

Annual Project Progress Report

[Alternatives to DDT usage for Anti-fouling Paint production in China]
[February 20, 2012]



Basic Project Information

Project Title: Alternatives to DDT usage for Anti-fouling Paint production in China	
UNDP Award ID	00045358
UNDP Project ID	00053562
CRIS Contract Number	
Project Duration	November,2007-December,2012
Reporting Period	January to December 2011
Total Approved Project Budget	\$10,365,000
Participating UN agencies	
Implementing Partners/ National collaborating agencies	Foreign Economic Cooperation Office, Ministry of Environmental Protection, China
International collaborating agencies	
Cost-sharing third parties	
UNDP Contact officer	
Project website	http://afp.china-pops.org

Executive Summary

The project goal is to substitute DDT based antifouling paint(AFP) by technically feasible, economically viable, and environmentally friendly alternatives. The year 2011 is the fourth year of the project implementation, focused on the promotion of alternative AFP in 3 pilot areas of the North Sea, East Sea and South Sea.

In 2011, 971 tons environmental friendly antifouling paint was produced and distributed in the market as the substitute of DDT-contained Anti-fouling paint, which was promoted by an incentive program launched in August. The environmental awareness of the targeted stakeholders including the manufacturers, local fishers, shipyard owners etc has been raised significantly. The comprehensive inspection and enforcement program was initiated by 3 local project management offices, the fishing ship inspection authorities and Chinese Classification Society. Also the inventory of the contaminated ship yards caused by DDT and antifouling paint manufacture enterprises was developed. The risk assessment of contaminated sites was carried out in one typical ship yard and one antifouling paint manufacture enterprise.

1. Background

Development Context

China has 300,000 fishing ships widely distributed along its 18,000 km coastline, which consume 10,000 MT antifouling paints annually. Approximately half is DDT based paint and half organotin-based paint. About 250 MT DDT is used for production of DDT based antifouling paint per annum. As of 2002, the accumulative total of DDT used for this purpose since 1950s has reached 10,000 MT. China began to limit DDT usage in all related sectors after China acceded to Stockholm Convention in 2002. From 2002 to 2005, DDT used for antifouling paint production has seen a decrease, but still totaled a cumulative 1,000 MT.

Rapid industrial and agricultural development in the coastal areas of China in the recent past has resulted in contaminant discharge into the sea in excess of regulatory limits. This has resulted in significant deterioration in the quality of coastal marine environment as well as reduction in species of economic fish and output and has had adverse affects on income and livelihood of the local fishing community. Results from monitoring study indicates that the quantity of some toxicants found in economic fish, including DDT, in the body of main economic fish species is increasing, even beyond related international regulatory limits. The sources of some of the toxicants have been corroborated to be from their usage in coating of boats and ships. With the entry of China into WTO, her marine product exports have had some constraints in international market because of their failure to meet the relevant Quality Safety Standards.

Coastal environmental quality monitoring from year 2000 to 2005 found residues of DDT and its degradation derivatives DDD and DDE, which are also persistent and toxic, in sea water and sediments. The concentration of DDT in the sediments in some areas exceeded Class I or II of marine environment quality Standards limit. Cu in sediments was also found to exceed Marine Environment Quality Standards. Sediment is habitat to the benthics, e.g. *Meretrix meretrix* L., *Macra quadrangularis* Deshayes, *Mytilus edulis*, and Oyster, whose quality will be directly influenced by the sediment quality. For instance, in 2004, monitoring results showed that DDT residue in seashell in coastal waters exceeded standard's limit. DDT and Cu are also detected to exceed standard in bred organisms in the coastal aquatic farms.

The excess DDT and Cu concentrations in sediment is directly related to their extensive usage in DDT and copper based antifouling paint. Use of DDT as a pesticide in agriculture was banned 20 years ago. DDT residues on land, soil, and food have fallen down to trace levels. Therefore, release of DDT from antifouling paint on fishing boats and ships can be considered a new and the main source of DDT found in marine environment.

