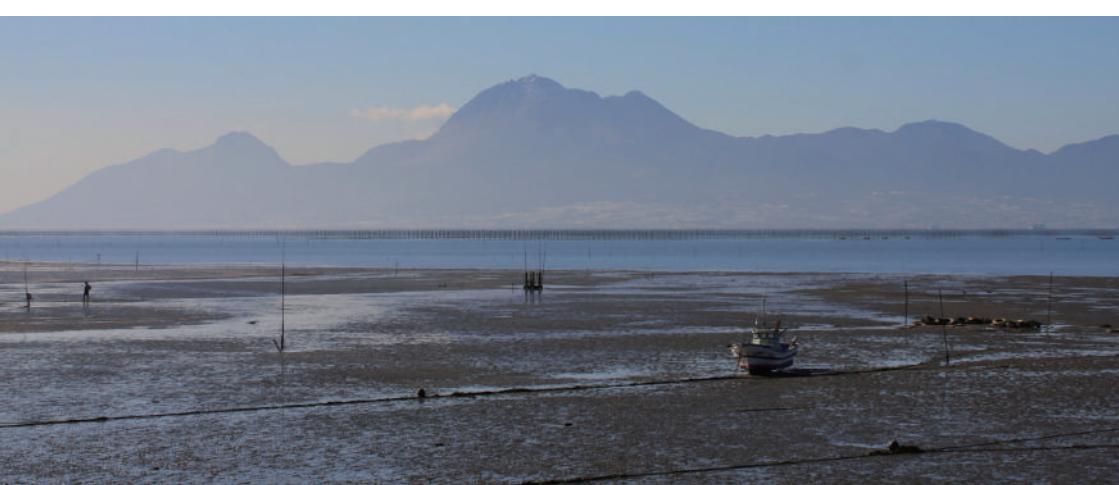


Ramsar Site

Arao-higata

The Guide Book to Arao-higata, Ramsar Site



Protect and nurture our rich treasure sea and the life of Arao-higata for the future

It's a great expanse of tidal flat in the Sea of Ariake
Tasty clams and laver are harvested from this tidal flat
Migratory birds, shellfish, lugworms, a diversity of life
Living side by side with the fertile tidal flat
are the people who nurture the life in the tidal flat,
who enjoy mud shrimp fishing during summer
The Ramsar site, Arao-higata
is our asset recognized by the World indeed



Outline of Arao-higata

Arao-higata—a tidal flat that represents the Sea of Ariake

The Sea of Ariake located in Kumamoto Prefecture, Japan, accounts for around 40% of the total tidal flat area of Japan. The extensive tidal flats in the Sea of Ariake were formed by large volumes of sediment carried by Japan's largest tidal flow and a vertical tidal range of 6 meters.

Arao-higata is located in the east of central



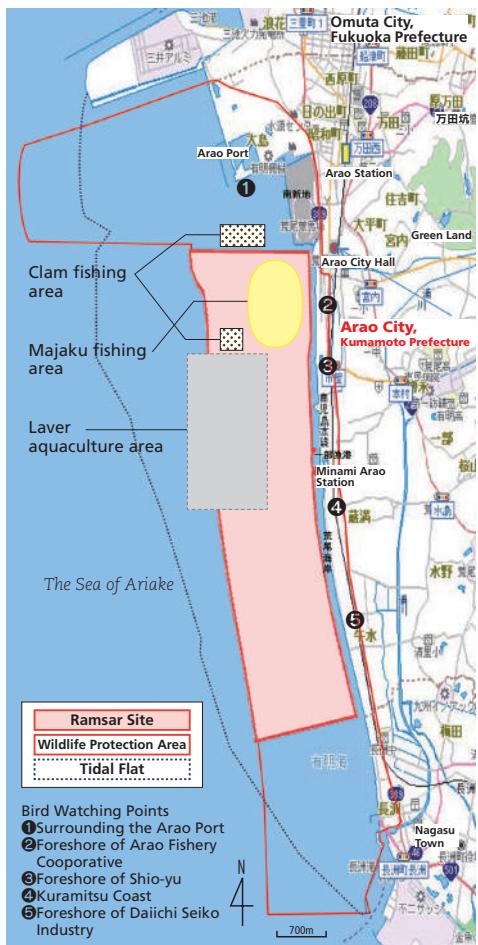
the Ariake Sea. It is one of the largest sandy tidal flat in Japan with a maximum width of 3.2 km and a length of 9.1 km.

