NOTES

DEEP SEABED MINING: ALTERNATIVE SCHEMES FOR PROTECTING DEVELOPING COUNTRIES FROM ADVERSE IMPACTS

INTRODUCTION

The fast approaching reality of deep seabed mining has been a source of great concern for developing countries. Ambassador Pardo first made the world aware of these concerns in 1967 with his now famous speech before the United Nations General Assembly in which he suggested that the resources of the seabed should be declared the common heritage of mankind.\(^1\) The first step in protecting developing countries was taken with the General Assembly Moratorium Resolution prohibiting unilateral seabed mining pending the establishment of an international regime.\(^2\) Most recently, the Third United Nations Conference on the Law of the Sea (UNCLOS III) has been the forum for discussion of alternative measures to protect the concerns of developing countries.\(^3\)

At UNCLOS III, negotiations entailed three specific developing country concerns. The first stems from the concept that the resources of the seabed are the common heritage of mankind. Developing countries want to insure a share in the revenues from the exploitation of seabed resources. The second concern is ancillary to the first. In order to be able to share in these revenues,

the developing countries want the technology for exploitation made available to an international authority which will participate in seabed mining. The third concern is the fear of adverse economic effects to be suffered by developing countries that are land producers of the minerals to be taken from the seabed. The scope of this paper is limited to the third of these three concerns.

Solutions to these three problems were apparently devised at UNCLOS III, but certain recent developments are likely to renew them. The first was the passage of unilateral legislation by the United States and the Federal Republic of Germany providing for interim regulation of seabed mining activities. Developing countries are concerned that their interests will not be protected adequately if seabed mining begins under this unilateral legislation. The second development was the withdrawal of the United States delegation from negotiations at UNCLOS III in March, 1981. The delegation was recalled by the Reagan Administration to re-evaluate the United States position. Apparently the Administration's position is inconsistent with the concerns of developing countries that seabed mining will affect their economies adversely, because the Administration opposes any limitations on production. Production limitations were provided as one means of protecting these particular developing countries.

Given these recent developments, three situations for seabed mining are possible. First, mining may begin after the passage of a comprehensive Law of the Sea Treaty, with developing countries protected by the schemes previously devised. Second, a comprehensive Law of the Sea Treaty may not be completed and mining may begin subject to regulation only by unilateral legislation. Or third, a comprehensive Law of the Sea Treaty may be completed but developing countries would not be protected adequately because either some of the countries that will carry on seabed mining activities would not agree to the treaty, or the protection schemes were substantially diluted or completely excluded.

In the context of these three situations, this note re-evaluates the concern of developing countries with land based production
that their economies will be adversely affected by seabed mining. The first part examines the potential impact of seabed mining on the markets of the minerals to be mined, and the consequent impacts on the developing country producers of these minerals. The second part considers protections provided these countries in the Draft Convention on the Law of the Sea (Draft Convention). The third part analyzes the viability of using the schemes in the Integrated Programme for Commodities (IPC) as alternative sources of protection for these developing countries.

I. THE ECONOMIC EFFECTS OF DEEP SEABED MINING ON MINERAL MARKETS AND DEVELOPING COUNTRIES

A. Physical Aspects of Deep Seabed Mining

Deep seabed mining is a capital intensive industry, and therefore, has only been pursued by consortia composed of mining companies from several countries. In 1979, six consortia were involved in various phases of seabed mining. For the most part, activities were restricted to the research and exploration stage, and although tests of several methods of mining have been conducted, commercial production is not expected to begin until at least the 1990's. Because even exploration and testing require the expenditure of large amounts of capital, members of the industry want to insure the security of their investments. The major factors that will affect the commencement of commercial production are:

1) The potential profitability of seabed mining;
2) The legal status of seabed mining; and

---

10 Draft Convention, supra note 3, art. 136, at 50.
12 U.S. DEPT OF INTERIOR, BUREAU OF MINES, MINERALS YEARBOOK, 1978-79, AREA REPORTS: INTERNATIONAL at 40-41 (1979) [hereinafter cited as MINERALS YEARBOOK]. The six consortia are: (1) Ocean Mining Associates; (2) OMCO (Ocean Minerals Company) Consortium; (3) DOMA (Deep Ocean Mining Associates) (Japanese); (4) AFERNOD (French Group); (5) CLB Group; (6) Kennecott Copper Corp.
13 Id.
15 See generally Murphy, Deep Ocean Mining: Beginning of a New Era, 8 CASE W. RES. U. J. INT'L L. 46, 50-51 (1976). Members of the industry are concerned that they will invest large amounts of capital in developing mining sites only to find that they will have to share their site or the profits from the mining of the site with an international authority.
3) The availability of adequate financing.

