

The Arctic is changing

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An environment at risk

It is difficult to travel far in the Arctic without encountering the workings and effects of the global capitalist industrial system, decades of socialist ideological excess, or reminders of how strategically important the region was during the Cold War. Vast oil producing complexes, such as Prudhoe Bay on Alaska's North Slope, are linked to metropolitan centres by an ever-increasing network of gravel supply roads. Oil and gas pipelines, some of them rusting and leaking, snake across hundreds of miles of tundra and mountain ranges, while seismic trails and the scars of clear-cut logging are etched deep on boreal and tundra landscapes.

Even in remote areas, far from any human habitation, unwelcome encounters with rubbish and industrial and military waste are reminders of the fragility, brittleness and vulnerability of the Arctic, and of the intrusive nature of human activity. In the northeast of Greenland, for example (an unpopulated area within a protected national park), plastic bags, fishing nets, barbed wire, fuel tanks and beer bottles are to be found washed up on shores seldom visited by humans. On Alaska's Seward Peninsula local people have discovered corroding aircraft batteries in rivers which provide drinking water for summer fishing camps, vehicles dumped by the United States military, and cannisters of mustard gas half-buried in the tundra. And in 1994 five years after the Exxon Valdez ran aground, spilling 11 million gallons of North Slope crude oil into Prince William Sound, it was possible to talk to fishermen from southern Alaska still trying to come to terms with the impact of the disaster on their livelihoods.

The Exxon Valdez incident in Alaska's Prince William Sound in 1989 illustrated the dangers of transporting oil by sea, and recent leaks from Russian oil pipelines have raised questions about their reliability and safety. Somewhere between 5-10% of Russian oil production is thought to be lost through leaks, oil well blow-outs, waste and theft. Minor discharges from marine vessels, such as tankers, freighters, fishing boats and coastal ferries, operating in northern waters are also a source of pollution and may not be readily monitored, but their impact on Arctic ecosystems may be significant nonetheless. Polar bears, seals, sea otters and sea birds are already frequent casualties of oil contamination, while bowhead whale migration routes through oil and gas lease areas in the Chuckchi Sea could be seriously disrupted if development goes ahead. Scientists have described how the curiosity of polar bears leads them to readily investigate unfamiliar objects and smells, including offshore drilling sites and oil cannisters in Arctic villages and Inuit hunting camps. They also risk death by ingesting oil directly, through licking oiled fur or through eating contaminated seals or birds.

Oil persists for longer periods in the Arctic because low temperatures result in low rates of evaporation and relatively little light during most of the Arctic year reduces ultraviolet radiation necessary for decomposition. The impact of oil pollution on tundra environments may remain visible for several years with lichens, which constitute the main source of food for reindeer, and other plants especially vulnerable to contamination. On land snow and ice cover may stabilise

the oil during winter, but spring melt only releases it (thus coinciding with the arrival of migrating birds), while in marine environments Arctic sea ice reduces wave action, which in more temperate regions would help to mitigate the effects of oil pollution. Oil fires also produce smoke clouds that are concentrated at very low atmospheric levels by Arctic air inversions. Not only do smoke clouds from oil fires reduce crucial levels of solar radiation, they contain pollutants harmful to both human health and to the productivity of marine and terrestrial environments.

Other threats to the Arctic environment and on human populations are less visible, but no less real. UVB radiation has effects on human skin, eyes and the immune system. Atmospheric and marine pollution means organic contaminants enter the food chain at every level. Because these persistent organic pollutants break down more slowly in the Arctic than in warmer regions, they pose greater dangers to human and animal populations. For example, polychlorinated biphenyls (oily, man-made substances known more popularly as PCBs, and which evaporate from rubbish dumps and burning oil) have been found in the breast milk of Canadian Inuit women. PCBs cause cancer and damage the neurological and hormonal development of children. There is also high concentration of PCBs in some seal, walrus and polar bear populations which threatens their reproduction. High levels of mercury have also been found in the liver tissue of ringed and bearded seals - both species constitute the primary source of food for polar bears, as well as forming the basis for the subsistence hunting culture of many Inuit communities. In Greenland, one in six people have dangerous levels of mercury in their blood, while other toxic chemicals found among Inuit include toxaphene and chlordane. Tundra and marine ecosystems are also at risk from the dumping of nuclear waste and heavy metal contamination. Nuclear test explosions have been carried out near Novaya Zemlya in the Russian Arctic, while radioactivity affects the northern Atlantic and Barents Sea. The highest levels of radioactive pollution along the Norwegian coast, for example, have not originated in Russia, however, but from radiochemical plants in the United Kingdom and France.