Diverse living creatures of Arao-higata

There is no major river flowing directly into Arao-higata. Sediments comprising sand and shells that are carried by the tidal flow that circulates counter-clock-wise in the Sea of Ariake have formed the tidal flat. The sandy tidal flat consists of coarse sand and shells and is not like the boggy mudflats stretching along the other coast of the Sea of Ariake in Fukuoka Prefecture and Saga Prefecture.

Arao-higata has a rich benthic community and houses creatures such as lugworms, shellfish and small crustaceans. This area is called the 'treasure sea' by the local people due to waterfowls and fishes that feed on the rich sediment. Clam and octopus harvesting and the cultivation of laver have also thrived since the old days. There is also the traditional mud shrimp fishing festival called "Majaku-tsuri-taikai". More than 900 local residents and visitors to the Kumamoto Prefecture celebrate the blessing of tidal flat during this festival every summer.

Migratory waterbirds such as Dunlins and Kentish Plovers, which breed in Siberia and Alaska, use Arao-higata as their stop-over point in autumn and spring before the winter migration to Australia and New Zealand. Some ducks such as Common



Ramsar Site, Arao-higata

Shelduck also use here as wintering habitat.

The core area of Arao-higata (754 ha) was designated as a National Wildlife Protection Area in June 2012. Subsequently, in July 2012, the tidal flat was designated as the first Ramsar site as a wetland of the international importance in the Sea of Ariake.

Because of the importance of Arao-higata as a stopover habitat for migratory birds, the tidal flat was registered in 2013 with the East Asian-Australasian Flyway Partnership (EAAFP), an international partnership for migratory bird conservation.

Arao City with Arao-higata

Arao City, with an area of 5,700 ha and a population of 55,000, flourished as a coal-mining town from early 1900s. It shared the "Mi-ike coalmine complex", one of the largest coalmines in Japan, with Omuta City. However, the coalmine was closed because of the energy conversion policy in the 1960s.

Arao City is now a thriving agriculture and aquaculture center. It produces a variety of farm products such as rice and fruits including oranges, watermelons and a local specialty pear called "Arao-nashi". Clam fishing and



laver culture are thriving thanks to the rich nutrients of the tidal flat.

The laver produced in Arao-higata is famous by the name of "Ariake Nori" and is loved nationwide for its flavor, luster and crispy texture.

Arao City is a famous historical town. "Manda-ko", the main mining site of the Miike coalmine complex is designated as a Cultural and Historical Property of National Importance. This historical mine is open to the public as one of the Modern Industrial Heritage Sites. Arao City is the birthplace of the Miyazaki brothers who had a close friendship with Sun Yat-sen, the leader of the Xinhai Revolution in China.

The city is also popular for its large amusement parks and hot springs, which attract more than 2.4 million tourists annually.

Tidal Flat, a Bounty of Marine Life

The sediments carried from many rivers into the Sea of Ariake are rich in organic matter. Due to the strong ebb and flow of currents, the sediment is suspended in the water, providing nutrients for seaweed and plankton. Benthic organisms such as lugworms and clams feed on the sediment and abundant plankton, and migratory birds including shorebirds gather on the tidal flats to feed on the rich Benthic organisms.

As the water in the tidal flats and shoals is warm, calm and rich in nutrients, the tidal flats are ideal spawning and nursery grounds for fish. As such, the tidal flats have an important role in nurturing fish resources. In addition, the organisms on the benthos that are eating, assimilating and decomposing organic matter contribute to good seawater quality. In this way, this tidal flat with such a high biodiversity and productivity serves as a fertile breeding ground and maintains the natural ecosystem.