DDT is listed in Annex B of Stockholm Convention. According to Article 3, Provision 1 of the Convention, the Parties shall limit the production and use of the chemicals listed in Annex B. The Acceptable purpose or specific exemption on production and use of DDT are limited to disease vector control and intermediate for production of Dicofol. DDT as an additive in production of antifouling paint is not considered a permitted use. According to Article 10 and 11 of the Convention, the parties shall encourage and develop activities to research, develop and monitor POPs and their alternatives as well as other potential POPs. As one of the actions in implementation of the Convention, China has listed DDT based antifouling paint into the recently issued list of products to be phased-out, annexed to The Guiding Directory for Industrial Restructure – 2005.

In cooperation with the United Nations Development Program (UNDP), a project titled Alternatives to DDT Usage in the Production of Antifouling Paint has been developed and got GEF Council approval on August, 2006, and GEF CEO Endorsement on July, 2007. The State Environmental Protection Administration of China (SEPA), through its Convention Implementation Office (CIO/SEPA), and the UNDP will be respectively the national executing agency and the international implementing agency of this four-year project from November 2007 till December, 2011.

Project Objectives and Strategy

The project goal is to substitute DDT based antifouling paint by technically feasible, economically viable, and environmentally friendly alternatives. The binding objective of this project is to eliminate 250 MT DDT per year used for production of DDT based antifouling paints by converting to technically feasible, economically viable, and environmentally friendly alternatives. The prospective objective of this project is to establish a long-term mechanism to protect the marine environment from pollution of harmful antifouling systems by supporting China to sign International Convention on the Control of Harmful Anti-fouling Systems on Ships (the IMO Convention) based on the technologies, experience and instruments obtained from phase out of DDT antifouling paint.

The implementation timeframe is 5 years. In the first two years, technically and economically feasible technologies/alternatives will be selected through open bidding and ranking process for on-ship coating experiment as well as for selection of manufacturing enterprises that possess strong technical capacity, competent management experience, and sound business development plans. Manufacturing sites will be prepared and equipment installed. Capacity will be built and policies providing enabling environment will be established. In the third and fourth years, production and promotion of the substitutes/alternatives in the market will be initiated and upscaled. In the fifth year, results and experience will be summarized and compiled into reports, while at the same time the production and sales of the alternatives will be further consolidated.

2. Key Results

In 2011 the main results of project focused on the promoting the alternative Anti-fouling paint through two measures:

Incentive program: The first phase incentive programs were carried out successfully in 2011. 971 tons environmental friendly antifouling paints are produced and distributed in the market as the substitute of DDT-based Anti-fouling paint, which involved 7 main manufactures in the industry. .

Policy: The project has made remarkable success in facilitating the regulatory authorities such as Fishing Boat Bureau under Ministry of Agriculture and China Classification Society under Ministry of Transport to mainstream the environmental concerns into their rules for survey, inspection, and certification of antifouling products. The project will continue to help to build the capacity of these regulatory entities for enforcement so that environmental concerns can be well addressed in their routine agenda.

Anticorrosive and Antifouling Paints System for Ship Hull (GB/T 6822-2007), which is the national product standard for the industry to follow and the industry to enforce, has included DDT in the list for ban.

The standard draft Technical Requirement for Environmental Labeling Products: Ship Anti-fouling Paints gives bans or limits on certain substances that were previously used in large quantities as solvents or biocides in the antifouling paints. The risk assessment principles and procedures developed by this project are included in the standard to determine the level of risks of the active substances added to antifouling paints. This standard is intended to guide enterprises to incorporate risk assessment into the lifecycle of antifouling paints from R&D to production and distribution.

Project Outcomes

Outcome 1: Institutions and mechanism for project management and coordination

The project has been able to create solid infrastructure for cross-sectoral coordination, stakeholder mobilization and participation, regulatory framework innovation, and experience exchange since the inception of the project. Based on this infrastructure, the project implementation in 2011 has achieved planned outputs effectively, efficiently and sustainably. Please refer to parts activities and outputs below in details.

Outcome 2: Management information system (MIS) and information management

Information regarding the progress and results of each project activity has been compiled and uploaded into the project MIS and website for wide dissemination and exchange of project information.

