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Nauru: Study on Food Supply Crisis Caused by Nauru Phosphate Exhaustion

Chapter 1. Introduction

The Republic of Nauru is an island country in the Pacific Ocean. It is located in the tropical rain forest belt. For thousands of years, countless seabirds have come to live and left a mass of bird droppings on the island. Over the years, bird manure has undergone chemical changes and become a layer of high-quality fertilizer up to 10 meters thick, which has become the "phosphate mine". The whole island is covered with phosphate, and there is only a narrow strip of flat land along the coast. According to statistics, 60% of the area of the island is covered by phosphate rock up to 6 to 10 meters thick, and its mineral grade is as high as 38.9%. As a result, the extraction and export of phosphate have become the main source of high income for the residents of the Republic of Nauru. Nauru had an average annual income of US \$8500 and its per capita gross domestic product (GDP) once ranked first in the South Pacific.^[1]

However, it is the rich phosphate rock resources that led to the over-exploitation of Nauru by Great Britain, Australia and New Zealand at the beginning of the 20th century. While mining phosphate as a source of high-income economy, there is also a huge food security crisis. The development and exploitation of phosphate occupy a large area of land, which on the one hand reduces the area of cultivated land, and on the other hand, it destroys the quality of land in a large area. Food is the most important thing for the people, and the issue of food security is the top priority of national security. This practice at the expense of the environment is tantamount to a desperate act.

This paper studies the developmental history of mineral resources in the Republic of Nauru, the current challenges, and analyzes the impact of the depletion of phosphate resources on the supply of agricultural products, especially the demand for food for people's life. It also puts forward some views on the food shortage in Nauru, which is a pressing problem to be resolved. At the same time, this paper will take the development mode of Nauru as an example to talk about the importance of food security to national governance, arouse human attention to food security, and avoid repeating the old path of Nauru. Therefore, taking the resource development and food security of Nauru as the topic has vital reference and practical significance for the resource economic development of Nauru and the sustainable development of resource utilization all over the world.

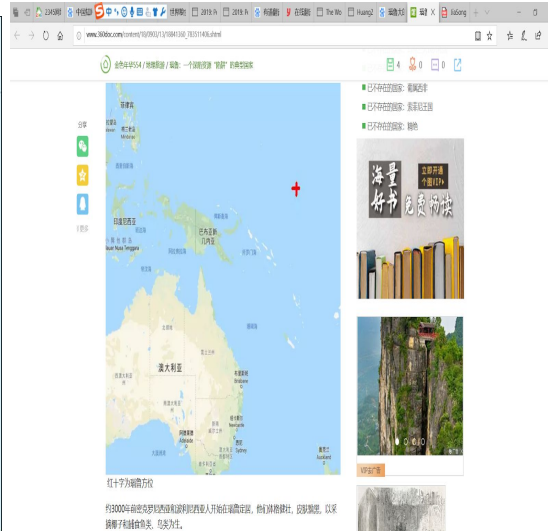
Chapter 2. A Survey of the Development of Phosphate Resources in Nauru--The Driving Force Behind the Food Crisis in Nauru

2.1 Nauru's Profile

Nauru is a tiny island north-east to Australia. It sits 42 kilometers south of the equator. It features a coral reef and white-sand beaches fringed with palms, including Anibare Bay on the east coast. With only a 21 km² area, Nauru is the third-smallest country in the world behind Vatican City, and Monaco. Additionally, its population of 10,670 is the world's third-smallest, after Vatican City and Tuvalu.^[2]



2-1



2-2

Figures 2-1 and 2-2 show the specific location of the Republic of Nauru

2.2 Phosphate Mining History of Nauru

In 1798, British Captain John Fearn discovered Nauru island. In 1896, a cargo officer (supercargo) for the Pacific Islands Company on the Lady M, Henry Denson, found a strange-looking rock on Nauru during a brief stop on the island. He originally believed it to be a piece of petrified wood. Denson, according to legend, had planned on making children's marbles from it but, as fate would have it, it ended up as a door stop in the company's Sydney office.

In 1899, Albert Ellis, a management official of the phosphate division of the Pacific Islands Company, was transferred to the Sydney office to "analyze rock samples coming from the Pacific Islands." Ellis noticed the rock and suspected it to be phosphate (similar in appearance to the phosphate coming from Baker Island), but was rebuffed by Denson and told that it was only wood. Three months later, Ellis decided to test his hunch and tested the rock for phosphate. It turned out to be phosphate ore of the richest quality. A neighboring island to the East, Banaba Island (Ocean Island), shared Nauru's geology and also had significant reserves of phosphate.

