
Regarding local guest houses, although 21 guest houses are listed, 15 guest houses were operating and the rest were in preparation in 2016. The number of guesthouses has increased to 27 in 2017.

Figure 6.5.1 shows the allocation of hotels, apartment hotels, motels and guesthouses.

Table 6.5.4 Number of Accommodation Types, Rooms and Beds

Category	Hotel				Apartment hotel				Motels	Camps ites	Guest house	Total
Rating	3	2	1	-	3	2	1	-				
Number	12	3	6	13	1	4	2	10	19	9	21	100
Number of rooms	586	88	161	423	16	45	11	185	179	-	63	1,757
Number of beds	1,914	278	1,009	1,261	54	173	72	603	614	-	-	5,978

Source: Deputy of Tourism, QFZO, on March 16, 2016, and Office of Planning and Budget, QFZO



Source: JICA Project Team

Figure 6.5.1 Locaiton of Hotel, Guesthouse and Motel in Qeshm Island

Attractions (tourism resources and products)

The existing tangible tourism resources are identified through the baseline survey, literature review, site visits and a series of discussions with relevant authorities and private sector representatives. Iran Cultural Heritage, Handicrafts and Tourism Organizations identified nine "National Natural Heritages" in Qeshm. (1) Dolphin Bay, (2) Turtle Beach, (3) Naz Islands, (4) the Birds Wetland, (5) Habitat of Shrews, (6) Star Valley, (7) Chakhooh Valley, (8) Old Territory of Geopark and (9) the Salt Dome and the Salt Cave. Those are within the recognized geosites of Qehsm Island UNESCO Global Geopark except (5). The objective of recognizing those sites are to protect them, however, those sites are included as existing and potential tourism resources. Table 6.5.5 shows the tangible resources by category.

(a) Baseidou-Doulab (Western Geopark): A total of 12 geosites are located in this area. Within these 12 geosites, Chahou Valley and the Salt Cave are currently the most popular sites. In the northern area, there is a beautiful tidal coast. In the southern area, a beautiful sandy beach, hawksbill turtle nesting beach and humpback dolphin are found.

(b) Laft-Selakh (Hara Mangrove Protected Area): This area is characterized by the Hara Mangrove Protected Area, which is one of the most valuable natural resources on the island, and Laft, which preserves the cultural heritage of the island. The Hara Mangrove Protected Area accommodates abundant natural habitats for wildlife, such as birds and dolphins (Indian porpoise). One of the most popular tourism activities in this area is to traverse the Hara Mangrove Protected Area by boat. The lenj boat in Gouron, which is registered as an intangible cultural heritage by UNESCO, is also a potential tourism resource.

(c) Shibderaz-Hangom (marine and wildlife): This area is well known for its attractive marine wildlife, such as sea turtles and dolphins (*Tursiops aduncus*) on Hangom Island. Dolphin watching is one of the most popular activities in the area. Additionally, many tourists visit Shibderaz during the period when sea turtles lay eggs and hatch (from March to June).

(d) Souza (Eastern Geopark): Popular geosites of the Eastern Geopark, such as Stars Valley and Naz Islands, are located in this area. Since these geosites are easily accessible from Qeshm and are attractive, many tourists whose purpose is mainly to shop also visit these sites.

(e) Ramkon (agriculture): This area is traditionally recognized as an agricultural area. As such, lots of cultural heritage sites related to water remain in this area. Although agriculture is not as popular recently because of the shortage of water, which Qeshm has been suffering from, local people have an image of the island being an oasis.

(f) Qeshm-Dargahan (urban): This area is characterized by urban tourism. Almost all the shopping centers are located in this area. Tourists whose purpose is to shop stay in these cities. In the southern area of Qeshm, the only resort hotel in Qeshm, the Golden Beach, is located along the sandy beach. A coral reef is also available.

Table 6.5.5 Tangible Tourism Resources by Category

	Nature (Geopark)	Nature (marine/wildlife)	Nature (agriculture)culture)	Man-made (museum)	Man-made (recreation)	Culture (heritage)
Baseidou-Doulab	• Chahou Valley (G06) • Salt Cave (G07) • 10 other geosites	• Tidal coast • Sandy beach • Hawksbill turtle • Indo-Pacific humpback dolphin (*Sousa Chinensis*) • Gazelle	N/A	• Information point (East Chahou)	N/A	• British soldiers' cemetery (Baseidou)
Laft-Selakh	• Mangrove (G20) • Laft Village (G23) • Roof of Qeshm (G03) • Statues Valley (G04)	• Bird sanctuary • finless porpoise (*Neophocaena phocaenoides*)	・Date garden (Haft Rangou)	• Laft Museum • Visitor center (Sohil, Tabl)	• Shopping mall	• Windcatcher • Golden Wells • Naderi Castle • Sulfur mineral water spring, historic dam, lenj workshop (Gouron)
Shibderaz-Hangom	• Hangom Islands (G19) • Turtle Beach (G21)	• Sandy beach • Coral reef • Hawksbill turtle • Indo-Pacific bottlenose dolphin • (*Tursiops aduncus*) • Gazelle	• Date garden (Direston)	N/A	N/A	N/A
Souza	• Stars Valley (G01) • Naz Islands (G15) • Crabs Rock (G22)	• Sandy beach	N/A	• Visitor center	• Crocodile park	• Kamah historic school (Nakhl Gol)
Ramkon	• Korkora Kooh (G02) • Natural geometry site (Jijiyon)	N/A	• Seedling nursery (Jijiyon) • Fig tree (Tourion) • Dates garden	N/A	N/A	• Ancient dam (Peyposht) • Qanats (Zeinabi) • Borka (Ramkon, Kousha) • Shrine (Tomsenati)
Qeshm-Dargahan	• Khorbas Cave (G24) • Dokouhak (G25)	• Flamingo habitat (Dokouhak) • Sandy beach • Coral reef	N/A	• Geopark Museum (G9)	• Marine school • Crocodile park	• Qoba Mosque (Dargahan) • Ramcha Mosque • Portuguese Castle, Bibi Water Reserve, Koulaghan Historic City (Qeshm)

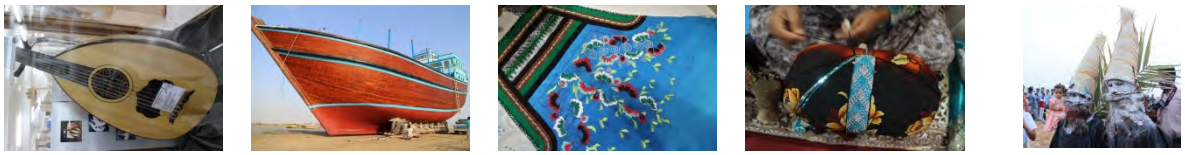
Source: JICA Project Team

The table below shows the recognized intangible tourism resources. The local community has already recognized the potentials; however, most of the resources are not utilized for tourism, except handicrafts. It is necessary even for handicrafts to improve in terms of quality.

Table 6.5.6 Intangible Tourism Resources by Category

	Tradition	Handicrafts	Lifestyle	Ceremony (music and dance)	Festivals and events
Qeshm Island	Oud (music instrument)	• Henna • Embroidery • Shak Bafi • Dkhtlvk (doll) • Borke • Kilim • Traditional basket • Gargour (fishing net) • Shell accessories	• Shrimp catch • Fishing by net • Date harvesting • Pollination of palm trees • Traditional dishes and confectionery • Camel riding	• Ritual leiva • Ritual sword dance • Azva ceremony • Zar ceremony • Shushi ceremony • Molood	• Wedding • Eid al-Fitr • Eid Qorban
Specific location	Lenj boat building (Gouron)	• Traditional pottery (Selakh)	• Gariz fish, silver pomfret, crab • Mangrove honey harvesting (Hara area)	• Wedding rituals (Laft Port)	• Fishermen's Nowrooz Festival (Selakh)