Global warming caused by increased emissions of greenhouse gases also threatens to have a significant impact on the Arctic and on the livelihoods of indigenous peoples. Arctic ecosystems are extremely sensitive to climate change and a likely increase in average winter temperatures of between three to six times the global average is predicted. There is already evidence that winters in the Arctic and sub-Arctic regions are becoming warmer. While the average temperature of the earth's surface is predicted to increase by between 2°-5°C during the next fifty to one hundred years, the Arctic regions are expected to have greater temperature increases, of up to 10°C. Global warming could reduce the extent of sea ice, permafrost would thaw more quickly in spring but take longer to refreeze in autumn, fish stocks would fluctuate and the migration routes of animals such as caribou would be disrupted as forest, tundra and coastal habitats adapt to new environmental conditions. Climatic change is also likely to disrupt millions of migratory birds as they find less food at stop over points, wintering sites and breeding grounds. Hunting, trapping and fishing activities would be severely affected and the economies of small, remote communities, already vulnerable to changes in global economic conditions, would suffer drastically.

Arctic climatic processes influence global conditions, which in turn contribute to further change in the Arctic. Some scientists however are careful to point out that, while global temperature data sets seem to suggest that there has been a surface warming of between 0.3 and 0.6°C over the last one hundred years, regional studies do not confirm that there are any worldwide trends. Rather, atmospheric temperature trends in the Arctic are seasonally and spatially variable. Nonetheless, there is considerable alarm at the prospect of global warming, while affecting the Arctic, melting the polar ice caps and resulting in a

rise in sea levels, thus threatening coastal towns and cities and low-lying countries such as Bangladesh and the Netherlands. The melting of Arctic permafrost will release huge amounts of methane which will contribute further to the greenhouse effect. Climatic warming may also result in greater cloud cover and higher levels of precipitation as a result of more water vapour (another greenhouse gas) in the atmosphere. A hole in the ozone layer has been found over the Arctic (as well as over the Antarctic) and if the ozone layer thins or if the hole gets bigger, then scientists argue that there are a number of implications not only for the Arctic but for the planet as a whole. As ozone, a gas found between 20-50km up in the earth's atmosphere, helps to reduce or filter high-energy ultraviolet radiation from the sun, the thinning of the ozone layer means that more ultraviolet radiation will reach the earth's surface. Possible consequences include mutations in vegetation growth and an increased risk of skin cancer in humans and animals. Ozone depletion may also contribute to a gradual warming of the earth's surface. One of the main causes of ozone depletion is the emission of chlorofluorocarbons (CFCs), human-made gases used in refrigerators and aerosols which are unreactive and, once released into the atmosphere, help to thin the ozone layer.

The Arctic has the unenviable advantage of being a natural scientific laboratory for studying global environmental issues. Some of the most alarming illustrations in recent years that Arctic environmental problems are global rather than regional concerns include the contamination of lichen and reindeer (which eat the lichen) in northern Scandinavia in the aftermath of the Chernobyl disaster, the discovery of PCBs in the breast milk of Canadian Inuit women (which were found to be four times higher than those found in women living in southern Canada), and Arctic haze, which provides the best example of long-range transportation of atmospheric pollution. A photochemical smog which is most problematic during winter, Arctic haze contains pollutants which originate from industrial activity such as coal and oil combustion and steel manufacturing which are transported by air from Eurasia towards the north polar regions where, because the colder air is more stable, the haze particles persist. Sulphur particles are the most common component of Arctic haze and not only do they threaten low-level ozone, they disrupt atmospheric energy flows and contribute to acid rain. Other pollutants include copper, lead, zinc and arsenic. They have been found in lichens and mosses in Alaska, Sweden, Norway and Finland, but also fall in some of the Arctic's prime fishing grounds.