The availability of financing probably will depend to a great extent on the first two factors. Until a comprehensive treaty on the Law of the Sea is completed, the legal status of seabed mining will remain uncertain. The potential profitability of seabed mining is dependent on many factors, including the world market for the relevant minerals and the existence or non-existence of artificial controls on those markets.

The minerals that are currently the most promising for exploitation are found on the seabed in the form of nodules shaped like large potatoes. These nodules contain many minerals, but nickel, copper, manganese, and cobalt are, at present and for the future, the most economically feasible for exploitation. The nodules can be divided into four basic types on the basis of the concentration of these four minerals in the nodules. The most attractive contain greater than 1% each of nickel and copper. According to one rough estimate, approximately 15% of the world’s seabed is covered by...

---


18 Ocean minerals exist in other forms also. Phosphorous exists in clumps; iron ore, sulphur, copper, zinc and berite ore are mined from deposits on the ocean floor; and several minerals are dissolved in the ocean itself. See OCEAN YEARBOOK 1, at 182-208. (E. Borgese and N. Ginsberg eds. 1978). More recently deposits of polymetallic sulfides are being considered for exploitation. These deposits consist largely of zinc, iron, sulfur, silver and copper in high concentrations. Murphy, Polymetallic Sulfides, SOUNDINGS, LAW OF THE SEA NEWS AND COMMENT, Nov. 1981-Feb. 1982, at 1.

19 Collins, Mineral Exploration of the Seabed; Problems and Alternatives, 12 NAT. RESOURCES LAW 599, 605 (1978).

20 D. LEIPZIGER & J. MUDGE, SEABED MINERAL RESOURCES AND THE ECONOMIC INTERESTS OF DEVELOPING COUNTRIES 126 (1976). The other three categories are: (1) Nodules with high iron content and less than one percent each of nickel, copper, and cobalt; (2) nodules with high manganese content and very little nickel, copper, and cobalt; (3) nodules with high cobalt content and small amounts of nickel and copper.
these nodules. The greatest potential for mining is in prime areas where higher grade nodules are more concentrated. Most of these prime areas are located in the Pacific Ocean. The total recoverable amount of minerals is still too speculative to estimate with any precision, but one authority has estimated that the Pacific Ocean alone contains 1.66 trillion tons of nodules.

B. The Impact of Deep Seabed Mining on Mineral Markets and Developing Countries

The impact exploitation of these nodules may have on developing countries has long been recognized as a legitimate problem. The economies of most developing countries depend heavily on earnings from the exports of raw materials including minerals. In 1974, a report was submitted to the General Assembly of the United Nations which purported to show the potential economic impact of seabed mining on the world markets for the relevant minerals. The report recognized that if the market of a particular mineral was significantly affected, any developing country whose economy was dependent on that mineral for export earnings could also be affected. The report examined both the potential short and long term effects of deep seabed mining on the markets of the four minerals most likely to be concerned: nickel, copper, manganese, and cobalt. However, in order for the report to reach any conclusions, assumptions had to be made regarding the future levels of several important factors in the economic equation.

One assumption made concerned the tonnage of nodules that would be recovered in a single year. The United Nations report estimated that fifteen million tons of nodules per year could be mined by 1985. This figure is directly related to the number and size of mining operations capable of commercial production. Optimal sizes for economic efficiency have been estimated to be two to three mining rigs per operation, each rig with a production capacity of one to two million dry tons of nodules per year. The amounts of the few key minerals produced would depend on their relative concentrations within the nodules. Assuming 15 million tons

---

21 INTERNATIONAL OCEAN SYMPOSIUM, supra note 14, at 55.
22 Id. at 57.
23 Id.
24 D. LEIPZIGER & J. MUDGE, supra note 20, at 124 (citing J. MERO, THE MINERAL RESOURCES OF THE SEA 175 (1965)).
26 Id. at 29.
27 Id.
of nodules per year are produced, the estimated metal production per million tons of nodules is 230,000 tons of manganese, 15,000 tons of nickel, 13,000 tons of copper, and 2,000 tons of cobalt. The United Nations study also assumes that commercial recovery of seabed minerals will begin by 1985. However, mining companies have been hesitant to commit large amounts of capital to development due to the depressed state of world mineral markets as of late and the uncertainty surrounding the legal position of seabed mining. If mining does not commence until several years after the predicted 1985 date, the world demand for the relevant minerals probably will have risen past the projected 1985 levels. If so, the impact of seabed mining may be significantly less than predicted. Seabed production conceivably could begin at the same level as predicted for 1985, 15 million tons of nodules, but the world demand would be greater; thus seabed nodules would be available to satisfy a smaller share of the world demand.

The impact seabed mining will have on the markets of the four minerals, and concomitantly the economies of the developing countries that produce those minerals, will depend in general on the relationship between supply and demand in those markets. The fear of the developing countries is that seabed mining will decrease either their capacity to export the minerals or their export earnings by causing the prices of the minerals to drop.