Outcome 3: Enabling policy environment

The policy and regulatory environment to enable the elimination of DDT in the usage of antifouling paint production has been created and consolidated by the project through the promulgation of regulations, rules, standards, and methods as well as a series of trainings for enforcement of them.

Outcome 4: Conversion from DDT based antifouling paints to alternatives

With the incentive program well designed, agreed by stakeholders, and put in place, the project is moving right on the track to achieve the DDT phase-out and substitution goals in the antifouling paint sector.

Outcome 5: Awareness raising and education

Audio, video, and photos have been taken for all milestone events including panel tests, on-ship tests, and workshops for production into a documentary for this project in 2011. The project team had intensive discussion in determining the objectives, the major components, and the way of knowledge presentation and audience reaching of the documentary. The documentary production team has started the compilation and editing of the first part of the documentary, which will snapshot the good practices and present good experience and knowledge generated during the selection of alternatives to DDT based antifouling paint.

Outcome 6: Monitoring and evaluation

The project implementation has consistently benefited from the strict and effective M&E system guided and over sought by UNDP. Experience and lessons are reviewed and incorporated into the future planning and implementation in a timely manner. The national project management team has maintained a regular communication and reporting mechanism with UNDP through meetings and reports on AWP, QORs, PIR, and APR. Intensive travels and field visits have been paid in order to inspect the progress of the subcontracts with or without company of project experts, UNDP, and the local PMOs depending on actual needs. Please refer to descriptions for the M&E activities and outputs above in details.

Activities and Outputs

With the project entering into the last year of implementation, those activities relevant to the alternatives selection and the creation of policy enabling environment have come to an end. The section will focus on activities and outputs for the promotion of alternatives.

Activity 1.1 Establish project management institutions and coordination mechanisms

The national project management team has maintained a regular communication and reporting mechanism with UNDP through meetings and reports on AWP, QORs, PIR, and APR. Intensive travels have been carried out in order to inspect the progress of the subcontracts with or without company of project experts, UNDP, and the local PMOs depending on actual needs.

The local PMOs have fully played their local advantages in organizing, coordinating, and supervising the implementation of major programs including on-ship patch tests, MAM-PEC scenario development, contaminated site investigation, incentive program promotion, and awareness raising within their jurisdictions together with the national project management team, project consultants, and subcontractors. The local PMOs have been involved in trainings on the incentive program and awareness raising campaigns. The specific outputs of these programs will be introduced under the specific activities in the following parts.

Activity 1.2 Establish a national expert team to provide technical and consulting supports to the project implementation

The recruited experts have assisted the CIO to review the existing experience in the above-mentioned areas and analyze the applicability to the project. Based on this, the experts have developed TORs containing general methodologies for subcontracts, and have been guiding and supervising the selected subcontractors to carry out the substantial work as per the TORs. The expert team consists of the CTA, NTA, 2 risk assessment experts, 3 policy experts, 1 awareness raising expert, 1 incentive program expert, and 1 contaminated site expert.

Activity 1.3 Conduct trainings to improve managerial and technical capabilities for project management

Completed and reported in previous APRs.

Activity 1.4 Conduct study tour abroad to learn advanced experience and technologies

Completed and reported in previous APRs.

Activity 2 Establish an MIS and website for the project

The programs of the project MIS and website were upgraded to a new version that is compatible with the new upgraded version of the server environment at FECO. Information regarding the progress and results of each project activity has been compiled and uploaded into the project MIS and website.

Based on the survey of the production, distribution, and consumption of DDT antifouling paint in 2010, the socio-economic impacts were analyzed and quantified. The chapter on the socio-economic impacts from introducing alternatives to the market focused on the estimation of total costs between DDT antifouling paint and alternatives and on the effective technical, economic, and administrative instruments to close up the cost gap. The environmental, health, and social benefits from deploying alternatives in the market were also analyzed in the report. The report (Annex 1) established a baseline of the producers and users of antifouling paints for fishing ships in terms of their technical, economic, and social characteristics, which will be the basis for the development and implementation of the incentive program for promotion of the alternatives in the second stage of the project. All the entries of information have been input into the MIS for decision making and impact analysis in the future project implementation.

