

Integrating Indigenous Knowledge and  
Western Scientific Knowledge in  
Community-Based Resource  
Management:  
Selected Bibliography

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## **TABLE OF CONTENTS**

<b>I. Print .....</b>	<b>1</b>
<b>II. Selected Annotations .....</b>	<b>16</b>
<b>III. Audio-Visual Materials .....</b>	<b>27</b>

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## II. Selected Annotations

Agarwal, Bina. 1986. Cold Hearths and Barren Slopes. New Delhi: Allied Publishers Private Limited.

This book examines deforestation in Third World countries and its devastating impact on the availability of woodfuel. Agarwal documents the woodfuel problem and the woodstove programs, treeplanting initiatives and various rural innovations that have been developed to redress the problem. Throughout she analyzes the relationship between the extent of the problem, the acceptability of projects, and the degree and nature of local involvement in designing and implementing solutions.

Berkes, F. 1981. "Fisheries of the James Bay Area & Northern Quebec: A Case Study in Resource Management." Proceedings: First International Symposium on Renewable Resources & the Economy of the North. Edited by M. Freeman. Ottawa: ACUNS/MAB, pp. 143 - 160.

This paper presents data about fish species harvested in various James Bay communities, the traditional methods of fish harvest and analytical techniques for forecasting the size of the harvest and its effect on the community's economy and local environment. This information is then used to describe subsistence fishing and biological management, including an examination of the potential relationship between traditional knowledge and southern scientific information.

Brokensha, D.; Warren, D.; and Werner, O., eds. 1980. Indigenous Knowledge Systems & Development. Lanham: University Press of America.

This report comprises twenty-five case studies which demonstrate the richness, variety and value of indigenous knowledge systems. It also presents a convincing case for development planners to include the traditional skills and technology of indigenous peoples as part of an integrated approach that includes factors such as conventional science, the physical environment, prevailing socio-economic institutions and political and administrative realities. Regional emphasis is strongest for tropical Africa, with coverage of Latin America and South Asia.

**Brownrigg, L.** 1985. "**Native Cultures & Protected Areas: Management Options.**" Culture and Conservation. Edited by J. McNeely and D. Pitt London: IUCN/Croom Helm, pp. 33-43.

Brownrigg points out that on their own, the culturally native populations of Latin America protect large areas of natural ecosystems and achieve a renewable use from their natural resources. The authors present four management options for the formal designation and organization of protected areas: (1) native-owned lands where the area is protected by native people; (2) reserves where a protected natural area corresponds with the territory of a particular native population; (3) buffer zones where a protected area serves as a physical or ecological barrier between native lands and the lands of others; and, (4) research stations where certain areas under native management are organized as agricultural or ecological research stations.

**Cohen, F. and Hanson, A., eds.** 1989. Community-Based Resource Management in Canada. Ottawa: Canadian Commission for UNESCO/MAB, Report No. 21, 190 pages.

This report is based on two workshops held by the Working Group on the Human Ecology of Coastal Areas. It presents an inventory of community-based projects currently underway or recently completed in all coastal regions of Canada except the eastern arctic and Newfoundland. The editors provide lists of resource persons, scholars and researchers working in related areas. A main thrust of the report is that there is a need to integrate various forms of community involvement in decision making to ensure that decisions being made lead toward a sustainable future. The report also provides bibliographies of related material for each region.

**Chase, A.** 1990. "Anthropology & Impact Assessment: Development Pressures and Indigenous Interests in Australia." Environmental Impact Assessment Review, Vol. 10, pp. 11 - 23.

**Chase** describes the considerable pressure being placed on aboriginal groups that claim traditional attachment to lands being developed by various natural resource extraction and tourism projects. This article examines the shortcomings in the social impact assessment process for a major development project, silica sand mining.

Colorado, P. 1991. "Indigenous Science." Edges, Vol. 4 No. 1, pp. 12 - 14, 24 - 25.