Determining the extent of any impact at some point in the future involves a consideration of many speculative factors. Both future demand and future supply have to be predicted. The United Nations study determines future demand by taking the demand for

---

28 The nodules most attractive for exploitation contain greater than 1% each of nickel and copper. The average assays of these nodules according to Leipziger and Mudge are 33% manganese, 1.5% nickel, 1.1% copper, and 0.4% cobalt. D. LEIPZIGER & J. MUDGE, supra note 20, at 126. The U.N. study assumes average assays of 24% manganese, 1.6% nickel, 1.4% copper and 0.21% cobalt. The average metallurgical recovery rate is assumed to be 95%. Using these figures the study calculates the approximate metal production. Economic implications: Report of the Secretary General, supra note 16, at 28. If the Leipziger and Mudge assays were used, the approximate metal production would change only slightly as is shown below.

<table>
<thead>
<tr>
<th></th>
<th>L&amp;M</th>
<th>U.N.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mn</td>
<td>316,250</td>
<td>230,000</td>
</tr>
<tr>
<td>Ni</td>
<td>14,062</td>
<td>15,000</td>
</tr>
<tr>
<td>Cu</td>
<td>10,214</td>
<td>13,000</td>
</tr>
<tr>
<td>Co</td>
<td>3,809</td>
<td>2,000</td>
</tr>
</tbody>
</table>

---


30 See supra text accompanying note 14.
DEEP SEABED MINING

the latest year for which data is available and applying an estimated annual growth rate for that demand until the year for which the projected demand is desired. If the growth rate of demand changes, the projected demand will change. If demand grows faster than predicted, the impact of seabed mining on the developing countries at any particular point in the future is likely to be lessened. Conversely, if demand grows slower than expected, the impact is likely to be greater. In the long term analysis, the availability of substitutes, the potential for recycling, the industrialization of developing countries, and the development of new technology, all could affect the future demand of any of the four minerals.

The future supply of these minerals could depend to a large degree on the magnitude of seabed production, which in turn is limited by cost and technology. Both the cost of seabed mining and the rate of development of the necessary technology are speculative factors. Predicting future supply also requires a consideration of the level of land based production and a determination of the level of seabed production. The rate of depletion of land based reserves and the discovery of new reserves will affect future supplies, as will the development of new production technology.

In addition to future supply and demand, other factors may contribute to the determination of the extent to which seabed mining will effect the developing countries. The level of dependence on a particular mineral exhibited by a country will determine the degree of impact that a change in either supply or demand will have on the country's export earnings. If the country is largely dependent on the mineral, the impact on export earnings will be greater than if the level of dependence is lower. However, the level of dependence for most countries is likely to decrease as they become more industrialized and are able to export manufactured products. Another factor which may lessen the impact of seabed mining is the existence of trade agreements which guarantee a certain export level to the developing country. If a country has a guaranteed export level, it can be injured only if the prices of the minerals drop.

Despite the difficulty in making accurate determinations of the future levels of supply and demand of the minerals, the United Nations report makes some reasonable predictions of the impacts of deep seabed mining on the mineral markets. Translating these potential impacts into effects on the economies of developing countries is a problem of economics, but some general conclusions can be made by studying the projected effects on the following four mineral supply markets.
1. **Manganese**

The United Nations study prediction for the manganese market in 1985 is that seabed production will depress prices.\(^3\) The primary use of manganese is in steel production,\(^3\) and it has no suitable substitutes.\(^3\) Any increase in supplies would decrease the price.\(^3\) Assuming a 5% growth rate for demand, the 1985 estimated world demand is 16.4 million metric tons (mmt).\(^5\) The estimated production of manganese from the seabed in 1985 is 920,000 tons, which is 5.6% of the projected world demand.\(^6\) Estimates indicate that world reserves of manganese (excluding seabed resources) should be more than adequate to meet demand through the year 2000.\(^7\) Therefore, seabed production has the potential for displacement of some demand for land based production, but the effect should not be significant considering the relatively small percentage of projected world demand seabed production could meet. However, at least one authority believes that the industrialized world's demand for manganese will equal and begin to exceed land based supplies by 1985, resulting in significant shortages by the year 2000.\(^8\) In this case, developing countries probably would be harmed very little by seabed production, as their reserves are expected to be depleted significantly by that time.\(^9\) The countries most likely to be affected are the Republic of South Africa, Gabon, and Brazil. They were the largest developing country producers of manganese in 1978.\(^10\)