Ramsar Convention and Its Wise Use Concept

What is the Ramsar Convention?

Arao-higata was listed on the Ramsar List of Wetlands of International Importance as the 2,054th Ramsar site in the world on 3 July 2012.

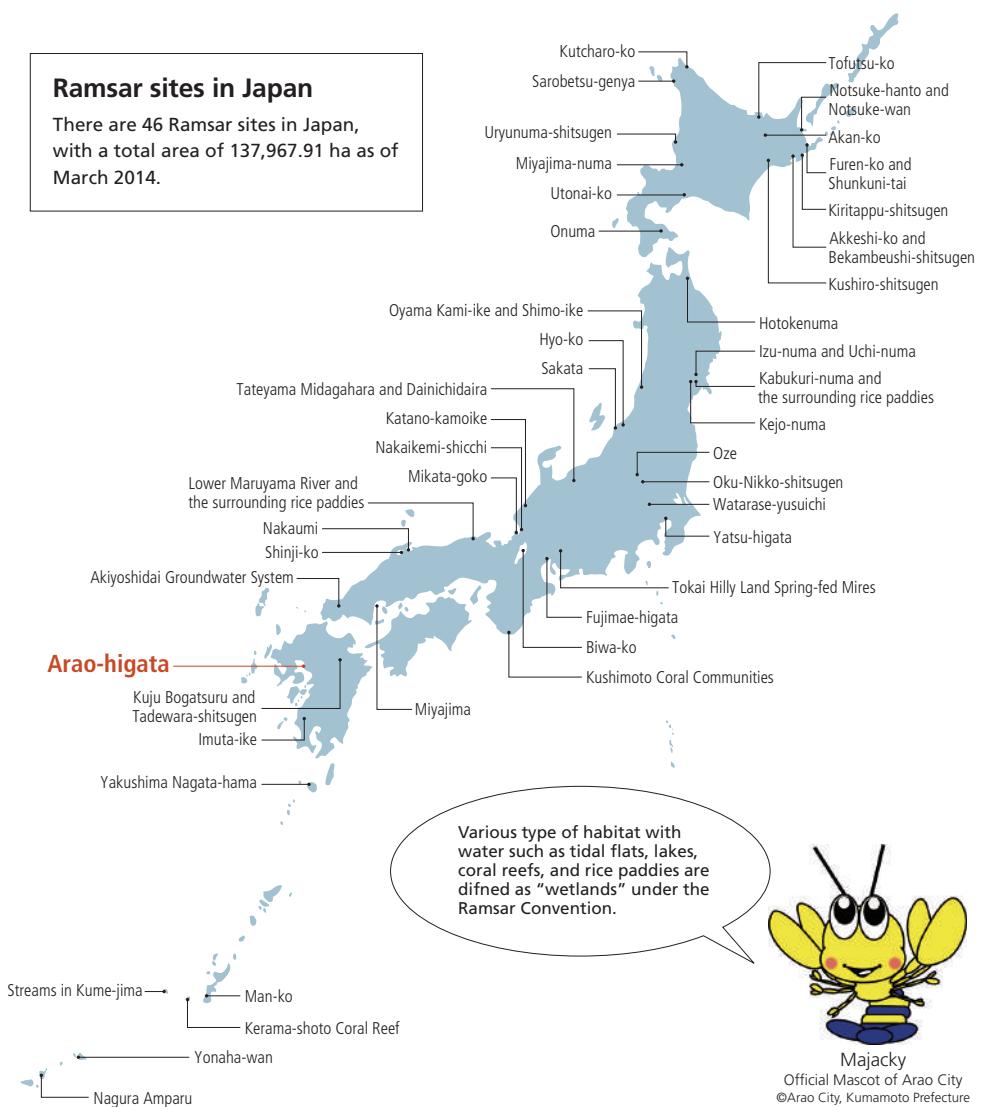
The Ramsar Convention is an international

treaty for the conservation and wise use of wetlands. Various type of habitat with water such as tidal flats, lakes, coral reefs, and rice paddies are defined as “wetlands” under the Ramsar Convention.