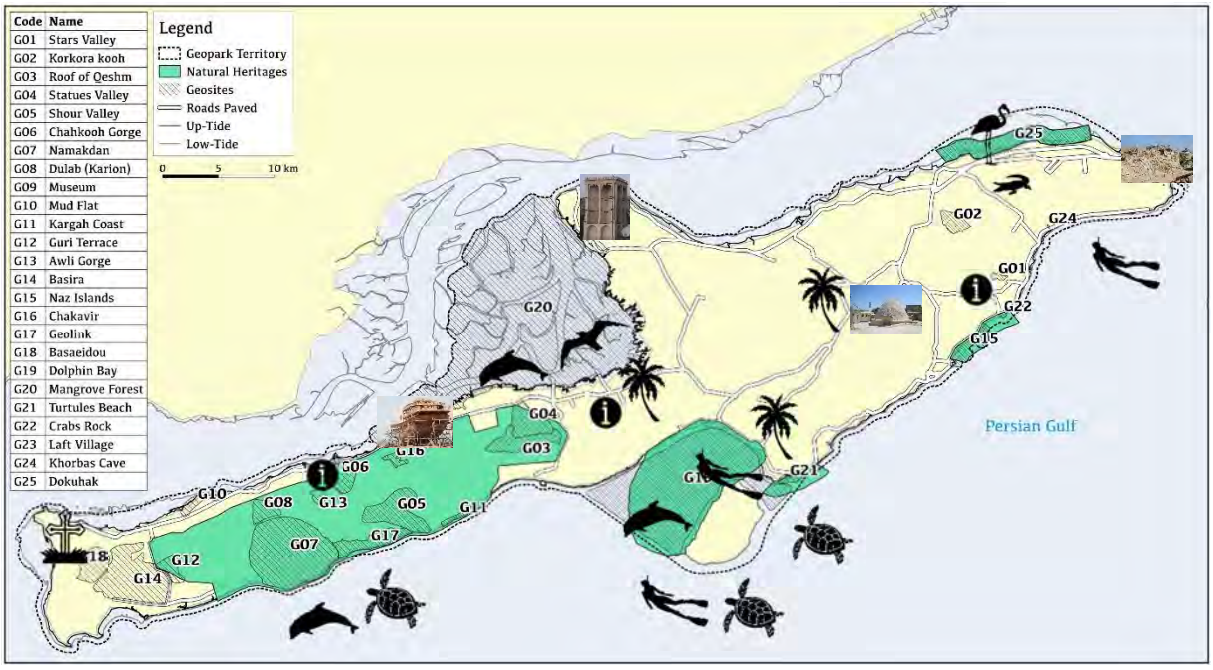
Source: JICA Project Team



Oud | Lenj boat | Embroidery | Shak bafi | Selakh Festival

Source: JICA Project Team

Figure 6.5.2 Tangible and Intangible Tourism Resources



Source: JICA Project Team

Figure 6.5.3 Location of Tangible Tourism Resources

In order to access/utilize these recognized tourism resources, there are four jetties around the Hara Mangrove Protected Area at Tabl, Sohli, Kovarzin and Laft. Dourbani Jetty is under construction. There are two jetties developed for dolphin watching in Shibderaz and Direston. As for the access

facilities at geosites, Stars Valley, located in the eastern part of the island, is outstanding, with a visitor center and signboards. The Geopark and Environment Department of the QFZO has been installing signboards at major geosites. A geopark information center at the airport has been prepared, but is not yet fully functional. The tourist information center in Sohli is under renovation as of August 2016.

(4) Measures to enhance sustainable tourism

Marketing

Statistical data are indispensable when it comes to observing current market trends and deciding on the future direction and target market. However, data related to tourism are very limited, except for the number of arrivals and departures at each entry point. Starting in 2011, the Geopark and Environment Department of the QFZO began recording the number of visitors to the museum in Qeshm, Stars Valley and its visitor center, the Tabl and Sohli Jetties, Chahou Valley and the Salt Dome. In 2015, the department started to record the breakdown of domestic and international visitors. According to the interview survey, the majority of tourists went to Dargahan and the shopping centers. After shopping, the four attractions most visited by tourists were Naz Islands, Stars Valley, the Hara mangrove forest and Dolphin Bay. The table below shows which attractions tourists visited, according to each entry point. The tourists who depart from the airport tend to travel around the most, followed by the tourists departing through Laft Port, with the least being the tourists traveling through Zakeri Port. The next step should be to analyze available data, collect additional necessary information, and develop/renew marketing strategies.

Table 6.5.7 Top Four Attractions Visited via Each Entry Point

Location	First	Second	Third	Forth
Airport	Stars Valley (47.6%)	Naz Islands (45%)	Mangrove (38.8%)	Dolphin Bay (38.5%)
Laft Port	Naz Islands (33.2%)	Stars Valley (33.2%)	Dolphin Bay (28.8%)	Mangrove (27.5%)
Zakeri Port	Naz Islands (31.7%)	Mangrove (30.1%)	Stars Valley (28%)	Dolphin Bay (22.4%)

Source: JICA Project Team

Promotion

In order to address tourism attractions in Qeshm, the "Seven Wonders of Qeshm" campaign was promoted several years ago. The "Seven Wonders" were as follows: 1) hawksbill turtles, 2) Naz Islands, 3) dolphins, 4) Salt Cave, 5) Chahou Valley, 6) Stars Valley and 7) the mangrove forest. It is assumed that the current top four attractions mentioned above could have been the result of this "Seven Wonders" campaign, as well as their accessible location. In order to promote Qeshm consistently, branding is the key to develop the image of Qeshm. Under the developed brand, there are different promotional methods and tools, which can be used for different purposes to enhance tourism. Advertisement through the mass media can draw attention to and raise the awareness of a destination. It is also effective to stage an exhibit at a tourism fair, either domestic or international, for raising awareness. According to the International Affairs Bureau of the Iran Cultural Heritage, Handicrafts and Tourism Organization (ICHTO), it participates in annual exhibits at international tourism fairs at the request of the private sector, such as the ITB Berlin, the International Tourism Fair in Spain, Italy's Borsa Internazionale del Turismo (BIT) and the Arabian Travel Market in Dubai. Meanwhile, the QFZO has exhibited at BIT, the China International Travel Mart and the Moscow International Travel and Tourism Exhibition.

Websites and other SNS tools are important for distributing the necessary information to those who are interested in the destination in the course of planning their visit. Information centers are quite effective at distributing detailed information that is locally available. These promotional activities should be executed consistently with a marketing strategy and plan. However, these activities have been implemented by a different department of the QFZO on an ad hoc basis due to the lack of an integrated executing body for tourism promotion on Qeshm. Consequently, the interview survey highlighted tourists' dissatisfaction with the lack of tourist information

Local communities' involvement (human resource development)

Tourism provides opportunities to generate employment and to diversify sources of income, since it can include a wide range of businesses. The rapid increase in accommodation in the last five years on the island has expanded employment opportunities; however, the quality of services, which requires proper training, has not been maintained at the same pace. Local communities have been involved in the tourism business in the last decade, since they noticed the tourism potential in terms of income generation. The QFZO has also supported local communities in setting up small businesses (such as operating local guest houses and restaurants, providing boat services and selling local handicrafts) through organizing a series of workshops and training courses. Consequently, 27 local guest houses are in operation, while local food and handicrafts are on sale at popular tourism sites. Five boating associations, one at each jetty, are also established to provide boat services for sightseeing to visitors.

Seasonality

The gap in tourist flows between the peak and low season is very high on Qeshm Island. The highest peak season on the island is during the Iranian New Year (approximately 0.63 million people visited from March 16 to April 2 in 2014, and 0.58 million people visited during the same period in 2015). It is believed that lots of visitors, whose primary purpose is shopping, visit the island with their own car and tents, staying at campsites, parks or along the roadside. Consequently, it is assumed that this movement results in limited contribution to the local economy and increased environmental degradation due to scattered litter. On the other hand, the results of the interview survey showed that the purpose for visiting for half of the visitors was sightseeing; however, the visitors were not satisfied due to the lack of tourist information and facilities. Measures to mitigate the fluctuation and to promote the changing focus from shopping tourism to eco-tourism should be taken.

Tourism environment

It is important to offer a comfortable tourism environment for visitors. Safety is one of the most essential factors to enhance tourism. Hospitality and neatness by host communities are also indispensable to attract and satisfy visitors. At the same time, visitors should also respect the host communities and their environment. According to the interview survey, a lot of comments were made regarding the cities' lack of cleanliness and hygiene. Meanwhile, interviewees made positive comments on the warm hospitality the received from the people of Qeshm and their local culture and food.

Environmental conservation

It is essential to balance tourism development and environmental conservation in order to achieve sustainable tourism. When observing the current conditions between tourism development and environmental conservation, tourism development tends to be emphasized more. For instance, tourism facilities, such as jetties and souvenir shops around the Hara Mangrove Protected Area, should be environmentally cautious; however, local authorities have tried to expand these facilities to gain more benefits from visitors, while the DoE of the QFZO is reluctant to control them. Additionally, the protection of the most popular marine resources, such as sea turtles and dolphins, is crucial to sustain tourism businesses. A clear policy and a set of proper guidelines should be developed and agreed upon through coordination with relevant stakeholders, the DoE of Hormozgan Province, the DoE of the QFZO, local authorities and communities.

6.5.2 Issues to be tackled

The SWOT analysis below summarizes the internal factors, strengths and weakness, as well as external factors, opportunities and threats in relation to the current tourism situation on Qeshm.

