Benefit Sharing and the Boreal Forest:

Insights from case studies examining resource management and governance

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Written by Kimberly Lewtas, Pauline Gerrard and Dimple Roy

Executive Summary

Forests are a major source of wealth for Canadians, providing a wide range of economic, social and environmental benefits that are critical to the Canadian economy. The Canadian boreal forest accounts for 28 per cent of the world's boreal/taiga forest systems (Natural Resources Canada [NRCan], 2014), and is central to the country's natural environment, culture and economy. The region provides numerous ecosystem services including, air and water purification, carbon storage, and habitat to millions of species of birds and animals (Brandt, et. al., 2013). It is also home to hundreds of Indigenous communities, contributing to a way of life and livelihood—as well as a sacred cultural connection—that has developed over thousands of years (Karst, 2010).

At present, the region remains largely undeveloped. However, the search for resources—coupled with technological advances—is likely to create both increased pressures and opportunities in the region. The long-term effects of rapid resource development on local communities vary from region to region. However, common historical trends include many negative repercussions: exclusion of Indigenous people from regional decision making, high labour prices and other factors of production limiting the development of a more diversified regional economy, a rapid increase in population that overwhelms existing infrastructure and community services, and exhaustion of locally available skilled labour (Steffens, 2011). These factors commonly result in high social, economic and environmental costs that reduce the benefits of resource development, particularly for local populations.

Fostering sustainable growth and development that benefits communities and their environment for the long term requires strong science and economics, and an integration of ecological, cultural and social needs and values. Government and communities in many regions across the world are exploring new policies and management methods that more fully support and integrate the socioeconomic needs of local communities, biodiversity conservation and the provisioning of a wide range of ecosystem services, including those of high economic importance. This paper examines cases of other management models and their ability to successfully maintain ecological and cultural services in areas of resource growth.

Key lessons from the case studies examined include:

1. **Clear Vision and leadership** were drivers of many of the development models and planning frameworks described. Governments and/or stakeholders had a vision of what they wanted to achieve, and they used this to inspire others and create a plan to realize their goals. In many cases, there were considerable challenges along the way, and strong leadership (along with consultation or negotiation) was required. However, without the vision and leadership to see it through, new management models could not have been developed nor success achieved.
2. **The establishment of institutional mechanism**s for implementation was a common factor across the cases studies examined. Although institutions were established in different ways and with different mechanisms, they were accountable to the government and local communities and included representation or direct involvement with the key stakeholders involved. Institutions that succeeded in implementing the desired sustainable management strategies and achieve long-term outcomes had clear governance, a mandate, and a budget to implement them (United States Agency for International Development [USAID], 2004; Columbia Basin Trust [CBT], 2015; International Union for Conservation of Nature [IUCN], 2011).

3. **Strong legislation** has been critical to formalizing many of the management strategies and ensuring effective implementation. In cases where strong legislation did not exist, implementation was not maintained and benefits were lost or ineffectively distributed.
4. **Respecting rights and sharing decision making with Indigenous populations** has resulted in planning that incorporates local needs and ensures that benefits reach local populations. Many of the regions examined have significant populations of Indigenous people, and the incorporation of their views and needs has been critical to the success in these management frameworks. Mechanisms that ensure that Indigenous people are part of the decision-making process have been critical to long-term sustainability, resulting in systems based on local needs and support the communities themselves.
5. **Risk management and long-term thinking**, including the development of more diverse and sustainable economic models, has been critical to avoiding overreliance on a single resource or a non-renewable sector. Resource-driven economies run the risk of financial ruin once resources are depleted. An important component of long-term sustainable development in resource-rich areas is a plan for alternative or more sustainable economic models, ensuring that populations are not dependent on the resources themselves and are building alternative economic strategies to maintain a strong economy once resources are depleted (Steffens, 2011).
6. **Including robust scientific data and Indigenous knowledge** in resource development planning has resulted in more effective conservation and sustainable development outcomes. A scientific approach gives stakeholders confidence in both the process and its outcomes, as well as the ability to communicate the benefits to a wide variety of audiences. Indigenous knowledge of land and wildlife often provides invaluable information about long term change and sustainable habitat management. Planning which incorporate these two ways of examining and understanding the environment as well as regular monitoring and adaptation result in better long-term outcomes and an improved understanding of systems for long-term decision making.

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Introduction

The Canadian boreal forest accounts for 28 per cent of the world's boreal/taiga forest systems (NRCan, 2014), and is central to the country's natural environment, culture and economy. The region provides numerous ecosystem services including, air and water purification, carbon storage, and habitat to millions of species of birds and animals (Brandt, et. al., 2013). It is also home to hundreds of Indigenous communities contributing to a way of life and livelihood—as well as a sacred cultural connection—that has developed over thousands of years (Karst, 2010) (Figure 1).

Forests are a major source of wealth for Canadians, providing a wide range of economic, social and environmental benefits. In 2013, the forest sector contributed $19.8 billion[1] to Canada's GDP (NRCan, 2014). In a global context, Canada has the world's largest forest product trade balance, at $19.3 billion (2013) (NRCan, 2015b). The Canadian forest industry is export-oriented, accounting for approximately 6 per cent of Canadian exports in 2014 ($31 billion) (NRCan, 2015). While it lags in providing absolute revenue, it leads in the provision of jobs and export value (Table 1).

Table 1: Benefits to the Canadian economy 2014

Sector	Contribution to GDP (billions of dollars)	Exports per dollar of value added	Balance of trade per dollar of value added	Employment per million dollars of value added
Forests	$19.8	$1.44	$0.97	9.34
Minerals and Metal	$53.6	$1.71	$0.34	6.13
Energy	$15.5	$0.78	$0.43	1.94

Source: NRCan, 2014.

The footprint of natural resource extraction industries within the southern portion of the boreal forest encompasses an area of 73 million hectares, which includes forestry, hydropower, mining, and oil and gas extraction (Pew Environmental Group, 2011). Since 1990, approximately 0.33 per cent of Canada's total forest area has been converted to other land use, and the conversion of forest to agricultural land use has remained the largest cause of deforestation in Canada. Furthermore, deforestation from activity in the oil and gas sector has also increased in recent years (Table 2; Figure 1).

With industrial development, intact boreal forest is increasingly rare (Badiou, 2013); nationally, 41 per cent of the treed area of Canada's boreal forest has been fragmented by logging or industrial development, and 45 per cent has been allocated for logging (Global Forest Watch, 2008b; Greenpeace, 2011). Intact forests are defined as areas in their natural state, largely untouched by human activity, that are large enough to be resilient to natural disturbance. These areas are vital for maintaining biodiversity, ensuring the survival of at-risk species and maintaining ecological functions—including air and water purification, carbon sequestration, and recreational and cultural heritage among others.

[1] All figures CAD unless otherwise noted.

Table 2: Estimated area of deforestation in Canada by industrial sector, 1990–2010

Sector	Deforestation area (hectares) by year				
	1990	1995	2000	2005	2010
Agriculture	42,100	22,200	20,500	19,100	18,900
Forestry*	3,700	3,300	3,600	3,800	3,800
Hydroelectric	2,700	1,500	900	1,100	600
Industry and Transportation					
Industry	900	900	900	900	900
Mining	2,800	2,700	2,900	2,700	2,500
Oil and Gas	4,400	5,400	7,900	11,300	11,100
Transportation	2,000	1,700	3,000	2,800	2,700
Municipal	3,900	3,700	4,300	4,700	4,700
Peat Mining	900	700	500	100	100
Recreation	600	700	700	600	600
Total	**64,000**	**42,800**	**45,200**	**47,100**	**45,900**

*Note: * Forestry numbers result from the creation of permanent forestry access roads.*
Source: Environment Canada, 2014; NRCan, 2014.

A better understanding of the value of forests and the services they provide—combined with increasing pressures—has pointed to a need for strategic planning that prevents ad hoc development and unintended consequences to communities, ecosystems and economies. The International Boreal Conservation Campaign (IBCC) has emerged out of an understanding of the value of the Canadian boreal forests (Pew Charitable Trusts, 2016). The IBCC uses scientific evidence to promote protection of the boreal forest under the Boreal Forest Conservation Framework. The Framework, an agreement between members of the resource sector, conservation organizations, financial institutions, and Indigenous peoples, calls for at least 50 per cent of the overall intact boreal ecosystem to be linked in a system of interconnected reserves to ensure that plants, animals and cultural values are provided the best chance at survival. The remaining 50 per cent is envisioned as a sustainable development model that ensures ecosystem services are balanced with communities' needs for economic growth and long-term prosperity.

Finding a means to ensure the long-term survival of ecosystem services and community prosperity requires strong science and economics, and an integration of ecological, cultural and social needs and values. One way to develop sound management options is to examine lessons from other management models and their ability to successfully maintain ecological and cultural services while encouraging the social and economic benefits of holistic, inclusive, long-term prosperity. Government and communities in many regions across the world are exploring new policies and management methods that more fully support and integrate the socioeconomic needs of local communities, biodiversity conservation and the provisioning of a wide range of ecosystem services, including those of high economic importance. This study examines cases from areas of resource-intensive development and provides lessons for benefit sharing and resource governance for management of the boreal forest.

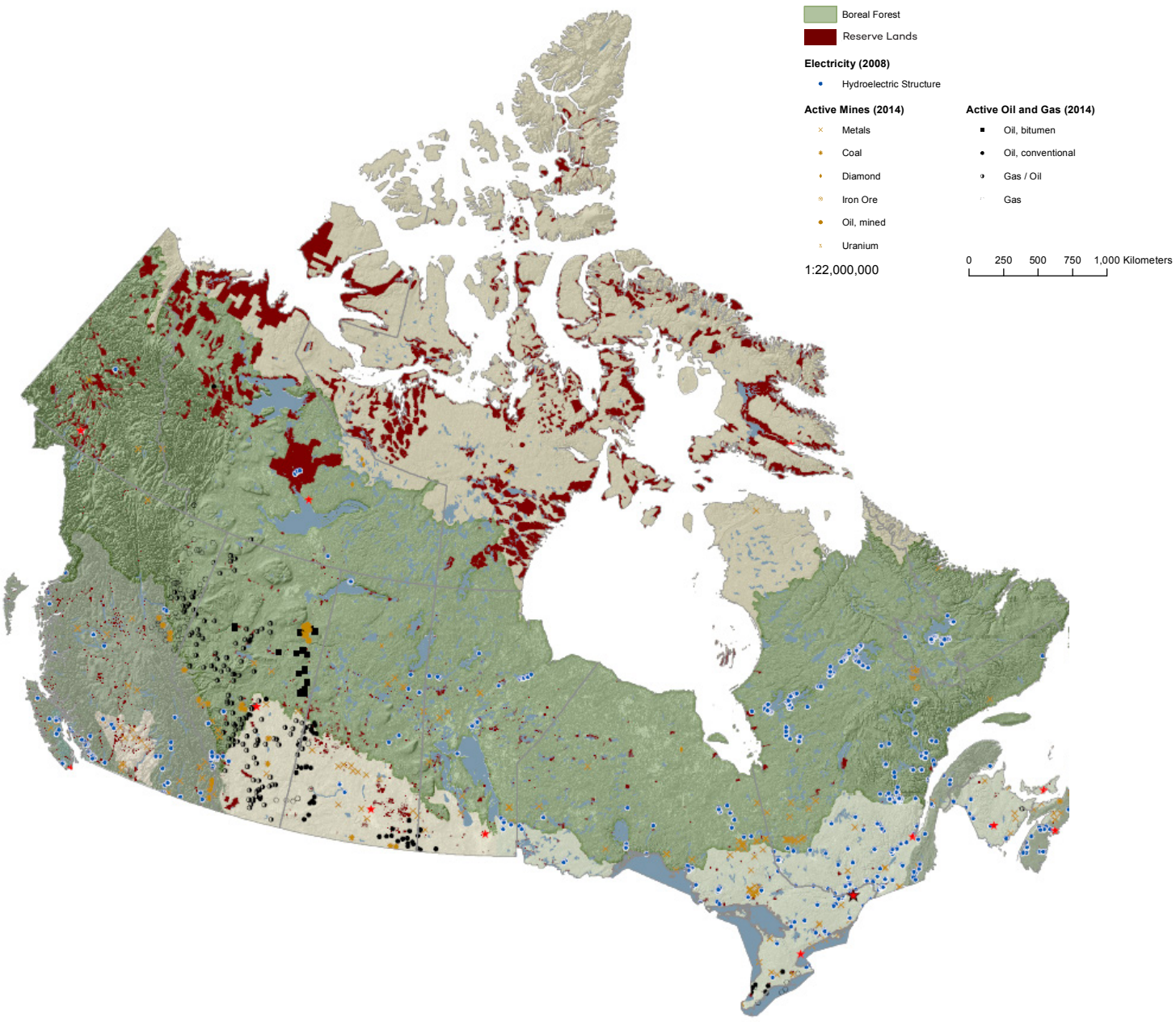

Figure 1. Canadian Boreal and resource extraction activities: mineral extraction (gold), oil and gas extraction (black) and hydropower generation projects (blue), relative to Indigenous communities (red).

Source: Map was created by IISD (Geoffrey Gunn) for this project. Data sources: NRCan, 2015; CEC, 2011.

Methodology: Case Study Selection

This report focuses on natural resource governance policy frameworks that integrate benefit-sharing priorities and mechanisms, and corresponding examples of implementation. Benefit sharing refers to the mechanism of a commitment to channel returns of a project—either monetary or non-monetary—back to the range of designated participants, project-affected populations (or populations living near a development) (United Nations Environment Programme [UNEP], 2007). Case studies were sought from regions of Canada and other parts of the world in the context of resource management and governance, including forestry, mining, oil and gas, hydropower development and other resource-based sectors (Table 3). The selected case studies are exploratory and illustrate ways in which jurisdictions have managed resources to optimize benefits to the sector and to local communities, ensuring long-term sustainability and economic growth. The selected case studies are intended to illustrate a range of approaches that sustain long-term diversification of growth and to improve the understanding of benefit-sharing policies by identifying principles that underlie these policies and governance structures.

Case studies were selected based on multiple criteria, including:

- Regions that have experienced resource booms and faced associated challenges in managing growth.
- Inclusion of multiple policy mechanisms, including economic, regulatory and investment strategies, to enable sustainable management of resources and ecosystem management in the context of benefit sharing.
- Inclusion of Indigenous or traditional community rights and knowledge.
- Inclusion of local and rural communities, either through planning and benefit sharing.
- Representation of various sectors (forestry, mining, oil and gas, and hydropower).
- Level of innovation in policies or processes.
- Insight into poor planning and cautionary aspects.
- Relevance to the Canadian boreal forest context and management.

Table 3: Selected resource management case studies and corresponding attributes

Case Study	Resource Sector	Policy Instrument & Benefit Sharing Mechanisms	Description
Plan Nord *Québec, Canada*	• Forestry Management • Hydropower Generation • Mining	• Development Plan	Integrated development plan supporting economic and social development along with environmental management and protection.
Government Pension Fund Global (GPFG) *Norway*	• Oil and Gas	• Sovereignty Fund or Resource Trust Fund • Revenue Sharing	Fiscal policy designed to maintain the national oil capital stock over generations. Strong legislation in support of diversifying economy and revenue sharing.
Alberta Heritage Savings Trust Fund *Alberta, Canada*	• Oil and Gas	• Endowment, Sovereignty or Resource Trust Fund • Revenue Sharing	Resource revenue investment strategy. Case of heavy reliance on a non-renewable resource, and lack of planning and accountability by provincial government.
Columbia Basin Trust *British Columbia, Canada*	• Hydropower Generation	• Resource Trust Fund • Development Fund • Revenue Sharing	Financial offsetting mechanism to provide additional long-term compensation through community projects and initiatives. Successful community involvement and benefit sharing.
Great Bear Rainforest Initiative *British Columbia, Canada*	• Forestry Management	• Private-Public-Partnership on forest conservation and management	Multi-interest group negotiation and planning process that has led to conservation and management of high-value forest in coastal British Columbia.
BOLFOR I & II *Bolivia*	• Forestry Management	• Development, conservation program • Community partnership	Aimed at reducing degradation of Bolivia's forests and protecting biodiversity through promoting sustainable forest management as both a source of income and conservation.
Costa Rica's PSA Programme (PES) *Costa Rica*	• Forestry Management	• (PES) Payment of Ecosystem Services	Recognizes GHG mitigation, hydrological services, scenic beauty and biodiversity as ecosystem services.
Nigeria: Oil Development & Revenue Sharing *Nigeria*	• Oil and Gas	• Revenue Sharing • Corporate Social Responsibility	Despite robust growth, the oil sector has affected the country's development, where poverty and environmental degradation is significant, with increasing inequality and regional disparities.

Source: NRCan, 2014.

Québec's Plan Nord

Plan Nord is a development policy for Northern Québec intended to take into account the economic, social and environmental needs of the region. The project anticipates $50 billion in public and private investment for the 1.2 million square-kilometre territory, which covers roughly 72 per cent of Québec's geographical area (Gouvernement du Québec, 2015). It includes a strong commitment to improving social conditions and public services for the Cree and Inuit people in the region, and partnerships on mining investment and decision making, as well as conservation.

1. Background

The Northern Québec region covered by Plan Nord includes 1.2 million km^2 (Figure 2) and has a population of 120,000 people, one-third of whom are members of four Indigenous nations: Cree, Inuit, Innu and Naskapi. There are also 32 non-Indigenous communities in the Baie-James, north of Saguenay–Lac-Saint-Jean, and Côte-Nord regions (Gouvernement du Québec, 2015). Administratively, Northern Québec includes five municipalities and two semi-autonomous governments (The Grand Council of the Crees and the Kativik Regional Government) formed as a result of the James Bay and Northern Québec Agreement and the Northeastern Québec Agreement. (Gouvernement du Québec, 2015).

Northern Québec is home to both Boreal and Arctic habitat including considerable aquatic, marine and terrestrial wildlife and over 200,000 km^2 of forests (Gouvernement du Québec, 2015). The region supports globally significant ecological values including storage of 31 billion tonnes of biotic carbon, healthy populations of sea run fish such as Atlantic salmon, breeding grounds for 180 bird species, and among the world's most significant herds of barren ground caribou (Berteaux, 2013; Pew Charitable Trusts, 2016).

Natural Resource Development

Northern Québec is endowed with significant natural resources: it contains extensive mineral deposits and is the site of 75 per cent of Québec's installed hydroelectric capacity (Gouvernement du Québec, 2015). It is widely recognized for untapped mineral, hydroelectric, wind, and solar potential, and between 2007 and 2012 private investments in these sectors more than tripled (Gouvernement du Québec, 2015). Large hydroelectric projects are an important part of the province's history—Québec possesses 3 per cent of the world's freshwater reserves and has a long history of hydroelectricity development (Gouvernement du Québec, 2015). Major hydroelectric projects, including Bersimis and Manic-Outardes stations and the James Bay complex, have positioned the province as a world leader in hydro production, allowing Québec to limit its GHG emissions from fossil fuels. Mining in Northern Québec is also expected to be a major source of economic development. Ongoing and planned nickel mining in Nunavik and gold, diamond, uranium zinc and copper mining operations planned in the James Bay/Eeyou Istchee region are expected to bring significant economic growth and employment opportunities to the province and local communities.

Figure 2. Area covered by Plan Nord

Source: http://plannord.gouv.qc.ca/wp-content/uploads/2015/04/Carte-1-ANG.pdf

The forest industry has been operating in Northern Québec for decades. The Québec boreal forest is composed of relatively dense stands of mainly softwood trees used for saw wood: high-strength engineered and structural timber products, and pulp, paper and cardboard production (Gouvernement du Québec, 2015). Forestry-related activities in Northern Québec support approximately 12,500 jobs, including 3,700 in forestry and 8,800 in primary wood processing plants (Gouvernement du Québec, 2015). Canada's slowest-growing forests are found in the Taiga Shield ecozone, with an average wood volume of 61 m3 per hectare, in comparison to 136 m3 per hectare for Canada's fastest-growing oldest trees in the Pacific Maritime ecozone (NRCan, 2014). The government aims to support and increase the participation of Indigenous communities in forest management, and discussions have been ongoing with the Cree Nation since 2009 to establish a collaborative regime for the management of forest resources.