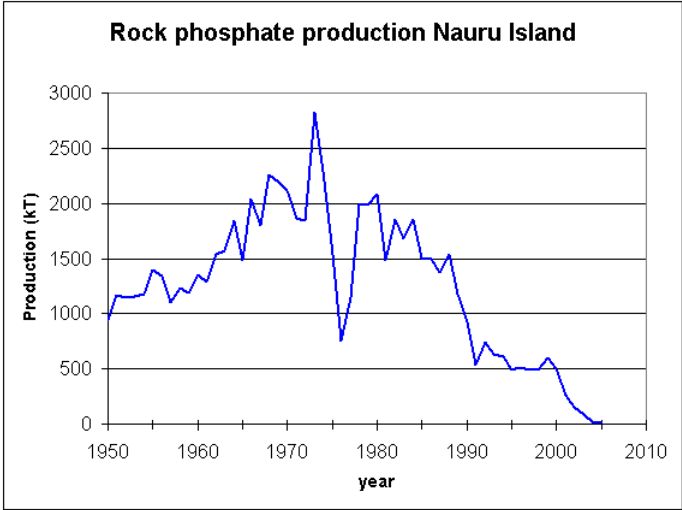
From the end of World War I to Nauru's independence in 1968, the island was always under British, Australian and New Zealand colonial rule. Britain, Australia and the Netherlands's predatory exploitation of Nauru's resources exacerbated the depletion of resources. In 1919, Britain, Australia and New Zealand reached an agreement on phosphate development. The Phosphate Company directly bore the costs of the Nauru authorities continued to pay compensation to the people of Nauru. Each of the three countries sent a representative to form a management committee to purchase phosphate at the fixed cost price. Affected by the natural environment, especially its geographical location and climate, Nauru relies on imports for almost all its food and drinking water.

The economy of Nauru has been almost wholly dependent on phosphate, which has led to economic catastrophe on the island, with 80% of the nation's surface having been strip-mined. The island's phosphate deposits were virtually exhausted by 2000 although some small-scale mining is still in progress.^[3]

2.3 Decrease in Phosphate Yield and Decrease in per capita GDP in Nauru

In the early 20th century, the phosphate mine in Nauru was discovered, and predatory mining began. From 1919 to 1968, Nauru became independent, with a total of nearly 34 million tons of phosphate mined. Ellis, the discoverer of the phosphate mine, wrote a book called *Ocean Island and Nauru: Their Story* to emphasize that the phosphate industry will bring Nauru into modern civilization. After the discovery of the phosphate mine, the mining industry basically replaced agriculture as the main economic pillar of Nauru. The total volume of foreign trade also skyrocketed. After Nauru became independent, the state took over the phosphate industry in the first year, and the amount of mining increased further. The coconut, the only agricultural product, was left unattended, agriculture was largely abandoned, and the country relied solely on mining to build temporary prosperity.

However, with the exploitation of phosphate, the mineral deposits on the island gradually dried up. The chart shows the changes in the annual production of Nauru phosphate, and we can see very clearly that by 2004, there was little Nauru phosphate left. From this we can see that Nauru has always been a single product economy, and its economic progress depends entirely on the mining industry. This kind of development model made it impossible to develop the economy in an all-round way. The false prosperity brought about by Nauru's single economy also disappeared in an instant.^[4]



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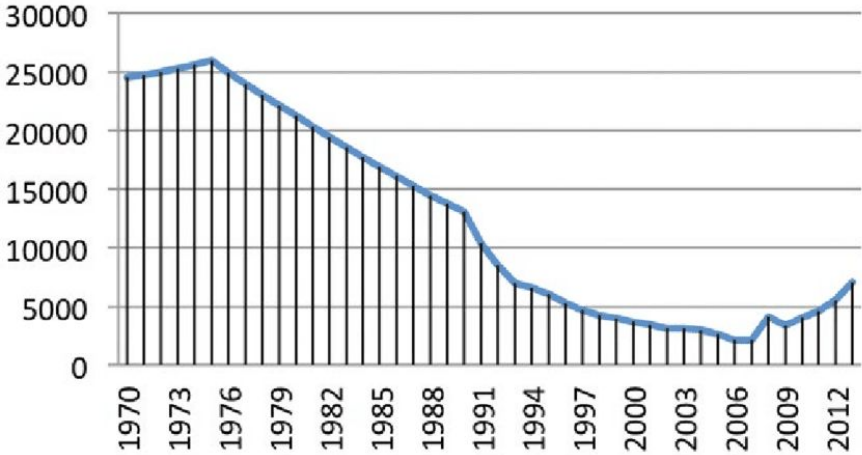
Figure 2-3-1 shows the decrease in phosphate production in Nauru in recent years