Activity 3.1 Establish or revise related regulations, standards, and rules

Ten ministries jointly issued the ban on production, distribution, consumption, import, and export of pesticidal POPs including DDT in China in May 2009. In the recently issued Anticorrosive and Antifouling Paints System for Ship Hull (GB/T 6822-2007), which is the updated version of General Specification, becoming effective on April 1, 2008, DDT is explicitly banned. In order to support this ban, The Method for DDT Content Detection in Antifouling Paints has been developed by the project. The Method for DDT Content Detection in Antifouling Paints has been reviewed and approved by the State Standardization Administration for publication after iterative use and validation on the alternatives in the lab analysis by Tsinghua University. This method standard (Annex 2) is now officially published as a GB coded national standard (GB/T 25011-2010) and comes into effect in 2011.

Activity 3.3 Establish and promote a voluntary certification and labeling program in the antifouling paint sector

The standard draft Technical Requirement for Environmental Labeling Products: Ship Anti-fouling Paints gives bans or limits on certain substances that were previously used in large quantities as solvents (such as Di-n-octylphthalate, Dibutylphthalate, 2-Methoxyethanol 109-86-4, 2-Methoxyethyl acetate, 2-Ethoxyethanol, 2-Ethoxyethyl acetate, 2-(2-Butoxyethoxy) ethyl acetate, n-Hexane) or biocides (such as DDT, TBT, copper, and some heavy metals) in the antifouling paints. The risk assessment principles and procedures developed by this project are included in the standard to determine the level of risks of the active substances added to antifouling paints.

The environmental labelling standards are supposed to be met by top 30% products in the industry which will lead the rest 70% to catch up with the higher standard. In this logic, the environmental standards will be updated on a dynamic basis. In 2011, the standard developer has collected representative samples from antifouling paint manufacturers to verify this criterion. The contents of various regulated substances have been tested in certified labs. The final values for the limits have been readjusted based on the results from the laboratory tests. At present, the final draft standard (Annex 3) has been submitted to the Ministry of Environmental Protection for final review and approval for promulgation.

Activity 3.5 Strengthen the capacity of related departments to effectively enforce the regulations, standards and action plan

In July 2011, China's Register of Fishing Vessels issued an order to its subordinates to strengthen the registration and certification of antifouling paints in accordance with the upgraded regulations regarding the ban on DDT and other harmful substances. The local project management office in the South Sea Area developed a special inspection and enforcement plan for 2011-2012 in reference with the existing bans, pollutant emission standards, product standards, and enforcement rules. According to the plan, plants previously producing DDT antifouling paint, plants producing alternatives, shipyards, and fishing ships shall be inspected in terms of their compliance with the mentioned bans and standards. In September 2011, two training workshops for the inspection and enforcement have been held respectively in the east and west of Guangdong Province. It is planned that the actual inspection and enforcement will be carried out in January to March of 2012, and the wrap-up meeting will be held in April to May to summarize experience into reports to the national project management team.

Activity 4.1 Test, select and acquire alternative technologies.

This activity has been successfully completed. The methodology for the alternatives selection will be further disseminated into the industry for them to use in the research, development, and commercialization of new alternatives in the future.

Activity 4.2 Select demonstration enterprises and business plan improvement

The consultant for the incentive program has developed the incentive program which specifies the general principles, subsidization model, eligibility, scale, monitoring, verification, and distribution. The incentive program adopts an application-implementation-verification approach. To support the implementation of the rules, the application dossier with instructions for providing required data and information about the applicants' basic information, product information, and production and distribution promotion models was also developed. A group of experts consisting of experts for technology transfer, antifouling paint production, risk assessment, marketing, auditing and verification will be organized to provide trainings before the application for subsidy to candidate enterprises and evaluate proposals before implementation. A qualified auditing and verification institution will be contracted to carry out independent auditing and verification of the implementation of proposals. On 13-14 June 2011, an information disclosure and training meeting was held to assist the interested enterprises in developing and submitting proposals for the production and distribution of qualified alternatives.