In addition to natural resource extraction activities, wildlife management, tourism and bio-food production also have potential to stimulate economic development in the region (Gouvernement du Québec, 2015). If planned right and in balance with the strong conservation commitments of the plan, these potential economic activities could generate important employment opportunities for local communities while maintaining the ecosystem integrity upon which they depend.

Infrastructure Needs

Northern Québec faces a range of challenges created by its geographic, demographic, social and environmental features. The immense region is sparsely populated, with small, scattered communities, many of which have limited service provision and living conditions. Much of the area is difficult to access and includes distinctive, often fragile environments. Infrastructure is a limiting factor in both community economic development and social and environmental research. The existing road network was largely built as a result of the James Bay hydroelectric project to connect dams on La Grande River (The James Bay Road, 2015). There are no roads to Nunavik from the south and the community is accessible only by air (The Government of Québec, 2015). Similarly, telecommunications and access to the internet are constrained by severe infrastructure limitations, which present significant challenges to economic development in the region.

2. Québec's Plan Nord

Plan Nord is an ambitious northern development plan for the Province of Québec, launched by the Parti Liberal du Québec in 2011 and revised by the government of Premier Philippe Couillard on April 8, 2015 with the release of Plan Nord Toward 2035, 2015–2020 Action Plan. The plan was developed through a rigorous multistakeholder consultation and consensus-building process, and was designed with a strong focus on sustainable development, integrating resource extraction with land and biodiversity conservation and bringing the benefits of industrial development to northern communities themselves.

Plan Nord covers a territory of 1.2 million km^2 that accounts for 72 per cent of Québec's total surface area (Gouvernement du Québec, 2015). It includes significant investment in energy, natural resource, infrastructure and social development projects in the province. Responding to the needs of communities and supporting economic development in the region, Plan Nord is a long-term plan for sustainable development that includes diversified development strategies, planning and environmental protection. The plan addresses the need for ongoing research and a commitment to protecting at least 50 per cent of the territory from industrial activity (Gouvernement du Québec, 2015).

The plan is estimated to cost the province $2.7 billion over 20 years. Hydro-Québec will also invest $20 billion over the same period, and there is an expectation of private sector investment of an additional $17 billion. The total expected cost is estimated at $50 billion (Balis, 2015; Gouvernement du Québec, 2015).

Plan Nord has placed northern communities at the heart of sustainable development. It recognizes the need to focus on living conditions and social equity in addition to creating the necessary conditions for the development of the area's resources. The plan recognizes that development in the north must benefit the northern population as a whole, producing development revenue that remains with the people living there, while providing for communities placed under pressure by the establishment of large-scale economic projects in their vicinity (Gouvernement du Québec, 2015).

The overall vision for 2015–2035 is to enable the development of the region, for the benefit of its population and of the whole of Québec, through an exemplary form of sustainable development based on a comprehensive, integrated, consistent and responsible approach. (Gouvernement du Québec, 2015)

The primary policy directions for the 2015–2020 Action Plan address three fundamental dimensions of sustainable development: economic development, the well-being of local and Indigenous communities, and the protection of the environment and conservation of biodiversity. As detailed in Plan Nord's Action Plan, these include:

- "Develop the diversified economic potential of Northern Québec in a responsible way and for the benefit of the population living there and Québec as a whole.
- Support the development of all communities in the area covered by the Plan Nord, by helping them realize their full potential and enhancing their living conditions.
- Protect the environment and preserve the distinctive biodiversity of Northern Québec by ensuring that mechanisms are put in place to dedicate 50% of the area covered by the Plan Nord, by 2035, to non-industrial purposes, protection of the environment and the safeguarding of biodiversity" (Gouvernement du Québec, 2015).

The government's focus is on attracting private investment to Northern Québec and maintaining processing activities in the region such that development promotes the diversification of the local and regional economy, and, in particular, supports enterprises of all sizes and at all stages of development (Gouvernement du Québec, 2015). To encourage investment, Québec offers a series of fiscal measures, including a 10-year tax exemption for major investment projects, allocations for processing and transformation, and the possibility of benefiting from advantageous power rates. It also offers the possibility of investing in companies via a Mining and Hydrocarbon Capital Fund (Gouvernement du Québec, 2015).

To improve quality and access to basic services, such as education, health, housing and cultural services, Plan Nord includes a number of objectives that specifically address the needs of local populations. Plan Nord highlights the need for local and Indigenous communities to plan and structure their own development and provide real opportunities for northerners. This includes programs to support labour force training and retention, increased graduation rates and educational attainment, and a better response to the social needs of local populations. The Plan also highlights the strong cultural heritage of local communities and Indigenous nations, and the need for innovative, collaborative solutions to provide for the needs of families and seniors in the north.

To protect the environment and biodiversity of Northern Québec, the plan commits to protecting 50 per cent of the area from industrial activity by 2035. It highlights the need to gain knowledge about the area's physical and ecological environment in order to identify the most appropriate conservation measures and recognize the potential for development. It also commits to ensuring an efficient, community engaged process for environmental assessment (Gouvernement du Québec, 2015).

Plan Nord recognizes that there are a number of underlying conditions of success that also require specific government support. In particular, the development of strategic transportation, energy and communications infrastructure is critical to both economic development and the social well-being of northern communities. The government recognizes that to develop the north sustainably, and in a way that brings concrete benefits to local communities, the region must be equipped with the necessary infrastructure. To meet these needs, Plan Nord includes objectives for specific infrastructure development, including transportation, energy and communications (Gouvernement du Québec, 2015).

Finally, there is a recognition of the need for research, scientific data and understanding to support implementation and to monitor sustainable development outcomes. Information is needed to ensure that actions are planned effectively in a way that ensures respect for communities and that meets the desired outcomes. To this end, Plan Nord includes the creation of the Institut Nordique du Québec and commits to providing assistance to research partners who work with the Institute.

3. Impacts and Outcome

Economic Impacts

There are substantial potential economic benefits for the province and northern communities from the implementation of Plan Nord. The Québec Government has projected over $22 billion in mining investments, and roughly 20,000 jobs as part of construction and production (Gouvernement du Québec, 2015). The political uncertainty in Québec between 2011 and 2013 resulted in concerns in investment, particularly in the mining sector. In 2014, with the new government's commitment to renewing Plan Nord, and strong messages that Québec is open to natural resource development, the province rose to sixth place in the world in the Fraser Institute Survey of Mining Companies (Jackson, 2014). Despite a global downturn in demand for certain metals, especially iron, it is projected that investment will remain at a historically high level of more than $2 billion (Gouvernement du Québec, 2015).

Plan Nord has been well received by the business community overall. The relaunch of Plan Nord is expected to help maximize the mining, energy and forestry potential in Northern Québec and to create business and investment opportunities in construction, infrastructure, transportation, tourism and other industries (Guimond & Amadee, 2015). Key factors such as transparency, existing support and capacity for project design and structuring, clarity in leasing and ownership rights and the presence of reliable courts and rule of law all favour investment in Québec (Steffens, 2011) and will help the province meet its economic development goals.

One of the real benefits of Plan Nord is the inclusion of a clear plan for long-term economic diversification. A common trend in resource-rich areas is financial (and inevitably social) decline once resources are depleted. Plan Nord includes a definite plan for diversification including tourism, export of related expertise in mining and renewable energy, application of advanced renewable energy and mining technology (Steffens, 2011). Planning for diversification from the outset should help maintain strong economic outcomes for the region over the long term.

Social Impacts

Under Plan Nord, the Government has earmarked almost $2 billion for the next five years to improve access to the Plan Nord territory, improve telecommunications, and work to increase environmental data and understanding. These expenditures are aimed toward benefiting communities, Indigenous peoples, and mining and forestry companies (Fleche, 2015). Plan Nord focuses on improving living conditions in the territory and addresses the specific needs of local communities and First Nation populations in connection with employment, education, health and social services, housing, justice and security.

An important component of Plan Nord is the establishment of a governance structure to ensure social acceptability of the Plan by local and Indigenous communities. The Société du Plan Nord was established through the 2014 Act respecting the Société du Plan Nord and is responsible for ensuring responsible development in a spirit of respect for local and Indigenous peoples. It includes representatives of the regions and the Indigenous concerned as well as the private sector (Gouvernement du Québec, 2015).

Although the first version of Plan Nord, launched in 2011, came under heavy scrutiny from some Indigenous communities, the revised Plan has been met by many of those communities with cautious optimism. This is largely a reflection of the strong engagement process and the clear efforts to take community concerns into account. Job creation is a top priority, and there is a desire to make the most of mineral potential. A focus on training and capacity building will ensure that workers meet requirements for jobs in the mining industry (Peyton, 2015).

Plan Nord promises to bring jobs and educational opportunities into the region but considerable care and planning by northerners themselves is critical in this area where people still rely on hunting and fishing, and where animals such as caribou carry cultural and spiritual significance. By working toward a balanced plan that includes investments in community needs such as infrastructure, communications access and capacity building, as well as the protection of half the territory, Plan Nord has the potential to bring real long-term change into the region. Considerable work will be required to implement this vision in a way that works for all stakeholders involved, but the potential for positive outcomes is significant.

Environmental Impacts

Environmental protection and scientific partnerships are major components of Plan Nord. Through the plan, the government has committed to protect 50 per cent of the territory from industrial activities, for the purposes of environmental protection and biodiversity conservation by 2035. In particular, the 2020 goals of Plan Nord include (Gouvernement du Québec, 2015):

- Providing for 20 per cent of the territory covered by the Plan Nord to be made up of protected areas, including 12 per cent in the commercial boreal forest north of the 49th parallel.
- Establishing a mechanism for allocating the remaining 30 per cent of the territory on a priority basis to protect it from industrial activity and ensure it is devoted to environmental protection, biodiversity conservation and the enhancement of various types of development.

When initially announced, the pledge to conserve 50 per cent of the land area was applauded by conservation groups throughout North America and endorsed by over 500 scientists who encouraged the government to follow through on its commitment (Canadian Boreal Initiative, 2009). The large area of intact forest in Northern Québec provides the planning flexibility to establish a comprehensive protected area network while maintaining substantial opportunities for economic development (Carlson, Wells, & Jacobson, 2015).

Fulfilling the conservation potential of Plan Nord is contingent upon the establishment of a transparent and balanced planning process that identifies—in partnership with local and Indigenous communities—which lands are of interest for protection based on knowledge of ecological values and their sensitivity to development. Québec's Bill 65 establishes a framework in which conservation decisions are driven by comprehensive land-use planning that respects the leadership role of Indigenous peoples in achieving conservation and development goals on their traditional lands. Strong implementation of this framework as part of Plan Nord implementation could lead to many positive outcomes, including protection of a vast portion of Canada's boreal forest and the ecological benefits it provides.

Insight for Benefit Sharing in Resource Development

Plan Nord supports the proposition that resource development expansion will occur but that proper planning can ensure that development proceeds in a fashion that does not sacrifice ecological integrity (Carlson, Wells, & Jacobson, 2015). Although Plan Nord was implemented relatively recently, a number of key lessons can be derived from the planning process and response to date.

Critical to the early interest in Plan Nord was a process for integrated stakeholder engagement and consideration of the needs of northerners and Indigenous communities. A considerable share of conservation organizations and Indigenous communities supported the original plan and were signatories, with a minority remaining opposed. However, some of those have felt their concerns were address by the revisions made during the initial planning process for the 2011 version of Plan Nord (M. Jacobson, personal communication, Sept 12, 2016). Key to long-term success will be continued transparent and action-oriented engagement including a place for local and Indigenous voices in the decision-making process. All northern communities need to benefit from investment through jobs and capacity-building programs. Active involvement in the decision-making processes through the Société du Plan Nord will maintain the focus on the needs of the region while also providing a transparent process for investment, helping to mitigate the risks to industry looking to operate in the region (PricewaterhouseCoopers LLP, 2011)

Resource-driven economies run the risk of financial ruin once resources are depleted (Steffens, 2011). A critical component of long-term sustainable development in resource-rich areas is a plan for regional economic diversification that takes into account a region's long-term needs. The planned investment in infrastructure and communication technology will lay the foundation for a more stable economy. Plan Nord also includes a plan for the economic diversification of Northern Québec, including exploring potential in the tourism/ecotourism sectors, development of renewable energy and mining technology, and export of expertise in the area as it develops (Steffens, 2011).

Finally, Plan Nord reflects a balance of development and conservation, recognizing the importance of the large area of intact boreal forest remaining in Northern Québec and the rest of Canada's boreal region. The plan has been identified as perhaps the best opportunity globally for maintaining in perpetuity the full range of ecological, economic, and cultural values supported by forest ecosystems (Carlson, Wells, & Jacobson, 2015). It recognizes the importance of maintaining these ecosystem values as being critical to sustainable development of the region and—most importantly—the people of Northern Québec.

Norway Government Pension Fund Global (GPFG)

Norway's Government Pension Fund Global (GPFG) is a fiscal policy designed to maintain the national oil capital stock over generations, and to support inclusive sustainable development integrating economic, environmental and social strategies. The Fund's capital consists of revenues from the petroleum sector, and expenditure is transferred to the national fiscal budget to finance the non-oil budget deficit. Originally named The Norwegian Oil Fund, this unique fund demonstrates strong non-renewable resource governance through economic policy, voluntary principles for sovereign wealth funds, and environmentally responsible investing.

1. Background

Norway has developed as a mixed economy with state-ownership in several resource sectors, including petroleum production, hydroelectric power generation and fisheries; however, recent growth has been largely fuelled by the country's abundant oil and gas reserves. Despite this reliance on non-renewable resources, the country has long promoted environmental and social sustainability, and strong environmental stewardship is embedded in multiple national policies. Due to the expansion and heavy reliance on a carbon-based economy, Norway has established innovative fiscal instruments and economic mechanisms to combat environmental pressures and ensure long-term prosperity from non-renewable resource extraction. Norwegian policies consist of a variety of mechanisms, including revenue sharing, equity sharing, development funds, taxes and preferential electricity rates. Of particular interest is the country's sovereignty fund for oil and gas revenues, the Government Pension Fund Global, described in the case study below.

Oil and Gas Development

Norway began oil exploitation in the Norwegian Continental Shelf (NCS) in 1962 when Phillips Petroleum attempted to claim exclusive rights to petroleum extraction (International Monetary Fund [IMF], 2008). In response, the Norwegian government established sovereignty over the NCS in 1963, and new regulations determined that the state owns any natural resources on the NCS and is solely authorized to award licences for exploration and production (Ministry of Petroleum and Energy [MPE], 2012). Prior to the oil exploitation in the 1960s, there was almost no direct involvement by the government in the petroleum sector, and the government granted concessionary tax breaks and a 10 per cent royalty rate to attract private investors (Natural Resource Charter, 2012). Ekofisk Oil Field was the first large-scale discovery, and extraction began in 1970 under poor contractual conditions and minimal Norwegian public sector stake in the project. During this time, foreign companies dominated exploration and the responsibility for the initial development of the country's first oil and gas fields. Due to the government's minimal share of and involvement in the sector, the Norwegian Petroleum Directorate (NPD) and Statoil were created in 1972 as the sector regulator and national oil company, respectively. At the time, Statoil was awarded 50 per cent of all petroleum production licences. Currently, Statoil controls 80 per cent of Norwegian petroleum operations.

The extraction of oil and gas in the North Sea is the greatest component of the Norwegian export economy. Significant areas on the continental shelf are occupied by oil and gas installations, and the export value from these installations is estimated at 50 per cent of all Norwegian exports, 34 per cent of state revenues and 26 per cent of GDP (Natural Resource Charter, 2012). The average amount of oil per day produced by Norway in 2013 was 1.54 million barrels. In comparison, Canada's daily production in the same year was 3.36 million barrels a day (Schein, 2014).

Petroleum activities have contributed significantly to Norway's economic growth, as well as financed the Norwegian welfare state. The innovative use of economic instruments for the stability of the various forms of capital, including natural resources, has facilitated the successful application of many environmental policies in Norway. One of the most successful is the Government Pension Fund Global.

2. Norway's Government Pension Fund Global (GPFG)

When Norwegian oil and gas development first began in the 1970s, oil reserves were estimated to be exhausted within 20 years based on their then-current extraction rate and technology. Gas reserves were given more than 80 years (Organisation for Economic Co-operation and Development [OECD], 1999). Faced with the rapid expansion of multiple industries and a heavy reliance on a carbon-based economy, coupled with a strong national focus on sustainable development, Norway established ambitious environmental policies to protect and combat the environmental pressures these posed. The resulting policies work to ensure long-term benefits from non-renewable resource extraction while avoiding full dependence on resource revenues. This translated into strategic investments in industries that were complements to upstream petroleum extraction, ensuring that these industries develop in a competitive environment. Correspondingly, the State's Direct Financial Interest (state portfolio) was created to assess these investment projects. In 1990, as the result of a sufficiently advanced investment strategy, the Oil Fund (presently the Government Pension Fund Global) was established as a separate entity.

The Norwegian Government Pension Fund Global (GPFG) was created in 1990 as a fiscal policy tool to support the long-term management of Norway's petroleum revenue. The GPFG contributes oil revenues to a savings fund for public infrastructure and social programs. The GPFG framework allows resource revenues to foster continued high levels of domestic investment promoting sustainable and inclusive economic growth. The structure of the fund is designed to give the government financial flexibility to manage economic contractions and reductions in oil prices (Cappelen & Mjoset, 2009). The Norwegian government acts as both owner and regulator, and is involved in all aspects of the industry, including investment strategies beyond the oil sector. The GPFG is embedded in the Government Pension Fund Act,[2] governed by the Ministry of Finance, and structured by a transparent delegation of duties and system for controls and supervision. The fund is integrated into the government budget and adheres to the "budgetary rule": over the course of a business cycle, the government may spend only the expected real return on the fund, estimated at 4 per cent per year (Figure 3; Norges Bank Investment Management [NBIM] I, 2015). This phases oil revenue into the economy gradually, and ensures that only the return on the fund is being spent. Based on this principle, in 2014, 156.2 billion kroner ($25.5 billion) was transferred to the National Budget from the GPGF for public spending.

[2] The Government Pension Fund Act (no.123 of December 21, 2005) clarifies the objectives and management responsibilities of the Government Pension Fund Global and Government Pension Fund Norway, which supports government savings to finance National Insurance Scheme's expenditure on pensions and support long-term considerations in the use of petroleum revenues.

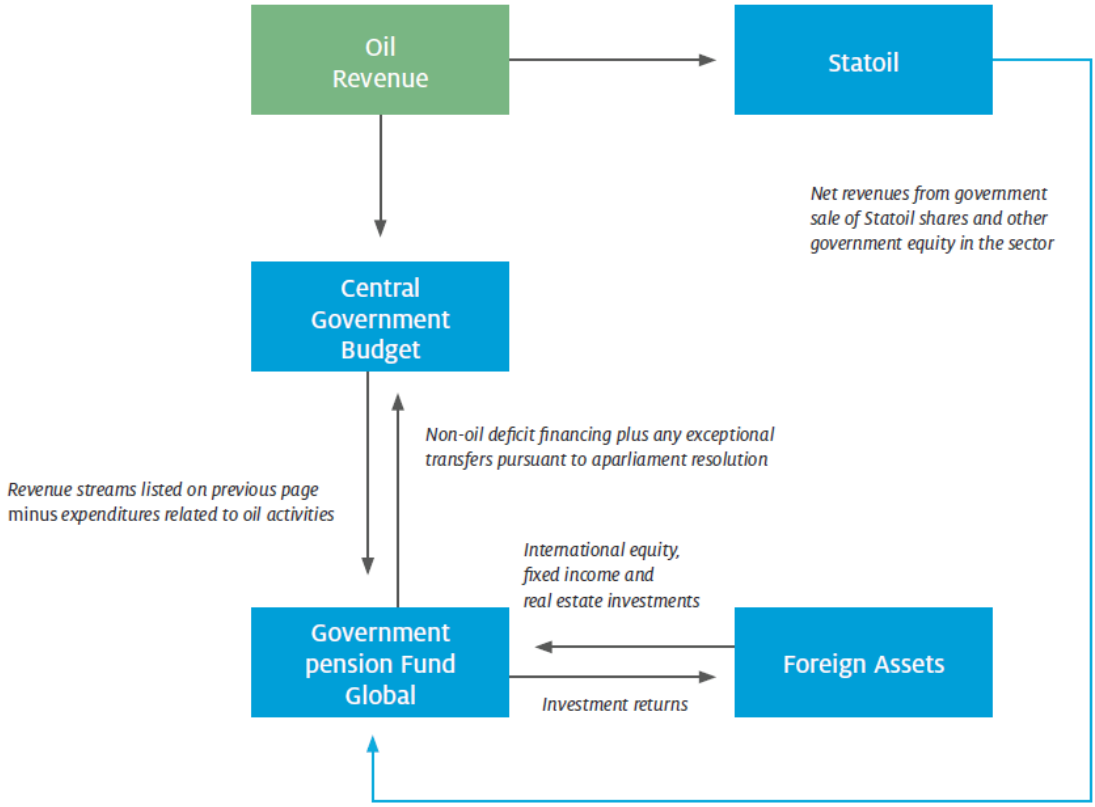

Figure 3. Flow of funds in the GPFG

Source: Natural Resource Governance Institute and Columbia Center on Sustainable Investment, 2013.