Table 6.5.8 SWOT Analysis

Strengths	Weaknesses
• UNESCO Global Geopark • Secnd global geopark in the region • Availability of basic infrastructure and facilities • Numerous natural and cultural tourism resources • Unique culture difference from the mainland • Affordable markets • Warm hospitality of local communities • Comfortable weather in the coldest season • Safety and security conditions	• Lack of an integrated tourism management system • Lack of proper planning and monitoring • Lack of a marketing and promotion plan • Limited diversification of tourism products • Image of low-grade shopping and resort • Lack of proper branding and promotion • Lack of proper distribution of tourist information • Not enough coordination between stakeholders • Low quality of hotel facilities and services • Large demand for staying at individual houses • Hot and humid weather during summer • Seasonal fluctuation • Low quality of life, health facilities and public welfare
Opportunities	**Threats**
• Growing trend of investment in the tourism sector of the island • Tourists incentives for low-cost travel • Gradual increase in the growth of the global tourism industry • Political stability within the region	• Security concern in the region • Increasing the price level of goods and services • Gradual decrease of number of visitors • Damage to tourist sites (Geopark) • Destruction of traditional craftsmanship on the island • Negative impacts on culture and life • Environmental pollution • Existing domestic and regional competitors

Source: JICA Project Team and Office of Planning and Budget, QFZO

Identified issues from each perspective are summarized below:

(1) Tourism administration

An institutional framework should be considered to enhance tourism on Qeshm, as both the SWECO Master Plan and the KMPG tourism strategy suggested. Coordination and cooperation are keys to promote collective efforts for strengthening tourism. This should be executed not only within the public sector (such as among each department within the QFZO, and between the QFZO and tourism-related state authorities), but also between the public and private sectors (who are the main actors in the tourism industry). For instance, Qeshm Island as a free zone does not require visa within 14 days, however, immigration authority at the airport annoys tourists by requesting documents. Therefore, a coordination committee should be established.

(2) Basic components of tourism

The basic components of tourism consist of accessibility, accommodation and attractions; however, this subsection focuses on accommodation and attractions, since Section 6.5 (Transport Development Plan) covers issues to be tackled regarding tourism-related accessibility.

Accommodation

Although the number of hotels and local guest houses has rapidly increased during the last five years, the range of accommodation types is still limited. Hotels and apartment hotels are located only in Qeshm and Dargahan and local guesthouses are extablished in the rest of Qeshm Island. There is one four-star hotel in Qeshm, however no luxury accommodation that can be categorized as five-star. Ecolodges or boutique hotels can also be acceptable in pursuit of diversifying the range of accommodation types for visitors. Some five-star hotels are already planned to be constructed; however, construction is sometimes suspended for unclear reasons. The obstacles to promoting proper investment should be investigated, while measures should be taken to satisfy the various needs of

visitors. Campsites should also be constructed in strategic locations.

Attractions (tourism resources and products)

As mentioned in the previous section, abundant and diversified tourism resources exist on Qeshm. However, these have not been fully utilized. Firstly, it is necessary to upgrade basic facilities, such as signboards, explanation boards, toilets and visitor/tourist information centers in specific locations. Secondly, tourism products should be diversified in order for local communities to gain more benefits from tourism. Currently, managing local guest houses and restaurants, visiting geosites, mangrove visits, dolphin watching, sea turtle watching, scuba diving and selling local handicrafts are the main tourism products and activities. In order to promote eco-tourism, well-trained eco-tourism guides are important, but there are only a few. Guided eco-tours, various tour circuits and other tourism activities should be developed to attract more visitors and increase their length of stay and expenditure on the island. Food is also an important aspect of tourism; however, the range of restaurants offering high-quality meals and service is quite limited. Thus, it is also necessary to diversify and improve restaurants.


Local guest house


Local food


Mangrove visit


Dolphin tour


Sea turtle

Source: JICA Project Team

Figure 6.5.4 Tourism Attractions on Qeshm Island

(3) Measures to enhance sustainable tourism

Marketing

According to the statistics of arrivals on Qeshm in 1394, the number of international visitors was 48,391 (including visa exchanges) and the number of domestic visitors was 3,683,067 (including excursionists or day-trippers). Currently, domestic visitors are obviously dominant. When observing the situation of the sector as analyzed through the results of the interview survey, it is estimated that 44% of airport passengers, 8% of Zekari Port passengers and 10% of Laft Port passengers stay at hotels. It was found that many visitors stay at individual houses, instead of hotels, even if it is illegal, which negatively affects hotel businesses. In order to attract valuable investors to the sector for future eco-tourism development, measures to improve the situation should be taken.

Collecting appropriate statistics helps in grasping the issues that the sector faces in order to analyze the current market trend and develop a proper marketing strategy. More detailed and periodic statistics are required, such as occupancy rate, number of overnight visitors, nationality breakdowns, length of stay, and amount of expenditure. It is important to establish a mechanism to collect the necessary statistics in order to update the marketing strategy regularly and develop proper plans.

Promotion

In the Iranian domestic tourism market, Qeshm is recognized as a low-grade shopping and resort island. Although it is assumed that some of the domestic visitors whose main purpose is shopping have started to enjoy sightseeing, it is necessary to change the image of Qeshm to that of an eco-tourism destination.

The marketing strategy should develop a brand for Qeshm as an eco-tourism destination, which enhances Qeshm's strength and determines the proper promotion means, tools and materials, in order to penetrate into the target market. However, it cannot be executed effectively and efficiently without the coordination of the related departments within the QFZO and collaboration with the private sector. Additionally, it is indispensable to cooperate with the ICHTO in order to access the international market. A mechanism for delivering collective and consistent promotional activities should be developed.

Local communities' involvement (human resources development)

The current growth of visitors who not only enjoy shopping, but also tourism on Qeshm has generated employment and business opportunities for local communities. Villagers have started to manage guest houses and restaurants. Women produce handicrafts and sell them. Local guides are also crucial to connect visitors with these products and services. It is necessary to support each other and strengthen the network in order to offer different and unique products and services to tourists. However, each village is competing with each other, providing similar products to tourists. Additionally, it is not yet sufficiently recognized by both public and private sectors how the quality of services, knowledge and professionalism are important in order to sustain tourism. For instance, the QFZO has issued guide licenses to those who received initial training, but the training was provided only once. Continuous training programs should be prepared to improve guides' knowledge and quality of service. Consequently, this will foster professionalism in the tourism sector.

Seasonality

One of the outstanding negative issues is the big fluctuation in the number of visitors between the peak and low seasons. In the first month of the Iranian year, which includes Nowrooz, in 1394, Qeshm received 0.65 million visitors. Meanwhile, only 0.17 million people visited in the fourth month. There are seasonal activities, events and festivals on Qeshm. For instance, the Fisherman's Nowrooz in Selakh is organized in July, the lowest month in terms of visitor numbers, while mangrove honey and dates are harvested from June to August. By utilizing those seasonal activities and events for eco-tourism, measures to mitigate the fluctuation are necessary. Additionally, a promotional package during the lowest season should be considered to support the sector, including collaboration between the airlines and accommodation providers.

Tourism environment

The positive tourism environment that currently exists, in terms of safety and local communities' warm hospitality, should be acknowledged/built upon, while the negative aspects should be rectified, such with regard to garbage disposal. According to the interview survey, negative comments were made about the cities' lack of cleanliness and hygiene issues. Coordination with Qeshm County is necessary to improve the perception of the island as a negative tourism environment.

Environmental conservation

In order to balance tourism development and environmental conservation, the DoE of the QFZO should have more power to formulate a clear policy and proper guidelines in order to implement the adopted policy and guidelines, as well as control critical development. It is better that the organizational status of the DoE of the QFZO is examined. On the ground, environmental education programs for local communities should be continuously provided to raise more awareness of environmental conservation, including the protection of positive tourism environments. Additionally, visitors should also be educated to follow local customs and regulations in support of the conservation of the unique environment and culture on Qeshm.