Manufacturers submitting proposals include Shanghai Kailin Coating Manufacturing Plant, Qingdao Jiaweite Chemicals Co., Ltd., Xiamen Shuangrui Ship Coating Co., Ltd., Qingdao Oceanic Chemicals Research Institute, Changzhou Tian'an Special Coatings Co., Ltd., Guangzhou Tianlang Coatings Co., Ltd., and Shanghai Haiyue Coatings Co., Ltd. Following the training workshop targeting the enterprises intended to produce and distribute alternatives, the enterprises prepared and submitted their business plans in the template required by FECO. FECO organized a group of experts and officials to review the business plans on July 6. Comments have been provided for enterprises to improve their business plans. See Annex 4 for the business plans of the enterprises for the production, distribution and promotion of alternatives. Seven contracts have been signed between FECO and the 7 enterprises after FECO received the improved business plans that have well incorporated the comments from the evaluation expert group.

Activity 4.3 Produce, distribute and promote alternatives

Following the approval of their business plan and the signing of the contracts, the 7 enterprises started the production and distribution of alternatives according to the business plans. FECO contracted a professional accounting firm supported by technical individuals to inspect and verify the implementation of the business plans as of December 2011.

On November 29, FECO held a meeting to receive reportings from the 7 enterprises regarding the implementation progress of their business plans. The accounting firm introduced to the meeting attendants the needs of information and materials for the verification of the amount of alternatives produced and distributed as well other requirements that need to be met by the manufacturers. The representatives from the 3 local project management offices also attended the meeting.

The on-site inspection and verification started from December 4 till 10. Three groups of technical specialists and accountants were dispatched to each sea area. The technical specialist focused on:

- The manufacturing process and equipment
- The raw material storage and inventory
- The manufacturing records and quality control records
- The product type certificate
- The storage and inventory of finished products
- On-site quality control tests
- The enterprise product standard

The accountants reviewed the financial transaction materials including orders, contracts, inventories, sales invoices, cash receipt invoices, and end user invoices in order to determine the actual production and distribution of alternatives. Totally 971.26 tons of alternatives were verified with specific allocations shown in the following table. See Annex 5 for the verification report.

Enterprise	Product type	Amount applied	Product type	Amount verified	Amount unverified

	applied		verified		
Shanghai Haiyue Coatings Co., Ltd.	3	150.67	2	130.55	20.12
Shanghai Kailin Coating Manufacturing Plant	5	500.00	5	415.61	84.39
Changzhou Tian'an Special Coatings Co., Ltd.	1	121.79	1	121.79	
Xiamen Shuangrui Ship Coating Co., Ltd.	2	100.00	2	97.97	2.03
Guangzhou Tianlang Coatings Co., Ltd.	1	99.20	1	12.74	86.46
Qingdao Jiaweite Chemicals Co., Ltd.	1	100.00	1	75.16	24.84
Qingdao Oceanic Chemicals Research Institute	1	195.00	1	117.44	77.56
Total	14	1,266.66	13	971.26	295.40

Activity 4.4 Conduct environmental sound management of DDT at contaminated sites

A preliminary inventory of the DDT contaminated sites has been identified through collecting and analyzing information from questionnaires, existing databases, past surveys, interviews, and Internet. Potential DDT contaminated sites include DDT antifouling paint manufacturing plants and shipyards that use DDT antifouling paint in the processing of ship bottom surfaces. DDT may enter into soil of antifouling paint formulation plants if there is material leak or spillover from raw material storage, paint production, and product storage. The sources of DDT pollution into soil, sea water, and sediment of shipyards include antifouling paint storage, paint residue removal and disposal, and new antifouling paint spraying. In total, there are 40 antifouling paint plants and 1,096 shipyards inventoried with levels of risks estimated based on the likelihood and magnitude of DDT pollution in the historical operations of these plants. See Annex 6 for the preliminary inventory.