2. **Nickel**

The conclusion of the United Nations report with respect to the

---

\(^2\) Id. at 37.
\(^3\) U.S. DEPT OF INTERIOR, BUREAU OF MINES, MINERAL COMMODITY PROFILES: MANGANESE 13 (July, 1979) [hereinafter cited as MINERAL COMMODITY PROFILES: MANGANESE].
\(^3\) Economic Implications: Report of the Secretary General, *supra* note 16, at 38.
\(^5\) Id.
\(^6\) 230,000 tons of manganese/million tons of dry nodules times 4 million tons of nodules = 920,000 tons of manganese. When this report was prepared only two mining companies were interested in the recovery of manganese, therefore, 4 million tons of nodules is used in the computation rather than 15 million tons. However, if all companies were interested, the estimated production would be 3.45 million tons of manganese, or 21% of the projected world demand. *Id.* See *supra* text accompanying note 27.
\(^7\) MINERAL COMMODITY PROFILES: MANGANESE, *supra* note 33, at 17. This projection is based on a growth rate of demand of only 2.9% and a projected demand of 12.6 mmt. Even at a 5% growth rate, however, land reserves should be more than sufficient to meet demand in 1985.
\(^3\) 1979 Senate Hearings, *supra* note 29, at 244.
\(^3\) Id. at 165.
\(^10\) MINERAL COMMODITY PROFILES: MANGANESE, *supra* note 33, at 3.
possible impacts of seabed mining on the market for nickel is that land based producers will not be affected seriously.\textsuperscript{41} Developing countries accounted for only 13\% of total world production in 1972,\textsuperscript{42} and this figure was projected to increase to only 17\% by 1985.\textsuperscript{43} The only major developing country producers of nickel are New Caledonia, Indonesia, and the Dominican Republic, which accounted for approximately 12\%, 5.4\%, and 3.2\%, respectively, of the total world production in 1979.\textsuperscript{44} Therefore, these countries should be affected only minimally by any impacts on the world market. The Dominican Republic may feel the effects most if its dependency on nickel exports does not decrease.\textsuperscript{45} Land based reserves of nickel are expected to be sufficient to meet the projected world demand in the year 2000,\textsuperscript{46} but the United Nations study predicts that land based production would have to increase by 70\% over 1972 levels in order to meet the 1985 demand.\textsuperscript{47} Therefore, seabed production may be necessary to help compensate for any deficiency if land based production lags.

3. \textit{Copper}

Seabed production is not expected to have a significant impact on the world copper market as a whole because of the relatively small amount of seabed production expected in relation to world land based production. Seabed production of copper will probably represent only from 1.3\%\textsuperscript{48} to 2.0\%\textsuperscript{49} of world demand in 1985, depending on the growth rate of demand. The developing countries most likely to be harmed are Chile, Zambia, and Peru. In 1978, copper accounted for over 90\% of Zambia's exports.\textsuperscript{50} 52\%

\begin{itemize}
\item Economic Implications: Report of the Secretary General, \textit{supra} note 16, at 34.
\item Id.
\item Id. at 35.
\item These percentages were obtained by dividing each country’s production by the total world production. \textit{MINERALS YEARBOOK, supra note 12, at 25.}
\item In 1978, exports of nickel represented 10.6\% of the Dominican Republic’s total exports. \textit{Id. at 1124.}
\item \textit{U.S. DEP'T OF INTERIOR, BUREAU OF MINES, MINERAL COMMODITY PROFILES: NICKEL 15, 18 (May 1979) [hereinafter cited MINERAL COMMODITY PROFILES: NICKEL]. The demand for nickel has been predicted to grow anywhere from 3.6\% per year, \textit{Id. at 15, to 50\% per year. Economic Implications: Report of the Secretary General, supra note 16, at 34.}
\item Id. at 36. The United Nations study estimates that copper production from the seabed would only be about 0.2 mmt or 1.3\% of the 24.9 mmt of expected demand by 1985. The expected demand of 24.9 mmt is based on a 5\% growth rate for demand.
\item \textit{U.S. DEP'T OF INTERIOR, BUREAU OF MINES, MINERAL COMMODITY PROFILES: COPPER 16 (Sept. 1979) [hereinafter cited MINERAL COMMODITY PROFILES: COPPER]. This estimate is based on a growth rate for demand of 3.8\% and a projected 1985 demand of 20.2 mmt.}
\item \textit{MINERALS YEARBOOK, supra note 12, at 1068 (in 1978 the value of total exports was $818.4 million and the value of copper exports was $760.3 million).}
\end{itemize}
of Chile's, and 42% of Peru's. Due to the level of dependence on copper for export earnings, any impact on the world market could have a significant effect on these economies. Traditionally, Chile has depended on copper for 70-80% of its export earnings, but dependence has been decreasing recently due to an export diversification program. Seabed production may displace some land based production before the year 2000, but demand beyond then is expected to exceed present reserves.

4. Cobalt

The market for cobalt probably would experience the most extensive impact from seabed production. The total estimated world demand for 1985 is only 60,000 metric tons. Seabed production in 1985 is expected to be 30,000 metric tons, or 50% of the estimated world demand. A 50% increase in production could translate into a 66% drop in price as supply is relatively inelastic with respect to price.