6.5.3 Objectives and development target

"ECO-QESHM: A Clean and Creative Island" is proposed as the vision for Qeshm in the ECO-QESHM Master Plan. Under this proposed vision, eco-tourism should represent the mainstream of the sector. Eco-tourism is here defined as "responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education", following the criteria of the National Eco-tourism Committee, which adopts the definition of the International Eco-tourism Society. Education regarding this definition should also include tourists. Eco-tourism satisfies the balanced development of economic, sociocultural and environmental aspects with the catalyst of human resource development. It will lead to the sustainable development of Qeshm as an eco-island. Taking all those into considerations, the tourism vision is proposed as

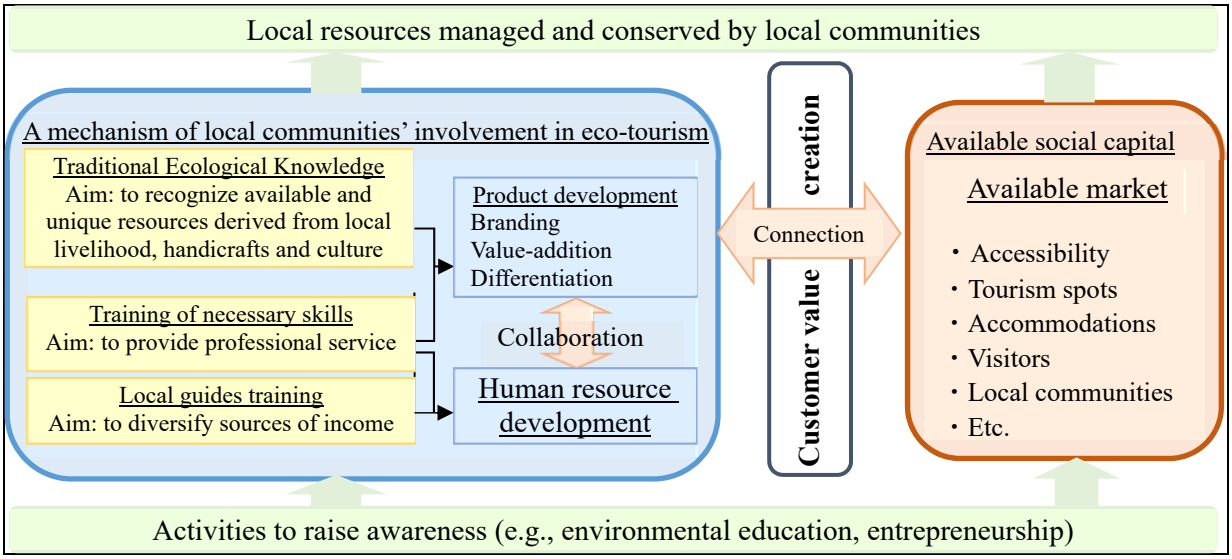
follows: ***"ECO-QESHM fosters "WELLNESS[2]" for local communities and visitors through enhancing qualified eco-tourism."***

Tourism is regarded as one of the most important and prosperous industries on Qeshm. One of the reasons is that it can be combined with other existing industries on the island. Tourism promotes local consumption of the products of primary industries and sales channels for their value-added byproducts. In addition, tourism service providers supply tourism products by utilizing traditional ecological knowledge (so-called Qeshminess), which differentiates Qeshm from other competitors. Thus "Qeshminess" is essential to generating new tourism products. In this regard, tourism will not only boost its own market but also create ripple effects among related industries. Tourism connects local communities and visitors and enhances both sides' wellness by accelerating the healthy and sustainable development of the local economy.

Source: JICA Project Team

Figure 6.5.5 Vision of Tourism Sector and Interrelation with Eco-tourism

The below figure describes an ecotourism development concept. As can be seen, ecotourism suppliers, as well as ecotourism supporting factors and the market, should be equally well educated and developed. In turn, this will enable local communities to manage and conserve their resources.



Source: JICA Project Team

Figure 6.5.6 Eco-tourism Development Concept

[2] According to Global Wellness Institute (https://www.globalwellnessinstitute.org/), "wellness" is defined as a state of complete physical, mental, and social well-being. It goes beyond absence from disease and emphasizes the proactive maintenance and improvement of health and well-being.

In order to deliver eco-tourism successfully, it is necessary to foster a healthier market for attracting valuable investors to invest in future eco-tourism projects. Therefore, an initial development target is proposed to achieve a good level of operations by the existing accommodation, since the tourism interview survey estimated that only 11.6% of visitors currently stay in hotels. Assuming that the future hotel user ratio will increase to 30%, the necessary number of tourists who stay in hotels is estimated in accordance with the target occupancy rate. As a target indicator, in the short term (2019-2021), 1.16 million tourists need to stay in hotels to achieve 40% of the occupancy rate. In the medium term (2022-2026), 1.32 million tourists are necessary to achieve 50% of the occupancy rate, while 1.45 million tourists are necessary to achieve 60% of the occupancy rate in the long term (2027-2036).

Table 6.5.9 Estimated Tourist Nights

Target occupancy rate	Number of beds as of 2016	Estimated target for guests nights	Estimated tourist nights	Remarks
40%	5,978	872,788	2,909,293	Survival limit
50%	5,978	1,090,985	3,636,617	Better operation
60%	5,978	1,309,182	4,363,940	Good operation

Source: JICA Project Team

Table 6.5.10 Estimated Annual Tourist Arrivals

Term	Target occupancy rate	Estimated tourist nights	Average length of stay	Estimate annual tourists arrivals
Short (2019-2021)	40%	2,909,293	2.5 nights	1.16 million
Medium (2022-2026)	50%	3,636,617	2.75 nights	1.32 million
Long (2027-2036)	60%	4,363,940	3 nights	1.45 million

Source: JICA Project Team

The following table shows the secondary indicators that are used to evaluate the quality of the supplier side when considering improvements to local communities' livelihoods and the conservation of the natural environment through promoting eco-tourism. Since eco-tourism on Qeshm is at the preliminary stage and the necessary statistics are not available, the following development indicators are proposed. The method of setting up a mechanism to collect the necessary data periodically in order to measure the degree of achievement of the objectives in future shall be discussed.

Table 6.5.11 Objectives and Development Indicators

	Objectives	Development indicators
Economic	Increase economic benefits for local communities	• Increase in overnight stays • Increase in expenditure • Increase in local employment
Sociocultural	Foster the pride in the local culture and the sense of conservation for natural and cultural heritage among both visitors and local communities	• Increase in tourism products and circuits utilizing traditional knowledge • Increase in licensed local businesses • Satisfaction level of visitors
Environmental	Minimize negative environmental impacts	• Enforcement of zoning plan • Enforcement of policy and guidelines • Increase in educational programs

Source: JICA Project Team

6.5.4 Development plan

In order to enhance the area's attractiveness and further strengthen its comparative advantage, development efforts should be concentrated on reinforcing the strengths and opportunities mentioned in the previous section.

(1) Spatial development emphasis

Geotourism Strength Zone (Baseidou-Doulab-Gouron)

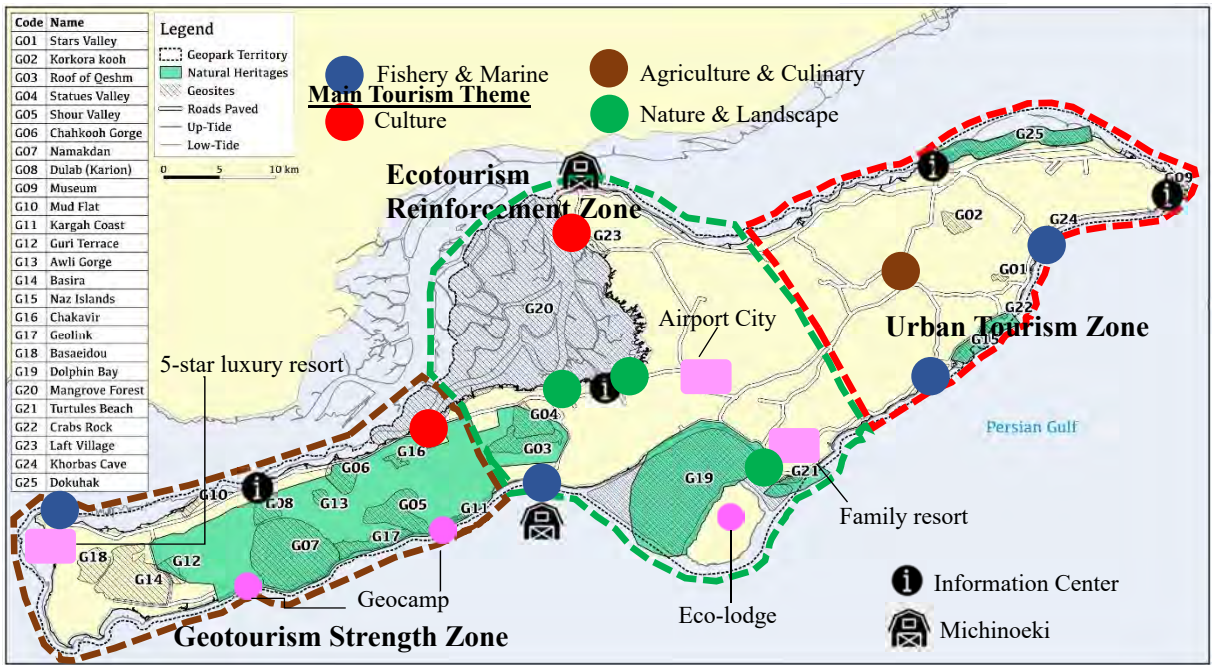
Ecotour trails and circuits will be established to connect each geosite. As the QIGG has joined the UNESCO GGN, this zone will invite the UNESCO Regional Geopark Center to promote the Geopark in the region. The zone also includes Gouron, which conserves Lenj boat (traditional wooden vessel) building, which is registered as a UNESCO intangible heritage. Baseidou will accommodate a five-star luxury resort. A beautiful and calm beach, a hawksbill turtle nesting beach and natural thermal bath along the south shore will provide costal tourism with low impact.

