

# Environmental Issues in the Jeju Island, Korea.

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## Introduction

Jeju Island is Korea's largest island in the southwestern sea from the Korean Peninsula with a population of 500,000 on 1,845.60 km<sup>2</sup>. It is a beautiful island which has been attracting the tourists from South Korea, Japan, China and foreign presidents for the summit conferences, including US President Bill Clinton and Russian President Mijail Gobarchov, and many other international conferences. It has been isolated from the Peninsula, but it is located in one hour's distance by airplane from Seoul to Jeju. Jeju Island has maintained its own unique history, dialect, and culture, somewhat different from the Peninsula. Blue oceans and Mount Halla, the highest peak in South Korea, the second highest next to Mt. Paekdu in all Korea, oranges, pork, fish, rocks, wind and woman are famous assets. So it is a

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favorite spot to visit.

Created by a series of volcanic activities, the island has many long caverns to be explored in the coastal area. Its southern part has many natural scenic places and orange trees walled by the dark rocks against the wind from the ocean. It is a picturesque town. The Jejuwomen have been tough for their diving into the sea to collect seaweed, abalone, sea cucumber and fish, while raising their children. They are cash crops from the sea.

In recent years, developers have been constructing condominiums and golf courses in the scenic places. Tourism is the major revenue source of the Island. The pristine environment has been ruined for the development purpose. The land has become a precious commodity. Solid waste has been increasing, and the drinking water is becoming a scarce economic value. Conservation of nature and protection of the environment are voiced by the civic organizations. Confrontational politics between the developers and the environmentalists is emerging in the beautiful island.

Jeju's strength, weakness, opportunity and threat are as follows: (Jeju Environmental Planning Document, 2005). See Table 1:

<b>Table1 JejuSWOT</b>	
<p style="text-align: center;">Strength :</p> <p style="text-align: center;">Beautiful island setting Nature conservancy and cultural heritage Image of clean environment Citizens' environmental consciousness Environmentally sound and sustainable development</p>	<p style="text-align: center;">Weakness :</p> <p style="text-align: center;">Increasing number of automobiles Increasing number of tourists Increasing large scale development Increasing highway construction</p>
<p style="text-align: center;">Opportunity :</p> <p style="text-align: center;">Desire for environmental quality Environmental paradigm UNESCO natural heritage designation of Mt. Halla, and other hills International Free City</p>	<p style="text-align: center;">Threat :</p> <p style="text-align: center;">Environmental impacts from Shanshi Dam construction in China's Yangtze River Financial weakness for environmental facility investments Low competitiveness of Jeju's orange and farm products</p>

Strength : pristine environment ; nature conservancy, historic preservation, citizens' high environmental consciousness; environmentally sound and sustainable development.

Weakness: increasing number of automobiles, tourists, highway construction, and large-scale development.

Opportunity : citizens' desire for environmental quality; environmental paradigm, UNESCO's natural heritage designation of Mt. Halla and other hills; and the international free city.

Threat : Ocean degradation from the Shanshi dam construction in China ; low financial commitment for the environmental investment ; low competitiveness of Jeju orange and farm products in comparison with the United States.

The Jeju Environmental Planning sets up the three stages for the future. It is now in the first stage (2003-2010) for the foundation work. The second stage for 2010-2020 and the third stage for 2020- ) are designed for environmentally sound and sustainable development and for creative environmental management respectively.

This paper is to discuss the Jeju Island's environmental issues and its future. Describing the present state may lead to the forecasting the future. Description can contain explanation and prescription.

## The Current Issues

### 1. State of Nature

Jeju Island is more than an island; it is composed of the main island and eight man-living small islands and 54 no man's islands. Its land is 1.85 percent of South Korea land; one tenth of North Kyungsang Province and one fifth of North Choongchung Province. Its coastal land below 200 meters sea level is 54.8 percent of the island that is residential and farming lands. Its high elevation between 200 meters to 600 meters sea level makes 31.9 percent for grazing land; 600 to 1,000 meters sea level makes 8.9 percent for forest and tourism; and the 1000 or above makes 4.4 percent for the Mt. Halla National Park. New "Jeju International Free City Special Law" will

dictate the land use regulations: At the present time, nature conservation area, 13.1 percent; scenic area, 15.9 percent, and the groundwater conservation area, 16.3 percent. They are somewhat overlapping (Yang Ha-beck, 2002). The special law still emphasizes the environmentally sound land use planning, and will protect the environment.