The fund is structured by investing 100 per cent of its holdings outside of Norway, while retaining approximately 85 per cent of its net revenues and owning 80 per cent of its petroleum production. The GPFG is highly regarded as best practice by international standards, primarily due to its features, including:

- Aims to support government saving and promote an intergenerational transfer of resource. Facilitates the long-term management of the government's petroleum revenues and serves to pre-fund public pension expenditures.
- Functions as a fiscal policy tool and provides guidelines to limit government spending. The fund's capital consists of revenues from the petroleum sectors and expenditure transferred to the fiscal budget to finance non-oil budget deficit. The fiscal guidelines, introduced in 2001, limit non-oil structural central government deficit of approximately 4 per cent of the assets.
- Is integrated into the national budget. The fund adheres to the "budgetary rule" and during a business cycle, only return on the fund is allocated.
- Provides a transparent investment strategy. The Ministry of Finance, the fund's owner on behalf of the Norwegian people, reports on the governance framework, fund's goals, investment strategy and results, and ethical guidelines. The Central Bank, the fund's operational manager, publishes quarterly and annual reports on the management of the fund, performance and listing of all investments.
- Invests exclusively abroad. The fund's assets are invested exclusively abroad to ensure risk diversification and shield the non-oil economy from shocks in the oil sector.

3. Impacts and Outcome

When Norwegian oil production started in the 1970s, it was generally considered more risky to reinvest oil and gas revenue into financial assets than to preserve the petroleum stock itself. However, the GPFG investments and management have supported inclusive, sustainable development and prosperity by integrating economic, environmental and social policies.

Economic Impacts

Since the discovery of oil in 1969, Norway's economy has grown by 3 per cent per annum, on average (OECD, 2011). In 2009, the petroleum sector accounted for 20 per cent of GDP and 46 per cent of export revenues (OECD, 2011). The fund has generated an annual return of 5.8 per cent from the establishment of Norges Bank Investment Management in 1998 to the end of 2014 (NBIM II, 2015). In the 1990s, Norway had significant budget surpluses (+2.7 per cent of GDP) compared to negative averages in EU (-4 per cent) and OECD countries (-3 per cent) (OECD, 2001).

Currently, the GPFG market value is estimated at 7,323 billion kroner (CAD 1,303.4 billion; USD 879 billion): it owns 1.3 per cent of the global equity market and invests in 75 countries and 9,000 companies (NBIM II, 2015).

Social Impacts

During the period from the 1950s to 70s, Norway's GDP per capita was relatively low compared to the OECD average, and was considerably lower than other Scandinavian countries such as Denmark and Sweden (Statistics Norway, 2014; Moe & Brathu, 2014). During the 1970s, there was significant growth in national income and, starting in the early 1990s, an increase in relative income. Currently, Norway is ranked among the countries with the highest GDP per capita in the world, and at the top according to UNDP's human development indicator. This development is arguably due to the growth of the Norwegian petroleum sector and particularly, the strong institutions and policies surrounding this sector.

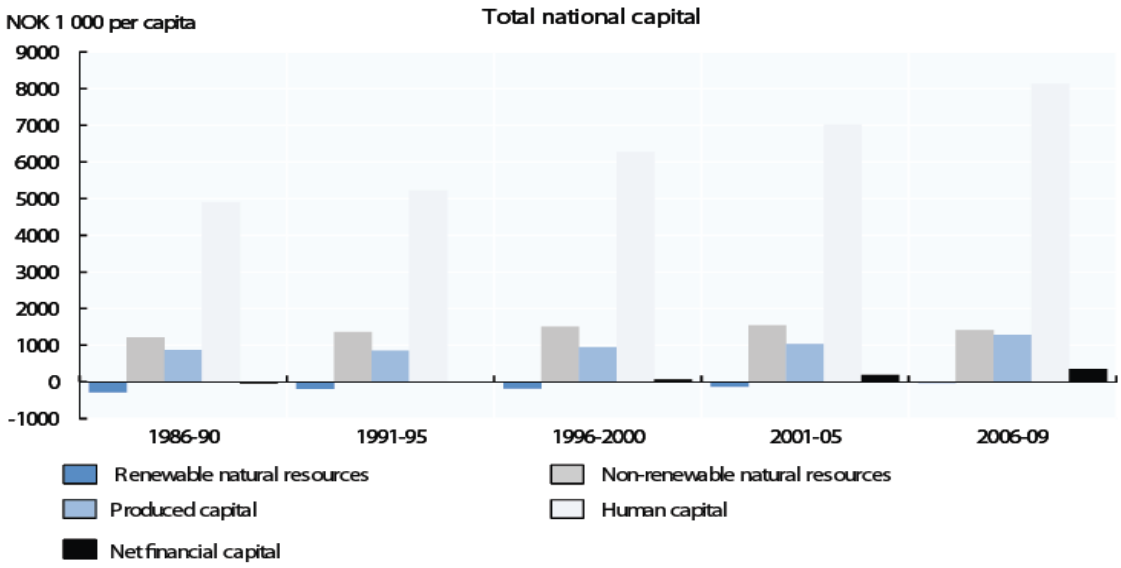

Figure 4. Norway's total national capital divided by capital (produced capital, net financial capital and human capital) and resources (renewable natural resources and non-renewable natural resources).

Source: OECD, 2011.

Norway's welfare system relies heavily on financial reserves produced by natural resources, particularly through the GPFG and the petroleum sector. A main component of the GPFG requires that decreases in natural capital are to be offset by increases in other forms of capital: human, producer or financial (Figure 4). The GPFG has accomplished just that. With an economy saturated by oil wealth, Norway's has seen unemployment remain at approximately 4 per cent, even as many European countries were experiencing double-digit unemployment rates (Moshin, 2015). Norway also has some of the developed world's highest salaries and most generous welfare benefits. In recent years, the GPFG has safeguarded Norway from the decline in international oil prices, and Norway's financial position has enabled sustained higher basic wages, living standard, and education subsidies other debt-strapped economies have not.

Environmental Impacts

The petroleum industry is responsible for significant greenhouse gas emissions; however, Norway has aimed to achieve carbon neutrality by considerably reducing its own greenhouse gas emissions and offsetting the remaining through investments in environmental projects. These focused largely on combatting deforestation in developing countries to obtain carbon credits. A limitation of the GPFG is the lack of direct investment into environmental programs and policies. Despite this, Norway does continue its efforts to ensure that environmental policies effectively control the environmental pressures that strong petroleum growth has generated. For example, emissions of SO2 have continued to decrease and are well below the OECD average per unit of GDP (Figure 4; OECD, 2010; 2011).

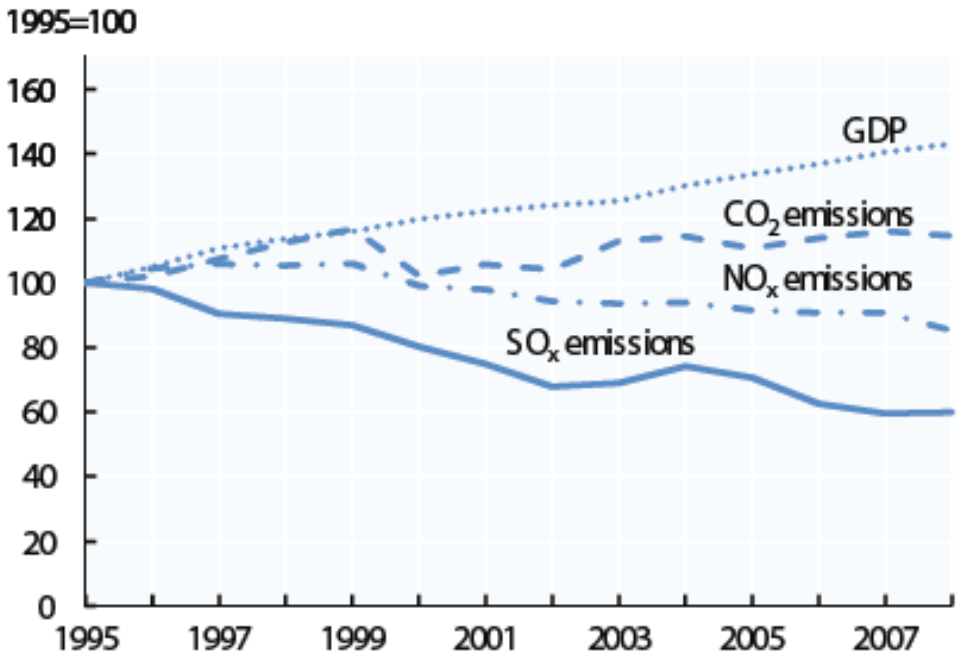

Figure 5. Norway's air pollution relative to GDP growth from 1995–2008

Source: OECD, 2011.

The ratio between environmental protection expenditure (EPE)[3] and gross domestic product (GDP) has been used as an indicator of the importance of environmental protection relative to overall economic activity. A low level of EPE does not necessarily mean that a country is not effectively protecting its environment; however, fluctuation in expenditure can provide information on environmental political stability during years of economic crisis and sectoral collapse. EPE is divided into three main providers: the public sector, industry (mining; manufacturing; electricity; and gas and water supply), and specialized producers of environmental services (such as waste collection). In 2014, Norway's total EPE was 29,664 million kroner, amounting to 2 per cent of total government expenditures (Statistics Norway, 2014). In comparison, when the GPFG was created in 1990, EPE accounted for 1.2 per cent of GDP (Statistics Norway, 2014; Moe & Brathu, 2014).

Comparing the European Union Member States' (EU-28) to Norway's EPE, EU-28-specialized producers EPE accounted for 1.11 per cent of GDP in 2013, the public sector accounted for 0.67 per cent and industry EPE accounted for 0.40 per cent (Eurostat, 2014). Expenditure made by industry across the EU Member States (EU-28) fell slightly in relation to GDP between 2003 and 2013 (–0.02 per cent). During the same time period, Norwegian EPE by industry was 21.3 per cent above its 2003 level. However, expenditure decreased during the early part of the decade, and again in 2009, associated with the global financial and economic crisis. Despite the general development of rising EU-28 environmental protection expenditure over most of the last decade, the rate of change, especially between 2008 and 2009 (reduction of 7.8 per cent in EPE), reflects the impact of the financial and economic crisis. Expenditures on environmental protection in oil and gas extraction in Norway also increased 13 per cent between 2012 and 2013 (3.8 billion kroner in 2013) (Statistics Norway, 2014).

The GPFG also practices environmentally responsible investing. The fund recently published its divestment details on responsible investing by removing investments made risky by climate change and other environmental concerns including coal, oil sands, cement and gold mining ("World's biggest," 2015). A total of 114 companies were recently removed from the fund's investments on the grounds of environmental and climate risk. Over 50 billion kroner (USD 60 billion) in fossil fuel company stocks were divested by 180 organizations on the basis of incompatible business models with the pledge by the world's governments to tackle global warming ("World's biggest," 2015).

4. Insight for Benefit Sharing in Resource Development

The success of Norway's GPFG and implementation of benefit-sharing mechanisms that support sustainable development can be credited to its strong legislation in support of diversifying the economy and revenue sharing, as well as the strong role of the federal government in regulation and development of the oil industry. The Norwegian government led the development and management, as both owner and regulator, in all aspects of the industry.

Norway's government also increased the capacity to manage risk through fiscal policy, the GPFG, and the appropriate rate of capture of resource rents by government on behalf of the broader society. A main component of the GPFG requires that decreases in natural capital are to be offset by increases in other forms of capital: human, producer or financial. GPFG supports the diversification of the Norwegian economy, and this diversification has reduced risk by allocating investments among various financial instruments and capital.

[3] Environmental protection expenditure (EPE) is defined as economic resources devoted to activities aimed at the prevention, reduction and elimination of pollution or any other degradation of the environment. Resource management expenditure (RME) is defined as economic resources aimed at preservation and maintenance of the stock of natural resources and hence safeguarding against depletion (Statistics Norway, 2014).

Alberta Heritage Savings Trust Fund

Energy, specifically the oil and gas sector, has powered Canada's economy, driven business investment, and influenced government policy. Oil and gas activity accounts for less than 10 per cent of the country's economy; however, it holds a much larger share of exports (30 per cent) and business spending (30 per cent) (McKenna, McCarthy, & Jones, 2015). Alberta accounts for approximately one-third of Canada's economic growth: prioritizing the sector in this way has promoted a heavy reliance on the oil market. This case study of the Alberta government and the Alberta Heritage Savings Trust Fund provides cautionary lessons on overreliance on one resource sector and the use of economic returns without strong legislation, and strategic, long-term thinking around related benefits for the region

1. Alberta Economy and Oil and Gas Development

Alberta's economy pivots on the well-being of the oil and gas sector, which accounts for roughly 10 per cent of Canada's GDP and approximately 30 per cent of its exports (NRCan, 2015). In the first half of 2015, the energy sector accounted for 30 per cent of Canada's economic growth and Alberta was still the fastest-growing province in the country (RBC, 2015; Parkinson, 2014).

The oil and gas sector has been a driver in business capital investment and critical to economic stability in Alberta since the 1940s, when a major oil field was discovered near Edmonton. Since that time, Alberta's economy has largely reflected the price of oil, rising significantly during the 1967 Oil Embargo, the 1973 oil crisis, and the 1979 energy crisis and dropping during the 1980s global oil surplus (Bott, 2004). Today, the energy sector makes up nearly 30 per cent of Alberta's economy and direct revenues from energy royalties account for more than 20 per cent of the provincial government's revenue base. The spinoffs from petroleum production have allowed Alberta to develop many other industries, in particular oil patch-related manufacturing and financial services. The provincial economy is still heavily reliant on the oil and gas sector and is currently being affected by plunging oil prices. The province has indicated that the 2015–16 provincial budget is projected to run a $6.1 billion deficit (Alberta Finance, 2015b).

Oil and gas extraction has long been a priority of the Alberta government, and considerable investment and political effort have been directed toward growth in this sector, in part by removing regulatory safeguards for the protection of environmental and social systems that pose hurdles for the resource industry. Although the resulting growth has been considerable, the lack of a long-term plan has also resulted in negative impacts on sustainability and financial security in the province. The following section highlights the Alberta Heritage Savings Trust Fund as a mechanism originally established for long-term economic prosperity but without adequate measures to ensure achievement of these goals in the long term.

2. The Alberta Heritage Savings Trust Fund

The Alberta Heritage Savings Trust Fund (AHSTF) was created via legislation in 1976 to steward revenue from Alberta's non-renewable resources by providing the greatest financial returns on revenue for current and future generations. The AHSTF was established with the goal of setting aside non-renewable resource revenues during a period when Alberta's oil reserves were thought to be limited, and money would be needed to build and diversify the provincial economy. The AHSTF diverts a portion of annual resource revenues from the government's general revenue fund into a long-term fund aimed at ensuring returns for future generations (Finance Alberta, 2015a). The fund today produces income that supports government programs essential to Albertans, such as health care and education and infrastructure (Finance Alberta, 2015b).

During the first decade, the AHSTF grew steadily, with an annual investment of 30 per cent of provincial energy revenues. However, in 1987, when the fund was valued at $12.7 billion, the province faced a substantial budget deficit. At that time, transfers from resource revenues were suspended and succeeding governments largely spent Alberta's energy revenues (Alberta, 2015b). After 1987, no deposits were made until nearly two decades later, when deposits resumed briefly between 2006 and 2008. A brief comparison of the AHSTF and a similar fund set up in Alaska, the Alaska Permanent Fund, created in the same year (1976) is made in box 1 below.

Box 1. Alaska Permanent Fund

In 1976, the Alaska legislature established a constitutional amendment that let voters approve or deny diverting 25 per cent of oil revenues to the fund. The Alaskan government was also prevented from touching the fund's principal. In addition to the constitutionally mandated 25 per cent, the state later passed statutory requirements that raised the contribution rate on new oil and gas fields. Alaskan law, the 1980 Permanent Fund Act, required that 50 per cent of all newer mineral lease rentals, royalties, royalty sale proceeds, net profit shares and other related revenues from the same be deposited into Alaska's fund.

A key difference between the Alaska Permanent Fund and the AHSTF is the institutional control and safeguards that exist for the Alaskan Fund. The reason for the difference has been attributed to the rules of the two funds. For 27 of the 39 years that the AHSTF has been in place, Alberta's government failed to set aside the originally planned 30 per cent of annual oil revenues. Minimal investments and low investment returns have led to a plateau in the fund's value and as of December 31, 2012, the AHSTF was valued at $16.4 billion, not much more than its value in 1987 ($12.7 billion) when the province stopped making deposits linked to resource revenue. In comparison to the Alaska Permanent Fund, from 1981 to 1985 the legislature made special appropriations totalling $2.7 billion.

In 2011, Alaska's Permanent Fund's assets were valued at $40.1 billion; in comparison, the same year the Heritage Fund was less than half the size at $14.2 billion (Alberta Heritage Savings Trust Fund, 2011; APFC, 2012).

As described in the previous case study, Norway's Government Pension Fund Global (GPFG) is also comparable to the AHSTF. It too is meant to facilitate government savings to finance rising public expenditure and to support long-term considerations in the spending of government petroleum revenues. Norway is similar in size and population to Alberta, with an oil-rich economy; however, despite being set up over a decade later (1976 vs. 1990), the Norwegian fund's market value stands at CAD$1-trillion, over 65 times the size of Alberta's Heritage Savings Trust Fund.

In recent years, Alberta's rising government program spending and overreliance on the oil sector accentuated the government's deficit, and correspondingly, reduced its commitment to the AHSTF. Between the 2004–2005 and 2014–2015 fiscal years, Alberta's spending increased by 98.3 per cent (Finance Alberta, 2015a). Between 1977 and 2011, the AHSTF earned $31.3 billion on its assets; however, the Alberta government withdrew $29.6 billion from the fund (Alberta Heritage Savings Trust Fund, 2011).

3. Outcome and Impacts

Economic Impact

Despite the substantial revenue Alberta has generated from the oil economy, the province has saved little of these resource proceeds. Over the long term, the AHSTF is severely lacking when compared with similar funds in Alaska and Norway. Since the fund's inception, the province has transferred 5.4 per cent of all resource revenues and Alberta has used almost all of the earnings of the fund to finance current operations.

Alberta's fiscal history has been inevitably tied to natural resource revenues and the international price of oil; therefore, Alberta's government budget tends to be at a surplus when natural resource revenues increase as a share of government revenues and a deficit when those revenues decrease. The challenging conditions afflicting Alberta's economy contributed to a more pronounced hit to economic growth in early 2015. The economy contracted by 1.3 per cent in 2015, with a projected budgetary deficit of $5.9 billion (RBC, 2015). While the AHSTF was initially established to help build long-term economic stability and sustainable revenue from a non-renewable resource, the lack of fiscal management and legislation related to the fund has resulted in a failure in revenue generation and a loss of the desired economic stability for the province.