Risk assessment based on sampling and analysis at two selected potential contaminated sites was carried out: (1) Guangzhou Tianlang Coatings Manufacturing Co., Ltd., which ever produced DDT antifouling paint for more than 10 years from 1998 to 2008, and (2) Yangjiang Zhapo Shioyard Co., Ltd., which ever consumed DDT antifouling paint for 15 years from 1983 to 2008. Stratified grid-based samplings were taken to ensure reliability. Besides DDT, other pollutants including heavy metals, VOCs, SVOCs, OC, and TPH were analyzed by an accredited laboratory. No significant risk was identified with the demolished plant site of Guangzhou Tianlang Coatings Manufacturing Co., Ltd., owing to the concrete paved floors and the good management of raw material storage, formulation production, and product storage by the plant. However, concentrations of DDT and other pollutants in the soil of the shipyard and the adjacent marine sediments were found to significantly exceed the risk limits established by concerned national or international standards. The risk should be specially cautioned in the fact that the shipyard is located beside a busy fishing port. See Annex 7 for the risk assessment report.

Activity 5.1 Prepare publicity materials

Guangdong Provincial Environmental Awareness and Education Center made posters and brochures targeting fishermen, ship-owners, and the public in order to raise their awareness and understanding about the harms of DDT from the use of DDT antifouling paint.

Activity 5.2 Mobilize NGOs to conduct community based environmental education and awareness raising

On September 15 to 16, Guangdong Provincial Environmental Protection Department supported by Guangdong Provincial Environmental Awareness and Education Center, held a workshop in Zhanjiang, a coastal city in the province. More than 70 representatives of shipyards, ship-owners, fishermen, and college volunteers attended the meeting. The awareness raising specialist of the project gave a lecture with full evidences showing the harms of DDT to human health and the environment. The national technical advisor gave a lecture on the alternatives from the viewpoints of risks, production, and distribution.

The volunteers are from the Environmental Protection Association of Zhanjiang University. They were specially trained to understand the principles of the project philosophy and approaches by the specialists. Posters and brochures were then distributed to the hands of fishermen, ship-owners, and the public in ports with instructions delivered for questions from the audiences. Such community based environmental education and awareness raising activities have been carried out in other coastal cities of the province by mobilizing the environmental protection associations of the local universities.

Activity 6.1 Conduct meetings for project inception, review progress and project results

On December 2, 2011, UNDP and FECO had a meeting to review the major progresses and issues with the project implementation in 2011 and prepare outlines for the annual work plan for 2012.

Activity 6.2 Launch field investigations and inspections to monitor and evaluate progress of project implementation

The national project management team and the local project management office have paid site visits to the alternatives manufacturing plants to inspect the results of alternatives production and distribution. It was found that two plants have changed their sites for production. The two plants were required to resubmit supporting materials to justify the eligibility of the production equipment and processes.

Activity 6.3 Prepare progress reports to monitor project progress and performance

The project team has prepared and submitted to UNDP the 2010 annual project review report, the 2011 annual work plan, 4 quarterly operational reports according to the M&E requirements of UNDP and GEF during this reporting period.

Activity 6.4 Conduct annual project audit

The national audit team has taken routine audit over the project.

Sustainability

The sustainability of the project has been achieved through the following measures:

- The project has created a policy and regulatory framework to enable the elimination of use of DDT and other harmful substances in the usage for antifouling paint production, including product standards, testing method, risk assessment method, environmental labelling standard, ban, and other forms of administrative orders.
- The industrialized production and distribution of alternatives by enterprises have taken a significant and increasing share of the market. Normally, enterprises have the motivation to continue the supply of such products to the market while keeping the price going down.
- There is strengthened awareness among the end users and the general public about the harms and benefits in choosing antifouling solutions. Consequently, this will force the

suppliers to phase out polluting products and turn to the production of environmentally friendly ones.

The sustainability of the project impact will be continuously strengthened and consolidated by the implementation of the second and third stage of the incentive program.

MDG Targets

The project is facilitating the realization of the MDGs:

- Target 7.A: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources.
- Target 7.B: Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss. Long-term accumulative contamination of soil and water during production and use of DDT and DDT based antifouling paint will also cause damages to the sensitive species, and even trigger species extinction. The cost of species extinction and rehabilitation of damaged ecosystem will be too huge to calculate.