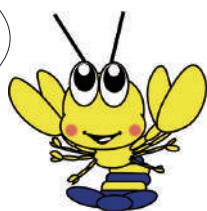
As of March 2014, the Convention had 168

Ramsar sites in Japan

There are 46 Ramsar sites in Japan, with a total area of 137,967.91 ha as of March 2014.



Various type of habitat with water such as tidal flats, lakes, coral reefs, and rice paddies are defined as “wetlands” under the Ramsar Convention.



Majacky
Official Mascot of Arao City
©Arao City, Kumamoto Prefecture

contracting parties and had 2,177 sites listed under the Convention covering 200 million ha of wetlands.

Japan acceded to the Ramsar Convention in 1980 and designated the Kushiro-shitsugen in Hokkaido Prefecture as the first Ramsar site in the nation. There are now a total of 46 sites in Japan including Arao-higata listed under the Convention. There are Ramsar listed wetlands, but few with substantial areas of tidal flats like Yatsu-higata (70 ha) in the Chiba prefecture, Fujimae-higata (323 ha) in the Aichi prefecture, Manko (58 ha) and Yonahawan (704 ha) in the Okinawa Prefecture. Arao-higata is of national importance as it has the largest tidal flat area of 754 ha.

Values of Arao-higata

Arao-higata is recognized as an internationally important wetland because it is a habitat for two endangered bird species namely the Black-faced Spoonbill and the Chinese Black-headed Gull. Both species are highly valued.

In addition, the sustainable use of the wetland by local people provided a powerful impetus towards its designation. The eco-friendly fishery practice including plowing the tidal flat for the growth of clams which resulted the increase of living creatures to be the “wise use of the wetland”, which is the most important concept of the Ramsar Convention.

Wise Use of the Wetland

The Ramsar Convention does not exclude people from the protected wetlands. In order to conserve wetlands, the Ramsar Convention values people's interaction with wetlands and their awareness of the benefits from the “wise use” of wetlands. It is necessary that the values and benefits from wetlands such as water, animals, plants and natural products, including fish and rice, are

“utilized practically”. In other word, Ramsar Convention does not seek to stop human interaction with wetlands. Instead, it encourages the concept of “wise use”, a way of using the wetland wisely.

“Wise use” means a relationship with wetlands to sustain various benefits from wetlands for the future.

In order to examine the way of conservation and wise use unique to Arao-higata, the Ministry of the Environment organized a “Conference for the Wise Use of Arao-higata” in 2013. Various stakeholders with a strong relationship to the tidal flat were invited to exchange ideas and opinions. The participants discussed under the principle of “Protect and nurture our treasure sea, life abounding Arao-higata for the future” and developed “The Basic Plan for Wise Use of Arao-higata” and “The Basic Plan for Field Base Facilities in Arao-higata”.

Stakeholders representing various views such as the local people, government administration, concerned organizations and experts developed common goals and a strategy of how to achieve the goals through consultation and mutual cooperation.



Ramsar Convention, Fishery and Wise Use

The Ramsar Convention has two specific criteria based on fish (criteria 7 and 8) among the Criteria for Identifying Wetlands of International Importance. Resolution IX.4 adopted at the Conference of the Contracting Parties (COP), states that fishing is of great social, cultural and economic importance, and notes ecosystems such as tidal flats provide benefits such as water purification and food supply. It is very important for tidal flat conservation to undertake inventories of fisheries resources. The livelihoods of the future generations are dependent upon the maintenance of these tidal flats through sustainable fishery practices.

Examples of Wise Use in Other Ramsar Sites

Based on this approach, fishing is actively carried out in Japan both in the Ramsar sites and non-Ramsar sites or wetlands. In addition to fishing, various forms of wise use are practiced in tidal flats including tourism and recreation.