Ecotourism Reinforcement Zone (Laft-Selakh-Shibderaz-Hangom)

This zone has the most diversified tourism resources, with not only natural resources, such as the Hara Mangrove Protected Area, marine wildlife (dolphin and turtles) and a coral reef, but also cultural resources, such as Laft, in the form of a cultural village. Tourism activities have already started such as boat trips in the Hara Mangrove Protected Area and dolphin watching on Hangom Island; however, these run the risk of deteriorating existing ecosystems. Therefore, they should be upgraded as value-added ecotourism products, provided that a mechanism to operate ecotourism and human resources is properly developed. The establishment of a marine research center in this area could contribute to balancing the preservation and utilization of natural resources.

Urban Tourism Zone (Qeshm-Dargahan-Ramkan-Souza)

This area includes Qeshm and Dargahan, which have biggest population on Qeshm and have already been developed as a shopping area for tourists; therefore, they should be upgraded as urban tourism destinations. Various kinds of tourism activities should be offered, such as the arts, amusements, live culture, gastronomy, events and festivals. Connecting with those urban areas, the Ramkan area will be developed as an excursion destination where local communities remain nostalgic for agriculture, utilizing traditional lifestyle and farming activities alongside the remaining water-related cultural heritage sites. In the Ramchah, Souza and Messen areas, which are easily accessible from Qeshm, it is recommended to develop them into an active costal tourism zone, utilizing traditional fishing methods. Various kinds of costal activities along the sandy beach have been introduced. The areas can be made more attractive alongside most popular geosites, such as Stars Valley and Naz Islands. Figure 6.5.7 shows the spatial development plan for tourism.



Source: JICA Project Team

Figure 6.5.7 Spatial Development Plan for Tourism

(2) Product development emphasis/goals

The table below shows the product development direction, according to the specified area. It mainly describes the tourism products that require infrastructure development. At the same time, new tourism products, which utilize intangible tourism resources, such as handicrafts and traditional/living culture, should be improved and developed. Table 6.5.12 shows the potential activities that can be developed as new tourism products in each tourism development zone. Seasonal activities, events and festivals should help to mitigate seasonal fluctuation.

Table 6.5.12 Product Development Direction

Area	Short term (2019-2021)	Medium term (2022-2026)	Long term (2027-2036)
Geotourism Strength Zone (Baseidou-Doulab-Gouron)	• Ecotrail development • Gouron Lenj Museum • Circuit development (around the Geopark) • Campsites • Doulab information point	• Circuit development (coast cruise with *tartari* boat) • UNESCO center • Thermal bath, sand bath, sand therapy	• Luxury ecovilla development
Ecotourism Reinforcement Zone (Laft-Selakh-Shibderaz-Hangom)	• Existing tours to be upgraded as ecotourism products • New ecotourism product development • Laft Michinoeki • Laft Village tour • Upgrade guest houses • Upgrade diving shops • Ecolodge development on Hangom	• Circuit development • Laft cultural heritage restoration • Ecofriendly family resort development in Shibderaz	• Selakh Michinoeki • Marine research center in Shibderaz • Airport city development including spa facilities
Urban Tourism Zone (Qeshm-Dargahan-Ramkan-Souza)	• Information center in Qeshm and Dargahan • Four-/five-star hotels • Qualified restaurant • Agri-tourism development • Agri-restaurant • Culinary tourism • Fishery-related tourism activities • Costal activities development • Upgrade guest houses • Upgrade diving shops	• Culture center development • Seasonal events and festivals development • New marine and costal activities development • New other tourism activities development	• New marine and costal activities development • Seasonal events and festivals development

Source: JICA Project Team.

The implementation stage of this master plan should be conducted in order to develop ecotrails and/or ecocircuits to connect up with ecotourism products and services, which are developed in each village through pilot projects. In order to establish a preliminary base for ecotourism, the following pilot projects were implemented (refer to Chapter 13 for details). The objectives for Pilot Projects 1-4 support local communities in developing ecotourism products and improve their skills and services. The objectives for implementing 5 and 6 seek to establish facilities that can be utilized for ecotourism in the near future.

Table 6.5.13 Implemented Pilot Projects

No	Project title	Location	Objectives
1.	Traditional culture experience tour	Laft (Ecotourism Reinforcement Zone)	To utilize traditional culture for tourism products
2.	Hara mangrove ecotourism	Kovarzin, Sohil, Tabl (Ecotourism Reinforcement Zone)	To upgrade existing boat trips to ecotourism products via training
3.	Lenj Building and Sailing Open Museum	Gouron (Geotourism Strength Zone)	To conserve and promote the techniques and traditional culture of Lenj building and sailing
4.	Souvenir improvement	Messen (Urban Tourism Zone)	To utilize women's traditional skill at handicrafts
5.	Qeshm City Souvenir Shop (Qeshmineh Handicrafts Shop)	Qeshm (Urban Tourism Zone)	To establish an antenna shop to promote various kinds of handicrafts produced on Qeshm
6.	Traditional herb demonstration garden	Kovarzin (Ecotourism Reinforcement Zone)	To establish a facility to promote traditional herb to visitors
7.	Traditional date palm garden revival	Haft Rangou (Ecotourism Reinforcement Zone)	To establish a facility to present a traditional date palm garden to visitors

Source: JICA Project Team.

The below table shows potential tourism activities in each zone. Once it is developed as tourism products, it can help to diverse source of incomes in each zone. There are seasonal activities and all-year-around activities. Seasonal activities and events can be utilized to mitigate seasonal fluctuation. Since seasonal fluctuation especially from June to August is critical in Qeshm, seasonal activities and events such as harvesting dates, mangrove honey, special fishes, dates product making, and fishermen's Nowruz festival should be developed and promoted.

Table 6.5.14 Potential Tourism Activities in Each Zone

	Activities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Geotourism Core Zone (Baseidou-Doulab)	Catching shrimp by net												
	Fishing by net and cooking												
	Fishing by line and hook along northern coast												
	Harvesting different traditional dates												
	Beekeeping and producing honey												
	Visiting traditional goats												
	Visiting fluorescent beach												
	Desert night tours												
	Visiting handicraft firm												
	Riding on a lenj accompanied by fishermen												
	Visiting a traditional wedding												
	Night ceremonies with old fishermen												
Ecotourism Core Zone (Laft-Salakh)	Catching shrimp and gariz (fish) along northern coast												
	Harvesting silver pomfret (fish)												
	Harvesting crabs												
	Fishing by line and hook and moshta (set net)												
	Harvesting local vegetables												
	Harvesting mangrove honey												
	Harvesting dates												
	Harvesting mangrove seeds												
	Pollination of palm trees												
	Harvesting jujube												
	Birdwatching												
	Visiting birds' laying site												
	Visiting birds' hatching site												
	Observing mangrove forest flowers												
	Visiting rats nesting in the Hara mangrove forest												
	Riding camels												
	Observing mudskippers in the Hara mangrove forest												
	Riding a lenj												
	Visiting a lenj workshop												
	Visiting cultural heritage sites of Laft												
	Making an oud (musical instrument)												
	Visiting caravan serai												
	Selakh Fishermen's Nowrooz Festival												
	Religious singing (molood)												
Nature and Wildlife Zone (Shibderaz-Hangom)	Harvesting crabs												
	Fish cage culturing												
	Pearl oyster culturing												
	Visiting shrimp farm on Hangom Island												
	Harvesting dates in Direston												
	Visiting a turtle nesting site												
	Dolphin watching												
	Wildlife of Hangom Island (gazelle, lizard)												
	Diving tour												
	Visiting the shell mountain in Direston												
	Riding a camel												
	Traditional food, handicrafts and wedding parties												
	Religious singing (molood)												
Marine Zone (Souza)	Harvesting mountain almonds after rainfall												
	Traditional food/handicrafts												
	Handicrafts making												

	Activities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Agrotourism Zone (Ramkon)	Dates Product												
	Traditional pashmak (sesame sweet)												
	Visiting shrine in Tomsenati												
	Traditional dairy products												
	Traditional kebab, bread, spice and sweets												
	Traditional handicrafts												
Urban (Qeshm and Defari)	Harvesting dates in Hamiri, Defari and Kabeli												
	Biking tour in Qeshm, Defari and Trogon												
	Paragliding and parachuting												
	Traditional perfume in Defari												

Source: JICA Project Team

(3) Target market emphasis

In the short term, the establishment of a competitive brand and raising awareness about Qeshm among domestic, regional and international markets shall be prioritized. Particularly for the domestic market, it is necessary to diversify the image of Qeshm as a shopping destination into an ecotourism destination. During this period, tourists who come to Qeshm mainly for shopping will be encouraged to enjoy sightseeing by disseminating tourist information at various points. According to tour operators who deal with ecotourism, there are 0.3 million ecotourists on the domestic market. Brand establishment shall enable penetration of this market. For the regional market, it is indispensable to raise more awareness in Germany, Switzerland, Sweden, Austria, France and Poland, which are also keen on ecotourism, in readiness for the next transition stage.