Development Effectiveness

The project has been implemented effectively with the objective to phase out the use of DDT in the usage of antifouling paint production being realized stably. The industry has been implanted with the concept and methodology for controlling risks in the entire life cycle of their life cycle. With the stoppage of discharge of DDT from this source, and along with other bans on agricultural use of DDT, the sea shores and estuaries as sinks receiving DDT accumulation will have concentrations of DDT and metabolites in sea water, sediments, and sea organisms starting to going down.

Cross-cutting Issues

Economic loss of aquatic product export will be incurred by the excessive DDT contents. The increase rate of aquatic product export in 2005 was reduced by 14% as compared with that in 2004, mainly due to the over residual of pesticides. While it is hard to quantitatively determine the impacts of DDT usage in antifouling paint to the aquatic product quality, it should be a significant factor due to direct release of DDT into coastal waters and accumulation in aquatic products.

The ultimate substitution of DDT usage in the production of antifouling paint depends on the private sector, including the suppliers and demanders of the antifouling products. From the very start, the project spends great efforts to mobilize the international manufacturers and domestic manufacturers to research, develop, and demonstrate their alternatives to DDT under the support of this project. International companies showed reluctance due to the low profit margin by manufacturing and selling short-life antifouling paints to fishing ships. However, the project has successfully attracted the domestic enterprises and research institutions. They are also committed to produce and sell the tested qualified alternatives under the incentive program. Awareness raising activities have been and will continuously be launched among the end users including the shipyards and individual ship owners to pull the demand of alternatives.

3. Project Management and Oversight

Implementation Status

Basically, the project has carried out activities and delivered the outputs following the annual work plan of 2011 as outlined above. The project has come into the last year of implementation.

Monitoring and Evaluation

See descriptions under Outcome 6.

Human Resource Management

The successful project implementation depends on the availability of a wide range of expertise from R&D of antifouling technologies, antifouling paint production and marketing, chemicals regulations and enforcement, and public relations. UNDP and FECO's platforms and networks of expert human resources have provided the project with sufficient choices of qualified experts in developing and delivering the knowledge and know-how to the industries, regulators, and the public. Please refer to the description for Activity 1.1 and 1.2 for details regarding the staffing of PMOs and the areas of experts hired.

Risk Management

The major risks of the project lied in the failure in successfully selecting out a number of alternatives for promotion. These risks have been overcome by the effective mobilization and involvement of the industry into the test platforms provided by the project. With the successful implementation of the first stage of the incentive program, it is foreseen that the project will be unlikely to encounter high-level risks before the project completion.

Inter-Agency Coordination and Delivering as One

N/A.

Communication and Advocacy

The project has implemented a holistic strategy for the communication and advocacy. In the first half of the project, the emphasis has been put on the dissemination of information regarding the harms of DDT and methods in researching and developing alternatives. In the second stage, the emphasis will be shifted to the choices of alternatives and benefits from using alternatives. The national project management team has adopted Internet, newspaper, and information sessions for the dissemination of information regarding the incentive program so that the enterprises, distributors, and the general public can be highly mobilized in the participation in the incentive program.

4. Financial Management

Cash and in-kind co-financing received up to the end of 2011 amounts to USD 827,372 and USD 2,246,696 against the total committed co-financing amount of USD 3,750,000 and USD 8,500,000 from the Government of China (GOC) and Private Sector respectively, representing 22% and 26% receipt of the total committed amount.

Two companies submitted their capsaicin based alternatives to the project for evaluation. During the research and development of these alternatives, they jointly applied research funding worth of 1,200,000 USD from the 863 Program sponsored by Ministry of Science and Technology.