The unusual nature of the cobalt market makes the potential impact even more difficult to predict. Cobalt is mined as a by-product of nickel and copper. Therefore, cobalt production will be limited by the level of nickel and copper production. The two countries likely to be affected most are Zambia and Zaire. Cobalt accounts for as much as one third of the export earnings of each. Zaire is the world's largest producer of cobalt, accounting for approximately 40% of total production in 1979, and probably would experience a significant decrease in export earnings. New Caledonia is the only other developing country that is a significant producer. World supply is more than adequate to meet demand

51 Id. at 21.
52 Id. at 727.
53 Id. at 221.
55 Id. at 18.
56 Economic Implications: Report of the Secretary General, supra note 16, at 41.
57 Id.
58 Id. at 9.
59 U.S. DEPT OF INTERIOR, BUREAU OF MINES, MINERAL COMMODITY PROFILES: COBALT 1 (Oct. 1979) [hereinafter cited as MINERAL COMMODITY PROFILES: COBALT 1].
60 MINERAL COMMODITY PROFILES: COBALT, supra note 59, at 1.
61 Id.
63 Id. at 39.
64 New Caledonia provided 13% of the total world mine output in 1978. Id. at 5.
through the year 2000. However, production might not keep pace with demand because of limited nickel and copper production, surges in demand, or political or military interruptions.

While the number of developing countries likely to be affected by seafloor mining seems relatively small, some of those that are affected may suffer a serious impact. Although it is speculative, a determination can be made with some accuracy and agreement as to who will be affected and to what extent. The level of impact that is to be considered significant may be the subject of future controversy, but could be determined under the chosen protection scheme.

II. THE PROTECTION SCHEMES OF UNCLOS III

Despite the conflicting interests of the more than one hundred developing countries participating in UNCLOS III, they have managed to attain some cohesiveness and form a formidable bloc in the negotiations. The motivation for their solidarity stems from many sources, but the result is support by the whole for the interests of a few. Therefore, even though few developing countries are likely to be affected by seafloor mining, their demand for protection is likely to be supported by the entire bloc of developing countries.

Article 151 of the Draft Convention provides three protection schemes for land-based producers: commodity agreements, seafloor mining, and other arrangements.
production limitations, and compensation. The stated purpose of these schemes is to "promote the growth, efficiency and stability of markets" for the seabed minerals. The International Seabed Authority (Authority) is the organ established to promote these policies and control activities in the seabed.

A. Commodity Agreements

Article 151 of the Draft Convention gives the Authority the power to participate in international commodity agreements concerning minerals produced from the seabed. Commodity agreements provide long term protection for land based producers by stabilizing prices and assuring market access. No specific provisions for the negotiation of these agreements are provided in the Draft Convention, but several writers have suggested that the United Nations Conference on Trade and Development would be a proper forum. Because commodity agreements may take years to negotiate and implement, the Draft Convention contains provisions for more immediate protection in the form of production limitations and compensation.

B. Production Limitations

The purpose of production limitations is to prevent seabed production from displacing land based production. This is accomplished by limiting the production of nickel from the seabed to 60% of the increase in nickel consumption. The production of copper, manganese, and cobalt necessarily are limited thereby because their relative concentrations to nickel in the manganese nodules is fairly consistent. The production limitations are only temporary, however. They are to last twenty-five years, or until the end of a review

---

69 Draft Convention, supra note 3, art. 151, at 56-58.
70 Id. art. 151(1), at 56.
71 Id. arts. 156-158, at 61.
72 Id. art. 151(1), at 56.
73 International commodity agreements will be discussed in detail in Section 111.
76 Draft Convention, supra note 3, art. 151(2)(b), at 57.
77 See supra note 18. For a criticism of this ancillary limitation, see D. LEIPZIGER & J. MUDGE, supra note 20, at 219-20.
conference to be held fifteen years after commercial production begins, or until commodity agreements can be established.78

C. Compensation

The final scheme for protection contemplated by the Draft Convention is compensation. Article 151(4) provides that a compensation system should be set up to provide assistance to developing countries that experience adverse effects on their economies as a direct result of seabed mining.79 No specific compensation scheme is elaborated, but provisions are made for cooperation with existing agencies and organizations.80 While compensation may provide the most immediate relief, it may be the most ineffective and inefficient form of protection in the long run.

The question of the adequacy of the three protection schemes discussed above cannot be answered until the specific details of the schemes are completed. However, the acceptance by the developing countries of these schemes seems to indicate their satisfaction that they will be protected adequately by the Draft Convention. The possibility exists, however, that an agreement will not be reached on the Draft Convention, or at least that some of the provisions of Article 151 may be changed. The United States has indicated its dissatisfaction recently with the concept of production controls,81 and may try to renegotiate those provisions.82 The solidarity of the developing countries should make it difficult for the United States to gain any concessions on this point without making significant concessions in other areas. However, if the developing country bloc can be split on this issue, the fact that only a few developing countries are likely to be affected by seabed mining may give the United States enough negotiating advantage to reduce or eliminate the production controls. Other possibilities are that agreement on the Draft Convention will not be reached before seabed production begins, or that the United States and other industrialized countries with the technological capacity to mine the seabed will not be parties to the treaty. In any of the above three situations, developing countries with land based production may have to look beyond the Law of the Sea negotiations for protection.