Towards an agenda for Arctic sustainable development

The Arctic Council (www.arctic-council.org) was established in 1996 with a mandate to take cooperation on Arctic affairs beyond the environment, with particular emphasis on sustainable development. The Council is to provide a high level forum for the Arctic states (Canada, the United States, Iceland, the Russian Federation, Denmark, Sweden, Finland and Norway) to address environmental protection (especially in areas of pollution), sustainable economic development, subsistence activities, health, community development, tourism, and transport and communications. Indigenous peoples organisations were also ensured permanent participation.

The objectives of the Arctic Council's working groups are to protect Arctic ecosystems (and here, humans are considered part of the ecosystem); to ensure the sustainable utilisation of renewable resources by local populations and indigenous peoples; to recognise and to incorporate the traditional and cultural needs, values and practises of indigenous peoples related to protection of the Arctic environment; to review regularly the state of the Arctic environment; to

identify the causes and extent of pollution in the Arctic; and to reduce and eliminate pollution. This takes place through five programmes set up to deal with environmental problems, such as oil pollution, the dumping of radioactive waste, contamination of the environment by heavy metals, acidification and Arctic haze. These programmes are: the Arctic Monitoring and Assessment Programme (AMAP); Protection of the Arctic Marine Environment (PAME); Emergency Prevention, Preparedness and Response (EPPR); Conservation of Arctic Flora and Fauna (CAFF); and Sustainable Development Working Group (SDWG).

The Arctic Council superseded the Arctic Environmental Protection Strategy (AEPS) which was initiated in Rovaniemi, Finland in June 1991 when environmental ministers from the eight Arctic countries signed the Declaration on the Protection of the Arctic Environment. Also referred to as the Rovaniemi process, the AEPS was a forum for the eight Arctic states to share information and to develop programmes and initiatives to deal with environmental problems such as Arctic pollution.

The Inuit Circumpolar Conference (ICC) was formed in Alaska in 1977, in response to increased oil and gas exploration and development, and represents the Inuit of Greenland, Canada, Alaska and Siberia. Since 1983 the organisation has had NGO status at the United Nations and also sees itself as being in the vanguard of indigenous rights generally, especially with regard to self-determination. The ICC criticised the AEPS for its initial narrow focus on conservation and emphasised a need to go beyond merely monitoring the state of the Arctic environment by including discussion of how to provide and maintain a sustainable economic base for Northern communities, which would move beyond the cycles of boom and bust that characterises much large-scale economic development. While the conservation of certain species such as whales and polar bears is important for indigenous peoples, science-based resource management systems often ignore indigenous perspectives and values. The designation of wildlife refuges and national parks to safeguard animals and the environment, for example, often restricts the rights of people to hunt, trap and fish in those areas, while international regulation has had an effect on subsistence whaling. The ICC position is that protection of the environment is a prerequisite for the sustainable development of Arctic resources.

The ICC has pushed the issue of sustainable development because the small, remote, predominantly indigenous communities of the circumpolar north are mostly characterised by their precarious mixed economies, combining the informal sector of customary and traditional subsistence activities, which provide the primary sources of food for many households, with the formal sector of wage-earning possibilities and transfer payments. The informal sector is not always easy to measure or analyse, combining as it does hunting, trapping and fishing based on long-term, consistent patterns of use and seasonal variation, non-accumulation of capital, sharing of wild foods, the generational transmission of knowledge, and non-monetary exchange based on kinship groups and other networks of close social association. Subsistence activities do not only provide the nutritional means for survival, hunting and fishing are important for cultural identity and embody notions of a specific relationship between humans and animals essential for the continuity of indigenous culture and livelihoods. Despite the cultural and economic importance of subsistence hunting, increasingly fewer residents of Arctic communities participate in or depend directly upon the harvesting of terrestrial and marine mammals. Furthermore, even if most wished to hunt or fish, subsistence activities cannot by themselves provide the basis for long-term sustainability in all Arctic regions. Instead, many Native people are involved in other types of economic activities, such as commercial fishing, the oil industry or mining.