In part due to the failures of the AHSTF, the province of Alberta hasn't established the right kinds of economic safeguards to ensure returns for itself from industry. The oil sector is over-subsidized, and the government is not making enough revenue from the industry. Between 1995 and 2004, Alberta's oil sands production grew 133 per cent, while revenues from oil sands royalties shrank by 30 per cent. Revenue per barrel of oil equivalent (BOE) from oil sands also declined by over two-thirds from $1.60 (1995) to 50 cents (2004) (Taylor, 2006). The decline was attributed to the royalty regime for oil sands projects implemented in 1995. This regime imposed a 1 per cent royalty on gross project revenue until the developer has recovered all project costs plus a return on investment (Sawyer & Stiebert, 2010). Only then does the royalty increase to 25 per cent of net revenue. In 1999, the Oil Sands Generic Royal Regime set rates and established the provincial accelerated capital cost allowance for oil sands projects to encourage development. In recent years, the Alberta government has adjusted subsidies and royalty rates in response to oil prices and trends. The creation of a new Alberta Royalty regime was implemented in 2009 and raised the maximum royalty rates to 50 per cent up from 35 per cent (Sawyer & Stiebert, 2010; Alberta Royalty Review Panel, 2007).

Box 2. Subsidies in the Oil Sector

From an environmental standpoint, oil prices and subsidies mispresent the societal cost of a barrel of oil extracted, leading to higher activity levels and more environmental degradation (Sawyer & Stiebert, 2010). Alberta has a mix of different types of subsidies, with royalty relief (46 per cent) and tax breaks (25 per cent) comprising the largest proportion of the total. The Sawyer & Stiebert examined the role subsidies play in the Canadian economy, and conclude that government balances are lower, even with higher corporate taxes and royalty payments. As well, subsidies drive fossil fuel production and hence greenhouse gas emissions. Nationally, with subsidies, emissions are approximately 2 per cent higher than they would be otherwise. In Alberta, a 5 per cent increase in emissions was attributed to subsidies (Sawyer & Stiebert, 2010).

There is also the risk of a growing subsidy obligation on governments; with oil production predicted to more than double between 2010 and 2020 (with or without subsidies in place) the share of subsidy relative to overall government expenditure could grow. In the simple model created by Sawyer & Stiebert, scaling up current subsidies to future production more than doubles the subsidy as a share of government expenditures. Government balances are then worse off, as the tax and royalty increases are more than offset by the subsidies paid. A total of 63 subsidy programs aimed at the oil industry (18 in Alberta), estimated that provincial and federal governments are providing over $2.8 billion in subsidies to the oil sector in Alberta, Saskatchewan and offshore Newfoundland and Labrador (Sawyer & Stiebert, 2010).

Social Impacts

The purpose of the fund was to support economic development and social investment, and is linked to social programs such as health care, education and infrastructure. However, Alberta has no legislative or constitutional requirement for the government to save resource revenues for future generations. A lack of safeguards on the Heritage Savings Trust Fund could be seen as increasing the risks to core social programs due to their reliance on the energy sector and these funds. In comparison, despite Norway's vulnerability to oil fluctuations, short-term economic turbulence does not appear to affect long-term economic and social planning, which includes tax cuts and no significant changes in governmental operations. In contrast, Alberta continues to struggle to make up for a shortfall caused by the drop in oil prices and capture revenues to support welfare programs.

Environmental Impacts

Alberta has not optimized its revenue from the province's finite oil and gas resources, and has been unsuccessful in creating an adequate financial endowment—either for future generations or for protecting the environment as originally planned through the AHSTF. Oil and gas extraction has long been a priority of the government of Alberta, and this prioritization has resulted in the removal of barriers to resource extraction including those mechanisms providing regulatory or other safeguards to the environment. Alberta's low royalty rates are accelerating the pace of oil sands development, which has resulted in negative environmental impacts, including deforestation, water quantity and quality, ambient air quality, and increased GHG emissions (Gosselin et al., 2012). Furthermore, the provincial budget for Alberta's Ministry for Environmental Policy and Sustainable Resource Development has been steadily decreasing, down to $717 million (2015–2016) from $901 million annually (2014–2015) (Finance Alberta, 2015a).

In general, the focus on the oil industry by the provincial government has resulted in considerable environmental degradation and carbon emissions, while the failures of the AHSTF have meant fewer resources available for environmental protection to offset these environmental costs.

4. Insight for Benefit Sharing in Resource Development

The economic impact of the AHSTF has been limited, and its current role appears to be to finance ordinary government expenditures (McMillan & Warrack, 1992; Milke, 2008; Warrack, 1992, 2005). Alberta continues to struggle to make up for a shortfall caused by the drop in oil prices and capture revenues, continuing an ongoing structural deficit (RBC, 2016). In the absence of capital investment, the AHFST cannot sustain this level of investment income, especially as inflation erodes its purchasing power (McMillan & Warrack, 1993; Warrack, 2005).

The case of the Alberta government and the Alberta Heritage Savings Trust Fund provides cautionary lessons on overreliance on one resource sector and the uncontrolled use of economic returns without strategic and long-term thinking. The overreliance on oil and gas has left the province of Alberta vulnerable to global oil prices and markets, and highlights the need for diversifying and balancing the economy. The Alberta government's failure to reform resource-management strategies and investments (the fund in particular) has further encouraged the development of the sector at the cost of environmental and social safeguards. The lack of legislative or constitutional requirements for investment of returns has limited the effectiveness of the AHSTF to save resource revenues for future generations.

Columbia Basin Trust

The Columbia Basin Trust (CBT) is an institution established to facilitate community engagement and enable regional benefit-sharing mechanisms in the context of hydropower generation in the Columbia River watershed. The CBT case offers insight into common features of regional trusts, and illustrates a case where British Columbia invests a substantial amount of funding and uses profits from these investments to support funding programs, research, and community/economic development initiatives that benefit the region.

1. Background: The Columbia River

The Columbia River is an important river in western North America, providing drainage for hundreds of rivers, creeks and streams, and covering an area greater than 670,000 km^2 (US EPA, n.d.). It is the fourth-largest river in North America and flows over 1,900 km from its source in the Canadian Rockies through the western United States to the Pacific Ocean. Fifteen per cent of the river is located in Canada, and both the Canadian and the United States portions of the watershed have been heavily developed for hydroelectricity, flood control, irrigation and recreation (Penfold, 2012).

The British Columbia Hydro and Power Authority (BC Hydro), a provincial crown corporation, manages hydroelectricity on the Columbia River and is the third-largest electric utility in Canada. The province obtains 30 per cent of its electricity from hydroelectric generating plants, 80 per cent of which are produced by stations on the Columbia and Peace Rivers (Égré, 2007). Facilities located in the Columbia Basin region include four major hydroelectric dams (all built before 1984), two water storage dams, and seven smaller hydroelectric dams. Working with local communities, British Columbia created the Columbia Basin Trust (CBT) to recognize the continuing impacts from historical water management and hydropower development in the Columbia Basin and to address outstanding social issues using revenue and equity sharing.

In 1961 the Government of Canada[4] and the United States signed the Columbia River Treaty (CRT) with the aim of creating a structure for the cooperative use of the Columbia River and to efficiently provide both countries with greater hydroelectric power and flood control. As part of the agreement Canada was required to build three large storage dams that would provide flood control and power benefits downstream in the United States. In return, Canada received an upfront fixed payment representing the discounted present value of the flood control benefits, as well as half of the additional electricity generated due to the added storage and flow regulation (Égré, 2007). As a result of the treaty, three dams were built on the Canadian stretch of the Columbian River: Duncan (1968), Keenleyside (1969) and Mica (1975). The treaty also allowed for the United States to build a fourth dam (Libby, in 1973) with a significant portion of its reservoir located in southeastern British Columbia.

The focus of the CRT was on hydroelectricity and flood control, and the process included very little consultation with affected communities. As a result, it includes few provisions for additional impacts, including fish protection, irrigation and other environmental concerns. The main impacts of these dams were:

[4] Obligations were later transferred to the province of British Columbia in 1963 under the Canada-British Columbia Agreement.

- 2,300 people were displaced by the reservoirs and facilities.
- 60,000 hectares of high-value, valley-bottom land was flooded.
- Indigenous archaeological and burial sites were submerged.
- Areas that were critical for the culture, economic and environmental well-being of the region were claimed for hydroelectric generation.

In the early 1990s, the sale of the first 30 years of British Columbia's share of downstream benefits through the treaty was set to expire. Residents, local officials and representative from regional districts and Indigenous groups came together to coordinate efforts and form the Columbia River Treaty Committee to approach the Province of British Columbia. They sought to negotiate that funds be allocated to the region to represent a fair share of ongoing benefits and that regional organizations be included in the management of those funds. The negotiations led to the creation of the Columbia Basin Trust Act, which in turn created the Columbia Basin Trust.

This case study on the Columbia Basin Trust illustrates several approaches that maximize the efficiency of equity funds to support revenue sharing and provisions that foster the active involvement of community organizations in the project-affected area.

2. The Columbia Basin Trust

The Columbia Basin Trust (CBT) was created in 1995 to "support the efforts by the people of the basin to create a legacy of social, economic and environmental well-being and to achieve greater self-sufficiency for present and future generations" (CBT, 2015). The CBT was established as an institution to facilitate community engagement and enable regional benefit-sharing mechanisms for communities in the context of hydropower generation projects.

The roles and responsibilities of BC Hydro and the CBT are established in a number of agreements and legislation, including the 1995 Financial Agreement and the Columbia Basin Trust Act. The Trust acts on two core functions:

- Invest capital and manage the assets of the Trust.
- Use the income generated to deliver benefits to the basin (Delivery of Benefits).

The CBT is governed by a binding agreement that formalizes a series of benefits for residents of the basin, including:

- $276 million to finance power project construction;
- $45 million to be used as an endowment for the CBT; and
- $2 million per year from 1995 to 2010 for operations.

The CBT Investment Program invests the existing $321 million endowment in power projects, private placements and market securities. The program's goal is to generate a predictable, sustainable and appreciating income stream to fund CBT's current and future Delivery-of-Benefits activities and corporate operating expenses.

The Trust is mandated under the Columbia Basin Management Plan to include the people of the basin in planning for the management of the assets and to work with affected parties to coordinate activities related to the purpose of the Trust.

Using the income earned through the investment program, both from the endowment and power project investments, CBT's delivery-of-benefits activities support programs and initiatives that focus to strengthen the economic, social and environmental well-being of the basin and its community (Table 4).

Table 4: Summary of the CBT's investments and delivery of benefits

Investments	Delivery of Benefits
Non-power portfolio covering a range of investments from business loans to deposits and securities to real estate. Initial funding investment $45 million (Basin Fund, contributed by the Province of British Columbia). 50% ownership of three hydroelectric project in the basin. 50% ownership of development rights of a fourth project (Legacy Fund). Columbia Power Corporation is the other half owner of these projects and manages the project on behalf of the partners. Projects: Brilliant Dam. Arrow Lake Generating Station, Brilliant Expansion. Waneta Expansion.	Net income generated from its investment to fund its corporate operations and deliver benefits programs. Earned revenues overs $29 million (2014/15). In 2014/15, CBT distributed $22 million in funding to programs and initiatives. Program areas include: environment; economic development; social; education and training; youth initiatives; arts, culture and heritage.

3. Impacts and Outcome

Economic Impact

Over the past year (2015–16), the Columbia Basin Trust earned $29 million in revenues (8 per cent return on power projects) and was able as a result to distribute nearly $22 million in programs, initiatives and services to communities and residences of the basin (Figure 6; CBT, 2015). Due to the ongoing success of the fund and active involvement of the community, the forecast funds available for distribution through the Delivery-of-Benefits programs and initiatives are to increase significantly to $47 million in 2016/17 and $48 million in 2017/18.

The Trust works closely with people who live in the basin to respond to the needs communities in the area. Using the income earned from the Investment Program, the Trust supports programs and initiatives that identify social and economic priorities, and implement mechanisms to address them. In 2014/15, $5.5 million was distributed to Economic Initiatives in the Columbia Basin, $6.9 million to Community Initiatives, $2.6 million to Social Initiatives and $3.6 million to Water and Environment Initiatives (Figure 6) (CBT, 2015).

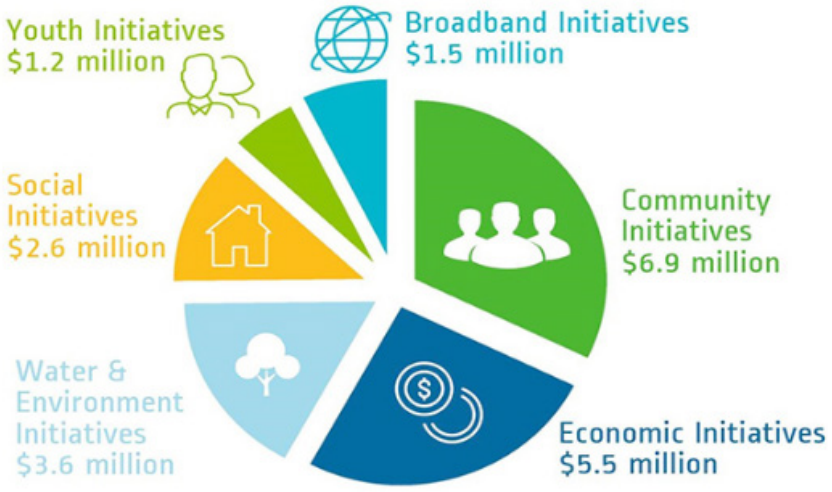

Figure 6. Distribution of funding and amount into initiative areas.

Source: Columbia Basin Trust, 2015. .

Building on the success of the CBT, British Columbia has created a series of development trusts in different regions of the province. Current trusts in the Province of British Columbia include:

- **Nechako-Kitamaat Development Fund Society:** Supports sustainable economic activity in northern communities affected by the Kitimat-Kemano project and by the creation of the Nechako Reservoir.
- **Northern Development Initiative Trust:** Independent regional economic development corporation focused on stimulating economic diversification and job creation in northern and central British Columbia. Lease of BC Rail assets, managed by a regional body.
- **Southern Interior Trust:** Intended to grow and diversify the economy of the southern interior of British Columbia through economic development initiatives in 10 sectors.
- **Island Coastal Economic Trust:** Initiates strategic investments in regional economic priorities such as forestry, transportation, tourism, mining, economic development, small business, agriculture and energy to help diversify the economy of central and northern Vancouver Island and the Sunshine Coast region (created in 2006, $50 million).

Social Impact

Up until and throughout the treaty negotiation process, the lack of consultation left residents of the Columbia Basin feeling that their concerns and needs were not adequately addressed, particularly through fiscal imbalance and equity of economic development opportunities across the province. The CBT works with residents of the Columbia Basin to strengthen the well-being of the region by focusing on local priorities and issues. Collaborative relationships and partnerships have been established across the basin, and residents are involved in community decision making. In 2014/15, the CBT delivered $6.9 million to community initiatives, $2.6 million to social initiatives and $1.2 to youth initiatives (CBT, 2015).

Box 3. Examples of Community Benefit Projects supported by the CBT.

The Kinship Connection Centre project involves renovating an existing building so it can house multiple community non-profits, including the local youth society, arts council, mental health and addictions counsellor, and other preventative health organizations.

The Blue Lake Forest Education Society project involves piloting a four-day summer camp for Basin youth with special needs.

In 2014/15, 28 projects received support from the Trust's Social Grants, including the Kinship Connection Centre (Nakusp Chapter of Options for Sexual Health) and the Blue Lake Forest Education Society (Box 3). The Trust also works to strengthen its relationships with the Indigenous people of the basin by increasing cultural literacy within the Trust, and working with the Indigenous community to define appropriate support and with ongoing grant program support.

Environmental Impact

Hydropower generation projects affect the environment in many ways, including changes in the hydrological regime of rivers, lakes, streams and riparian areas, and consequently the loss of wetlands and upland areas, affecting wildlife habitat. The CBT works to maintain a resilient, biodiverse landscape that can support the human and ecological needs that depend upon it. Through the Water and Environment Initiative, the Trust supports research and outreach projects that contribute to the five goals established by the CBT (2015):

- Water: Contribute to safeguarding and enhancing the quality and availability of water in the basin for a variety of human and ecological needs.
- Ecosystems: Strengthen basin-wide and local efforts to maintain and enhance aquatic and terrestrial ecosystem function and native biodiversity.
- Resilience and climate change: Enhance basin-wide efforts to reduce greenhouse gas emissions and prepare for and adapt to changing climatic conditions.
- Environmental education and stewardship: Engage basin residents in opportunities for lifelong environmental education and stewardship that inspires ecologically informed decisions and actions.
- Environmental capacity building to strengthen communities: Support communities and organizations in developing and maintaining the capacity to effectively address basin-wide and local environmental challenges.

The CBT partners with existing groups across the basin to deliver a range of program, including environmental research and monitoring. The Trust delivered $2.87 million to the Water and Environment Initiatives in 2014/15 (CBT, 2015). Some examples of environment grant program recipients in 2014 include: Columbia wetlands water bird survey project (Wildsight Golden Organization); an invasive fish removal and monitoring project (Isabel Ohanjanian); youth environment education camp (Elk River Watershed Alliance); expanding the accessibility of an outdoor classroom to children and families of the Akisqnuk First Nation (Eva Joseph Learning and Cultural Society); and improved travel corridor for blue-listed Rocky Mountain bighorn sheep (Rocky Mountain Trench Natural Resources Society) (CBT, 2015).

4. Insight for Benefit Sharing in Resource Development

The Columbia Basin Trust has proven to be an effective benefit-sharing mechanism for hydro revenue in the region. Its success largely comes from the involvement of residents from the affected area, the formalized legislation that governs the agreement, and effective investment management. The CBT is a partnership agreement between the province, industry and local communities, with the inclusion of legally binding financial benefit sharing between resource industry and the local communities. The CBT also exemplifies several approaches to maximize the efficiency of such funds, e.g., establishing provisions that foster the active involvement of community organizations in the project-affected area and considerable locally based initiatives that directly address the needs of local populations in the area.

The CBT illustrates the importance of establishing and implementing sound institutional procedures to manage funds, while creating institutional mechanisms for engagement and community-based capacity for regional development. The priority of the CBT is social, economic and environmental projects that range from hydro's direct impacts to overall regional well-being.

Great Bear Rainforest Agreement

The Great Bear Rainforest Agreement was established by the Province of British Columbia, logging companies, Indigenous communities and environmental organizations for the sustainable management of a high-value, high-biodiversity forest in coastal British Columbia. The agreement was developed after years of conflict in the area and demonstrates multiple benefits from a multistakeholder approach to resource planning and management.

1. Background: The Great Bear Rainforest

The Great Bear Rainforest covers 6.4 million hectares of BC's north and central coast and is home to one-quarter of the world's coastal temperate rainforest. There are roughly 35,000 people from small coastal communities including 27 Indigenous communities whose traditional territory overlaps with parts of the region. The area is home to over 300 birds and 65 mammals, including grizzly bear, grey wolf and spawning grounds for over 20 per cent of the world's wild salmon population. (Esbjörn-Hargens & Zimmerman, 2009).

Commercial logging has a long history in Northern British Columbia and the Great Bear Rainforest, traditionally conducted by broad swath clear-cuts with a large impact on these old-growth forests. Ninety five per cent of forests in British Columbia are publicly owned, and the province allocates forest tenures and regulates forest operations and practices (Armstrong, 2010). Logging in the Great Bear Rainforest has traditionally been an important part of the economy and culture of the region.