78 Draft Convention, supra note 3, art. 151(2)(a), at 56.
79 Id. art. 151(4), at 58.
80 Id. Compensation is discussed in detail in Section III, infra.
81 Statement by the President, supra note 7.
III. **International Commodity Agreements and the Integrated Programme for Commodities.**

A. The Integrated Programme for Commodities

International commodity agreements may be the best source of protection for those developing countries whose economic well-being is threatened by seabed mineral production. The Draft Convention recognizes commodity agreements as a source of protection, but does not elaborate on the form they should take.\(^3\) International commodity agreements presently exist for several commodities, but not for any of the four seabed minerals.\(^4\) The possibility of negotiating agreements for these four minerals has been facilitated somewhat by the adoption on May 30, 1976, of the Integrated Programme for Commodities (IPC) by the Fourth Session of the United Nations Conference on Trade and Development (UNCTAD IV).\(^5\) The IPC is designed to be “a program of global action to improve market structures in international trade in commodities of interest to developing countries, and which is consistent with the interests of all countries, particularly those of developing countries. . . .”\(^6\) The IPC, with its detailed structure for commodity agreements, would be an excellent forum for negotiating the commodity agreements contemplated by Article 151 of the Draft Convention or for negotiating commodity agreements as an independent and alternative source of protection.

B. Objectives of the Integrated Programme for Commodities

If international commodity agreements negotiated within the bounds of the IPC are to provide protection for those developing countries that may be affected adversely by seabed mining, they should have objectives which are consistent with the needs of those countries. The major concern of developing country producers is that seabed mineral production will have adverse effects on their export earnings.\(^7\) These earnings are a function of market price

\(^3\) Draft Convention, supra note 3, art. 151(1), at 56.


\(^6\) Id. at 7.

\(^7\) In addition to the desire to protect their export earnings, these countries may also
and export capacity. Both of these factors could be affected by seabed mining. Market prices could be depressed if supplies are increased by seabed production. Export capacity could be decreased if seabed production displaces part of the demand for developing country production. These concerns are not peculiar to developing countries likely to be affected adversely by seabed mining, but have been recognized as general concerns of all developing countries the economies of which are substantially dependent on earnings from the export of commodities.  

The declared objectives of the IPC are: (1) to stabilize prices; (2) to improve the real income of developing countries through protection of export earnings; (3) to improve market access and the reliability of supply; (4) to diversify production in developing countries; and (5) to improve the market structure for commodities. Those objectives are consistent not only with the needs of the developing country producers, but go beyond to the improvement of the economic position of developing country producers of primary products.  

C. Protection Schemes of International Commodity Agreements

The objectives of the IPC are to be achieved through the implementation of several international measures, which include:

1) The establishment of a common fund for the purpose of enacting international stocking arrangements;
2) The establishment of supply management measures such as production controls and export quotas;
3) The improvement of compensatory financing facilities; and
4) The expansion and diversification of export trade including industrialization.

1. Buffer Stocks

Buffer stocks can help stabilize prices and export capacity by regulating the quantity of a mineral valuable to the world market at any particular time. The international commodity agreements

be interested in actually increasing their export earnings. This would increase their economic strength relative to developed countries pursuant to the goals of the New International Economic Order.


Res. 93 IV, supra note 85, § I at 7.

See supra note 87.

Res. 93 IV, supra note 85, § III at 7, 8.
for both tin\textsuperscript{92} and cocoa\textsuperscript{93} utilize buffer stocks as a control mechanism. In order to operate the system, a target price range is determined. As prices rise toward the upper limit of the price range, stocks of the commodity are sold in order to expand the supply and reduce the price. As prices drop toward the price floor, stocks are bought, supply is restricted, and prices rise.\textsuperscript{94} The buffer stocks are maintained through a fund established by the commodity agreement. Financing for the stocks under the 1975 International Cocoa Agreement is obtained through the imposition of a levy on all imports and exports of cocoa.\textsuperscript{95} The fund for the Fifth International Tin Agreement is established by contributions from parties to the agreement.\textsuperscript{96}

The establishment and continuation of international buffer stocks is central to the IPC.\textsuperscript{97} The arrangements for buffer stocks under the IPC are similar to the arrangements in the Tin and Cocoa Agreements. One innovative feature of the IPC scheme is a proposal to adopt the concept of indexation.\textsuperscript{98} Indexation is an attempt to protect developing countries from the effects of inflation by adjusting the total price ranges within the buffer stock quota to account for the effects of inflation on the prices of manufactured goods imported by developing countries.\textsuperscript{99}