Yet the informal and formal economies are, in many cases, interdependent making the boundaries between them blurred and not easily defined. Although a subsistence economy is usually differentiated from a capitalist economy in that

the unit of production (in this case, the family) is also the unit of consumption, the subsistence economies of the Arctic are nonetheless dependent upon market forces and monetarisation. This has been the reality since Native peoples became involved with the fur trade. And as studies of commercial fisheries in remote Alaskan villages have shown, while people fish in order to sell rather than consume their catch, they nonetheless engage in activities which correspond to the spatial, seasonal, cultural and social organisational aspects of subsistence modes of production, such as resource diversification and the interdependence of households. Similarly, in Labrador, the techniques and knowledge required for a commercial caribou hunt resemble aspects of harvesting caribou for subsistence purposes, except that the hunters are employed by a commercial enterprise and deliver the caribou to a processing plant. It is difficult to see the difference between a hunter who brings caribou meat home for his family, and the hunter who harvests the animal in exactly the same way but sells the meat to a processing plant in order to buy food for his family.

As the Labrador case illustrates, although some of the produce from hunting, herding, trapping and small-scale fishing may be consumed by the families of hunters, herders, trappers and fishers, some of it is traded, exchanged, or sold. While much of this happens in local and regional contexts, meat, fish, furs, and skins also find their way to distant markets, making informal economic activities dependent upon and closely interwoven with the global economy. Hunters, trappers and fishers and their families also depend on modern technology, such as outboard engines, snowmobiles, gasoline, rifles, and nets, which means a steady flow of cash is needed to support subsistence activities. Until the activities of anti-sealing and anti-trapping organisations virtually wiped out the markets for seal skins and furbearing animals such as beaver and muskrat, the principal source of cash for hunting families came from the sale of these commodities. In the north of Greenland, for example, the fall in the price of sealskins and even the loss of sealskin markets as a result of animal-rights activity in the 1980s meant that people in settlements dependent on hunting had to look elsewhere for a source of cash needed to supplement subsistence hunting. A modest fishery for Greenland halibut developed to meet this need. Yet, overfishing has already resulted in a depletion of Greenland halibut stocks, as large-scale commercial fishing by boats from other parts of Greenland combine with local fishing to put pressure on the resource.

Generally, then, throughout the circumpolar north hunting families are characterised by pluriactivity in that cash is generated through full-time or part-time paid work, seasonal labour, craftmaking, commercial fishing or other pursuits that support or supplement subsistence activities. Although, ironically, full-time work restricts the time available for hunting and fishing, the casual, temporary or seasonal nature of many jobs does not allow for many households to be self-sufficient and independent of the formal economy. Subsistence activities may be something that individuals fall back on to supplement the paid work they have, or while they are looking for employment in the formal sector.

Some observers see informal economic activities as having great potential in forming the basis for economic diversification in indigenous communities, stressing the importance of the informal sector for small-scale community development, and arguing that subsistence activities provide the best basis for self-sufficiency, in the sense that the local economy would be able to provide people with a real and regular income. The expansion of informal economic activities, such as the harvesting of terrestrial and marine mammal products on a more commercial basis, has been seen by some as the solution to reliance on non-renewable resource development. For example, in Greenland the Home Rule Authorities consider the production, distribution and exchange of food and products from hunting and fishing as vital to the development of local, small-scale sustainable community development. The promotion of this system by the Home Rule government would reduce the need for imported foodstuffs, promote local

hunting practices and offset the need for government subsidies to smaller settlements. As well as meeting demand from domestic and regional markets, indigenous business ventures are also looking to open up international markets. For example, Korean buyers regularly fly to Alaska's Seward peninsula and pay at least \$50 for a pound of reindeer antler (which is then used as an aphrodisiac). In Labrador Inuit hunters kill around 1,000 caribou annually in a commercial hunt, while one Baffin Island community is meeting Japanese demand for the skins of ringed and harp seals.

But because of the interdependence between formal and informal economic sectors families and households are faced with the problem of ensuring a regular cash-flow. Opportunities for part-time work in small communities are limited and full-time jobs are even more scarce. The fur trade, the gold rush, and oil, gas and mining have all afforded employment opportunities to indigenous peoples, as well as impacted on indigenous ways of life, yet markets collapse, prices fall and jobs go. Recently, the growth of the tourism industry throughout the Arctic has allowed indigenous communities to capitalise on the desires of visitors to experience wilderness and Native culture, but the appearance of tourists is seasonal making it unlikely that tourism can form the basis for community development.