In the medium term, based on its cultivation in the short term, the domestic market shall be expanded even more. Since Qeshm ought to become popular as an ecotourism destination within the domestic market, it should start to attract "hard" ecotourists. It also becomes known as an ecotourism destination on the international market, in turn attracting tourists to start visiting. In addition, the international market will be extended to Portugal, Malaysia and China through the GGN.

In the long term, efforts shall be taken to maintain the domestic market. Meanwhile, new emerging international markets shall be explored by offering new tourism products, such as MICE and wellness tourism. General directions concerning the target markets are described in Table 6.5.15.

Regarding the regional market, it is subject to diplomatic relations between Iran and the Persian Gulf Cooperation Council (GCC). Additionally, four-and five-star accommodation should be developed to receive tourists from GCC countries. In the short term, Oman offers the highest potential, since a ferry route from Khasab to Qeshm started to operate in July 2016, which means that the "Visit Friends and Relatives" campaign can be promoted. In the medium term, according to the 2015 analysis by Future Market Insight, the GCC's ecotourism market is expected to grow at a compound average growth rate of 6.2% between 2015 and 2020. In addition, the adventure and wellness tourism market has been growing. Therefore, Qeshm can expect to penetrate the regional market, such as UAE and Qatar, if the above-mentioned conditions are fulfilled.

Table 6.5.15 Target Markets in the Short, Medium and Long Terms

Period	Short term (2019-2021)	Medium term (2022-2026)	Long term (2027-2036)
Target market (general direction)	• Explore new market segment of domestic market • Promote international market • Promote regional market	• Expand targeted segment of domestic market • Expand international market • Explore regional market	• Maintain targeted domestic market • Explore new emerging international markets • Penetrate regional market
Domestic market	• People in their 20s to 40s, with a family, middle class and well educated • Transition from shopping tourists to soft ecotourists	• People in their 30s to 40s, with a family, middle class and well educated • Soft ecotourists and hard ecotourists • Academics and researchers	• People in their 30s to 40s, with a family, middle class and well educated • Soft ecotourists and hard ecotourists • Academics, researchers, athletes
International market	• Germany, Switzerland, Sweden, Austria, France and Poland	• Germany, Switzerland, Sweden, Austria, France, Poland and UK • Portugal, Malaysia and China through the GGN	• Ecotourists, adventure tourists, wellness tourists, athletes in Europe and East Asia
Regional market (under specific conditions)	• Oman	• Oman, UAE	• Oman UAE, Qatar

Source: JICA Project Team.

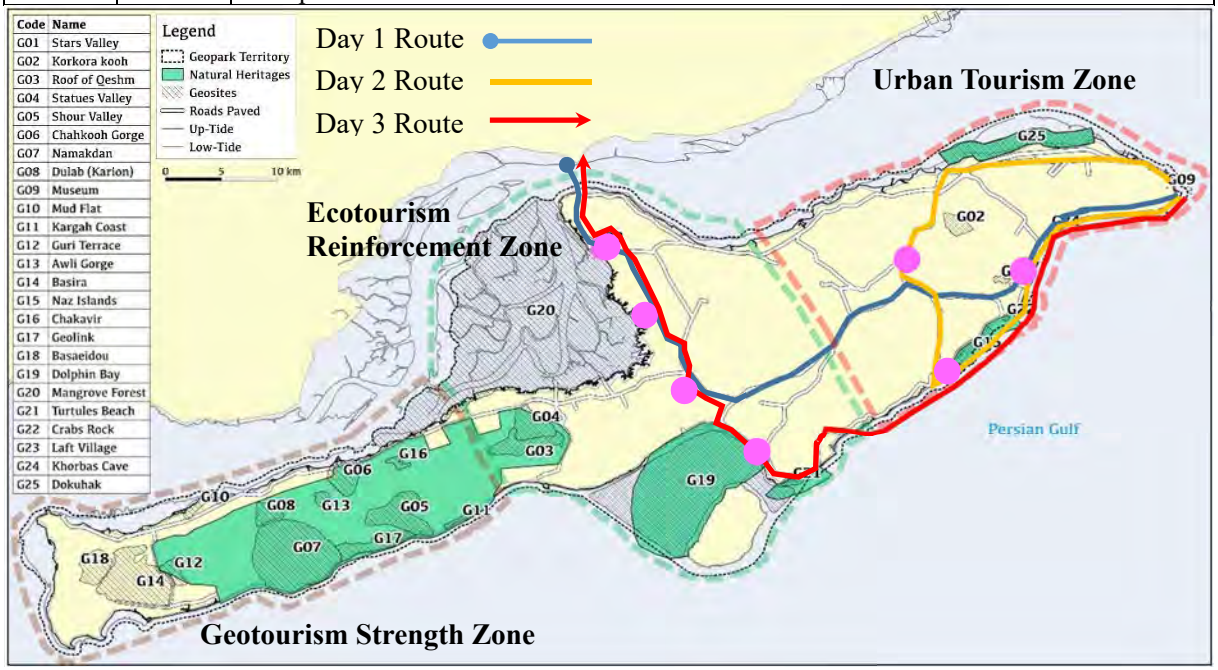
The following strategies and tourism model routes for each strategy are proposed for domestic and international markets in order to achieve the above target market emphasis.

1) Domestic market

It aims to gradually shift its focus from current shopping tourism to ecotourism and to establish Qeshm as ecotourism destination on the mainland.

Strategy 1: To make shopping tourists aware of ecotourism on Qeshm (to foster soft ecotourism)

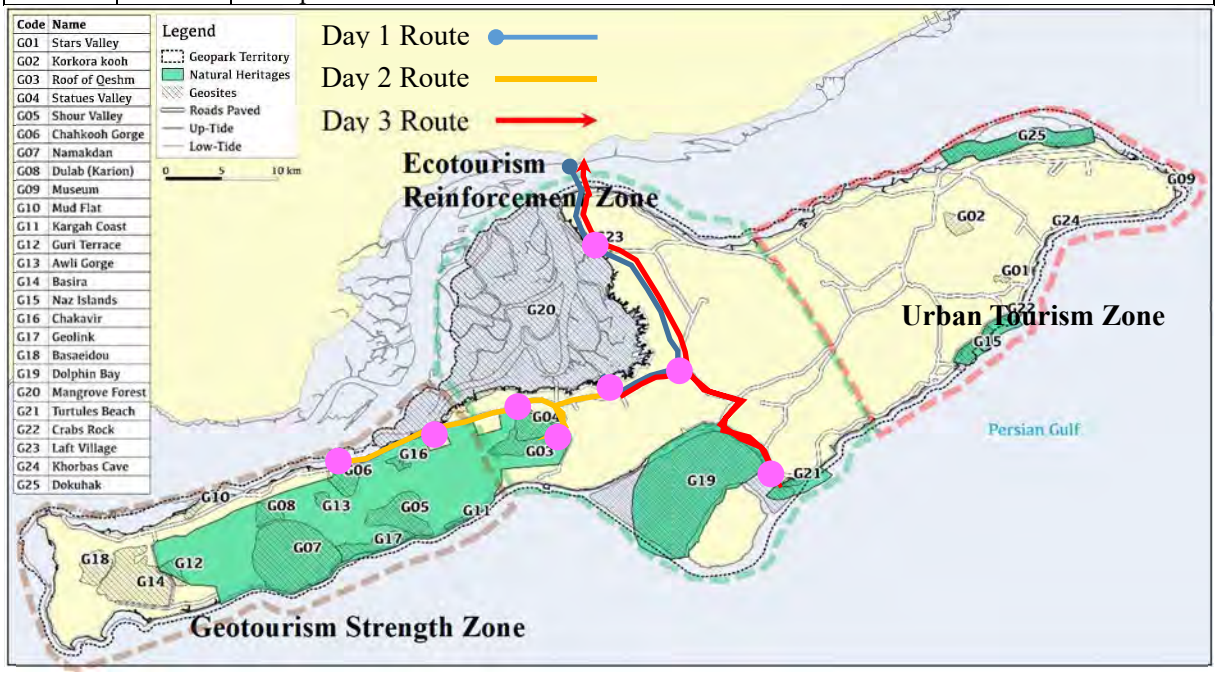
Days	Time	Program
Day 1	A.M.	・ Arrive at Laft Port. ・ Visit Laft Ecomuseum (experience traditional wedding room and henna) ・ Lunch and short excursion to Laft with a local guide ・ Visit Hara Mangrove Protected Area (Kavarzin) to enjoy a boat trip
	P.M. Sunset	・ On the way to Qeshm, visit Stars Valley ・ Stay at Qeshm
Day 2	A.M.	・ Visit Naz Islands and enjoy costal tourism activities (fishery/marine) ・ Dinner at Ramkan to enjoy traditional meals and sweets ・ Visit Dargahan on the way back to Qeshm (visit Qeshmineh) ・ Stay at Qeshm
Day 3	A.M. P.M.	・ Visit Dolphin Bay and Hangom Island ・ Lunch at a traditional guesthouse and enjoy traditional music ・ Depart from Laft Port