One of the major obstacles to the establishment of international stocking arrangements has been the inability to obtain sufficient funds to maintain the stocks.\textsuperscript{100} This problem has been reduced greatly by the adoption of the Agreement Establishing the Common Fund for Commodities (Common Fund) in Geneva on June 29, 1980.\textsuperscript{101} The Common Fund has two accounts. The first provides

\textsuperscript{92} Fifth International Tin Agreement, \textit{supra} note 84.
\textsuperscript{93} International Cocoa Agreement, \textit{supra} note 84.
\textsuperscript{94} \textit{Note, United States and International Commodity Accords: Cocoa, Coffee, Tin, Sugar and Grain}, 9 \textit{L. \\& POLY INT'L BUS.} 553, 556-57, 583, 585-86 (1977) [hereinafter cited as \textit{International Commodity Accords}]. Both agreements also incorporate export quotas to be used in conjunction with the buffer stocks. Export quotas are discussed in Section III, \textit{infra}.
\textsuperscript{95} \textit{Id.} at 557.
\textsuperscript{96} \textit{Id.} at 584.
\textsuperscript{97} \textit{Action on Commodities, including Decisions on an Integrated Programme, in Light of the Need for Change in the World Market Economy}, Report by the UNCTAD Secretariat, UNCTAD IV, U.N. Doc. TD/184 (1976) [hereinafter cited as Report by the UNCTAD Secretariat].
\textsuperscript{98} \textit{Id.} para. 38, at 13.
\textsuperscript{99} \textit{Id.} para. 59, at 19.
\textsuperscript{100} \textit{Id.} para. 21, at 9.
\textsuperscript{101} Agreement Establishing the Common Fund for Commodities, United Nations Conference on Trade and Development, TD/IPC/CF/CONF/24 (1980) [hereinafter cited as Common Fund].
financing for international buffer stocks, and the second provides financing for other measures in the field of commodities.\(^{102}\) Loans are made under the first account to international commodity organizations for the purpose of financing the purchase and maintenance of buffer stocks held pursuant to international commodity agreements.\(^{103}\)

2. **Export Quotas and Production Controls**

A surplus supply of a commodity on the market can cause the price of the commodity to drop. Export quotas are designed to keep surpluses off the market and thereby keep prices stable.\(^{104}\) The 1978 International Coffee Agreement\(^ {105}\) uses export quotas to keep coffee prices within a certain price range.\(^ {106}\) If quotas are used as the sole control mechanism, the export earnings of producer countries will not necessarily be protected. Prices will remain stable, but export capacity is reduced. The Tin and Cocoa Agreements use export quotas in conjunction with buffer stocks. Export quotas are increased or decreased depending on the direction prices are moving.\(^ {107}\)

The production controls provided for in Article 151 of the Draft Convention can help limit excess supply of the seabed minerals on the market without affecting the export capacity of developing country producers. The major difference between these production controls and export quotas is the time frame in which they operate. Changes in production controls would take a much longer time to affect the market because of the time lapse between production decisions and actual production. Export quotas, on the other hand, can have a more refined effect on the market because they can be imposed on a yearly basis.

3. **Compensatory Financing**

Compensatory financing arrangements can provide more direct and immediate protection to injured developing countries than market controls. The IPC contemplates the compensation arrangements in international commodity agreements will supplement the

---

\(^{102}\) Id. art. 3, at 4.

\(^{103}\) Id. art. 17, at 17.


\(^{105}\) 1976 International Coffee Agreement, supra note 84.

\(^{106}\) *International Commodity Accords*, supra note 94, at 575.

\(^{107}\) Id. at 557, 583.
schemes for price stabilization through market control.\footnote{Report by the UNCTAD Secretariat, \textit{supra} note 97, para. 42, at 7.} Compensation may be necessary to protect individual countries that are adversely affected, even though the world market is stable.\footnote{Id.} Article 151 of the Draft Convention provides for the establishment of a compensation scheme, but does not elaborate on the details of such a scheme.\footnote{Draft Convention, \textit{supra} note 3, art. 151(4) at 58.} Compensatory financing under the IPC could be provided through the existing facilities of the International Monetary Fund (IMF) or through the adoption of a scheme similar to STABEX in the Second Convention between the African, Caribbean, and Pacific (ACP) States and the European Economic Community (EEC) signed in Lome on October 31, 1979 (Lome II).\footnote{The Second ACP-EEC Convention, Oct. 31, 1979, \textit{reprinted in} Lome' II Dossier, \textit{reprinted from} The Courier, Nov. 1979 (Special Edition) [hereinafter cited as Lome II].}