In the mid-1990s, theWorld Resources Institute (WRI) completed a satellite analysis of global forest cover. The report found that only one-fifth of the world's large intact forests remained in natural condition and classified the coastal rainforests of British Columbia as rare and threatened (Armstrong, 2010). Correspondingly, in 1995, a number of environmental groups started a campaign to protect the critical coastal rainforest habitat of the Great Bear Rainforest. Greenpeace, ForestEthics, Rainforest Action Network, and the British Columbia chapter of the Sierra Club of Canada joined together to promote conservation and sustainable management through non-violent direct action. The group's protests and boycotts against logging companies targeted retail customers, including Home Depot and Lowe's and capitalized on the movement for more sustainable forest products. These protests resulted in retail companies demanding more sustainable solutions from logging companies, which resulted in a groundbreaking collaboration between environmental groups and logging companies to find these solutions (Smith, 2010).

At the same time, Indigenous communities in British Columbia were gaining increasing authority over their rights and title to their lands (Smith, 2010). In 1997 the landmark case of Delgamuukw v. British Columbia ruled that Indigenous title is different from mere land use and occupation as had previously been defined, but also incorporates Indigenous jurisdictional authority over how the land is used. This ruling acknowledging Indigenous collective ownership included a cultural relationship to the land (First Nations Studies Program, University of British Columbia, 2009). In the spring of 2000, nine Indigenous communities from the north and central coast, and Haida Gwaii formed the Turning Point Initiative, supporting the re-emergence of a sustainable economy while taking into account the cultural and ecological diversity of the Great Bear Rainforest (Coastal First Nations Great Bear Initiative, 2015). Indigenous communities were asserting their rights and the need for sustainable management and ecological protections of the goods and services they rely upon.

Resolution came from bringing different perspectives to the table and looking for joint solutions that meet the multiple interests in the region. In 1999, logging companies and environmental groups agreed to form a

bilateral working group called the Joint Solutions Project. This enabled communications and negotiations, and facilitated a broader dialogue with Indigenous people, the British Columbia government, labour groups and local communities (Smith, 2010). By the end of 2000, forestry companies had placed a moratorium on logging in key areas and environmental groups suspended their active market campaigns. Constructive dialogue was occurring in the Joint Solutions Project, the Coastal First Nations Great Bear Initiative, and the Land and Resource Management Planning tables and eventually led to an agreement for the region.

2. Great Bear Rainforest Agreement

After over a decade of campaigning and six years of negotiation, the Great Bear Rainforest Agreement was signed on February 7, 2006. This comprehensive package was announced by the BC Government, environmental groups, logging companies and Indigenous communities and resulted in the protection of 5 million acres of rainforest land and a shift to forest management using a new ecosystem-based approach. The agreement included four key elements: rainforest protection, improved logging practices, the involvement of Indigenous communities in decision-making, and conservation financing to enable economic diversification. The final agreement committed to implement ecosystem-based forestry management for the entire Great Bear Rainforest by 2009 and to ban logging in 33 per cent of the area.

The agreement was followed, in 2007, by a landmark conservation financing agreement that brought $120 million to the coastal Indigenous communities to support conservation management and economic development in the region. This included two Coast Opportunity Funds based on the recognition that a sustainable economy is vital to conservation efforts. The Conservation Fund is a permanent endowment fund supporting conservation efforts to maintain the Great Bear Rainforest's ecological health. The Economic Development Fund is shorter-term, aimed at creating sustainable businesses and jobs (Smith, 2010). The Costal Guardian Watchmen Network also arose from the agreement, a program that monitors the health of the Great Bear Rainforest resources, and impacts to its ecological and cultural diversity. This network supports local Guardian Watchmen programs by strengthening neighboring First Nations to contribute to a collective implementation of land and marine use plans, and other sustainable resource management initiatives, as well as monitoring the health of significant food, social and ceremonial species throughout the territory (Costal First Nations Great Bear Initiative, 2017).

The Great Bear Rainforest Agreement is considered to be among the most comprehensive conservation achievements in North American history (Armstrong, 2010). All of the Indigenous communities in the area approved the agreement, which gave them greater decision-making control over resource development in their traditional territories (Esbjörn-Hargens & Zimmerman, 2009). The agreement protects a network of ecologically and culturally significant areas that represent the full range of habitat types, focusing targeted protection on the most important areas for habitat and wildlife, and working with conservationists and Indigenous communities to identify these areas. The agreement utilizes the then-groundbreaking, ecosystem-based management approach, prioritizing economic and community objectives in areas that can best sustain them, and reserving greater environmental protections for more sensitive areas. The approach matches ecosystem-based management plans with socioeconomic strategies that generate income, enhance cultural and community health, and support sustainable livelihoods (Smith, 2010).

A key component of implementation of the Great Bear Rainforest Agreement is the use of formal institutions and legislation in lieu of voluntary mechanisms. The Land and Resources Forum is a government-to-government forum with representatives of Indigenous communities and provincial government that makes the decisions for how the Land and Resource Protocol Agreement will be implemented (Coastal First Nations Great Bear Initiative, 2015). Similarly, the Coast Opportunities Funds were both created with

mandates to guide or implement components of the agreement. They also embedded goals and process requirements into the terms of ongoing relationships among governments (Smith, 2010).

Finally, new legislation and regulations were created by the province to bind the agreements. These include a new "conservancy" designation that provides for Indigenous uses, and establishes ecological values as primary conservation objectives. In 2009 British Columbia formally adopted ecosystem-based management practices as part of its legislation to provide a legally binding forest management framework for the Great Bear Rainforest (Smith, 2010).

Implementation of the Agreements

In 2009, half of the region's rainforests were regulated under new protected areas and stricter logging regulation. A five-year plan was put in place to use ecosystem-based management to ensure both low ecological risk for the rainforest and a high quality of life in coastal communities. In early 2014, after three years of research, negotiations, and planning, the Joint Solutions Project delivered a set of recommendations outlining increased conservation and the future scope of logging. Over the course of 2014, the province and the region's Indigenous peoples reviewed the proposal and identified additional measures to support communities with new training, jobs, and revenue opportunities (Armstrong, 2010).

On February 1, 2016 the governments of Indigenous peoples and British Columbia, with the support of ForestEthics Solutions, Greenpeace, Sierra Club BC and five forestry companies announced the completion of the Great Bear Rainforest Agreement, protecting 85 per cent of the region's old-growth forests. The agreement allows logging in the remaining 15 per cent subject to the most stringent commercial logging standards in North America. The final accord required the completion of 26 government-to-government agreements between British Columbia and Indigenous communities on how the agreement will be managed. Companies gain a valuable green stamp of approval to market their products and have the certainty of partnerships with the local Indigenous communities. Implementation of the Great Bear Rainforest Agreement is being watched closely by conservation groups, forest companies, Indigenous communities and the general public. It is a model for achieving multiple benefits from an area with strong interest groups and valuable land.

3. Impacts and Outcomes

Economic Impacts

The Great Bear Rainforest Agreement has resulted in economic benefits for both Indigenous peoples and forest companies operating in the area. A key part of the Great Bear Rainforest negotiation process was aimed directly at finding economic benefits from conservation action. The result was a new initiative that built financing capital to support conservation-related activities and businesses. The Nature Conservancy and the Tides Canada Foundation raised $60 million in funding from foundations and private donors, and public agencies matched the contributions. The result was a $120 million fund for Indigenous conservation management and new sustainable development projects. The financing meant more than simply injecting money into the local economy: just as importantly, it linked new investments with clear and lasting conservation commitments (Smith, 2010).

These new investments supported innovative and sustainable businesses, and increased conservation-management capacity in Indigenous communities. The two Coast Funds began issuing awards in October of 2008. To date $24,804,583 in conservation funding has been approved for 118 conservation projects.

This funding has leveraged $20,454,107 to attract a total of $45,258,690 to the Great Bear Rainforest and Haida Gwaii since 2007 (Coast Opportunity Funds, 2015).

Similarly, the Coast Funds have approved $37,171,174 in economic development funding toward 135 projects. This funding has leveraged $125,213,495 to attract a total of $162,384,669 to the Great Bear Rainforest and Haida Gwaii since 2007. They have supported projects including archeological training, management planning, ecotourism development and transportation infrastructure investment. Projects are aimed at addressing community needs while maintaining the conservation value of the region.

In addition to the direct investment in communities themselves, the Great Bear Rainforest Agreement had significant benefits for timber companies operating in the region. Although considerable concessions were made to achieve the goal of maintaining 70 per cent of natural levels of old-growth forest, stability and clear rules for implementation helped companies achieve their own goals. After a decade of conflict and considerable public relations risk, forest companies benefited from a stable working environment and the ability to communicate that they were part of an agreement process and the resulting world-class forest management system (Rainforest Solutions Project, 2015).

Social Impact

Successful land management and conservation in the Great Bear Rainforest will only occur if communities are seeing societal benefits from the approach. The true test of success will be the emergence of a sustainable, conservation-based economy and maintenance of cultural values for the region. To ensure that community members have the skills and training they need to take advantage of new economic opportunities, the Coastal First Nations established the Great Bear Training Institute. This virtual school works with existing training and education institutions to identify labour market opportunities and develop tailored training programs that prepare Indigenous members for these opportunities. While the current economic impact can be measured in investments made, long-term social impact can only be measured over time and is a combination of cultural benefits and values and long-term security (Smith, 2010).

The Great Bear Rainforest Agreement has also had far-reaching impacts on the people of British Columbia and the world. The Great Bear Rainforest is a global treasure with great cultural and environmental significance. The landmark agreement for long-term protection maintains these cultural values and paves the way for collaborative, multistakeholder negotiation in similar areas around the world.

Environmental Impacts

Dependent on effective implementation and management, the Great Bear Rainforest Agreement will result in the protection of 6.4 million hectares of temperate old-growth rainforest on British Columbia's coast. The area is one of 11 temperate rainforest regions worldwide and comprises one quarter of the global extent of this ecosystem (Armstrong, 2010; Forest Ethics, Greenpeace, Sierra Club BC, 2010).

Eighty-five percent (3.1 million hectares) of the remote wilderness region's coastal temperate rainforests are now permanently off-limits to industrial logging. The remaining 15 percent (550,000 hectares) of the forest will be subject to the most stringent commercial logging legal standards in North America.

In addition to improved conservation of the area itself, the ecosystem-based management approach adopted in the Great Bear Rainforest has raised the bar for forest management and conservation globally (Armstrong, 2010). While ecosystem-based management approaches have been developed for landscapes and regions throughout the world, the approach for Great Bear Rainforest was novel in several respects.

The area under management was larger than had previously been seen in other areas. The co-management of the process by BC's provincial government and Indigenous peoples provided a new model for land-use planning and conservation management. The leadership role of the industry–environment coalition in defining management in the region had not been seen in previous land-use planning processes (Price, Roburn, & MacKinnon, 2008).

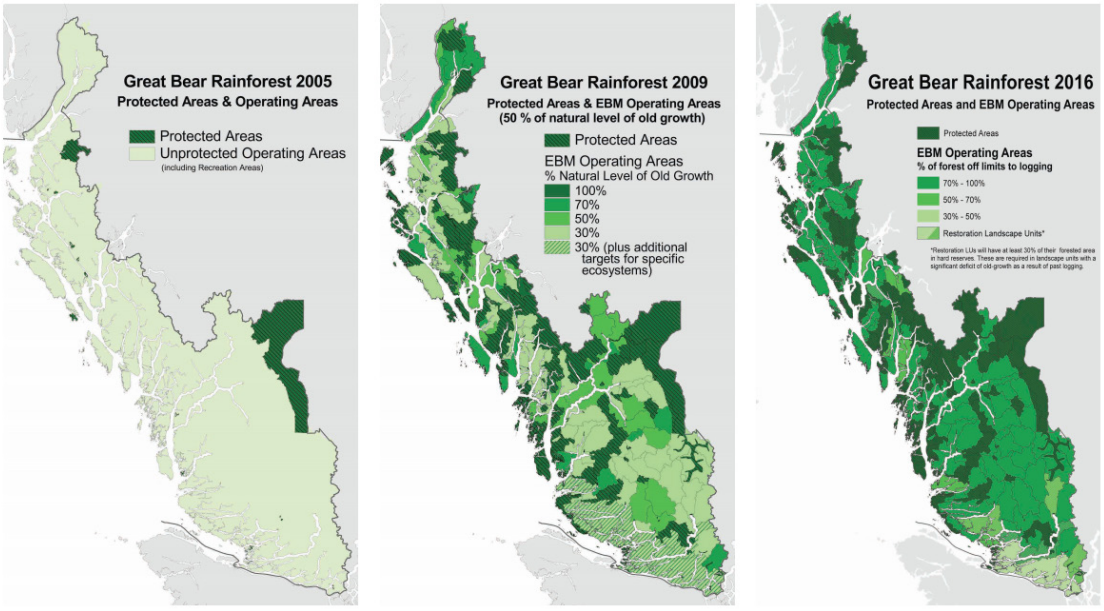

Figure 7. Protected and Operating Areas in the Great Bear Rainforest

Source: Forest Ethics, Sierra Club of BC and Greenpeace, 2010.

4. Insight for Benefit Sharing in Resource Development

The Great Bear Rainforest Agreement was the result of unprecedented cooperation between different interest groups. Although considerable challenges were faced along the way, stakeholders reached a mutually beneficial agreement, with the inclusion of multiple innovations from conservation financing to a new model for involving Indigenous peoples in governance (Fischhoff, 2014). Critical to the cooperation and outcomes achieved was the compelling vision of change. The shared desire for forest management that could sustain ecosystem health, resource use, and community well-being inspired support from the multiple interests at the table and forced collaboration out of conflict (Smith, 2010).

The implementation of ecosystem-based management is a multi-year process based on flexibility and adaptive management, requiring require long-term commitment and support. Shared decision making with Indigenous communities, legislative support and financial frameworks for implementation are critical to ensuring successful implementation. Smith (2010) observes that environmental groups and Indigenous communities lowered barriers and moved the negotiations forward toward the ecosystem-based management framework by focusing on critical habitat, traditional knowledge and conservation science, and through their willingness to come to the table with logging companies. True success in the Great Bear Rainforest Agreement will be measured through the results of forest conservation and socioeconomic development in the region over generations to come; however, the collaboration that has been achieved to date is a model for multiple benefit planning in other areas of Canada and around the world.

Bolivian Sustainable Forest Management Project

Bolivia is one of the fastest-growing economies in South America, where considerable growth comes from extensive oil and gas reserves, forestry and mining. The country's economy and national budget rely heavily on tax revenue from the mining and gas sector—in 2014, oil and gas sales added $6 billion to government reserves (FSRN, 2015). The Bolivian Sustainable Forest Management Project (BOLFOR) and its successor BOLFOR II, are integrated conservation and development projects dedicated to reducing degradation of Bolivia's lowland forests and protecting biodiversity through promoting natural forest management as both a source of income and a conservation strategy.

1. Background: Bolivian Forestry Sector and Economy

Tropical forests cover 48 per cent of Bolivia's land area, roughly 292 million hectares. (Food and Agriculture Organization of the United Nations [FAO], n.d.a). The Bolivian forestry sector contributed USD 431 million to the economy in 2011, which amounted to approximately 2.2 per cent of GDP (FAO, n.d.a; Global Forest Watch, 2014). During the same year, Bolivia was estimated to have 4,442 million metric tonnes of carbon stocks in living forest biomass, and according to FAO data 58.3 per cent of GHG emissions in Bolivia came from land-use change and forestry (FAO, n.d.a).

Bolivian forests weren't threatened to the extent seen today until the mid-1980s. Until that time the country's revenue was dependent on mining in the west, and agriculture was not linked to foreign markets (Müller, 2012). However, increasing pressures on lowland forests occurred due to the implementation of the structural adjustment program aimed at controlling economic stagnation[5] and stronger trade relations favoured the expansion of mechanized agriculture on forest land with production designed for export (Müller, 2012). Existing policies led to disorderly expansion of the agricultural sector, and consequently had negative implications for conservation, resulting in uneven benefit sharing from land and forest use.

Until the mid-1990s, Bolivia's forest sector was defined by highly selective but uncontrolled logging, a poorly enforced legal framework and increased land conversion for agricultural expansion (USAID, 2004; Pokorny, Johnson, Medina, & Hoch, 2012). Fewer than 200 companies had obtained legal rights to the timber on 20 million hectares of public and private lands. All other operations functioned outside of the law, creating an informal sector without established user rights (USAID, 2004). Furthermore, during this time the public sector had minimal regulatory and tax collection functions (USAID, 2004).

Since the 1990s, various innovative strategies have been implemented to successfully maintain ecological and cultural services of the Bolivian forests. Programs include land management and reforms to forest policy involving the recognition of the land and forest rights of Indigenous people and local communities. One such successful program was Bolivian Sustainable Forest Management (BOLFOR), implemented by USAID, the Bolivian government and The Nature Conservancy.

2. The BOLFOR Projects

The premise behind establishing BOLFOR was that governmental regulation was not sufficient to effectively conserve and manage tropical forests, and that there was a growing need for individual property owners to take interest and see an economic return from conserving this resource. BOLFOR's principal goals were to

[5] The introduction of the New Economy Policy (NEP), or structural adjustment program, in 1985 was the first major neo-liberal reform program in Latin America to be successfully implemented by an elected government. The reforms were aimed at controlling economic stagnation, widespread poverty and political instability (IMF, 1998).

promote sustainable forest management and economic development in Bolivia's lowlands, while increasing benefits to Bolivian communities from natural forest management and business practices that support increased forestry exports. Due to the success of the Bolivian Sustainable Forest Management Project (BOLFOR I), which ran from 1993 to 2003, a secondary project was implemented in 2003 (BOLFOR II).

BOLFOR I: Bolivian Government and USAID (1993–2003)

BOLFOR I was an integrated conservation and development project, dedicated to reducing degradation of Bolivia's lowland forests and to protecting biodiversity by promoting natural forest management as both a source of income and a conservation strategy. In the past, the wood products industry in Bolivia has primarily been dedicated to selling a few high-priced species, primarily mahogany (*Swietenia macrophylla*), Spanish cedar (*Cedrela spp.*) and tropical oak (*Amburana cearensis*). A limited number of private companies monopolized the industry and the development of the Bolivian forest sector was directly tied to increased exports because national markets for lumber are limited. BOLFOR I was established as a provider of services to timber companies willing to try sustainable forest management practices (USAID, 2004). Human resource development was a major focus of the project. Through training, courses, workshops, seminars and scholarships, the project helped to form a range of forest management professionals including foresters, biologist and economists. BOLFOR also led to the implementation of a new model for forest management and designed a cost-management and budgeting package to help businesses manage forestry, manufacturing and distribution more efficiently (Jenkins & Smith, 1999).

The BOLFOR project gave rise to forestry management and legislative reform in Bolivia. When the BOLFOR I Project began in 1994, little advancement had been made in legislation and the existing regulatory agency, the Center for Forestry Development (CDF). Along with the absence of any new policy framework, institutional priorities or regulatory system for forest management, there was also little scientific knowledge globally on forest ecology and the impact of logging in the tropics (USAID, 2004).

New institutions were then created to continue implementation of the new sustainable forestry management model, notably the Forest Superintendence, a Bolivian regulatory entity in charge of forest concessions, permits, and supervising forest management (Superintendencia Forestal [SF], 2000). It was also determined that public regulation needed the support of the private sector and Indigenous groups. BOLFOR helped to strengthen the few existing private organizations and was instrumental in creating NGOs and foundations in areas such as environmental law, and forest management, marketing, monitoring and research (USAID, 2004).

Part of reforming the forest sector involved the decentralization of government to the municipal level. The 1994 Popular Participation Law created 311 local governments and allocated 20 per cent of national income to municipal governments (USAID, 2004). Two notable concepts of this reform were:

- Municipal government should respond to its constituency, rather than carry out mandates from the national government.
- Civil society participation can best interact with municipal government through territorial units based on communities for planning and control.

The Forestry Law opened various avenues of access to forest resources for community forestry enterprises through property owners—including communities and Indigenous groups—to control the forest resources on their land. Groups could organize to request a forest concession from municipal forest reserves set aside specifically for this purpose. As a result, community forestry enterprises arose from Indigenous groups,

local social groups and rural communities. Many Indigenous groups in particular had never been involved in forestry activities prior to BOLFOR.