Strategy 2: To foster potential soft and hard ecotourism

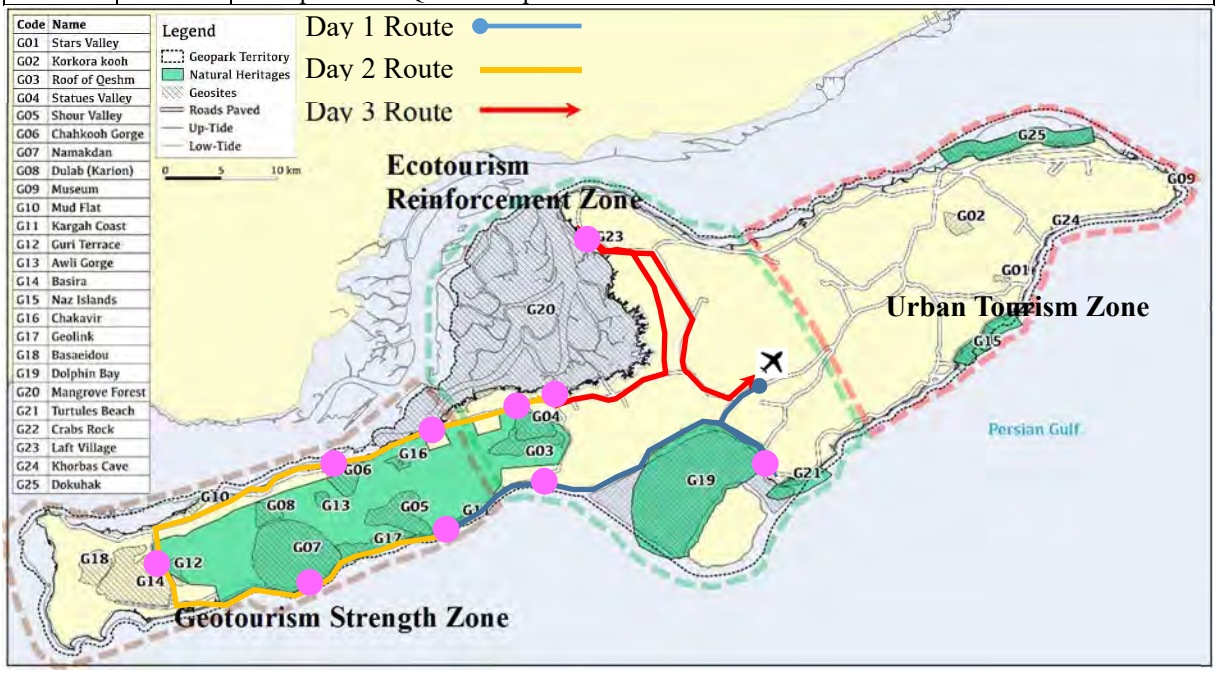
2)-1: To promote educational trips from the mainland (target: secondary school students)

Days	Time	Program
Day 1	A.M.	・ Arrive at Laft Port ・ Visit Laft Ecomuseum (experience traditional wedding room, henna and traditional cooking)
	P.M.	・ Lunch and short excursion to Laft with a local guide ・ Visit Mangrove Information Center in Sohil and Hara Mangrove Protected Area to enjoy a boat trip (Sohil) ・ Stay at a local guesthouse
Day 2	A.M.	・ Visit Chahkooh valley and Gouron Lenj Building and Sailing Open Museum with *tartari* experience
	P.M.	・ Visit Statues Valley and trek to the Roof of Qeshm with a local geoguide
	Evening	・ Visit a traditional herb garden or dates garden ・ Stay at a local guesthouse
Day 3	A.M.	・ Visit Dolphin Bay and Hangom Island ・ Lunch at a traditional guesthouse and enjoy traditional music
	P.M.	・ Depart from Laft Port



2)-2: To promote Qeshm to academic researchers (target: university professors, graduate students)

Days	Time	Program
Day 1	A.M. P.M.	・ Arrive at Qeshm Airport/Laft Port ・ Visit Dolphin Bay and Hangom Island ・ Visit Salakh to enjoy fishing and cooking ・ Stay at a campsite
Day 2	All day	・ Visit Salt Dome and Basira ・ Visit Chahkooh valley and Gouron Lenj Building and Sailing Open Museum with *tartari* experience ・ Visit a traditional herb garden or dates garden ・ Stay at a local guesthouse
Day 3	A.M. P.M.	・ Visit Hara Mangrove Protected Area (Tabl) to enjoy a boat trip and birdwatching ・ Visit Statues Valley ・ Lunch and short excursion to Laft with a local guide ・ Visit Laft Ecomuseum (experience traditional wedding room and windcatcher) ・ Depart from Qeshm Airport/Laft Port

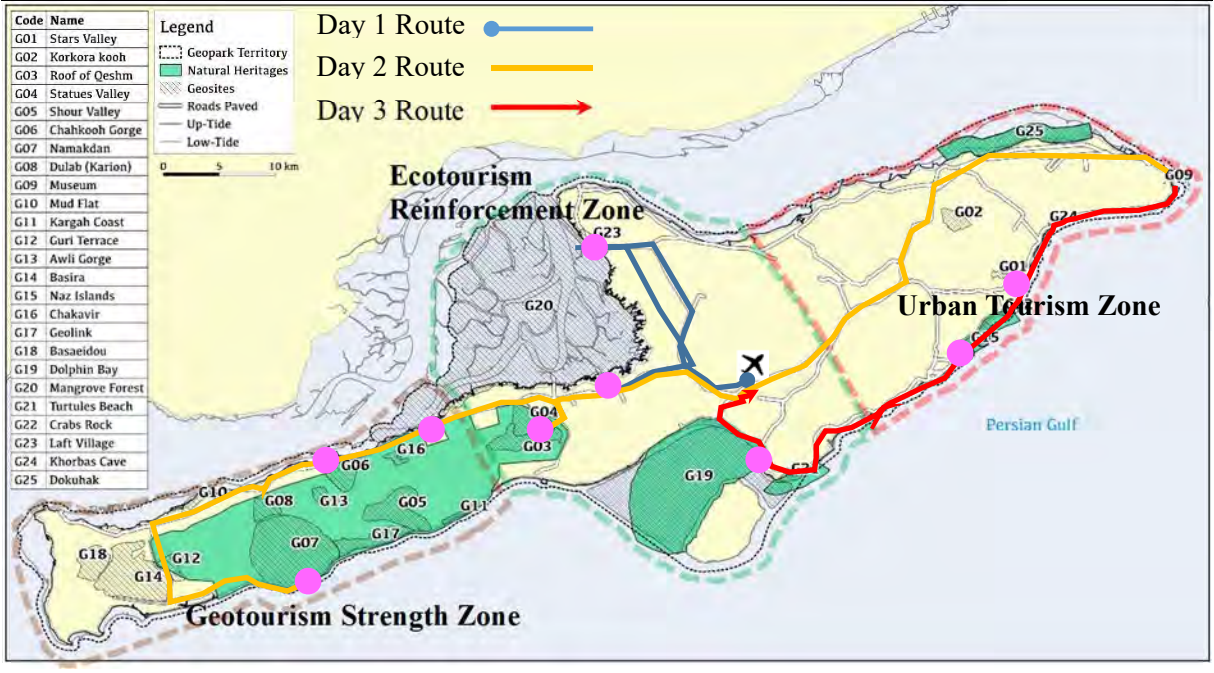


2) International market

It aims to establish Qeshm as ecotourism destination leading to a wellness island. In principle, promotional activities to establish the image of Qeshm as a ecotourism destination to the international market are more prioritized. In addition to promotional activities, the following strategies and tourism model route, which emphasizes the uniqueness of Qeshm, are proposed.