Shinji-ko is a brackish lake (8,000 ha) in the estuary of Hii River system in eastern Shimane Prefecture. Shinji-ko is famous for its “7 dainty seafood” such as sea bass, prawn, eel, smelt and ice fish. It houses a rich diversity of fish and related resources characteristic to this unique brackish water lake. Shinji-ko boasts the largest column of catch of Corbicula Clam in Japan. In order to ensure sustainable resource use, local fishermen have undertaken specific efforts including development of regulations on annual fishing period, prohibition of catching small size clams and measures towards water quality improvement.

Mikata-goko is a cluster of five, large and small lakes (approx. 1,110 ha) on a raised coastline facing Wakasa Bay on the west coast of Fukui Prefecture. The lakes are connected to each other by waterways. Due to the different salinity, area, size and depth of each lake, there are a variety of assemblages of fishes including freshwater, brackish water



Arao-higata in flow tide

and migratory species. Aquaculture is widely practiced in Lake Hiruga. Many tourists come to enjoy the beautiful landscape and tasty seafood.

Furen-ko is a brackish lake (5,600 ha) that used to be a part of the sea, at the base of the Nemuro peninsula in Hokkaido. The lake is connected to the sea of Okhotsk via two outlets. The extensive tidal flat formed along the shore is a fishing ground for clams and fishes. In order to manage eutrophication in the lake, local communities are engaged in environmental restoration activity such as planting trees in the catchment area.

Akkeshi-ko is a brackish lake situated on the coast of Pacific Ocean in eastern Hokkaido. Oyster aquaculture flourishes here due to the calm lake water. This lake is a Ramsar site demonstrating “wise use” of fisheries along with Akkeshi Bay, a famous fishing ground for salmon, trout and kelp. The local fishery cooperative conducts tree planting in the up-

per reaches of the rivers flowing into the lake.

Yatsu-higata is a 40 ha tidal flat in Narashino City, Chiba Prefecture, located approximately 2km inland from the coastline of Tokyo Bay. Although most part of the tidal flat that stretches along Tokyo Bay was reclaimed, Yatsu-higata survived miraculously by active conservation efforts of local community. It is an important stopover site for migratory birds, and also a popular site for recreation and environmental education.

Manko is an estuarine tidal flat (58 ha) in Okinawa Prefecture, formed at the confluence of the Kokuba River in Naha City and the Noha River in Tomigusuku City. Rich in biodiversity including crabs and lugworms, the site is an important staging and wintering area for migratory birds. There is an extensive mangrove forest on the western bank. As it is in the vicinity of an urban area, this tidal flat is quite popular among locals as a place for recreation along with the neighboring Manko Park.



Arao-higata in ebb tide

Tidal Flat and Fishery

Tidal Flat is a Farmland in the Sea

The tidal flat with abundance of animal protein has been called “farmland in the sea” and active fishery in the tidal flat has supported the livelihood of the local people for centuries. According to the “History of Arao City (vol. Environment and Folk Customs. 2012)”, Arao-higata has 80 species of benthos including sea anemones, lugworms, mud shrimps, prawns, crabs and clams. The Sea of Ariake has many endemic and sub endemic species found only in the Sea. Some of them such as brackish goby, Mudskipper, a crab species (*Hemigrapsus sinensis*), Heikegani, and a shellfish species (*Lingula anatina*) are found in Arao-higata as well. More than 100 species of fish including the Gizzard shad, Tonguefish, Yellow striped flounder and White spotted conger are also found here.

According to the Top 20 marine products harvested in Arao City, the greatest harvest was the Manila clams and other shellfish from the tidal flats, which comprised 70 % of total harvest of top 20 marine products harvested (statistics of 2011). However, the catch has decreased remarkably compared to the past when the tidal flat was called “Treasure Sea”.

In order to improve the environment in the tidal flat, Arao Fishery Cooperative has been plowing the tidal flats since 1988. In February and July every year, tractors are used to plow the tidal flat during low tide. The oxygen that penetrates deep in the sandy ground by plowing accelerates the growth of planktons, which will be eaten by clams resulting in increased clam catch. The local fishermen call this phenomenon as “Clams are out welling”. High plankton levels can cause “red tides”. However, higher numbers of clams will control the number of plankton and contribute to maintaining good marine water quality, which is essential in growing tasty laver.