Few comprehensive statistics on Nauru economy exist, with estimates of Nauru's GDP varying considerably. According to the U.S. State Department, Nauru's GDP volume was US\$1 million in 2004. Nauru receives about US\$20 million foreign aid a year from Australia.

Most recent 2017/2018 Nauru Budget indicates modest economic growth, with \$128.7 million in revenues and \$128.6 million in expenditures estimated.

In the years after independence in 1968, Nauru possessed the highest GDP per capita in the world due to its rich phosphate deposits. In anticipation of the exhaustion of its phosphate deposits, substantial amounts of income from phosphates were invested in trust funds. However, because of heavy spending from the trust funds, including some wasteful overseas investment activities, the government was now facing bankruptcy. To reduce expenditure, the government has called for a freeze on wages, a reduction of over-staffed public service departments, privatization of numerous government agencies, and closure of some of Nauru's overseas consulates. Fiscal uncertainty caused by financial mismanagement and

corruption, combined with shortages of basic goods, has resulted in some domestic unrest. In 2004 Nauru was faced with chaos amid political strife and the collapse of the island's telecommunications system. Moreover, the deterioration of housing and hospitals has continued.^[1]



2-3-2

Figure 2-3-2 shows the changes in Nauru's per capita GDP in recent years

Chapter 3. Nauru Phosphate Depletion Leads to Food Crisis--How does Food Problem "Turn Around"?

As Nauru's main economic pillar (phosphate mining) collapsed, Nauru's national income fell sharply. At this time, Nauru's disadvantage as an island nation is reflected to a great extent. On the one hand, phosphate mining is on the surface, thus destroying a large amount of surface soil and occupying agricultural land. At the same time, the high income from phosphate makes Nauru people give up agriculture. On the other hand, agricultural development is difficult because of Nauru's natural environment, tropical rain forest climate and island topography. Nauru people's food and fresh water are all imported. Phosphate resources are exhausted, and the only pillar of the economy tumbled impacting both income and food supply. How to revitalize Nauru's economy to solve the food problem has become the crux to Nauru's revival and development. To this end, in view of the current situation of Nauru resources, I personally put forward some practicable advice to solve the Nauru food crisis.^[5]

3.1 Based on the Current Situation, Remedy in Time

3.1.1 Improve Land and Restore Agricultural Production

The reason why Nauru people regard the development of mineral resources as the only economic pillar is inseparable from the objective environment of Nauru. First of all, there are very few people who need to be fed because of a small territorial area. Second, agricultural varieties are not good. People living in the Pacific islands have to take crops and animals such as pigs, dogs and chickens by boat, from which there are not many crops and animals. So it's difficult to optimize breeds through breeding due to the small scale. Third, the basic conditions of some islands are poor. Nauru Island does not have any fresh water resources. For a long time, people can only live by collecting rain water.

However, dating back to period before the discovery of phosphate resources, Nauru was a straw hat-shaped coral island surrounded by coral reefs and low-lying terrain. From the coast to the inland are

white sandy beaches, green belts and terraces. The green zone is two to three hundred meters wide and in the agricultural area, there were bananas, coconut, and mandarin trees along with pineapples and vegetables being grown. The platform is in the center, with a height of about 12-60 meters, which is called the plateau. Therefore, according to this analysis, I think Nauru should step up efforts to restore the land and cultivate fruits and agricultural products suitable for growth to ensure the needs of life.

3.1.2 Carry out deep processing of the remaining exported phosphate

On the one hand, Nauru can choose to reasonably mine the remaining limestone spikes, which contain several potentially useful minerals, such as dolomite. Nauru can adopt the way of fine processing and turn the goods produced into high-quality products, which are more likely to attract consumers.

Also, the United Nations Development Program has championed these so-called “neglected development minerals” as a way of helping Pacific nations (and others) out of poverty.