Indigenous communities and indigenous peoples' organisations are not against various forms of non-renewable resource development. Indeed, they wish to participate in, and profit from, development activities to ensure both economic and cultural survival. In the past, major industrial development rarely paid attention to the importance of the environment and its resources for indigenous peoples, or to the social and economic problems that often result from such development. The opportunities for dealing with the problems of indigenous economies can only arise if indigenous peoples have control over resource use and development, if the social and economic diversity of indigenous communities is recognised and maintained, and if indigenous skills and knowledge are enhanced. Furthermore, there are calls to take into account indigenous environmental knowledge in environmental impact assessment.

In some respects, land claims settlements have allowed indigenous communities to make considerable progress, and some of the more significant developments have been the result of work by community cooperatives and Native-owned corporations. The latter have either entered into joint ventures with oil, gas and mining companies, or have developed initiatives of their own. For example the Northwest Alaska Native Association (NANA), the regional corporation for northwest Alaska, has supported and promoted Cominco's Red Dog lead/zinc mine, while the Arctic Slope Regional Corporation (ASRC) is the biggest Alaskan-owned corporation, successful because of its relationship to the North Slope Borough (Alaska's wealthiest regional government, partly because it taxes the oil fields) and the North Slope oil industry. ASRC has also invested heavily in business concerns elsewhere in the United States.

The Arctic Council ministers likewise take the view that environmental protection and sustainable development are not mutually exclusive. The working group on sustainable development originated as a Task Force on Sustainable Development (TFSD) set up following the Nuuk AEPS ministerial meeting mainly in response to pressure from the ICC to broaden the AEPS agenda. TFSD was upgraded to a working group at the Inuvik AEPS ministerial meeting. Its establishment indicated that the future direction of the AEPS would be concerned with broader issues of sustainable development, rather than with pollution and environmental damage. Initial emphasis on the harvesting of renewable resources and tourism seems to suggest that the working group was much more influenced by the input of indigenous peoples' organisations, and in particular by the ICC submission at the Nuuk meeting on how indigenous peoples could participate and how indigenous knowledge could be integrated within the AEPS process. Sustainable development is also a priority area for the Arctic Council, which follows closely the 1987

Brundtland Commission definition as development which meets the needs of the present without compromising the ability of future generations to meet their needs. Canada, in its role as first chair of the Council, defined sustainable development as 'development which seeks human well-being through an equitable and democratic utilisation of society's resources, while preserving cultural distinctiveness and the natural environment for future generations'. While the challenge facing the Arctic Council is to continue the environmental protection work begun by the AEPS, it recognises that it must link it more closely to sustainable development. Indeed, Oran Young has stressed that sustainable development should be the overarching framework for the Arctic Council as it sets out to chart new developments in international Arctic cooperation. Among other things, Young has recommended that subsistence preference, co-management, and the development of environmentally-appropriate technologies and practices should be some of the guiding principles for the Council's work on sustainable development (see also www.svs.is/oran.htm).

In seeking to reconcile the diverse and contested perspectives of indigenous peoples, environmentalists, scientists and ministers, Canada argues that 'the Council's mandate, as well as its representative structures and processes..., can accommodate the concerns of all parties, under the rubric of environmentally sustainable human development (Graham *ibid.*: 51, emphasis in original). Mary Simon, Canada's former Ambassador for Circumpolar Affairs, was reported as saying that the Arctic Council must not make the mistake of seeing environmental protection and sustainable development as distinct, as the AEPS had done, but that sustainable development must have strong environmental goals. While the Arctic Council's view of sustainable development makes appropriate nods in the direction of the ICC position on sustainability, as development that allows social, cultural, spiritual and economic growth, controversy over appropriate development strategies may come to dominate the initial progress of the Council.