Tidal Flat and Laver

The Sea of Ariake is a fertile area for laver culture. Its laver is famous all over the nation by the name of “Ariake Nori”. The major producing district for laver in Japan used to be Tokyo Bay, which had an extensive tidal flat before, and the famous laver in Tokyo was called “Asakusa Nori”. Now that more than 90% of tidal flat have disappeared from Tokyo Bay due to reclamation. As such, the Sea of Ariake now accounts for 40% of total laver output in Japan.

The laver culture in Arao-higata started in earnest in 1950s and it is said that there were more than 400 households engaged in laver culture. Laver culture is still thriving, taking advantage of the shallow sea water with a wide tidal range. Laver is one of the major products in Arao-higata along with clams.

The work for laver culture in Arao-higata starts in September every year. Tens of thousands of poles are planted in the offshore tidal flat. When the water temperature gets below 23°C around October, many nets with laver seed (spore) are tied to the poles.

The buds of laver grow steadily in the wave of ebb and flow repeated twice a day until the harvest season starts around November, when the laver turns from red to black. The harvest of laver continues until early spring in March. The outbreak of red tide and rise in seawater temperature affects the output of laver considerably, regeneration of the tidal flat is one of the biggest challenges in Arao-higata.



Tens of thousands of poles are planted in the offshore tidal flat.



Plowing the tidal flat by tractors during low tide.



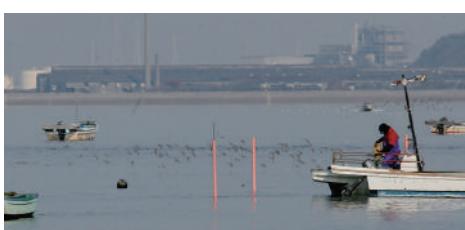
Plowed tidal flat



Nets with laver seed (spore) are tied to the poles



Sprinkle the young clams on the tidal flat



Flocks of waterbirds flying by fisherman's boats

Benefits from Arao-higata: Fortime scene of fisheries



Traditional fishing methods used in Arao-higata.



The whole family is involved in the clam catch

Tons of clams were caught from Arao-higata



Fishing activities is a tradition in Arao-higata. These photos taken some 50-60 years ago show the traditional fishing methods used in Arao-higata.

Clams taken in the tidal flats were loaded on the boats. Waiting for the flow tide, the boats carried the clams to the shore. Tons of fan-mussels and clams were caught from the rich bounty of the sand. In summer, people enjoyed sea bathing. Arao-higata was really the "treasure sea".



In summer, people enjoyed sea bathing.