On the other hand, there are still a small amount of phosphate resources in Nauru that have not been exploited. Nauru previously adopted an extensive regional development approach. This approach seeks the rapid growth of the regional economy in a short period of time at the cost of large-scale development of natural resources and destruction of the ecological environment. Nauru can then try to adopt a high level of regional development, paying attention to the rational development and deep utilization of natural resources, with fewer resources and environmental costs in exchange for sustainable social and economic development.^[6]

3.1.3 Make Effective Use of Local Resources and Make Full Use of the Aviation Industry--Extending Channels for Food Supply

Nauru Island is isolated from the sea, 300 kilometers away from the nearest Kiribati Oceanic Island. It is 720km to the capital of Kiribati and is even farther away from other neighboring island countries, all of which are more than 1000 km. It is about 4000 kilometers from Sydney, Australia and Hawaii. Therefore, in order to continue to meet the needs of food imports, it is important to develop the aviation industry. Nauru is a member of both IATA and ICAO now. Its aviation industry has three jetliners and 50,000-ton seagoing ships, which is suitable for the establishment of airlines and shipping companies. Nauru can build a fairly good international airport in Oro, on the coast of the Aaron region, and operate with many countries.

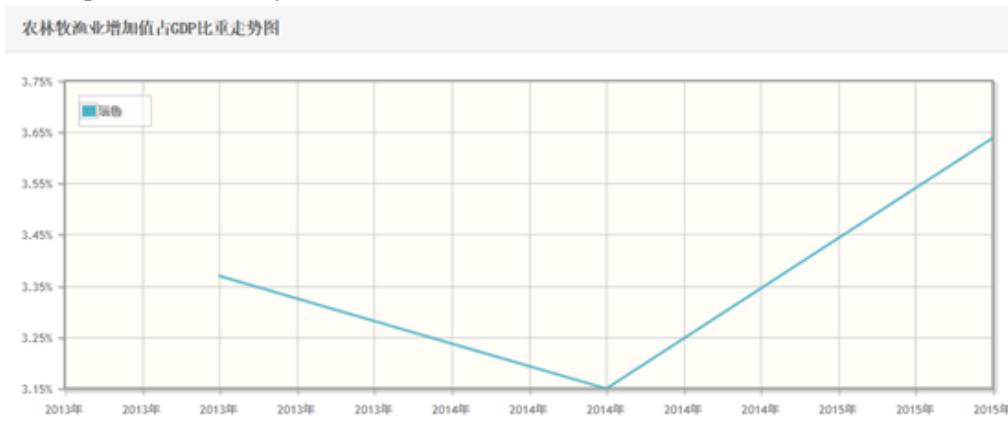
3.2 Looking for New Economic Supporting Points--Providing Economic Bases for Food Supply

3.2.1 Make Use of Marine Resources to Develop Fishery and Aquaculture

As an island country surrounded by the sea, Nauru is rich in fishery resources and has an exclusive economic zone of 200 nautical miles. Nauru tuna has a potential catch of more than 40,000 tons a year, to be exploited.^[1]

First of all, when the member states of the Nauru Agreement held their annual meeting in Yap, Federated States of Micronesia, they discussed the next step of fishery development of the eight member states, emphasizing the need to strengthen management and regard the sustainable development of fishery economy in the waters of the member states as the guiding principle for the decision-making of the member states. In the western and central Pacific Ocean, where more than half of the world's skipjack fish are produced, the Boat Sky Program is used to control the catch to ensure quality. And increase the "cost" of fishing for foreign vessels. As a result, Nauru's revenue from fisheries has been improved.

At the same time, Japan and Nauru signed fishing agreements on tuna long lines, bonito rods and tuna purse seines in 2011. Nauru can make full use of its potential fishery resources and strengthen cooperation with Japan in the fishery field to achieve mutual benefit.^[7]



3-1

Figure 3-1 shows the trend of the proportion of added value of agriculture, forestry, animal husbandry and fishery in GDP in recent years

I think Nauru should be well aware of the importance of fisheries, make full use of marine resources and be concerned about the development of fisheries. From my point of view, Nauru can vigorously promote scientific and technological innovation and personnel training in the fishing industry, and improve the technology of fishing. At the same time, Nauru should also pay attention to the sustainable development of the fishery, set a reasonable fishing ban period, and maintain the normal growth and reproduction of fish.

Sustainability in fisheries combines theoretical disciplines, such as the population dynamics of fisheries, with practical strategies, such as avoiding overfishing through techniques such as individual fishing quotas, curtailing destructive and illegal fishing practices, setting up protected areas, and restoring collapsed fisheries.