Barriers to sustainability: the Arctic in the global economy

The Arctic Council places emphasis on environmental protection and sustainable development, especially with regard to continuing the work begun by the AEPS. As the joint communiqué of the Council puts it:

"Ministers viewed the establishment of this new intergovernmental forum as an important milestone in their commitment to enhance co-operation in the circumpolar North. The Council will provide a mechanism for addressing the common concerns and challenges faced by their governments and the people of the Arctic. To this end, Ministers referred particularly to the protection of the Arctic environment and sustainable development as a means of improving the economic, social and cultural well-being in the Arctic."

Yet, how possible is this when development projects abound which are not sensitive to environmental protection needs and concerns for sustainability, nor indeed to the spirit of Arctic environmental co-operation. Indeed, how can sustainability be achieved in the Arctic regions when they are affected by the ebb and flow of the global economy? Large-scale development continues in the Arctic, even though the excitement over the AEPS and Arctic Council may have obscured it for a while. But it is not only the nation-states with Arctic territory that regard the circumpolar north as increasingly important for resource development. The economic future of the Arctic depends on global and economic processes, which makes the Arctic regions vulnerable to the volatility of world markets.

Countries such as Japan, Korea and European Union member states constitute markets for valuable Arctic resources, thus firmly placing the circumpolar north in the world system. Densely populated parts of the world with no or few resources

of their own cannot sustain the material demands made by their growing populations. They look to the northern regions for fisheries development, hydrocarbons and minerals. Siberia, for example, has some 20% of the world's forested area and about 40% of the world's coniferous forests, and the Bering Sea is one of the richest fisheries on earth. Fish stocks in the Bering Sea are threatened, however, by the commercial nature of the fishing industry (the pollock fishery was closed in 1992 due to overfishing), and the United States is only one of many nations contributing to the impoverishment of the Bering Sea ecosystem. Overfishing by a large international fishing fleet is also having an impact on the marine ecosystem in the European Arctic. There is urgent need to agree upon management regulations, but it is notable that fisheries do not seem to have provided a focus for Arctic environmental co-operation. There is uncertainty over whether fisheries will be a sustainable resource issue for the Arctic Council. And there is also disagreement over the environmental impact of commercial fishing. A report produced by the European Environmental Agency (EEA) points to commercial fishing having the greatest impact on the marine ecosystem, while a Nordic Council of Ministers report contradicts the EEA by concluding that overfishing in European waters has not depleted stocks.

The work begun by AEPS and its various working groups, and now being continued by the Arctic Council, focuses mainly on monitoring the effects of Arctic environmental problems, seeks to produce state of the Arctic environment reports, feed this information back to politicians, scientists and indigenous communities, and make recommendations for action on environmental protection and sustainable development by government ministers. While it is widely recognised that many environmental problems facing the Arctic originate from outside the region, Arctic environmental co-operation seriously lacks a wider perspective on the regional and global dimensions of environmental change and resource pressure. What is happening in the rest of the globe is equally as important for the Arctic. Arctic environmental discourse reproduces the image of the Arctic as a natural laboratory for studying global environmental change (a handy phrase to use when justifying grant applications to scientific foundations and research councils), but fails to consider that it is important to understand the relevance of poverty in developing countries, deforestation in Nepal, floods in Bangladesh, or the activities of transnational corporations in South East Asia for the future of the Arctic, its peoples and its resources.

The major threats posed to the ecology of the Arctic are primarily the result of social conditions arising from human activity and interactions with the environment in local, regional and global contexts. But the remit of the working groups initiated under the AEPS has been to monitor the systemic and cumulative effects of global processes on a specific region, albeit a geographically vast one, rather than with seeking to understand the complex social, economic and political processes which are the specific underlying causes of the global dimensions of environmental change and resource pressure. Future strategies for Arctic environmental protection and sustainable development would benefit from moving beyond an Arctic-centred perspective in an attempt to conceptualise economic, social and environmental linkages between the Arctic and other regions of the globe.