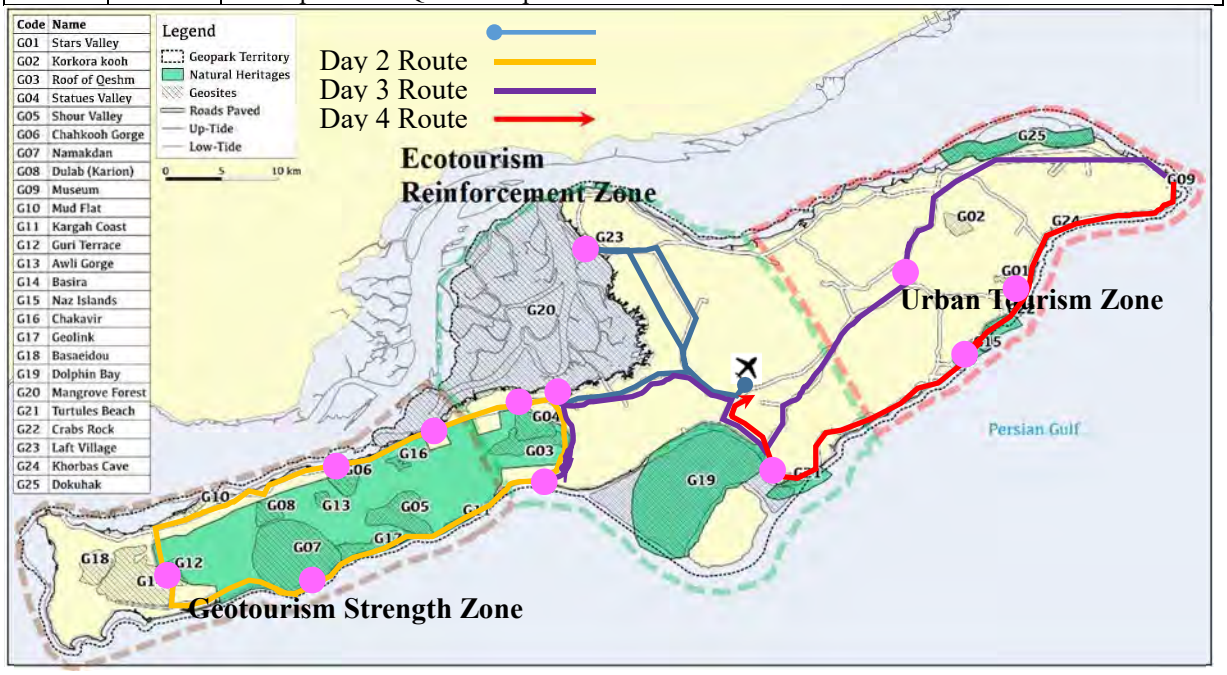
Strategy 1: To promote Qeshm as an ecotourism destination as part of holiday packages combined with stays on the mainland

Days	Time	Program
Day 1	A.M.	・ Arrive at Qeshm Airport ・ Visit Laft Ecomuseum (experience traditional wedding room and henna) ・ Lunch and a short excursion to Laft with a local guide
	P.M.	・ Visit Mangrove Information Center in Sohil and the Hara Mangrove Protected Area to enjoy a boat trip (Sohil) ・ Stay at a local guesthouse
Day 2	A.M.	・ Visit the Salt Dome, Chahkooh Valley and Gouron Lenj Building and Sailing Open Museum with *tartari* experience
	P.M.	・ Visit Statues Valley and trek to the Roof of Qeshm with a local geoguide ・ Stay in Qeshm City
Day 3	A.M.	・ Visit Star Valleys and Naz Islands ・ Visit Dolphin Bay and Hangom Island
	P.M.	・ Lunch at a traditional guesthouse and enjoy traditional music ・ Depart from Qeshm Airport



Strategy 2: To promote Qeshm via the GGN

Days	Time	Program
Day 1	A.M. P.M.	・ Arrive at Qeshm Airport ・ Visit Laft Ecomuseum (experience traditional wedding room and henna) ・ Lunch and short excursion to Laft with a local guide ・ Visit Hara Mangrove Protected Area (Tabl) to enjoy a boat trip and birdwatching ・ Stay at a local guesthouse
Day 2	A.M. P.M. Evening	・ Visit the Salt Dome via a geolink and Basira ・ Visit Chahkooh Valley and Gouron Lenj Building and Sailing Open Museum with *tartari* experience ・ Visit a traditional dates garden ・ Stay at a local guesthouse
Day 3	A.M. P.M.	・ Visit Statues Valley and Roof of Qeshm ・ Visit Salakh to enjoy fishing and cooking ・ Lunch at a local guesthouse ・ Visit Dolphin Bay and Hangom Island ・ Stay in Qeshm City
Day 4	A.M. P.M.	・ Visit Naz Islands and Stars Valley ・ Depart from Qeshm Airport



Strategy 3: To host international sports events such as marathons and triathlons

Qeshm can offer spectacular scenery for marathon runners. Additionally, it can also host an international triathlon event, which consist of swimming, cycling and running. The World Triathlon Organization organizes the "Ironman Triathlon", in which athletes compete in terms of physical endurance. Qeshm can provide some of the severe conditions during its summer for the event.

Example of marathon route, accessed on June 14, 2018.
Source: http://visit-okinawa.com/sport-und-freizeit/okinawa-marathon/.

Image of Triathlon, accessed on June 14, 2018.
Source: https://services.athlinks.com/beginners-guide-triathlon-race-management/.

Logo of Ironman Official Site, accessed on June 14, 2018.
Source: http://www.ironman.com/.

(4) Development plan

Actions should be taken to tackle recognized weaknesses and threats, as well as identify steps to support spatial development. Table 6.5.16 shows the goals in order to realize the proposed direction in the short, medium and long terms.

Table 6.5.16 Development Plan

	Subject	Short term (2019-2021)	Medium term (2022-2026)	Long term (2027-2036)
1.	Tourism administration	• To utilize existing Qeshm tourism association as a coordination committee to promote collective efforts to enhance tourism on Qeshm	• To involve local communities in taking initiative to develop eco-tourism via the tourism coordination committee	• To upgrade the tourism coordination committee as a destination management organization
2.	Marketing	• To agree core values of Qeshm and establish a brand for Qeshm via a participatory approach • To establish a mechanism to collect appropriate statistics • To develop and implement a Qeshm marketing strategy	• To strengthen the awareness and recognition of the Qeshm brand • To review the marketing strategy regularly, based on survey results • To install a regional tourism satellite account (TSA), as recommended by the UN World Tourism Organization	• To establish the royalty rights and identity for the Qeshm brand • To review the marketing strategy regularly, based on survey results • To improve the quality of the regional TSA
3.	Promotion	• To develop promotional materials and tools • To strengthen the functions of tourist information centers • To strengthen collaboration with the ICHTO on promotional activities • To participate in domestic and international tourism fairs as well as Dubai Expo 2020	• To review promotional materials and tools • To utilize tourist information centers to promote exchange activities between visitors and communities • To maintain the collaboration with the ICHTO on promotional activities • To participate in tourism fairs enabling access to target markets	• To renew promotional materials and tools • To review the functions of tourist information centers • To continue the collaboration with the ICHTO on promotional activities • To continue to participate in tourism fairs
4.	Local communities' involvement (human resource development)	• To establish a mechanism to implement eco-tourism on Qeshm • To train local eco-tour, geotour and cultural guides • To provide training to service providers to upgrade their skills and services • To promote local community involvement in the tourism business	• To establish a mechanism for tourism service providers to upgrade their skills regularly • To strengthen the network and collaboration among local communities engaged in tourism businesses	• To operate and review the established mechanism • To establish a mechanism to support newly emerging local entrepreneurs
5.	Seasonality	• To facilitate coordination between airlines, hotels and shopping centers to offer promotional rates during the low season • To organize events and festivals or develop experience tours by utilizing seasonal activities • To develop tour programs in which hot climate does not affect such as fishing by net and wind catcher experience	• To evaluate the results of measures taken and develop new countermeasures • To host sports event in which severe conditions are important such as Ironman Triiatholon	• To evaluate the results of measures taken and develop new countermeasures
6.	Tourism environments	• To liaise with Qeshm County on cleaning the cities • To maintain safety and security conditions	• To maintain clean cities • To maintain safety and security conditions	• To maintain clean cities • To maintain safety and security conditions
7.	Environmental conservation	• To raise local communities' environmental awareness through seminars and workshops	• To empower local communities to take the initiative in conserving vulnerable environments	• To continue conservation activities by local communities

Source: JICA Project Team