3.2.2 Strengthen Infrastructure Construction and Develop Tourism

Strengthening infrastructure construction and making efforts to improve tourism will become a good way for Nauru's economic development.

First of all, in the middle of Nauru Island, there is a volcanic lake, called "Povadara Palace Lake", with a diameter of 50 meters. The surrounding scenery of the lake is beautiful and charming. Second, Nauru has a history of thousands of years, and 96% of the local Nauru language is still spoken. Nauru can consider building a national museum to give full play to its own national characteristics and show its history and culture as well as the course of phosphate mining. Finally, as an island country, Nauru has superb coastal scenery. Nauru could develop sightseeing around the island by car, as well as sailing out to enjoy the scenery of the Pacific Ocean.^[8]

While paying attention to infrastructure construction, Nauru should also innovate the way of tourism publicity and marketing, and strive to enhance the popularity and reputation of tourism.

To start with, Nauru can strengthen the image promotion of tourist attractions. In my opinion, it can innovate publicity channels and expand the audience. Nauru can make full use of the power of media publicity to make documentaries related to tourist attractions and put them on the Internet. It can also make some tourist souvenirs with national characteristics to attract tourists.

In addition, Nauru can try to expand the tourist market. It can introduce some travel agencies and ask travel agencies to work out the best itinerary for tourists. Nauru can also explore the marketing model of "Internet + Tourism" to enhance Nauru's online popularity.

3.3 Other Ways to Solve the Problem

3.3.1 Seek International Assistance from Other Countries or NPO and NGO Organizations--Providing Major Support for Food Security

First of all, Nauru should strive to join hands with other countries and actively carry out international cooperation to build a community with a shared future for mankind in order to achieve long-term development. In the meantime, Nauru can endeavor to establish and develop a new effective international relation.

In addition, Nauru can first seek other aspects of assistance for its own development. For example, the United Arab Emirates has supported a pilot project to develop a solar farm on Topside. This could help wean Nauru from its reliance on diesel as a source of energy. At the same time, far greater investment from donors and the private sector would be needed to scale up these efforts. This could help other sectors to develop, such as a modest boutique tourism sector related to the island's location as an airline transit hub for the central Pacific.^[6]

3.3.2 Develop National Education and Improve the Quality of labor force

During the period when phosphate was heavily exploited, Nauru's per capita income was very high. This also led to laziness in the thinking and behavior of the people of Nauru. After a period of great prosperity, the people of Nauru are reluctant to work. Nauru can actively promote national education and improve the quality of the labor force, achieving economic revival by uniting the strength of the people.

3.3.3 Make Appropriate Changes and Create a Good Policy Environment

The inappropriate measures taken by the Nauru government in the early days led to a recession. Since then, although the Nauru government has carried out some reform measures, it still has little effect. The Nauru government should actively seek appropriate policies to change the domestic status so as to create a good political environment for economic development.

3.3.4 Introduce Technical Talents and Enhance the Ability of Innovation and Research and Development

Due to the extensive processing in the early stage and the unreasonable utilization of resources, Nauru's science and technology have not been fully developed, as well as the lack of professional technical personnel. Nauru can introduce technical personnel, so as to improve the overall scientific and technological level of the country.

Nauru can refer to China's practice in the introduction of talents. China has implemented the strategy of rejuvenating the country through science and education, the strategy of strengthening the country with talents, the strategy of innovation-driven development, and the strategy of intellectual property rights, promoting the adjustment of the employment structure through the development of human resources, and

then promoting the adjustment of the industrial structure, and finally achieve sustainable economic and social development.

Chapter 4. The Enlightenment of Nauru Food Crisis--Food Issues are Extremely Important

The course of Nauru's economic development is worth thinking about. There are also many resource-based cities in China, and the economic development of Nauru is of guiding significance to the development of resource-based cities in China.

A resource-based city refers to a city developing as a result of the exploitation of certain natural resources. However, resources are limited, so resource depletion is a challenging problem that every resource-based city is facing or will face. Whether the transformation of resource-exhausted cities is successful or not and whether suitable alternative industries can be found are not only related to the fate of these cities, but also related to China's resource strategy and development prospects in the next few decades.

For resource cities, in the face of resource depletion, we should seek emerging industries as new leading industries. At the same time, we should also bring environmental issues into comprehensive decision-making, change the traditional economic growth model, develop new technologies and achieve sustainable development.

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