Those involved in agenda-setting for Arctic environmental protection initiatives need to take into account the processes of globalisation. As with practically every part of the world, social, economic and political relationships in the Arctic have become truly globalised. In the modern Arctic virtually every aspect of life is influenced and shaped by events, trends, decisions and activities happening elsewhere. Just a glimpse of the well-stocked shelves of a Fairbanks supermarket, or drinking a cup of coffee with seal hunters on the sea ice in northern Greenland (whose wives prepare sealskins which will ultimately be exported to Japan) is enough to show how Arctic residents are very much a part of a global network of production and exchange. As the Arctic is inextricably linked to the global system,

in complex cultural, ideological, economic and political ways there is a need to understand the process of globalisation and such issues as population, production, technological change, consumption and lifestyles in global perspective. A growing population places considerable demand on resources and world production is increasing to keep up with demand for consumption. This, inevitably, leads to the depletion of natural resources such as coal, oil, gas and minerals and contributes to the emission of greenhouse gases such as carbon dioxide, and to habitat loss and the extinction of flora and fauna.

Pressure is placed on the environment not only by countries of the developed world, driven by the desire for economic progress and the maintenance of affluent lifestyles and vibrant economies (for example Japanese industry is depleting the forests of Sarawak and Sabah), but also by developing countries. One legacy of colonialism has been the creation and shaping of forms of society which now not only have to adjust to post-colonial systems but are following the same trajectory of economic development as developed countries. Many of these developing countries have to find ways of broadening their economic base. Industrial development means more burning of fossil fuels and increased emissions of carbon dioxide. And not only do developing countries need to feed their growing populations, they also have to pay off massive international debts, which accounts in part for deforestation (such as in the Amazon). The growth of urban areas in the developing world is also placing the environment under greater strain. Although the majority of the population of industrialised countries live in urban areas, Africa has the fastest urban population growth and by the first few decades of the twenty-first century half the world's population will probably be found in South and South East Asia. Most people in these regions will be living in cities which cannot produce what they need to sustain themselves. Resources from rural areas, the oceans and regions such as the Arctic will be vital to an increasingly urbanised world.

The future of the Arctic regions may be linked to other, non-Arctic regional social, political and economic interests. In *The Age of the Arctic* (1989) Osherenko and Young point of the importance of seeing the future of development in the Arctic in terms of transnational connections rather than the classic model of core-periphery relations developed under conditions of internal colonialism. As they put it:

"[...] foreign investors can promise capital and advanced technologies for Arctic development as well as providing markets for which there is no local demand. With few exceptions...this has not resulted in colonial arrangements or even neo-colonial relationships. But direct investment on the part of foreign corporations or governments is still growing rapidly and producing a complex network of transnational connections in the Arctic."

Fisheries represent a good example of how transnational practices impact upon local livelihoods and often prevent sustainability. Communities dependent on living marine resources in the Arctic, as in any other region of the world, are subject to the effects and influences of globalisation, and these are increasingly felt in all aspects of social, economic and cultural life. It is important to view many problems in coastal communities in relation to the global restructuring of fisheries, the balance of competition between different species and different fishing areas, the internationalisation of the sourcing of supplies for processing plants and retail markets and the redistribution of wealth from traditional actors, such as local fishers and local processors, to powerful global players in the form of transnational corporations. One of the major implications of globalisation for fisheries can be seen most markedly in resource management models and in the transition from fish as common resources to private property. In this way, fisheries are being transformed from industries or ways of life subject to the control and regulation of local, regional and national authorities to a global enterprise dominated by a handful of transnational companies.

The interrelations between international trade, the environment and sustainable development are poorly understood and global market trends influence how far the sustainable uses of living marine resources is actually possible. At present, fisheries subsidies constitute one of the key barriers to sustainable fisheries, distorting trade and generating fisheries overcapacity -- thus leading to overfishing and the decline of fish stocks. The ability to achieve sustainable development is dependent on nations phasing out fisheries subsidies, and it is notable that Iceland has taken a lead in this regard. Efforts to encourage fishermen to shift their attention away from declining stocks and concentrate on sustainable harvesting techniques is happening through international co-operation on the formulation of criteria for the eco-labelling of fish products. While the Food and Agriculture Organisation (FAO) is involved in this work, large corporations and NGOs have also made significant progress in aiming to secure good environmental practice through a system of eco-labelling. A good example of this is the Marine Stewardship Council (MSC), an initiative of Unilever and the Worldwide Fund for Nature. The MSC has imposed its own global standards for sustainable fishing and is working to create new market incentives by rewarding good fishing practices. In itself this can pose a threat to the viability of coastal communities and local industries based on marine produce as international trade and consumer action places increasing attention on the safety and security of marine produce for human food. Although aiming to ensure good sustainable practice, eco-labelling may actually mask trade distortions -- the effectiveness of such a system will only be known once research on local coastal economies and fishing practices has been contextualised with reference to the internationalisation of production and exchange and the activities and influences of transnational corporations involved in fisheries.