BOLFOR I was pivotal in the reform of forestry management and the development of sustainable forestry management practices. Twelve practices were incorporated in forest management strategies and implemented (USAID, 2004):

1. Selection and marking trees for harvest above minimum diameter.
2. Preparation of a forest management plan defining long-term objectives and actions to be applied to the entire area under management.
3. Appropriate maps prepared and used in planning.
4. Forest inventories to provide an information base for planning.
5. Planning harvest and silviculture activities for area of annual cut: preparation and implementation of operative plans based on commercial census of tree.
6. Limits on multiple entry into the same area of annual cut.
7. Several commercial species in the managed area harvested and marketed.
8. Harvest levels according to rates of growth and yield based on the best information available.
9. Implementation of best industrial practices that contribute to improved product quality.
10. Concrete actions for integral and efficient utilization of forest resources, both in the field and in mills and factories.
11. In case of conflict over use of forest resources, actions taken that tend toward resolution.
12. Prohibition on hunting and capture of wildlife.

The Forest Stewardship Council (FSC) certification system was created in 1994 to credibly identify well-managed forests as the sources of responsibly produced wood products. BOLFOR helped develop standards for tropical forest timber and non-timber products acceptable to FSC, and instituted the certification system in Bolivia, which continues to be the world leader in certified natural forests in the tropics.

The project followed a dual approach to promoting sustainable forest management: working to strengthen a system of voluntary certification that uses market forces to induce sustainable management while simultaneously working with the public sector to enact a forestry regime that grants forest user rights on the condition that the operator manage the forest following established norms and standards.

The result was an acceptance of sustainable forest management, an increase in demand for certified products and an understanding that sustainable forestry could support biodiversity conservation and be economically viable for communities and industry in the region (USAID, 2004). The future of the sustainable forest management model adopted in Bolivia rested heavily on the success of community forestry, which was the primary focus of BOLFOR II, managed by The Nature Conservancy.

BOLFOR II: The Nature Conservancy & USAID (2003–2008)

The development and implementation of BOLFOR II, the second phase of the Bolivia Sustainable Forest Management Project, was jointly funded by USAID, Bolivia and The Nature Conservancy. Both BOLFOR I & II projects developed partnerships with local communities to establish community-based integrated land-use management strategies that promote economic growth and forest conservation. BOLFOR II

prioritized promoting self-sufficiency in local communities, resulting in a reduction of direct external subsidies for the communities' forest management plans and certification for industrial companies while still strengthening the supply of and demand for legally harvested and certified timber (The Nature Conservancy [TNC], 2004).

3. Outcome and Impacts

The BOLFOR projects have demonstrated how forestry can be economically viable for both companies and local communities. BOLFOR I & II have provided valuable insight into a sustainable development model that ensures that ecosystem services are balanced with communities' needs for economic growth and long-term prosperity.

BOLFOR (I & II) achievements included:

- The protection of natural forests and large-scale biodiversity conservation;
- Increased habitat protection for endangered species;
- Local economic development in Indigenous, local and rural communities;
- Increased benefits to Bolivian communities from sustainable natural forest management;
- The promotion of sustainable forestry in Bolivia and internationally.

Some of the most significant outcomes of BOLFOR I & II projects were:

- Development of a model for sustainable management of natural forests in the tropics with an assemblage of procedures, including land-use planning and rotational harvesting concepts.
- Development of a standard for timber and non-timber products acceptable to the Forest Stewardship Council (FSC) and institution of the certification system in Bolivia which:
    - Continues to be the world leader in certified natural forests in the tropics;
    - Includes 9 million hectares certified and under management plans.
- Assistance in the formulation and implementation of the 1996 Forestry Law:
    - A comprehensive system that relies on long-term forest concessions on public land rather than harvesting contracts, as well as connecting forest use to land ownership on private lands. Prior to its enactment, land could be owned by one party while a second party was given contract to harvest.
- Transparency in forest rights and participation.
- Restructuring of the public sector institution charged with implementing the new model.
- Creation of the Bolivian Council for Voluntary Forest Certification (*El Consejo Boliviano para la Certificación Forestal Voluntaria*, or CFV).

Economic Impacts

The adoption of forest management required timber companies to use a wider range of timber species, and when natural forest management strategies were first adopted, exports dropped; however, it was difficult to determine how much of this impact was caused by the global economy at the time (USAID, 2004). In 2002, forest products represented over 8 per cent of the country's exports, valued at USD 88 million, consisting primarily of 64,000 cubic metres of wood products and over 30,000 tonnes of shelled brazil nut

(USAID, 2004). The forest sector employs an estimated 4 per cent of the economically active population, accounting for approximately 100,000 jobs during the time of this project (USAID, 2004). Furthermore, forest user fees amounted to $2.7 million in 2004 (USAID, 2004).

The improvement of forest management and business practices as a result of the BOLFOR projects promoted changes in operations that facilitated lower-impact logging, increased primary and secondary production, and reduced costs in the production of timber and non-timber forest products (TNC, 2004). Following the implementation of BOLFOR I, the forest sector generated nearly USD 1 billion annually in export, amounting roughly to 7 per cent of the country' total export (USAID, 2004). Following BOLFOR I & II projects, the Bolivian forestry sector contributed USD 431 million to the economy in 2011, which amounted to approximately 2.2 per cent of the GDP (FAO, n.d.a; Global Forest Watch, 2014).

Social Impacts

Human resource development was a main focus of BOLFOR, and through training, courses, workshops and scholarships, the program helped form a critical quantity of professionals to support the implementation of the new sustainable forestry management model. Seventeen Bolivians were fully funded to attend graduate school abroad in various disciplines through the BOLFOR training program, including forest economics, ecology, wildlife, and forest management (USAID, 2004). When the USAID (2004) report was completed, all fellowship recipients returned to Bolivia and occupied position in government and non-government organizations, many of whom are still involved in research. BOLFOR installed the technical capacity for communities to maintain the sustainable forestry management program with potential for long-term continuity. Over the term of project implementation, a total of approximately 8,000 individuals were trained, 1,300 of which were women.

BOLFOR directly provided improved and more reliable family-level incomes in forest-reliant communities that the project supported (FAO, n.d.a). Furthermore, the new Forestry Law gave private property owners access to the forest, including the recognition of Indigenous communities' property rights and the opportunity for these communities to manage forest areas. Despite their experience within forested areas, these communities had minimal knowledge of commercial species and logging. BOLFOR helped facilitate training and the transfer of information so that these communities could efficiently implement the sustainable forestry management model and gain FSC certification.

Environmental Impacts

Over the lifetime of the projects, BOLFOR's forestry strategy placed approximately 9 million hectares under forest management plans, enabled FSC certification for 1.2 million hectares and facilitated renewed concession rights for 40 years (USAID, 2004). In the case of Bolivia, areas under approved management plans are relatively well protected from illegal logging, land clearing, forest fires and hunting. Furthermore, ecological reserves are designated in each managed forest to control for minimal human disturbance. These ecological reserves amount to 1 million hectares under environmental protection (USAID, 2004).

As a result of BOLFOR I, a model for sustainable management of natural forests in the tropics was created and a series of procedures were assembled, based on concepts such as land-use planning and rotational harvesting. BOLFOR I helped to develop regulation and technical norms based on principles and criteria similar to those of the Forest Stewardship Council (FSC). FSC certification has become a key driver in efforts toward sustainable forest management, and acts as both a driver and as an evaluation of compliance

and progress. Developed as a response to global deforestation, particularly in the tropics, certification involves the voluntary, third-party assessment of forest management practices to specific sets of standards. Approximately 9 million hectares are now under forest management plans approved by the FSC in Bolivia (USAID, 2004). Furthermore, FSC is the preferred system of certification for major forest products companies globally, and the one that is most recognized internationally by environmental organizations and many Indigenous peoples (Greenpeace, 2011).

The BOLFOR projects have also contributed to the certification process worldwide, Bolivia:

- Has more certified tropical natural forest than any country in the world;
- Holds one of the FSC country initiatives, the second to be recognized worldwide;
- Is second to Sweden in obtaining FSC approval of its standards, and
- Has obtained approval for standards for a non-timber forest product, brazil nuts, in coordination with Brazil and Peru.

4. Insight for Benefit Sharing in Resource Development

One of the most important conclusions that can be drawn from BOLFOR's successes is that government leadership and vision for sustainable development have economic benefits. BOLFOR focused on capacity building and engagement in communities and Indigenous groups. Cooperation among authorities and across the forest and agricultural sectors was obtained, and rural development was promoted through productive activities, employment and local procurement.

The introduction of a model for sustainable forest management was initiated in the absence of a comprehensive legal framework. Interest in the project first came about through market forces, including the FSC certification system. This foundation laid during the beginning of the project helped gain support for the creation of the Forestry Law. In turn, the legal instrument, or Forestry Law, accelerated and formalized the adoption of management practices.

The strong focus on forestry research as part of the BOLFOR projects was critical to FSC certification and paved the way for forest certification in tropical forests around the world. Bolivia communities also benefited from the BOLFOR link to global certification as it resulted in introduction of affiliated benefits such as labour conditions, and accounting and administrative systems that fall outside of the Forestry Law.

Costa Rica: Payments for Ecosystem Service Program

Costa Rica has adopted a mix of economic and regulatory policies to protect its forests and their ecosystem services. The development of innovative ways to finance conservation, including payment for ecosystem services (PES) strategies and market-based policies has allowed for Costa Rica to transition from a country with one of the world's highest deforestation rate to having negative net deforestation (IUCN, 2011). This case study focuses on Costa Rica's Payment for Ecosystem Services (PES) program that was established in 1996 as one of the first institutional payment programs that recognized greenhouse gas mitigation, hydrological services, scenic beauty and biodiversity as valuable and marketable ecosystem services.

1. Background: Costa Rica Forestry Sector and Economy

Approximately 43 per cent of Costa Rica's landscape is covered with forest (IUCN, 2011). Overexploitation and land-use changes have threatened the country's forest stock and auxiliary benefits, and illegal activities such as logging and hunting continue in protected areas despite restrictions. The changing economic landscape, from forest to agriculture and mining, has fragmented habitat, reducing the forest's capacity to maintain complex and healthy ecosystems and Costa Rica's rich biodiversity (IUCN, 2011).

Two of Costa Rica's major sources of income depend on maintaining natural forest functioning and related ecosystem services. The country has developed an industry based on regulating research for new tropical-plant based pharmaceuticals, including protecting biodiversity and sustaining harvesting for scientific and pharmaceutical use, which are important to the economy. Costa Rica also has a thriving tourism industry, for which protecting private and state-run natural forests is critical (Sanchez-Azofeifa et al., 2007).

To address concerns about forest loss, Costa Rica has become a leader in conservation financing and developed a national economy that prioritizes ecosystem services management and biodiversity conservation. The country pioneered market-based policies along with strict command-and-control logging regulations and was the first to both offer payment for ecosystem services and to charge another country for the service offered by its forests in carbon absorption under Kyoto Protocol mechanisms (IUCN, 2011).

More recently, changes in economic policies and the structure of the Costa Rican economy has reduced incentives that were leading to deforestation. Agricultural contribution to GDP declined from approximately 25 per cent in the early 1980s to less than 10 per cent in the late-2000s, complemented by increased revenue from services and tourism industries (World Bank, 2010). Tourism now generates the highest export revenue (approx. USD 1.4 billion) and more than 60 per cent of the population works in the tourism/service sector (IUCN, 2011).

Costa Rica prioritized maintaining functioning ecosystem services for economic development focusing on the following four forest-related services (IUCN, 2011):

- Mitigation of greenhouse gases;
- Protection of water for drinking, agriculture and hydroelectric use;
- Protection of biodiversity for ecological reasons and for pharmaceutical use; and
- Protection of biodiversity and landscapes for tourism.

The country's 1996 "payments for ecosystem services" program (*Pago por Servicios Ambientales*, or PSA) is considered one of the most successful applications of the ecosystem services approach worldwide due to its innovation in conservation financing and the stability of financial and institutional mechanisms to deliver benefits (World Bank, 2005; IUCN, 2011; Porras, Barton, Chacon-Cascante, & Miranda, 2013). Costa Rica's successful application of institutional and market instruments provides the opportunity to evaluate direct payments and market mechanisms as conservation and benefit sharing policy tools, while offering insight into the performance of market-oriented arrangements that ensure the maintenance of ecosystem services as benefits to society.

2. Market Instruments and Payment for Ecosystem Services (PES)

Market-oriented arrangements to create value and transactions around ecosystem services provide incentives to manage ecosystems and to produce the services that promote human well-being (Sommerville, Jones, & Milner-Gulland, 2009). These instruments are recognized for their effectiveness in modifying the behaviour of land users and/or natural resource managers in ways that maintain and promote environmental protection (Millennium Ecosystem Assessment, 2005). There is usually limited structured control over access to benefits from ecosystem services under market-oriented arrangements; however, multiple channels exist for the flow of benefits, where the delivery and exchange of these benefits can be balanced (Wunder, 2007; Brockhaus & Botoni, 2009). Costa Rica has developed five market mechanisms for funding conservation and benefit sharing, benefiting both communities and government:

1. Biodiversity Conservation Trust Fund;
2. Certificate of Environmental Services (CES);
3. Environmentally Adjusted Water Use-Fee;
4. Trading carbon credits; and
5. Payment for Ecosystem Services (*Pago por Servicios Ambientales*, or PSA) Program.

Biodiversity Conservation Trust Fund

The Biodiversity Conservation Trust Fund was largely funded by the Costa Rican government and the Global Environment Facility (GEF) to promote sustainable utilization of biodiversity in various ecosystems in non-state properties. The fund was first used in 1992 to encourage private landowners to manage forests as protected areas in exchange for relief from property taxes (IUCN, 2011).

Certificate of Environmental Services (CES)

The Certificate of Environmental Services (CES) is a financial instrument that attracts private sector investment through the National Forestry Financing Fund (*Fondo de Financiamiento Forestal de Costa Rica*, or FONAFIFO).[6] CES allows the users of ecosystem services to pay the landowner for land-use and/or management actions that provide desired services. The amount paid is determined by the opportunity costs afforded by the land, and ideally is close to the income an owner would receive if they changed from forestry use to agriculture. The greatest participation in this program is from the private sector: larger companies that depend on ecosystem services for business, including hydroelectric producers, fruit and sugar cane producers and air transport companies to name a few (IUCN, 2011).

[6] The enforcement of the National Forestry Law enabled the creation of the National Forestry Financing Fund (FONAFIFO), which is an intermediary mechanism for buying ecosystem services from landowners and selling them to interested buyers. This mechanism pays landowners to enforce specific land uses that guarantee the provision of ecosystem services. When FONAFIFO was first created, the central government committed to finance the fund with 5 per cent of the revenue from the tax on fossil fuel.

Environmental Adjusted Water Use-Fee

The Environmentally Adjusted Water Use-Fee adds a user fee to water bills to pay landowners to maintain forests in watersheds (IUCN, 2011). The fee generated approximately USD 7.5 million during a seven-year period, in which 50 per cent was reserved for water management and 50 per cent for the protection of public and private lands in the watershed (Sanchez-Azofeifa, 2007).

Trading Carbon Credits

Under the Clean Development Mechanism of the Kyoto Protocol, Costa Rica participates in emissions trading schemes. In 1997, Norway paid Costa Rica USD$2 million to fix 200,000 tonnes of carbon, at USD$10 per tonne, by reforesting 1,000 hectares and conserving 3,000 hectares of forest (IUCN, 2011). This transaction was the first of its kind, with one country charging another country for its forests' carbon sequestration services, and demonstrates the feasibility for this type of reforestation project to mitigate the effects of climate change.

Payment for Ecosystem Services: Pago por Servicios Ambientales (PSA) Program

The *Pago por Servicios Ambientales* (PSA) or Payment for Ecosystem Services (PES) program was established in 1996, where three laws formed the framework in which the program could be established: the 1995 Environment Law 7554 mandates a balanced and ecologically driven environment for all; the 1996 Forestry Law 7575 mandates "rational use" of all natural resources and prohibits land-cover change in forests; and the 1998 Biodiversity Law promotes the conservation and "rational use" of biodiversity resources (Sanchez-Azofeifa, 2007). Specifically authorized under the 1996 Forestry Law, greenhouse gas mitigation, hydrological services, scenic beauty and biodiversity are recognized as ecosystem services. The PES program compensates forest landowners for these ecosystem services under the assumption that each service is provided equally by each hectare of forest (IUCN, 2011). Three types of payments/contracts are offered:

1. Forest conservation contracts that require owners of natural forests to protect the land for five years;
2. Restoration contracts that commit owners to planting trees on agricultural or abandoned land, and maintaining the plantation for 15 years; and
3. Sustainable forest management contracts for landowners who prepared a sustainable logging plan for low-intensity logging for 15 years.

Contract landowner payments vary depending on the type of contract: USD 210 per hectare for conservation contracts; USD 537 for reforestation contracts; and USD 327 for sustainable forest management contracts (Table 5). The primary funding sources in the initial phase of the program were a consumer tax on fossil fuels (15 per cent), water taxes (25 per cent intended for PES water catchment areas) and voluntary contracts with private hydroelectric producers.

Table 5: Costa Rica PES Program payment categorization

Activity	Subcategory	USD per hectare	Annual Payment (USD) per hectare
Protection (2-300 ha); contract and payments for 10 years	Forest protection	$640	$64
	In conservation gaps	$750	$75
	In zones of importance for water	$800	$80
Reforestation (1–300 ha); contract for 15 years and payments for five years	Reforestation	$980	$196
	With native species and species in danger of extinction	$1470	$294
Regeneration (2–300 ha); contract and payment for 10 years	In degraded areas with forestry potential	$410	$41
	In area that qualify for "additionality" under Kyoto standards (CDM)*	$640	$64
Forest Management	(2–300 ha); contract and payment for 10 years	$500	$50
Agroforestry (350–5000 trees); contract for five years, payment for three years	Agroforestry services	$1.30/tree	$0.43/tree
	With native species and species in danger of extinction	$1,95/tree	$0.65/tree

*Source: Modified from MINAET, 2011. Notes: * Dropped for 2013*

3. Impacts and Outcome

Economic Impacts

The PES program has influenced the supply chain by generating jobs, promoting infrastructure and supporting microbusinesses for the timber industry through PES for reforestation (Miranda, Porras & Moreno, 2004). Between 1997 and 2012, the program distributed USD 340 million: 49 per cent went to legal entities; 31 per cent went to individuals; 13 per cent went to Indigenous groups; and 7 per cent went to cooperatives (Porras et al., 2013). This is probably the greatest direct socioeconomic benefit to forested regions of Costa Rica. The payments are an important income source that diversifies participants' livelihood opportunities. The direct impact is highest in remote, rural areas where PES is one of the principal source of cash for many participants and a source of income diversification and redistribution with the local communities (Porras et al., 2013).

The PES program is financed through various sources: national, international, private and public. At the national level, the Costa Rican government developed two mechanisms: a fuel tax and water tariffs. By law, 3.5 per cent of national fuel revenues should be earmarked for PES financing, which has been the main source of financing since the establishment of the program. In 2012, the fuel tax contributed over USD 20 million, representing 80 per cent of total funding (FONAFIFO, 2013).

Recently, the government established a target for carbon neutrality, and new finance mechanisms for PES have been incorporated into the program, including the introduction of a voluntary domestic carbon market and the Costa Rican Compensation Unit (CCU), representing one tonne of CO2. Costa Rica has captured more than 90 million tonnes of carbon in recent years and PES programs under the Reforestation, Agro-Industrial systems and Natural Regeneration can obtain CCUs, which are then purchased by companies

looking to be certified as carbon neutral (Salazar, 2015). This provides the PES program with an additional source of financing, and each CCU has been sold for USD 7.50 since the program was introduced in 2013 (Salazar, 2015).