Budget Summary (US\$)		
As of [December 31, 2011]		
Total approved project budget	UNDP	10,365,000
	Other UN agencies	
	Counterpart funding	12,250,000
	Cost-sharing third parties	
	Total	22,615,000
Estimated total budget committed to date	UNDP	10,365,000
	Other	12,250,000
	Total	22,615,000
Estimated total budget disbursed to date	UNDP	3,070,757.90
	Other	8,686,729.67
	Total	11,757,486.57

Expenditure by Activity (US\$) [from January 1, 2011 to December 31, 2011]		
Activity	Cost item	Expenditure
1: Institutions and mechanism for project management and coordination		
	Subtotal	122,619.53
2: Management information system (MIS) and information management		
	Subtotal	27,499.25
3: Enabling policy environment		
	Subtotal	62,997.21
4: Conversion from DDT based antifouling paints to alternatives		
	Subtotal	701,366.24
5: Awareness raising and education		
	Subtotal	171,278.52
6: Monitoring and evaluation		
	Subtotal	19,031.27
TOTAL		1,092,032.76

5. Management Recommendations

The recommendations are given to guide the more effective and efficient implementation of the project in the last year of the project life, focusing on three aspects:

- Inspection and regulation enforcement
- Awareness raising and education
- Incentive program

5.1 Recommendation 1

The project needs to initiate a comprehensive inspection and enforcement program in the sector of antifouling paint. The national project management team and the 3 local project management offices shall involve and enable the fishing ship inspection authorities and Chinese Classification Society to take inspection and enforcement actions against products that may contain DDT.

5.2 Recommendation 2

The environmental awareness of the targeted stakeholders has been raised significantly. In the stage of the alternatives promotion, the focus of the specialist shall be re-shifted to the harms of DDT containing antifouling paint, the methods for choices of alternatives, and the benefits of the consumption of alternatives, aiming to promote the consumption of alternatives by the end users.

5.3 Recommendation 3

The local project management offices shall be fully empowered to play their organizational, coordinating, and supervisory roles in the implementation of the incentive program. First, they shall mobilize the local antifouling paint manufactures to participate in the trainings session for the incentive fund application. The local PMOs shall also be trained to understand the requirements and conditions for the application and issuance of the incentive funds. Site visits shall be paid by the local PMOs to verify the eligibility of the appliers and other basic conditions for the alternatives production, with findings and conclusions fed back to the national project management team. Second, during the implementation of the business plans by the enterprises, the local PMOs shall pay irregular visits to the manufacturing sites and distribution sites. The purpose of such visits is to prompt the enterprises to realize their commitments stably and surely, and report the progress and

issues to the national project management team. Third, the local PMOs shall assist the verification body to carry out the verification of the alternatives production and distribution.

5.4 Recommendation 4

Technology transfer shall be encouraged among the technology holders and demanders.

5.5 Recommendation 5

The national project management team and the local project management offices shall develop specific plans for the promotion of alternatives, and require the incentive fund appliers to develop corresponding advertisement and promotion plans for their products, with a common aim to increase the market share of alternatives.

6. Conclusion

Overall, the project has realized the transition from the selection of alternatives among R&D community to the promotion of alternatives among end users during this reporting period. Risks in organizing the intensive, large-scale but well controlled efficacy tests have been overcome successfully by taking the advantages of the effective infrastructure for horizontal and vertical coordination. With the incentive program well designed, agreed by stakeholders, and put in place, the project is moving right on the track to achieve the DDT phase-out and substitution goals in the antifouling paint sector.

The project has specifically completed the activities listed in the annual work plan for 2011 as outlined above, and laid a solid foundation for the implementation of activities in 2012. The annual work plan for 2012 will be developed taking into account the recommendations from this APR so as to bring the project to a full successful closure.

7. Annexe/s

Annex 1: Socio-economic survey and assessment of phase-out and substitution of alternatives to DDT-based antifouling paint

Annex 2: The Method for DDT Content Detection in Antifouling Paints

Annex 3: The standard draft Technical Requirement for Environmental Labeling Products: Ship Antifouling Paints

Annex 4: Business plans of the enterprises for the production, distribution and promotion of alternatives

Annex 5: Verification report of the production, distribution and promotion of alternatives

Annex 6: A preliminary inventory of the DDT contaminated sites in the sector of antifouling paint production and consumption

Annex 7: Risk assessment based on sampling and analysis at two selected potential contaminated sites