Coastal communities dependent on the harvesting of living marine resources are put at risk by the interplay of global forces, by international trade, the restructuring of the fishing industry, the broadening scope of fisheries policy and by environmentalist action. But they are also being challenged from within by changing community dynamics, the declining importance of kinship and family for the social organisation of fishing, different local responses to social change, and by divisions within and between local and national fishermen's organisations. A characteristic of coastal communities in Greenland, Iceland and northern Norway is that, traditionally, local fisheries have been small-scale and family based, having developed their own distinctive forms of social organisation centred on close-knit kin groups, from which members of fishing crews were recruited. The contemporary reality for small communities in many coastal regions is that people rely increasingly on occupational associations in addition to, or in place of, kinship relations. As is already the case in many North Atlantic fishing societies, in occupational terms, spatially-defined communities of common interest expressed through close kinship relations are being replaced by dispersed networks based on occupational associations and formal contractual relations. In an increasingly technical and modernising Greenland, for example, hunting is becoming more 'commercialised', while fishing has become more technologically complex. Fishermen are investing in bigger and increasingly sophisticated boats to fish the waters in different parts of Greenland. While, in some cases, male kinsmen such as brothers are investing in these vessels together, crew members are not always kin, but well-qualified non-kin who receive wages rather than shares in the profits of the catch.

Furthermore, the sustainable uses of living marine resources and the viability of local livelihoods are threatened by the transformation of fish, seals and whales from resources which are subject to common use rights to privately owned, divisible commodities subject to rational management regimes. In Iceland the principle of common use rights has been applied to living marine resources throughout the country's history, whereas in Greenland it has traditionally been the case that no one owns animals. In both cases, as is usual elsewhere in North

Atlantic fishing societies, a fish or a sea mammal does not become a commodity subject to individual ownership until it has actually been caught and transformed into private property. Even then, complex local rules, beliefs and cultural practices counter the exclusive sense of individual ownership. In Greenland, the sharing and free distribution of meat from seals and other marine mammals is an acknowledgement of the debt people owe to the animal in coming to the hunter and a denial that any one person has exclusive claims to ownership of the animals that are caught. In this regard, the development of markets for Greenlandic fish and meat products, while providing a source of income for local hunters and fishermen, has provoked debates within communities about the appropriate uses of living marine resources. For many people, seal hunting and whaling encapsulates relations which are posed in ideological, natural and cultural terms, and the sharing and distribution of meat is central to the Greenlandic subsistence culture and local identity -- the sharing and distribution of meat both expresses and sustains social relationships. In many parts of Greenland today, although it is still the case that much of the meat from sea mammals is shared out to members of the hunter's immediate and extended family, increasingly hunters and fishermen are selling part of their subsistence catch to the processing plants now found in most villages, for the reasons outlined earlier. When hunting is carried out to satisfy market demands beyond the local community and regional economy, there is a feeling that the customary ideology of subsistence, with its emphasis on kinship, community, sharing and reciprocity, is disrupted and irrevocably altered.

The changing nature of political and cultural understandings that shape the use of the Arctic, the consequences of global change and resource pressure, and the conflicting political, cultural and aesthetic values concerning its future make a theoretical rethinking of the Arctic in geopolitical terms necessary. Recent geographical and political perspectives on how the Arctic regions are changing under geopolitical, economic and cultural stress have made some progress in this respect. As we enter the twenty-first century, research in both the natural and social sciences in the Arctic will be valued increasingly for the contribution it makes to how we can understand global issues. But it is equally important to consider global processes and their impact if we are to understand the contemporary Arctic and its place in the global system.

Brief bibliography to point the reader to more extensive sources

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