Social Impacts

Protecting a healthy ecosystem benefits many people in addition to those who receive cash for participating in the PES program. Direct financial benefits come from receiving payments, and indirect benefits emerge in the form of such things as improved health, recreation opportunities, ecosystem resilience and sustainable economic development in the region. Three instruments have been used by the PES program to target social impacts: assigning participation priority to properties located in areas with a low development index (SDI); reducing transaction costs for landowners, improving outreach and using group contracts; and encouraging smaller farms to participate through income diversification (Porras et al., 2013). Field studies reported by Ortiz, Sage, & Borgeet (2003) showed that when comparing PES participants and non-participants, the first group is significantly better off than the second, where the majority of PES participants across the country are not living in poverty (Ortiz et al., 2003; Zbinden & Lee, 2005). However, this was undetermined to be a consequence of the program or a prerequisite in the application process.

Another strength of the PES program is its involvement of Indigenous peoples and poverty alleviation. The fund's allocation to Indigenous people grew from 3 to 26 per cent between 1997 and 2012, and Indigenous people are increasingly involved in the decision-making processes in regards to forest management and planning (Sucre, 2012). Contract payments are one of the main cash injections into the local economy, particularly for Indigenous communities, and are used to strengthen social development projects that will result in inclusive long-term benefits. Examples include investment into small cocoa enterprises for women, furniture workshops, scholarships for doctors and nurses in both traditional and non-traditional medicine (IIED, 2012).

Environmental Impacts

The PES program uses an input-based approach, where the amount of forest cover is usually used as a proxy for ecosystem services delivered without distinguishing between forest types and their biodiversity conservation value. From the early 1990s to early 2000s, Costa Rica went from having one of the world's highest deforestation rates to having negative net deforestation (IUCN, 2011). Deforestation rates were estimated to be 0.06 per cent per year between 1986 and 1997 (prior to PES program implementation), and 0.03 per cent per year between 1997 and 2000. However, the drop in deforestation has not been singularly attributed to the PES program, but through multiple conservation policies, including the ban on land-use change, and ecotourism bringing value to forests (Figure 8).

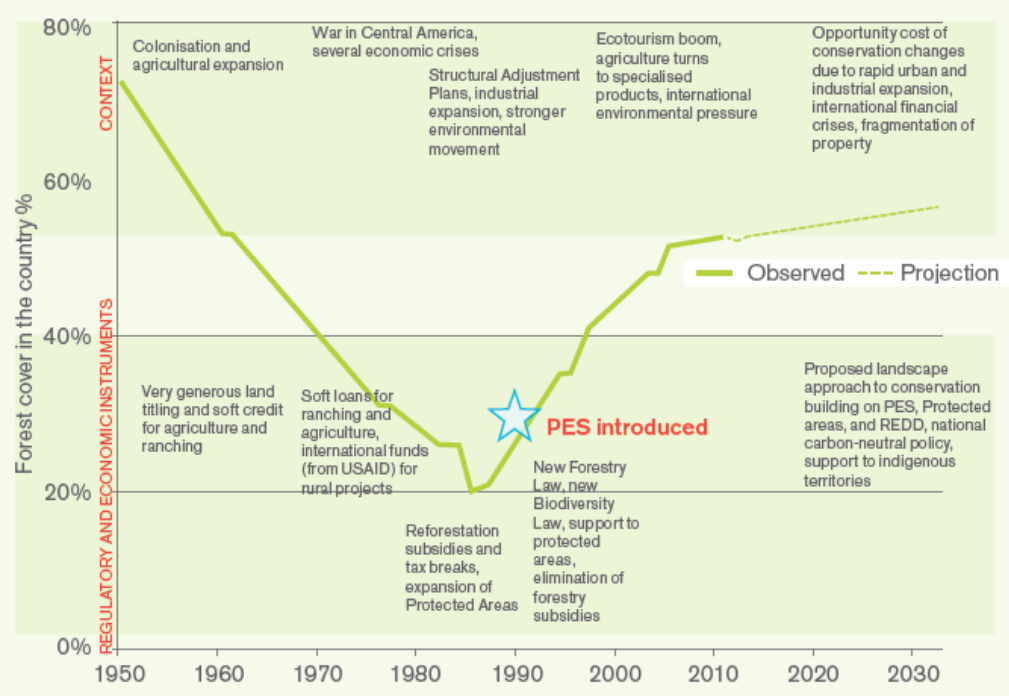

Figure 8. Changes in forest cover in Costa Rica in relation to context, economic and regulatory instruments.

Source: Porras et al., 2013 (Modified from Watson et al., 1998; Daniels et al., 2010).

From 1997 to 2013, payments for ecosystem services schemes covered nearly 1 million hectares of forest, and 4.4 million trees were planted as part of agroforestry systems since 2003 (IIED, 2013). During this time (1997–2013), forest cover increased to 50 per cent of the country's land area. In contrast, forest coverage was approximately 20 per cent in the 1980s (Porras et al., 2013). Furthermore, the program has protected more than 860,000 hectares of forest, reforested 60,000 hectares and supported sustainable forest management in approximately 30,000 hectares since it was initiated in 1997 (Porras et al., 2013). Forest protection dominates the program, making up 67 per cent of the total number of contracts allocated, 90 per cent of the total hectares of forest with PES, and 83 per cent share of the total budget (Porras et al., 2013). However, little evaluation has been conducted to assess how the program affects water, carbon, biodiversity or scenic values, and how this in turn has affected people in areas where it was implemented.

A considerable achievement of the PES program was the creation of the National Forestry Law, which was established in an effort to set up special markets and payments to ensure the delivery of services that ecosystems provide. The 1996 Forestry Law 7575 established the duty of the state to conserve, protect and manage the forest, forbidding logging in state-owned national parks, biological reserves, mangroves, protected areas, wildlife refuges and forestry reserves unless explicitly authorized. This created a mechanism for the state to impose limits on private property in accordance with land management and planning. The legislation also oversees the formation of employment and improvement of the quality of life of the rural population through its incorporation into forestry activities (1996 Forestry Law). The National Forestry Law was considered innovative because it introduced the concept of ecosystem services and created the possibility of paying owners of forest plantations for ecosystem services, including (Porras et al., 2013):

- Mitigation of greenhouse gases;
- Water protection for urban, rural and hydroelectric use;
- Biodiversity protection for conservation and sustainable use, for scientific and pharmaceutical purposes, for general research, and for ecosystem protection; and
- Protection of natural scenic beauty for touristic and scientific purposes.

The PES program has also been important for international carbon projects, such as the United Nations' program Reducing Emissions from Deforestation and Forest Degradation (REDD+).

REDD+ is an effort to create a financial value for the carbon stored in forests, and offers incentives for developing countries to reduce emissions from forested lands and invest in a low-carbon path to sustainable development. The first international transaction for ecosystem services took place in 1997 with the sale of carbon credits to Norway. Known as "Certified Tradable Offsets" (CTOs), certificates were sold through the Chicago Climate Exchange.

4. Insight for Benefit Sharing in Resource Development

Costa Rica's Payment for Ecosystem Services program successes represents a valuable source of information of economic and regulatory instruments that promote ecosystem conservation and sustainable development. The success and stability of the PES program in Costa Rica depended on the financial stability, legal framework and long-term capacity of institutions to administer the program. The program established the financial instruments and mechanisms for recognizing monetary value and compensation for ecosystem services and desired benefits. Ultimately, its success depends on its ability to guarantee the provision and protection of ecosystem services. Protected by legislation (the Forestry Law), greenhouse gas mitigation, hydrological services, scenic beauty and biodiversity are all recognized as ecosystem services. The program also obtained political support from all levels of government, and participation of stakeholders, including civil society, rural and Indigenous communities.

Nigeria: Oil Development & Revenue Sharing

Nigeria is one of the largest oil producers in the world and the commodity has been critical to the Nigerian economy for over 50 years. However, revenue and benefit sharing between different levels of government and communities has been a contentious issue. Tension exists between oil-rich parts of the country that want part of the revenues for regional development and restoration, and national demands for income redistribution to assure the delivery of minimum standards of public services across the country. The case of Nigeria illustrates some of the challenges that confront resource-intensive economies and provides lessons for how large natural resource endowments have the potential to dampen, rather than enhance, the prospects for development.

1. Background

Africa has abundant natural resources, and in recent years, a number of African economies have seen an accelerated GDP growth. In many cases, the petroleum industry has played a pivotal role in this growth. However, oil resources can result in significant governance and management challenges, and a number of oil-endowed countries have had lower economic growth and worse development outcomes than countries with fewer natural resources.

Nigeria is the most populous country in Africa, with a population of 182.2 million people (World Bank, 2015). It is also the largest oil exporter in Africa, with the largest natural gas reserves on the continent. On average, the volume of oil offered for sale is approximately 2.5 million barrels per day (Ojo, 2015; Obi, 2007). Nigeria's GDP in 2015 was USD 481.1 billion and GDP growth was measured at 2.7 per cent (World Bank, 2015). The oil and gas sector accounts for approximately 35 per cent of the country's GDP, and petroleum export revenue represents over 90 per cent of total export revenue (Organization of the Petroleum Exporting Countries [OPEC], 2015). In 2014, net oil export revenues amounted to USD 77 billion (OPEC, 2015).

Unfortunately, mismanagement of the nation's oil resources has led to the weakening of Nigeria's economy over the past two decades, and in turn significantly contributed to growing poverty levels. While oil revenue has supported the country's economy, close to two-thirds of the population live in extreme poverty, attributed in part by government misguidance and neglect, policy failure, and weak public institutions (Obi, 2009).

Oil Development in Nigeria

Nigeria has witnessed recurrent social unrest during the past several decades over concerns related to oil industry operations, its revenues, and petroleum-related pollution. Nigeria began exporting oil in 1958 and then gained independence in 1960 (Obi, 2007; UNEP, 2011). While oil exploration and the associated social and environmental consequences in Nigeria began prior to the country's independence, the event exacerbated social unrest and political instability in some regions of the country (UNEP, 2011). At independence, political boundaries were redefined, and Nigeria's federal structure set up as four regions defined by the principal ethnic groups. The new governmental structure also redefined regional allocation of resource revenue in relation to oil extraction (Ahmad & Singh, 2003). Due to mistrust concerning the government's revenue distribution, the military gained control in the mid-1960s and the economic situation worsened, which resulted in violent civil conflict, the Biafran Civil War (June 1967 to January 1970) (Obi, 2007).

After the end of the civil war in 1970, oil became a central factor in Nigeria's political economy. Oil development in the 1970s became a priority and a strong economic sector for the country, bringing in billions of dollars in revenue; however, this growth had implications for national politics and development (Ahmad & Singh, 2003). By the 1980s, the challenge was that of national ownership and control, maximizing the use of oil for the immediate and long-term benefits of the region. In the 1990s, the main issues became the use of oil revenues to aid economic recovery and the increasing concerns for environmental and social protection of the oil-producing regions, including the rights and livelihoods of the people living in the Niger Delta region.

By the 1970s, the Niger Delta had become the main source of the country's oil and gas, and the sector had replaced agriculture as Nigeria's primary economic driver, accounting for over 80 per cent of national revenues and over 90 per cent of export revenue (Obi, 2009; OPEC, 2015). Mechanisms were put into place in Nigerian legislation to ensure that benefits from these revenues were shared between regional stakeholders; however, there is disparity in enforcement due to policy failures and federal neglect (Obi, 2007; 2009).

2. Benefit-Sharing Mechanisms

Benefit-sharing mechanisms for oil revenue exist in the form of direct payment to citizens, establishment of funds, in-kind benefits, tax payments, investment in local initiatives and royalty sharing. For example, the Petroleum Profit Tax Act (2007) regulates the Petroleum Profit Tax applicable to upstream operations (exploration and production) in the oil industry. The tax covers rents, royalties, margins and profit sharing elements associated with oil extractions, prospecting and exploration leases. The Oil and Gas Content Development Act (2010) was established to enhance the level of participation of Nigerians and Nigerian companies in the country's oil and gas industry. Under this act, no less than 10 per cent of revenue is allocated to areas from which it is derived. However, implementation of this mechanism remains weak, and actual payment to states from which oil was derived has been a basis for conflict with communities because funds have not reached or benefited them (Obi, 2009; UNEP, 2011)

Revenue allocation between different levels of government and communities has been a contentious issue in Nigeria. Tension exists between oil-rich parts of the country that want part of the revenues for regional development and restoration, and national demands for income redistribution to provide adequate resources to all regions and assure the delivery of minimum standards of public services. To diffuse pressure from the natural resource-producing regions, the Nigerian government greatly increased the number of states as an instrument to reduce regional and ethnic conflict (Ahmad & Singh, 2003). Consequently, the four regions created at independence were divided into the present 36 states and the federal capital.

Although multiple mechanisms were established to deal with tension between states and the federal government, these mechanisms have eroded over time (Obi, 2009). Disruptive policies, revenue mismanagement and the lack of corporate social responsibility at the onset of the development of the oil and gas sector have led to a lack of benefit sharing with the regions from which the oil wealth originates. Of particular interest is the revenue allocation principal of derivation, which provides for revenue allocation derived from natural resources in proportion to the contribution to the federal purse by each state. The federal government, largely controlled by the political elite from dominant ethnic groups, established monopoly control of the collection and distribution of oil revenues through Decree No. 51 of 1969 and Decree No. 9 of 1971, and the Nigerian National Petroleum Corporation (NNPC), the state-owned oil company, controls oil-related operations in the country, including the payment of all production and transaction costs relating to petroleum extraction and sales (Obi, 2009).

Apart from the centralization of control over oil, the revenue allocation principle of derivation was progressively changed to reduce the revenue share of oil-producing states from 50 per cent in 1966 to 1.5 per cent in the 1990s (Obi, 2009). The progressive reduction of the derivation principle and the introduction of the Distributive Pool Account (DPA), which emphasized population size and equality of states as principles of revenue allocation, were viewed as unjust by ethnic minorities (Obi, 2009). Equitability proposed by the derivation principle in its original sense was seen as an important instrument for the delivery of benefits because it promoted diversification of revenue generation streams and supported economic development. In the 1950s and 1960s, the application of this principle ensured that the regions, based largely on cash crop economies, each contributed 50 per cent of their revenue to the federal purse. This placed them largely in control of the revenues derived from agricultural and mineral resources within their region. However, from 1970, the replacement by the Distributive Pool Account (DPA) shifted control of resources from the regions (states) to the federal government.

In addition to fiscal imbalance, the government had also underpriced oil by failing to charge adequate royalties for companies' access to oil deposits. State enterprises entrusted with petroleum production and exporting have also suffered from a combination of undercapitalization and poor investment of oil proceeds (Obi, 2007). A 1992 Word Bank–UNDP study assessed the economic and financial losses in Nigeria at $2.5 billion per year from poor investments, inappropriate domestic pricing, and corruption in the oil sector (ESMAP, 1993). Oil subsidies were costing the Nigerian treasury USD 1.9 billion annually in the early 1990s (ESMAP, 1993). Oil smuggling alone cost the country revenues of roughly USD 1 billion a year in the mid-1980s (ESMAP, 1993).

Box 4. Corporate Social Responsibility and Shell Petroleum Development Company

The oil and gas sector have been among the leading industries in supporting the principles of Corporate Social Responsibility (CSR); however, the effectiveness of CSR initiatives in these sectors has been increasingly questioned. At the onset of oil development in Nigeria, the implementation of development projects through multinational CSR programs was driven by short-term expediency rather than long-term development needs of a community (Frynas, 2005). A majority of these programs still operate this way. However, Shell's Nigerian affiliate, Shell Petroleum Development Company (SPDC) and CSR operations in Nigeria in recent years have evolved to emphasize sustainability and the long-term perspective for all its projects. For example, the company moved away from a focus on only large infrastructure projects, such as hospitals, to more promising smaller projects, such as micro-credit schemes. SPDC also created a partnership with external development agencies, such as USAID and other NGOs, that have greater expertise in implementing development projects. Shell in Nigeria has become an instructive case for illustrating the multiple potentials of CSR schemes for delivering long-term solutions for development (Frynas, 2005).

3. Impact and Outcome

The Nigerian oil sector has powerfully influenced the country's economy, politics and development. Yet despite robust growth and macroeconomic stability over the last decade, poverty and environmental degradation still remain significant, with increasing inequality and regional disparities.

Economic Impact

Today, Nigeria is the third-largest economy in Africa, largely due to the share of crude oil in its exports. The oil and gas sector accounts for approximately 35 per cent of the country's GDP, and petroleum export revenue represents over 90 per cent of total export revenue (OPEC, 2015). In 2014, net oil export revenues amounted to USD 77 billion (OPEC, 2015). Nigerian GDP at purchasing power parity more than doubled

between 2005 and 2010; however, the country's human capital and its overall standard of living are still lagging behind. Wealth generated by oil revenues has not been passed down to the citizens of Nigeria, as 46 per cent of the population still live below the poverty line (World Bank, 2014). Mechanisms such as principle of derivation were put in place to ensure oil-producing regions maintained revenue for regional safeguards and development, but these have been eroded over time and oil revenues are mostly directed to the federal government.

In addition to negative developmental effects on specific communities, prioritization of the oil industry has been blamed for distorting national economies and governance. Prior to the development of the oil sector, Nigeria led international exports of cocoa, rubber and palm oil. The agricultural industry, which currently accounts for 20.2 per cent of GDP and two-thirds of the country's employment, has shown a decline in productivity over the last 25 years (World Bank, 2014; FAO, n.d.b). In spite of oil production, agriculture remains the base of the Nigerian economy and provides the main source of livelihood for most Nigerians (FAO, n.d.b). The country has high agricultural export potential; however, food imports support a large portion of the growing population (FAO, n.d.b).

The recent decline of international oil prices also poses a strong challenge for public finance at all levels of government, and will represent a major constraint on the ability of the federal government to expand outside of the energy sector.

Social Impact

Resource wealth can contribute or be detrimental to the development process. In Nigeria, regional disparities and sociological factors, combined with the differential impact of economic and social policies, have accentuated poverty in some regions more than others. Oil operations have had adverse social effects on local communities in oil-producing areas, and the oil sector has played a role in triggering and prolonging conflict in these regions (Obi, 2007). Oil development alone does not lead to violence or corruption; however, conflict has occurred as a result of the politicization of oil influence in ways that promote exclusive control of oil and its distribution. Despite robust growth, averaging 7 per cent per year, and macroeconomic stability over the last decade, poverty still remains significant with increasing inequality and regional disparities (World Bank, 2015).

The case of Nigeria demonstrates how large natural resource endowments have the potential to dampen, rather than enhance, the prospects for development. Nigeria's oil industry has been afflicted by corruption and mismanagement, and as a result, the World Bank has estimated that 80 per cent of energy revenues in the country benefit only 1 per cent of the population (World Bank, 1996). Nigeria has one of the world's lowest per capita oil export revenue rankings. In 2014, Nigeria's per capita net oil export revenue was $483. In comparison, the OPEC per capita net oil export revenue for 2014 was $2,186 (OPEC, 2015).

The UNDP Niger Delta Human Development Report (2006) concluded that the Niger Delta, the region that accounts for the largest percentage of oil production and exports in Nigeria, faces significant challenges in human development, including: social instability, poor local governance, neglect of infrastructure, lack of access to fundamental services, environmental degradation and extreme economic deprivation (UNDP, 2006). Oil development has changed the socioeconomic landscape of the region and led to the destruction of traditional means to livelihood. Agriculture, the largest employer in the country has been negatively affected by oil pollution, including Ogoniland in the Niger Delta. Currently, a majority of the youth and women have become unemployed since their local economic support system of fishing and farming is no longer sustainable (UNEP, 2011).

Environmental Impact

Oil extraction in Nigeria has led to wide-scale contamination of the environment. Over 400 documented oil spills a year have occurred in the country since 2007 (Ojo, 2015). Ogoniland, a 1,000 km^2 region in the Niger Delta of Nigeria, has been the site of oil industry operations since the late 1950s, and is the region most heavily affected by pollution from oil spills and oil well fires. Oil industry operations in Ogoniland were suspended in 1993, although extensive environmental contamination remains.