Traditionally, bamboos were used for the laver aquaculture



Drying the hand-made Arao-nori Laver in the sun



Arao-higata Is a Major Staging and Wintering Habitat for Migratory Birds

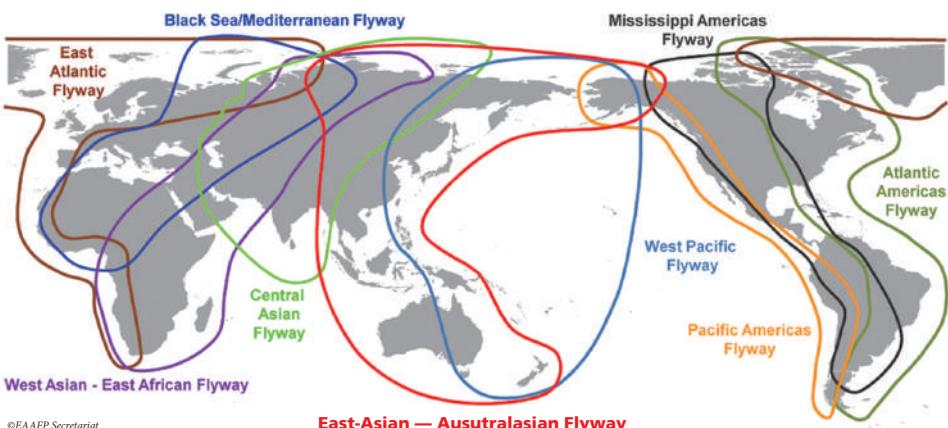
An important place for migratory birds

Many migratory birds visit Arao-higata. Shorebirds such as sandpipers and plovers are most abundant among them and visit Arao-higata from autumn to spring as their stopover. A number of shorebirds such as Kentish Plover, Grey-tailed Tattler, Grey Plover, Rufous-necked Stint, Terek Sandpiper and Lesser Sand Plover stop over in autumn, and the birds such as Dunlin and Kentish Plover spend winter here while the birds such as the Bar-tailed Godwit, Grey Plover and the

Grey-tailed Tattler are common in spring.

The survey "Monitoring site 1000, Survey on Shorebirds" conducted by the Ministry of the Environment in spring 2008 and in winter 2011 reveals that the number of birds observed in the coast of Arao including Arao-higata is the second largest in Japan.

In addition to this, Arao-higata is irreplaceable as a wintering and stopover habitat for a number of migratory birds such as Black-faced spoonbill, which is cited as "critically endangered" in the Ministry of the





1



2



3



4



5



6



7

1. Enjoy bird watching 2. Shorebirds visit Arao-higata as their stopover
3. Western Curlew 4. Grey Plover
5. Bar-tailed Godwit 6. Saunders' Gull
7. Kentish Plover is designated as a Bird of Arao City

Environment's Red List, along with Common Shelduck, and the Saunders' Gull, both of which are cited as "endangered" in the same Red List.

There are several bird watching points along the Arao coast as indicated in the map on page 2.

Flyway Partnership

Migratory birds move a long distance every year from their breeding sites such as the Arctic, Siberia and Alaska to their wintering sites in Australia and New Zealand. There are 9 major flyways for migratory birds in the world (cf. the map).

Japan belongs to the "East-Asian Australasian Flyway Partnership" which is crucial to the conservation of more than 50 million migratory waterfowl such as sandpipers, plovers, cranes, swans, geese and ducks, including 28 internationally endangered species.

Migratory birds account for 60 percent of the bird species recorded in Honshu, Shikoku, and Kyushu, and as much as 80 percent in

Hokkaido and Ryukyu islands. This indicates that the Japanese Archipelago is an important place for migratory birds.

The "East-Asian Australasian Flyway Partnership (EAAFP)" is an international liaison and cooperation framework for the conservation of migratory birds. It is an international cooperation project aiming to build an international network of important bird habitats, promote public awareness and conservation activities.

Japan has registered 30 important sites on the Flyway Site Network including Manko (Okinawa Pref.), Nakaumi (Tottori Pref.), Fujimae-higata (Aichi Pref.), Yatsu-higata (Chiba Pref.), Sakata (Niigata Pref.), Kabukuri-numa and the surrounding rice paddies (Miyagi Pref.), and Kutcharo-ko (Hokkaido Pref.). Arao-higata among the sites of EAAFP is a testament of its international importance as a habitat for migratory birds.

How to Enjoy Arao-higata

Exciting “Majaku” Fishing

Majaku is a local name in Arao for Japanese mud shrimp, a crustacean living in tidal flats.

It lives in 1~2 m deep Y-shaped vertical tunnel in the tidal flat. Majaku fishing technique use paintbrushes, which is inserted into the nesting hole of Majaku. It is a traditional fishing technique in the Sea of Ariake, where the Majaku pushes out alien substances (invader) from its nest.

In July every year, Arao Fishery Cooperative and the City jointly hold the “Arao City Majaku Fishing Festival” in Arao-higata. Majaku fishing is a regular summer event in Arao City and loved by many people in and out of the prefecture because they can enjoy fishing

guided by local fishing masters. In 2013, more than 900 people attended this event.

Majaku is about 10cm long and taste like shrimps. After fishing, people enjoy Majaku dishes such as tempura (deep fry) and nitsuke (simmering).