In the past 30 years, average temperature of Jeju Island is 14.7 degree Celcius, and precipitation in Jeju City is 1,423.6 millimeter, and that in Seoguipo Ccity is 1,771.4 millimeter. Mt. hall is at the center of the Island. There is no big river: the longest river is 30 kilometer; and a great majority of streams are 15 kilometers long. The rivers do not flow, except the flooding season. The volcanic rocks under the river and streams are absorbing the rainwater immediately. So they are all dry rivers and streams.

The groundwater provides enough drinking water forthe humans and wildlife, and farming for orange trees and other harvests. Therefore, conservation of groundwater and protection of water quality of the groundwater has been a major environmental issue in the Jeju Island.

There are 1,800 plants on the Island. The island is one botanical garden. There are 10 endangered species, and 63 species under the close watch. Invasion of foreign flora and fauna, and animals is closely monitored by the biologists. There are 300 different schools of fish living in the near sea of the Island.

## **2. Air Quality Management**

Coal-burning power plant and increasing number of cars are the major sources of carbon monoxide (0.5 ppm), nitrogen dioxide (0.0105 ppm), and

particulates in the Island in 2003.. Sulfur dioxide is controlled (0.0025 ppm). In the Spring, yellow dust originated from Gobi Desert and China is reaching the Island. In summer, violation of Ozone standard is troublesome. But the air quality of the Island is generally speaking in compliance with the national air quality standard. The Jeju Island is trying to establish the Swiss air quality (Jeju Environmental White Paper, 2004).

### 3. Water Quality Management

Drinking water is supplied to almost all Jeju houses and offices. 99.9 percent of Jeju people drink water coming from the water plants. However, the wastewater treatment plants treat only 65 percent of all wastewater at the present time. This low rate of wastewater treatment affects the groundwater contamination. Protection of groundwater quality is a lifeline for the Island people. So all preventive measures are taken for the protection of water quality. Since 1990, a series of the JejuDevelopment Special Law has stipulated the protection of groundwater quality and quantity. In 2006, the public nature of groundwater under the JejuInternational Free City Special Law enhanced the nature of public water. However, excessive withdrawal of ground water in the dry year or season is causing potentially a big trouble to the Island people. Monitoring of water quality and strict reporting of withdrawal are conducted. Seawater is invading the coastal area's groundwater. Nitrogen in the groundwater below 200 meters sea level has been found excessive. Nitrogen is attributed to fertilizer use and animal waste, wastewater plant operation, and exploration of groundwater (Ko Gi-won, 2006).

The water quality in the Jejurivers and streams is evaluated as the first class by the biological oxygen demand standard. But the Changro Stream is

evaluated as the second class.

#### **4. Ports and Coastal Management**

The Jeju Island's coastal area is not yet invaded by large industrial park ; fishing villages and orange field are located in the coastal area. Hotels and the 2002 WorldCup Soccer Stadium are new landscapes in the recent years. Oil spill from the harbor, fishing nets and tools from fishing boats and abandoned boats are nuisances to the coastal area. There are 107 ports in the Island; however, 85 percent of them are just fishing village ports. Jeju is the large port, followed by Seoguipo, Sungsanpo, Hanlim Port, Hwasoon Port, and Sosulpo. A great majority of ports are anchored by small boats. Ports of Jeju, Seoguipo, Sungsanpo, and Hanlim are polluted by the infusion of solid waste and wastewater from restaurants and inns, and shops, and oil spill from the sailing boats and anchored boats. Since they are all open to the ocean, pollution is washed out. Water quality in the inner harbors is classified as the second class or the third class by chemical oxygen demand standard in the summer time.

#### **5. Waste Management**

The Jeju Island people produced 628 tons of solid waste per day. Their waste generation is getting more, about 1 kilogram per person: food waste makes 34 percent and paper wood products 24 percent. Home appliances and electronic goods such as refrigerators and televisions are increasing in the solid waste dump sites. Recycling of solid waste is 46 percent in 2003 (Jeju Environmental White Paper, 2004). Jeju City and Seoguipo City have one land disposal site each. Waste in Jeju City is becoming an issue among the land owners, and the City Government, when old Shinhan Department

Store went to bankrupt in 2005. Waste disposal is becoming expensive, so that who should be responsible for the waste is a legal issue. There are 12 small land disposal sites for the wastes generated from counties. Groundwater contamination can be a serious issue to the Jeju people in the future, if not yet the issue.