If the IMF facility is used, a few major improvements should be made.\footnote{Report by the UNCTAD Secretariat, \textit{supra} note 97, para. 43, at 15.} First, determinations of shortfalls for purposes of compensation would have to be made on the basis of the larger of either total commodity exports of the country or all merchandise exports.\footnote{Id. para. 44, at 15.} The second improvement relates to the issue of indexation. Shortfalls should be determined in terms of real export earnings.\footnote{Id. para. 61, at 19.} This could be achieved through the establishment of an indexed reference price. Any shortfall caused by a fall in market price below the indexed price would be compensated.\footnote{Id. para. 44, at 15.} The third problem is that the IMF only provides short- and medium-term financing in the form of loans. Grants and longer-term loans would be more beneficial to the poorer developing countries.\footnote{Id. para. 61, at 19.} Finally, a country's present balance of payments situation should not be a consideration in providing compensation for injuries resulting from export fluctuations.\footnote{Id.}

STABEX is a good example of a functional compensation scheme.\footnote{Lome II, \textit{supra} note 111, at Title II.} STABEX establishes a system of grants and loans for ACP states that experience temporary losses of export earnings. In order for a country to receive payments, it must demonstrate that it has surpassed a dependent threshold\footnote{Id. art. 29.} and a loss threshold.\footnote{Id. art. 37.}
If a country's export earnings from one of the seabed minerals drop below the reference level and level off, compensation will be provided only until the reference level drops to the new export level. If the export earnings continue to drop, eventually they will fall below the threshold level and become non-compensable. Compensation is provided primarily in the form of loans to be repaid without interest, but repayment may be waived altogether by the EEC. STABEX could be a model for a new compensation scheme suitable to the needs of the IPC.

4. The Expansion and Diversification of Export Trade Including Industrialization

In the long-run, export diversification and industrialization are the best ways for developing countries to protect themselves from the possibility of economic injury from seabed mining. The root of the problem for developing countries is their dependence on primary commodities for export earnings. By increasing industrialization, the countries can process the commodities and export them as manufactured goods, thereby removing them from competition with seabed minerals. If the countries can diversify their exports, their economies will not be so dependent on the key seabed minerals and the potential injury will be lessened. The second account of the Common Fund may provide financial assistance in this area. Financing is provided in the form of loans or grants to international commodity bodies, which are to consist of the consumers and producers of the particular commodity who represent a sufficient share of its exports and imports. No specific programs are mentioned, but particular measures aimed at improving market conditions and competitiveness of the commodities are enumerated. The basic thrust of these measures appears to be toward increasing industrialization of the developing countries that depend on the protection of primary commodities and the expansion and diversification of the export trade of these countries.

The IPC, when fully implemented, could provide adequate protection for developing countries that suffer harm from seabed mining. However, in its present form the IPC has one very serious drawback: although other commodities may be added, at present

---

1 Id. art. 40, para. 4
2 Id. art. 44.
3 Common Fund, supra note 101, art. 18C, para. (c).
4 Id. schedule c.
5 Id. art. 28c, para. (a).
it covers only eighteen commodities and only two of the seabed minerals, copper and manganese.\textsuperscript{126} However, the UNCTAD Secretariat suggests that a compensation scheme could be established to cover commodities not included in commodity agreements.\textsuperscript{127}

CONCLUSION

The concerns expressed by developing countries at UNCLOS III over the possible adverse economic effects of seabed mining are likely to surface again in light of the recent interruptions in negotiations at UNCLOS III and the enactment of unilateral legislation for seabed mining by the United States and the Federal Republic of Germany. Determining which countries will be affected by seabed mining, and the extent of those effects, is a speculative venture at best. However, a generalized conclusion seems to be that of the four minerals to be mined from the seabed, copper, nickel, manganese, and cobalt, the market for cobalt is likely to be affected most seriously. Furthermore, although only a few developing countries are likely to be adversely affected, those that are could be affected seriously. While seabed production may be harmful to developing countries in the short run, it may be necessary in the long run to bridge the gap between land based production and world demand for the minerals.

Developing country producers will need protection whether seabed mining begins subject to a comprehensive Law of the Sea Treaty, subject to a Law of the Sea Treaty to which the major seabed mineral producing countries are not party, or subject only to unilateral legislation. The most promising source or protection is the IPC, and the recent agreement on the Common Fund is a major step toward its implementation. The IPC can provide short-term protection in the form of buffer stocks, export quotas, and compensatory financing, as well as long-term protection through industrialization and export diversification. When the IPC is fully implemented, developing countries and the rest of the world can look forward to the benefits to be reaped from the exploitation of deep seabed minerals.

David Hegwood

\textsuperscript{126} Res. 93(IV), \textit{supra} note 85, § 11 at 7.
\textsuperscript{127} Report by the UNTAD Secretariat, \textit{supra} note 97, para. 64, at 20.