Korea

Multipurpose Ocean Research Vessel Construction Project

Report Date: March 2001
Field Survey: September 2000

1. Project Profile and Japan's ODA Loan

Location Map of the Project Area
(Ansan is KORDI Headquarters)

Ocean Research Vessel built by this Project

(1) Background

South Korea has little land area for the size of its population and it lacks mineral resources. Securing stable supplies of energy and other main resources is a policy task, requiring far-reaching measures including changes in industrial structures. Faced with this situation, South Korea is turning its attention to the sea around its shores, and this emphasis was reflected in its Fifth Five-Year Plan for Economic and Social Development, which began in 1982. The Five-Year Plan contained Science and Technology Sector Plan, which emphasized surveys of oceanic resources and development of seafood resources. However, South Korea's marine development was less advanced than that of most developed countries, leaving it in only the preparatory stages for full-scale marine surveys. It lacked a research vessel and related investigative research equipment needed to promote its efforts in the field.

(2) Objectives

This project was to procure a ocean research vessel and related investigative research equipment, and to provide training in the navigation and operation of such a vessel, in order to raise the level of South Korea's marine research and development, which was under-developed.

(3) Project Scope

(a) Construction of a multipurpose ocean research vessel:
Size Approximately 730 international gross tons

(b) Purchase of investigative research equipment: Equipment for marine survey and analysis.
(Main procurement items: meteorological observation equipment, high-precision echo sounder, automatic-recording water temperature thermometer etc.)

(c) Consulting services:

Basic design of the ocean research vessel, preparation of bidding documents, construction supervision etc.

(4) Borrower/Executing Agency

Republic of Korea / The Korean Ocean Research and Development Institute (KORDI)

(5) Outline of Loan Agreement

Loan Amount/Loan Disbursed Amount	¥4,100 million / ¥4,035 million
Exchange of Notes/Loan Agreement	September 1985 / December 1985
Terms and Conditions	Interest rate: 5.0%, Repayment period: 25 years (7 years for grace period), General Untied (Partially untied for consulting services)
Final Disbursement Date	December 1993

2. Results and Evaluation

(1) Relevance

This plan was aimed to raise the underdeveloped level of marine research and development in South Korea, in line with the Fifth Five-Year Plan. To that end, it procured an ocean research vessel and related investigative research equipment, and provided training in the navigation and operation of such a vessel. Previously, South Korea could only pursue its own national surveys in inshore waters, but the procurement of the research vessel and related equipment enabled surveys to range much more widely, beyond coastal waters to the Pacific, including Antarctica. The project also contributed to promotion of marine environmental protection, a subject of international concern. Therefore the project plan is still relevant.

(2) Efficiency

1) Implementation schedule

When the plan was made, the research vessel was scheduled for launch in 1989, but organizational and institutional problems of the executing agency and related agencies delayed the selection of contractors and the bidding by approximately one year each. During that time, the international level of research vessels improved, prompting a revision in the vessel specification, which was raised from the planned 730IGT to 1,422IGT, in line with international standards. A further delay of one year occurred in the construction of the vessel, bringing the total delay to three years. The vessel was launched on January 11, 1992, and began its maiden voyage on January 17, that year.

2) Project cost

The approved value of the ODA loan provided for this project was ¥4,100 million, and the actual disbursement was ¥4,035 million, largely as planned. However, as improving standards in ocean research vessels made it necessary to build a research vessel of higher performance, the cost of building the vessel overran by ¥928 million (33%).

(3) Effectiveness

1) Quantitative effects

Operational status

The research vessel operates for an average of 320 days per year in continuing voyages, in which it is mainly occupied in marine surveys. It ranges from South Korean inshore waters through the Pacific and as far as Antarctica. Distance traveled per year ranges from 47,117km in 1994 to 76,952km in 1999. The total distance traveled over the last seven years was 434,026km, making the yearly average distance 62,004km. The number of voyages was three in 1992, the first year, and then ranged between seven and 11 in 1993 and later years. The average is nine voyages per year.

Table 1 Operational Indicators for the Multipurpose Ocean Research Vessel

	1992	1993	1994	1995	1996	1997	1998	1999	2000
Total distance sailed (km)	-	65,724	47,117	58,914	61,494	70,992	52,833	76,952	-
No. of voyages	3	9	8	8	7	11	9	10	10

Source: The Korean Ocean Research and Development Institute (KORDI)

2) Qualitative effects

Before the research vessel was obtained, South Korea conducted joint research aboard US or other vessels, or chartered foreign-registered vessels (from Chile, Russia, Norway and Argentina) to conduct research. After the vessel was obtained, South Korea became more active in pursuing its own research work, carrying out the new research and training operations listed in Table 2. Therefore the qualitative effects anticipated at the time of the appraisal, namely wider-ranging ocean surveys, more advanced ocean research and development and the establishment of bilateral or multinational joint ocean research systems, have been realized.

- **Wider-ranging ocean research**
  The range of surveys has extended beyond waters near South Korea, namely the Yellow Sea, the Sea of Japan and the East China Sea, to reach the Pacific and as far as Antarctica. Besides expanding the area, surveys have extended to greater seabed depths.

- **More advanced ocean research**
  Owning their own research vessel and related research equipment enabled researchers to be more active in pursuing a wide range of marine surveys and research activities. The main research investigations are seabed surveys, surveys of the Sea of Japan and of the Yellow Sea, which are conducted annually.