## Jeju's Environmental Policy for the Future

### 1. Nature Conservancy

The Jeju people should decide the future for the Island: develop more or conserve the nature more. Optimum development should be optimum conservation. The ratio of residents and tourists is 1 to 8 in Jeju Island. That ratio in Hawaii is 1 to 6. So the tourism industry may not be expanded from the residents-visitors ratio. More developments will certainly pressure the conservancy of the nature. Man-nature relationship will be tough.

Development means invasion of Mt. Halla from the bottom up. The Jeju Special Law on Land Use has classified the land into an absolute conservation area, conservation area, and special management area in terms of the need and level of conservation. All three areas should not be subject to the pressure for the development. Those who support the development may like to change the conservation area for possible development area with significant environmental concepts. This area means the middle-level of Mt. Halla. The top of Mt. Halla has been designated as the national park, so it can never be subject to the developmental pressure.

The Jeju Island ought to protect its nature and the environment. Under an

agreement with the Central Government, the Jeju Provincial Government should maintain the higher standard over the national standard in order to conserve the Jeju nature and to protect the Jeju environment. This is the spirit of the National Environmental Policy Act, too. Jeju requires the higher standard, because the Mount Halla is now designated as the UNESCO's World Natural Heritage, beyond the natural treasury of South Korea, and Korea as a whole. The wilderness of the mountain should be preserved. Each tree, rock, plant, bird, flower and hill should not be removed. At least 30 percent of Jeju Island should not be subject to any development activities. The Jeju governor and provincial legislative members should be the leaders who can protect the island as the nation's one of the best treasuries. Business leaders and citizens should make the prime policy to conserve the nature and to protect the environment. Business executives tend to forget the spirit of the National Environmental Policy Act. They should be educated to learn the value of the nature and the virtue of environmental protection.

Seoguipo City gave up its own Hanon Crater Restoration Project due to lack of budget to purchase the land, 488 billion won. The floor of the crater is 150,000 pyong. It can be another geo-scientific tourist spot (Halla Ilbo Editorial, September 12, 2006).

## **2. Basic Environmental Facilities**

### **2-1. Waste Incineration Facility**

Landfill of the solid waste is going out, and incineration is a new order of waste management. Landfill is threatening the quality of groundwater in the Jeju Island which is the major source of citizens' drinking water. The Jeju incinerator can burn 200 tons from the northern part of the Island and 100 tons from the southern part daily. Its construction cost was 450 billion won from 1997-1999. Dioxin was and still is an issue of citizens' health concern. The Jeju incinerator can comply with the stringent standard of 0.5 ng/Nm<sup>3</sup>. The existing landfill in Seoguipo city has been enhanced by the concrete wall in order to protect the groundwater.

### **2-2. Wastewater treatment plant**

The wastewater plant treats 60,000 tons per day from City of Jeju and 220,000 tons from City of Seoguipo; however, the Jeju Island generates 150,000 tons per day. So it treats only 53 percent. Untreated wastewater pollutes groundwater and coastal land and sea. Jeju island has a plan to improve the plant capacity for 70,000 tons more. Seoguipo has a small plant to treat 10,000 tons per day its Joongmoon area, which is known for the most attractive tourist town. Sungsan is now operating its own small plant. Four rural counties are collectively operating their wastewater plant for 35,000 tons per day. Under the circumstances, the Island has nearly 100 percent treatment system.

Installing the pipeline to transport the wastewater is one thing, and maintenance of the pipeline is another. Expensive operation cost and

maintenance cost should be the high priority for the island budget as the environmental priority task.