UNEP (2011) research found that oil contamination affects multiple regions in Nigeria, but Ogoniland most heavily, where it is widespread and severely affects many aspects of the environment. The report concluded that pollution of soils by petroleum hydrocarbons is extensive in land areas, sediments and wetlands (UNEP, 2011). There is no continuous clay layer across Ogoniland, exposing the groundwater to hydrocarbons spills on the surface. Two-thirds of the contaminated land sites close to oil facilities that were assessed exceed Nigerian national soil contamination standards, the Environmental Guidelines and Standards for the Petroleum Industries in Nigeria (UNEP, 2011). These communities have been exposed to petroleum hydrocarbons both in the air and drinking water, and exposure is through dermal contact from contaminated soil, sediments and surface water. Furthermore, some communities are drinking water from wells contaminated with benzene, a known carcinogen. One particular community, Nisisioken Ogale, has drinking water with recorded benzene levels over 900 times above the World Health Organization (WHO) guidelines (UNEP, 2011).

4. Insight for Benefit Sharing in Resource Development

When initially planning for oil-based development, Nigeria put in place financial mechanisms to ensure that oil-producing states retained revenue to deal with regional priorities. Yet these mechanisms were weak and have been consistently weakened over time, in favour of revenue for the federal government.

Even with federal oversight and control, Nigeria lacks any reliable delivery of benefits from natural resource development to the majority of the population. Decades of negotiations and development initiatives have been ultimately unsuccessful at delivering a solution that meets the expectations and responsibilities of all stakeholders (government, private industry and communities) (UNEP 2011; World Bank 1996; 2014). There is still the need for significant environmental and social improvements in regions of oil extraction, and a strategic policy on how the oil sector will function in a way that truly benefits the lives and livelihoods of the affected communities over short and long time periods. Nigeria's current benefit-sharing models lack a strategy for revenue management that provides either benefits beyond a project's lifecycle or a multistakeholder representative governance structure. Furthermore, in the case of CSR, there is a need to address building local capacity and filling in where the government falls short.

Policy failures and insecurity, federal neglect, and poor corporate social responsibility from the beginning of the of the oil and gas sector's development are some reasons for unsuccessful delivery of benefits for regional and national development. This case study provides cautionary lessons and emphasizes the need for leadership, clear legal and policy provisions on benefit sharing, and the inclusion of relevant stakeholders to ensure long-term sustainability of resource-based economic development.

Lessons Learned in the Context of Northern Development Planning

The case studies reviewed in this report present important lessons for boreal forest management and planning in Manitoba. They highlight a number of elements for success in resource management in the context of sustainable development—to ensure that such resource extraction takes place while maintaining environmental systems, allowing for social equity and overall economic development. The following principles are common across many of the case studies reviewed and have been critical to economic, social and environmental sustainability in these regions of resource growth.

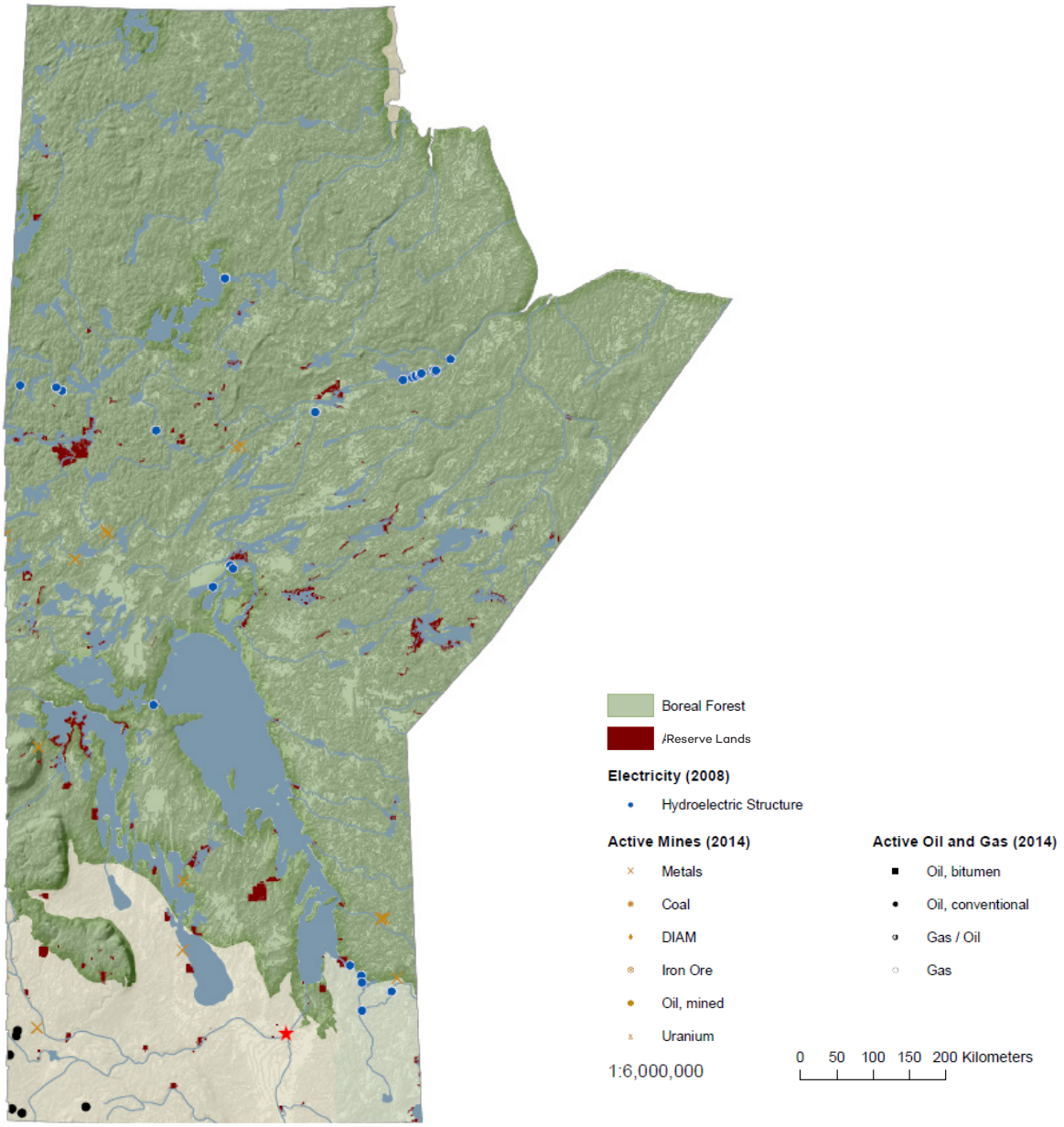

Figure 9. Manitoba boreal forest and resource extraction activities.

Source: Geoffrey Gunn for authors, based on data from NRCAn 2015 & CEC, 2011.

The long-term effect of rapid resource development on local communities varies from region to region. However, common historical trends include many negative repercussions: exclusion of Indigenous people from regional decision making; rising labour prices and other factors of production that limits the development of a more diversified regional economy; a rapid increase in population that overwhelms existing infrastructure and community services; and exhaustion of locally available skilled labour (Steffens, 2011). These factors commonly result in high social, economic and environmental costs that reduce the benefits of resource development, particularly for local populations.

Between 1990 and 2000 more than 4,000 km^2 of the southern boreal forest region of Saskatchewan and Manitoba comprised forestry, mining, hydropower production, road-building and other infrastructure developments (Stanojevic et al. 2006a, 2006b) (Figure 4). Despite this, Manitoba is still home to some of the largest remaining tracts of intact boreal forest in Canada (Lee, 2010). These intact areas are critical to maintaining the ecosystem goods and services provided by the boreal forest in Manitoba and will be important for long-term sustainable development in the province. The Government of Manitoba has committed to developing a Manitoba Boreal Plan including the engagement of Indigenous communities and the use of scientific research, traditional ecological knowledge (Government of Manitoba, 2012).

1. Clear Vision and leadership were drivers of many of the successful development models and planning frameworks described. Governments and/or stakeholders had a vision of what they wanted to achieve, used this to inspire others, and create a plan to realize their goals.

The Government of Norway recognized early on that the country was benefiting significantly from non-renewable oil and gas and had a vision for an investment framework to ensure future generations continued to benefit from this resource. The purpose of the Government Pension Fund Global (GPFG) is to facilitate government savings to finance rising public expenditure and to support long-term considerations in the spending of government petroleum revenues (Royal Ministry of Finance, 2015). This clarity of vision is apparent in its planning and implementation over the years.

In the context of Plan Nord, The Government of Québec recognized that past resource development in Northern Québec had not resulted in realized benefits for northern communities (Gouvernement du Québec, 2015). The Government envisioned a development model that supported the local economy, including building capacity and addressing key infrastructure needs. In the case of BC's Great Bear Rainforest, negotiations were successful because they were guided by a shared desire to create a model of conservation that could address ecosystem health, resource use, and community well-being. Forest companies, environmentalists and Indigenous communities had a common vision to work toward—the challenge was finding a way to get there (Smith, 2010).

In all of these cases, governments and/or stakeholders had a vision of what they wanted to achieve and created a plan to realize that vision. In many cases the vision was challenged, and consultation or negotiation was required along the way. Without the vision and strong leadership to see it through, new management models could not have been developed nor success achieved.

2. The establishment of institutional mechanisms for implementation was an important factor in the success of the Columbia Basin Trust (CBT), the BOLFOR projects and the Payment for Ecosystem Service Program (PES) in Costa Rica, among others. In all three cases, institutions were established to facilitate local engagement, asset governance and/or resource management.

The CBT was established as an independent institution and is governed by a binding agreement that formalizes benefits for residence of the Columbian River basin. It is responsible for investment of capital and management of the assets of the Trust and includes strong representation by local community members.

The success of Costa Rica's Payment for Ecosystem Services (PES) program provides valuable insight on economic and regulatory instruments that promote ecosystem conservation. Under the program, the Forestry Law was established providing the institutional framework required to implement and protect the PES payment system. The success and stability of the PES program depended on financial stability, a robust legal framework and the long-term capacity of institutions to administer the program. With legislative protection through the Forestry Law, political support from all levels of government was obtained to effectively administer the program.

The BOLFOR projects aimed at reducing degradation of Bolivia's forests and protecting biodiversity through promoting sustainable forest management as both a source of income and conservation. BOLFOR was an integrated conservation and development project, initially established because governmental regulation was not sufficient to effectively conserve and manage tropical forests in Bolivia. The project gave rise to forestry management and legislation reform in Bolivia, where new institutions were created to continue implementation of the sustainable forestry management model, notably the Forest Superintendence (FS). A government agency, FS is the regulatory entity in charge of supervising forest management; however, it was also determined that public regulation could not be sustained without the support of the private sector and Indigenous groups. The FS, with support from the BOLFOR projects, provided services to timber companies willing to implement sustainable forest management practices, working directly with the private sector, community members and Indigenous groups (USAID, 2004). BOLFOR helped to strengthen the few existing private organizations and was instrumental in creating NGOs and foundations in areas such as environmental law, forest management, forest marketing, and forest monitoring and research (USAID, 2004).

Although these institutions were established with various mechanisms, they include representation or direct involvement with the key interest groups and feature a clear governance structure, mandate, and budget to implement the desired sustainable management strategies (USAID, 2004; CBT, 2015; IUCN, 2011).

3. Strong legislation, along with appropriate institutional mechanisms, has been critical to the formalization of many of the management strategies and ensuring effective implementation. For instance, a key factor in the success of the Norwegian GPFG is the Government Pension Fund Act, which warrants that the government may spend only the expected real return on the fund, thus protecting the fund's assets and minimizing risk (NBIM I, 2015). Conversely, one challenge of the Alberta Heritage Trust Fund (AHSTF) is the lack of a legislative framework and the resulting failure of subsequent provincial governments to make regular contributions to the fund (Alberta, 2015b).

Alberta's limited deposits to the AHSTF first appeared as a reaction to the collapse of the price of oil, and consequently the state of the provincial economy in the late-1980s and early-1990s. Norway followed a similarly reactive pattern to the price of oil, and had an economic boom in the early 1980s until the price of oil collapsed in late 1985. Now more recently, with the collapse in oil prices over the past several years, both funds have reacted differently to the fluctuating price in oil. Norway tapped into the GPFG during a time of diminished returns and low interest rates to cover 2016 budget needs. The government is using the withdrawal from the fund to boost economic growth, while using less than the expected 4 per cent return to continue promoting growth of the fund (Statistics Norway, 2015). The GPFG is integrated into the government budget, and in 2015 179.6 billion kroner was transferred to the National Budget to offset Norway's loss in oil revenues due to a 50 per cent drop in the price of oil (NBIM, 2016). The oil and gas sector is Norway's largest when measured in terms of value added, government revenues, investments and export value (Norwegian Ministry of Petroleum and Energy, 2016). Norwegian government revenues from petroleum activities are transferred to the GPFG, and under fiscal rule, transfers can be made to the fiscal budget from the GPFG to finance public goods without drawing on the Fund's capital. However, during times of collapse in the price of oil and corresponding revenue, Norway continued deposits into the GPFG, in keeping with the 4 per cent budgetary rule, without cuts in funding to the welfare state but rather offsetting budgetary constraints.

In contrast, the lack of legislative or constitutional requirements for investment of returns has limited the effectiveness of the AHSTF to save resource revenues during years of both budgetary deficit and surplus. Payments to the AHSTF stopped in 1987, following years of deficits: from 1985 to 1994, Alberta ran an annual deficit (RBC, 2016).[7] The provincial budget ran as a surplus again from 1994 to 2008, yet no further deposits were made to the AHSTF.[8] The recent history of Alberta's provincial public finances provides a simple context for assessing the current predicament with the AHSTF. Surging energy revenues allowed the provincial government to save some of that revenue in the AHSTF through contribution between 1976 and 1986 (McMillan & Warrack, 1993; Warrack, 2005). More recently, expenditures have surpassed revenues in Alberta, with persistent deficits accumulating into a growing stock of debt.

Legislation for setting environmental protection goals has also been an important component of many of the cases examined in this survey. Plan Nord and the Great Bear Rainforest Initiative have resulted in specific legislation for forest conservation ensuring that 50 per cent and 70 per cent respectively of the forest area is protected from industrial activity. Similarly, the National Forestry Law in Costa Rica ensures forest protection measures and the provision of ecosystem services to society. The success and stability of Costa Rica's Payment for Ecosystem Services (PES) program depended on financial stability, a robust legal framework and the long-term capacity of institutions to administer the program. A considerable achievement of the PES program was the creation of the National Forestry Law. This law was supported and driven by multiple levels of government in an effort to set up special markets and payments to ensure that services that ecosystems provide to society are protected by legislation.

[7] Alberta's annual budget (negative indicates deficit): $2,133 million (1981–1982), –$796 M (1982–1983), $129 million (1983–1984) and $1,245 million (1984–1985), –$761 million (1985–1986), –$4,033 million (1986–1987), –$1,365 million (1987–1988), –$2,007 million (1989–1990).

[8] In 1994, the provincial budget balanced at $938 million and continued to run a surplus until 2008. The budget in 2008–2009 was $4,581 million and then –$852 million in 2009–2010 (RBC, 2016).

4. Respect of rights and shared decision making with Indigenous populations have resulted in planning that incorporates local needs and ensures that benefits reach local populations. Many of the regions examined have significant populations of Indigenous people and the incorporation of their views and needs has been critical to the success in these management frameworks.

Both Québec's Plan Nord and BC's Great Bear Rainforest Agreement included institutional mechanisms to ensure collaborative decision making, and to respect the existing rights of Indigenous populations. The Société du Plan Nord ensures responsible development in a spirit of respect for local communities (Gouvernement du Québec, 2015). The Land and Resources Forum in British Columbia is a government-to-government decision-making process jointly engaging the Province of British Columbia and Indigenous communities in land-use planning for the area (Coastal First Nations Great Bear Initiative, 2015).

The inclusion of local and Indigenous needs in forest management in Costa Rica and Bolivia have also resulted in considerable local support for sustainable management processes and benefit-sharing systems over the long term. The BOLFOR projects have supported many Indigenous communities in the Forest Certification Process. BOLFOR has thereby gained acceptance of sustainable forest management by demonstrating benefits to Indigenous communities, industry and the environment. One of the most important conclusions to be drawn from BOLFOR's successes is that providing government leadership for sustainable development has economic development benefits. BOLFOR focused on capacity building and engagement with communities and Indigenous groups. Cooperation among authorities and across the forest and agricultural sectors was obtained—and rural development promoted—through productive activities, employment and local procurement.

In Costa Rica, decision makers prioritized PES systems that brought benefits to vulnerable landowners including Indigenous communities. This had the highest direct impact in remote rural areas, where PES is one of the principal sources of cash for many participants and a source for income diversification within the farm or community.

Mechanisms to ensure that Indigenous populations amd their world views are part of the decision-making process have been critical to long-term sustainability, resulting in systems based on local needs and that support communities themselves. Supporting local Indigenous needs is not just about engagement, but also respecting their rights, ongoing consent and nation-to-nation status. Working effectively with Indigenous communities requires community support and involvement, a collaborative approach, and respect for community-based protocols and values. Indigenous peoples and their respective communities retain inherent rights to their knowledge, cultural practices and traditions. The collection and use of Indigenous knowledge should require levels of informed consent in advance from local governing bodies, as well as from the individuals.

5. Risk management and long-term thinking (including the development of more diverse and sustainable economic models) has been critical to avoiding overreliance on one resource or a non-renewable sector. Resource-driven economies run the risk of financial ruin once resources are depleted. An important component of long-term sustainable development in resource-rich areas is a plan for alternative or more sustainable economic models, ensuring that populations are not dependent on the resources themselves and are building alternative economic strategies to maintain a strong economy once resources are exhausted (Steffens, 2011).

A strong example of managing risk through the development of a more sustainable economic model is forest certification in Bolivia. By developing and promoting certified forest projects, the country moved away from unsustainable forest management and cultivated a high-value sustainable forest industry that focused on benefit sharing with small shareholders.

Both Plan Nord and the Great Bear Rainforest Agreement include financial support for the development of diversified economies and scientific knowledge about northern ecosystems and development over the long term. Plan Nord includes development in sectors including tourism, the export of related expertise in mining and renewable energy, and advanced renewable energy and mining technology as well as direct support to the communication and transportation infrastructure that is needed to help these industries thrive.

The success of both the Columbia Basin Trust (CBT) and the Norway Government Pension Fund Global (GPFG) can also be attributed to developing means of translating potentially short-term benefits into longer-term gains. In the case of Norway, the purpose of the GPFG is to facilitate government savings to finance rising public expenditure and to support long-term considerations in the spending of government petroleum revenues. The petroleum sector in Norway generates large but fluctuating revenues. The industry also contributes, through its demand for goods and services, to considerable activity and a range of employment in the rest of the Norwegian economy as well (Norwegian Ministry of Finance, 2015). Such revenues contribute significantly to the funding of the welfare state and the strengthening of public finances.

Both Norway's GPFG and the Columbia Basin Trust involve financial management of revenue coming from non-renewable resources such that they will provide benefits long after resources are depleted. In both cases ongoing successful financial management have resulted in continued revenue back to local communities and governments even in times of financial insecurity.

6. Strong scientific data and knowledge and identifying Indigenous knowledge as part of resource development planning have resulted in stronger conservation and sustainable development outcomes. A scientific approach gives stakeholders confidence in the process and outcomes, as well as the ability to communicate costs and benefits to a wide variety of audiences. Science combined with regular monitoring result in better outcomes and an improved understanding of systems as a whole for more effective long-term decision-making.

In the case of the Great Bear Rainforest, conservation science, Indigenous communities and industry worked together to use an ecosystem- and traditional knowledge-based management approach that defined critical habitat for conservation and identified logging areas. This scientific approach gave stakeholders confidence in the process and its outcomes, as well as the ability to communicate the benefits of the resulting management plans (Smith, 2010). In the case of BOLFOR, Bolivia's implementation of the Forest Stewardship Council (FSC) methodology and the development of a standard for tropical forest timber and non-timber products acceptable to the FSC, led to a scientific approach to sustainable forest management which could support biodiversity conservation and be economically viable for communities and industry in the region (USAID, 2004).

The Columbia Basin Trust (CBT) also recognized the importance of scientific research as part of ongoing implementation, and the CBT's research and outreach projects contribute to stronger environmental understanding and stewardship (CBT, 2015).

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