- **Establishment of bilateral or multilateral joint ocean research systems**
  South Korea now possesses its own research vessel, with advanced survey abilities and related research equipment, which enables it to be more active in joint research with other countries. It also conducts joint research with, or technology transfers to, researchers from developing countries which lack this kind of research vessel. International cooperation is pursued through cooperation with KOICA (the Korea International Cooperation Agency), and training in marine environmental protection was provided in 1999 with sponsorship from the Intergovernmental Oceanographic Commission (IOC)/ KOICA/ KORDI. Trainees from Asia, Pacific area and Russia attended. Long-term trainees from Viet Nam, Indonesia and Malaysia are also accepted for training.

Table 2 Main Activities by the Research Vessel

Date	Main activities
Sep. 1990 ~ Jan. 1992	Construction of the research vessel
Jan. 1992	Launch
Jan. 1992 ~ Mar. 1992	Maiden voyage
Mar. 199 ~ Sep. 1992	Seabed depth survey (ongoing survey carried out annually)
Nov. 1992 ~ Nov. 1992	East China Sea survey
Nov. 1992 ~ Dec. 1992	Tropical oceans/ global atmospheric research program
Dec. 1992 ~ Mar. 1993	Antarctic survey
Sep. 1994 ~ Sep. 1994	KOICA training (ongoing annual program)
Oct. 1994 ~ Oct. 1994	Sea of Japan survey (ongoing survey carried out annually)
Apr. 1996 ~ Apr. 1996	Yellow Sea survey (joint South Korean – Chinese survey: ongoing)

Source: The Korean Ocean Research and Development Institute (KORDI)

(4) Impact

1) Environmental impact

No notable negative environmental impact has occurred to date. Positive environmental impact has occurred through progress in research, which provides basic information that encourages protection of the marine environment in waters near South Korea and more broadly in the Pacific. Technology transfer in the field of marine environmental research are also executed for researchers from developing countries.

2) Social impact

Research reports have provided basic information which promotes the development of marine and fisheries resources in waters near South Korea and further afield. Exchanges with foreign researchers have been stimulated in the ocean research field. No adverse social impact has occurred to date.

(5) Sustainability

1) Operation and maintenance

The Korea Ocean Research and Development Institute (KORDI) currently has a staff of 622 workers. Its annual budget, which is allocated from the central government budget, is in the approximate range 1.6~1.8 billion Won (1997~1999), largely as planned. Approximately 0.8 ~ 1.2 billion Won are allocated for maintenance costs. Costs for incidental repairs and upgrading to the latest equipment were substantially above the budget plans for 1998 and 1999, but there was no notable problem in the maintenance scheme.

Maintenance of the procured vessel is carried out by the {Chanmok} Marine Station near Pusan, which is the KORDI local office. The shipbuilder of the research vessel (a private Norwegian company) provides thorough training and drilling for KORDI researchers and crew (experienced sailors who were hired to crew the vessel), and there are no technical problems. A maintenance and repair scheme is in place, such that KORDI carries out repairs that are within its abilities, and those that are not are commissioned from domestic Korean companies, while more serious repairs are commissioned from the Norwegian company that built the vessel.

2) Self-sustainability

There appears to be no problem with the independent realization of the research vessel's functions over the next ten years. The related research equipment is scheduled for ongoing replacement with the latest equipment. The importance of this vessel as a national project is growing, and sustained budgetary support from the central government can be anticipated.

Table 3 KORDI Staff Numbers

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
No. of staff (person)	264	347	338	326	332	325	353	296	576	622

Source: The Korean Ocean Research and Development Institute (KORDI)

Table 4 Annual Budgets and Maintenance Costs for the Executing Agency

		1997	1998	1999	2000
Annual budgets	Planned	1,645	1,841	1,945	1,707
(Million Won)	Actual	1,587	1,769	1,793	
Maintenance costs	Planned	795	302	481	736
(Million Won)	Actual	891	853	1,257	

Source: The Korean Ocean Research and Development Institute (KORDI)

Comparison of Original and Actual Scope

Item	Plan	Actual
①Project Scope	1) Construction of multipurpose ocean research vessel: 730IGT Vertical length: 51.6m Width: 9.4m Height: 4.5m Draft: 3.7m 2) Purchase of investigative research equipment* Total: ¥1,879 million (ODA loan portion: ¥1,073 million) 3) Consulting service ¥183 million	1) Construction of multipurpose ocean research vessel: 1,422IGT Vertical length: 55.5m Width: 12.0m Height: 7.55m Draft: 5.15m 2) Purchase of investigative research equipment * Total: ¥269 million (ODA loan portion: ¥189 million) 4) 3) Consulting service ¥139million
②Implementation Schedule Selection of Consultant Consulting service Construction of research vessel Bidding and contract Construction Procurement and installation of equipment and materials Completion	 Oct. 1985 ~ Aug. 1986 Aug. 1986 ~ Feb. 1989 Feb. 1987~ Jun. 1988 Jun. 1988 ~ Feb. 1989 Sep. 1987 ~ Dec. 1989 Feb. 1989	 Dec. 1985 ~ Oct. 1987 Oct. 1987～ Sep. 1989 ~ Sep. 1990 Nov. 1990 ~ Jan. 1992 Nov. 1990 ~ Jan. 1992 Oct. 1, 1992
③Project Cost Foreign currency Local currency Total ODA loan portion Exchange rate	 ¥4,900 million ¥126.9 million ¥5,027 million ¥4,100 million 1 won ＝ ¥0.3	 ¥4,035 million ¥44 million ¥4,078 million ¥4,035 million 1 won ＝ ¥0.2

* The total value is compared here because the types and quantities of research equipment procured differ from those planned at the time of the appraisal.