### **3. Water Resources: Conservation and Development**

The Ohseungsend Reservoir and groundwater are the two major water sources of the Jeju Island people. The drinking water plant supplies almost 100 percent for human consumption and farm consumption. Future population growth, their higher standard of living, and increasing tourism industries will demand more water supplies. One forecasting is shortage of water supply to the water need in 2011. Optimum daily supply is 1,768,000 cubic meters, but the water need is 1,839,000 cubic meters in 2011 (Chung Cha-youn, 2005). The major water consumption is farming (72.3 percent of all consumption at the present time. The future is not necessarily optimistic, because the water resource is limited in the Island. The Korea Water Resources Corporation did provide a comprehensive survey of Jeju Island water resources, water conservation, and drinking water plant operation and its future improvement room in early 1990s. Now, it has a capacity to supply 135,000 cubic meters per day with 135 kilometer pipeline from underground aquifersto the consumers. The National Government provided 865.2 billion won and the Jeju Island Government provided 491.2 billion won for this water project.

2004 was a critical year of water resources in the Island. On March 22, 2004, World Water Day, the Jeju Governor declared the public ownership of groundwater. The public nature of groundwater had been declared in 1994 by the JejuDevelopment Special Law: permit of withdrawing groundwater, reporting of withdrawals, and fees and charges for the withdrawals were stipulated in the law. In 2004, the Governor reemphasized the public

ownership of the groundwater:

Groundwater is not under any individual's ownership and his/her exclusive right to use. It is under the public ownership, and should be managed by the comprehensive water resources planning.

Private exploration or exploitation of groundwater should be prohibited. The regional or island-wide forecasting of future water consumption and possible amount of water supply should be scientifically examined.

Continuous basic surveys on the hydraulics, geology, and water resources in the Jeju Island should be conducted.

Development of surface water for the farming use, and reducing of groundwater should be sought after.

Prevention of groundwater contamination and monitoring of groundwater withdrawal should be done by all means.

Formation of environmental scientists, civil engineers and scholars who are specialized in water resources management is urgently needed to support public ownership of watersurface and ground water.

Drinking water and sewer management are still inexpensive, and therefore people tend to waste water. The Jejupeople do not yet see the scarcity of water resources. The economic value of water should awaken the Island people. The Jeju people, particularly Jeju farmers should be educated to know that water conservation is the lifeline to them, and to the future generation. Farming should be productive and competitive. Water and sewer

bill should not be subsidized by the government. It should reflect the actual cost of drinking water supply and sewer treatment system.

Water conservation in every kitchen faucet and bathroom, office, school, hotel, farm and recycling of used water should be enforced.

#### **4. Operation of Monitoring Networks of Environmental Pollutions**

Monitoring of air quality, water quality, noise level, and soil contamination is conducted by the national government (Ministry of Environment) and the Jeju Island Government monthly and quarterly. The groundwater level, temperature, quality, PH, CL, and precipitation among others are more frequently monitored. Monitoring should be scientifically done. Analysis of monitored data and information should be shared by all people inside and outside the Island.

#### **5. Local Agenda 21**

Since the United Nations Environmental Conference in Rio de Janeiro in 1992, all local governments have had their own responsibility to implement the local environmental actions under the appropriate catch-phrase, "Think Globally, Act Locally!" The government, business organizations, and civic organizations at the local level are supposed to make an orchestrated effort to make environmentally sound and sustainable development.

The Jeju Island has established "Forever Green Island, Jeju" as a vision statement and produced the following action programs: "Beautiful and Affluent Jeju with Proper Man-Nature Relationship," "Clean and Amicable Life Style, "Welfare and Cultural Jeju Community," "Environmentally

Friendly Industrial Structure and Resources Cycling Society," and "Evergreen Jeju actualizing Environmental Self-Local Government."

Local Agenda 21 has not yet evaluated as a success from the implementation perspective. This can be common in other localities in South Korea.

## **6. General Public's Environmental Consciousness**

Environmental education should be placed in all curricula from elementary school to colleges and universities. Jeju has utilized the school buildings no longer used for civic environmental schools run by the environmental NGOs. Children's extra-curricula activities are conducted in the old school buildings and outside. The Environmental White Paper has been annually published since 1996. All information is readily available to the public inside and outside the Island.

## **7. Wind Energy and Solar Energy**

Jeju Island is famous for its wind, sun and ocean tide. Wind energy, solar energy, and tidal energy can be renewable energy sources for the Jeju Island people. It has a great potential to explore these natural resources for the Island. Seogwipo City is innovative to utilize heating for the winter season and cooling for the summer season from renewable energy sources, and has a plan to supply energy for the citizens 100 percent from wind, solar and tide in the future (Halla Ilbo, September 12, 2006). New cars using electric power or batteries should be invented for Jeju people, because it is a small island, and the commuting distance is not long. Using the bus for commuting should be encouraged. Operating his or her own car from home

to work should be discouraged from higher gasoline tax and parking fees.