1. Many people gather at the Majaku fishing festival on the tidal flat 2, 3. Majaku is about 10cm long 4. Tasty tempura (deep fried Majaku) 5,6. Dig in the sand, insert the paintbrush in the nesting hole and catch the Majaku

Protecting the Tidal Flat

Local People and the Efforts of Committee for the Conservation and Wise Use of Arao-higata

The outbreak of red tide caused by water degradation, and decreasing fish haul due to exhaustion of resources have prompted the fishery cooperative to initiate a restoration project including tidal flat cultivation and sand scattering in Arao-higata.

In addition to this, the local people living along the coast in Arao City has carried out some nature conservation work, including preservation of pine colonnade, beach cleaning and regular bird watch meetings in collaboration with the Kumamoto branch of the Wild Bird Society of Japan. Furthermore, the governments of the 4 prefectures around the Sea of Ariake conduct simultaneous beach cleaning every August.

In Accordance with the designation as a Ramsar site, local stakeholders representing fishermen, the business sector, tourism industry, naturalists and the Arao City Gov-



Beach cleaning by citizens (upper), sand dune plant of *Vitex rotundifolia* (below)

erment established the “Committee for the Conservation and Wise Use of Arao-higata”. The aim is to conserve and restore Arao-higata and the surrounding environment, and to promote conservation and wise use of the species in the tidal flat including migratory birds. In order to raise public awareness for the Ramsar Convention and Arao-higata, they organized activities such as holding regular meetings, setting up public awareness signboards and organizing symposiums.

Tourist Attractions and Local Products in Arao City

Manda-ko Coal Mine The coalmine Manda-ko started its operation in 1902 and it was one of the major coalmines in Japan till 1940s. A part of the coalmine is preserved just as it used to be, which is open to the public now.

Birthplace of Miyazaki Brothers The birthplace and a museum of Miyazaki brothers including Toten Miyazaki. They had a close friendship with Sun Yat-sen, known as the leader of the Xinhai Revolution in China.

Green Land One of the largest amusement park (3 million m²) in Kyushu, with a towering ferris wheel as a landmark. A million people including families visit here every year.

Arao -nashi Pear A type of pear variety, Niita-

ka-nashi, that bears large fruits. Kumamoto Prefecture boasts the second largest output of this pear variety next to Chiba Prefecture.

Shodai Ware An earthenware made of reddish brown clay produced in Shodai-san Hill (501m) in eastern Arao City. It is one of the representative earthenware in Kyushu district.

Arao-nori Laver Thick and crispy laver cultivated in nutrient rich Ariake Sea.

Laver Soy Sauce A soy sauce mixed with 10 to 30% laver extract produced in Arao, a unique seasoning from the laver producing area, Arao.

Melon Pan A bread loved by locals. A hidden local specialty, delicately sweet and soft with crispy thin crust.

Access Guide

Access

by train

Hakata st. → Arao st. (50 min by limited express train)

Kumamoto st. → Arao st. (30 min by limited express train)

by car

40 min from Nankan IC or Kikusui IC of Kyusyu Expressway

by boat

Tahira Port (Nagasaki Pref.) → Nagasu Port (Kumamoto Pref.) (45 min by Ariake Ferry)

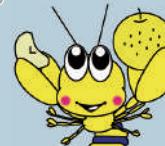
by air

90 min by non-stop bus from Fukuoka Airport, 70 min from Saga Airport or 90 min from Kumamoto Airport by car

Arao-higata (Kuramitsu-kaigan) is located 5 min walk from Minami Arao St. or 10 min by taxi from Arao St. on JR Kagoshima Main Line (Honsen)

Information

- Kyushu Regional Environmental Office, Ministry of the Environment
<http://kyushu.env.go.jp/>
- Arao City <http://www.city.arao.lg.jp/>
- Arao Sightseeing Association <http://arao-kankou.jp/>
- Wild Bird Society of Japan, Kumamoto Branch <http://torikuma.com/>



Majacky
Official Mascot of Arao City
©Arao City, Kumamoto Prefecture

Guide Book to Arao-higata, Ramsar Site

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