## Conclusion

Jeju has its own strength, weakness, opportunity and threat as other provinces in Korea. Reducing the weakness, minimizing the threat, and converting the opportunity to the success story is the task for the Jeju people. Small is not always beautiful. The Jeju Island is small, compared to Hawaii, but beautiful with an optimum size of population. The wealth of the Island may be the value of the Jeju people for the future. This desire may degrade the beautiful nature and coastline. Mt. Halla, many hills, many scenic places including small fishing villages and ports should be protected from the development planning. The Island should explore its historical places from the Samsunghyol, the mythical origin of the first three residents of the Island to the last Korean fights against the Mongol invaders in the 14th century, Kim Jung-hee's exiled house in Yi Dynasty, and houses of modern painter, Lee Joong-sup and of modern poet from Seoguipo, Kim Kwang-hyup for more attractive tourists' visit.

Jeju has its beautiful setting for man's long life in Korea. Clean air and clean water with healthy fish on diet must have contributed the Island people's long life in Korea. This kind of Jeju information should attract the middle class retiring Korean people to the Island like Florida does. So it can be Hawaii on one hand and Florida on the other.

Large-scale public work projects should be reviewed by the preparation of their environmental impact statements at the local level and at the provincial level. This can be the best planning and controlling tool to bring environmentally sound and sustainable development to Jeju under Evergreen

Jeju 21's vision statement. See the Table 1. Reviewing the planning and implementing the good plan with sufficient forces are the future task for the Jeju Island. The sufficient forces should be backed up by the financial investments on the environmental projects. The Jeju Do Planning Document and the JejuCity Document show adequate financial investments for the future (Jeju City, 2003). JejuCity spent 23.6 percent of its total budget into the environmental programs from 1997 to 2001 (Jeju City, 2003, p. 308). That was, and is still admirable. If Jeju City can continue its environmental investments 25 percent of its budget, then Jeju will be one of the most admirable cities among the world cities and in the

Table 2

<b><u>EvergreenJeju21</u></b>		
	<b><u>Vision</u></b>	<b><u>Contents</u></b>
Natural Environment	Man-Nature's Harmonious Island	Protection of Biodiversity, Mt. Halla and hills, oceans, caverns, scenic places
Living Environment	Clean and Amicable living place	Environmentally friendly consumerism, clean air and water, living streams and good living
Social Environment	Welfare-oriented and cultural community	Preservation of historical and cultural community, Protection of senior citizens, handicapped citizens, children, women, nurturing hope
Economic Environment	Environmentally friendly industrial structures and resource recycling society	Organic farming, green meadows, dairy farm, fish from clean seas, ecological tourism, renewable energy
Environmental Policy	Evergreen Jeju actualizing environmental autonomy	Model Case of environmental management; "Environmental Island," "Environment, Peace, Island" "Environmental Education"

Source : Reconstructed from Jeju-do websites

environmental history. One question is: how the Jeju environmental planning is synchronized with the Jeju provincial environmental planning and other neighboring local governments. Jeju City's environmental planning has four stages: the first stage, 2003-2006; the second stage, 2007-2011; the third stage, 2012-2016; the fourth stage, 2017-2021(Jeju City, 2003, p. 297). Due to its unique geophysical setting, The Jeju provincial government should play a more powerful environmental planner's role for all island over the local governments, as the State of Hawaii plays a dominant role over its local governments. Another question is: The wastewater plant operation is still subsidized by the general revenue, and the waste collection and disposal management are still subsidized. These are just two examples. The polluter-pay principle should be fundamental to all environmental principles, but far from the actualization in Jeju and Korea. In here, we can see the contradictions in the Jeju environmental policy and management. This contradiction is seen in Korea's central and other local governments, as well. The possible shortage of water supply that cannot meet the water demand as early as 2011 can be an urgent task for all Jeju people. Conservation of water, especially in farming, is absolutely necessary. The future governors, mayors, county executives, bureaucrats and citizens should make orchestrated efforts for the nature conservancy and environmental protection.

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