Colorado describes the process by which she arrived at a fuller understanding of the cultural basis of indigenous knowledge **and of the appropriateness of the term "Indigenous science" in consultation with and growing out of advice from Indian elders. Her search for knowledge and understanding integrates her doctoral studies and traditional indigenous ceremonies and explorations. She explains how the term science, taken from the Latin *sciens* meaning knowledge or a general way of coming to knowledge, serves as a bridge between western and native knowledge.**

Community of Paulatuk and the Wildlife Management Advisory Council. 1990. A Plan for the Conservation & Management of Renewable Resources and Land Around Paulatuk, NWT. 43 pages.

The Paulatuk Conservation **Plan** is a community-based document supported by the Wildlife Management Advisory Council (**WMAC**) and the Fisheries Joint Management Advisory Committee. The Inuvialuit Final Agreement gives the WMAC responsibility **to develop** a conservation and management plan for the western arctic. A Regional Conservation **Plan, released** in the fall of 1988, recommended that the six individual communities develop community conservation plans, of which this is the first. The plan will be integrated into the Land Use **Plan** for the Mackenzie Delta-Beaufort Sea Region.

Cruikshank, J. 1981. 'Legend & Landscape: Convergence of Oral and Scientific Traditions in the Yukon Territory.' Arctic Anthropology, Vol. 18 No. 2, pp. 67 - 93.

Cruikshank provides a strong analysis of the strengths and weaknesses of both scientific and oral traditions within the northern environment. Included is an examination of the role that myth and legend play within oral tradition and of the difference between private and public information. Strengths and limitations of oral tradition are said to include: persistence, individual variation and consistency, integration of historical events, oral tradition as technology, absence of documentary sources, and duration of observations. The author points out the danger in reducing oral tradition to "primitive science" since any realistic attempt to combine the two frameworks must begin with understanding the terminological and classification systems used by other oral societies, the development of ethno-biology, ethnohistory and ethnosience. The most effective and continuing interdisciplinary programs in the north seem to be in areas where native communities are very much involved in the projects. Such an approach is seen by the author as going some distance toward narrowing the gulf between local people and outside, scientific experts.

**Dankelman, I., and Davidson, J. 1988.** Women and Environment in the Third World: Alliance for the Future. London:: **Earthscan** Publications Ltd. in association with IUCN.

Dankelman and Davidson provide a thorough analysis of why it is important and **necessary to** include women's lives and roles in the context of environmental development **in the Third World**. They examine the desperate circumstances **of women who are rendered invisible by** the gender-blindness and gender-bias of standard analyses. They offset the distortions that arise from **generalizing** across so many millions of women by including, within **each area of** analysis, a set of case-study summaries written by various women working in community projects around the world. Their discussion of women's indigenous knowledge **and its application** in sustainable development emphasizes the importance of using an integrated approach to knowledge.

Dene Cultural Institute. **1990.** "Traditional Ecological Knowledge and Environmental Assessment." In the Canadian Environmental Assessment Research Council draft Background Paper on Traditional Ecological Knowledge and Environmental Impact Assessment. Fort Good Hope, NWT: 101 pages.

This paper begins with an overview of the development of western scientific interest in traditional ecological knowledge (**TEK**). The second section explains the nature and transmission of TEK and compares it to western science within the context of ecological observations and resource management. The third section examines the different methodological approaches that have been tried or are being tested in the documentation of traditional knowledge. Section four reviews examples of efforts to integrate TEK into the environmental assessment and management processes. The paper concludes with a discussion of **the key issues surrounding the subject**, together with recommendations for future action **to** further the recognition of the value of TEK to western science.

**Draz, O. 1985.** "The **Hema** System of Range Reserves in the Arabian Peninsula: Its Possibilities in Range Improvement and Conservation Projects in the Near East." Culture and Conservation. Edited by J. **McNeely** and **D. Pitt**. London: **IUCN/Croom Helm**, pp. **109- 121.**

**Draz** describes the **Hema** system, once commonly used in the Arabian peninsula **and** based on a philosophy of protection and improvement instead of exploitation. Basically the **Hema** system provided a fodder reserve for nomadic populations and controlled grazing to protect certain species. This paper suggests that the **Hema** system be re-introduced or combined with current grazing practices as a means of range improvement and of stopping the present destructive grazing and uncontrolled tree and scrub cutting.

Felt, H. 1988. "Self-Management and State-Management: Forms of Knowing and Managing Northern Wildlife." Knowing the North: Reflections of Tradition, Technology and Science. Edited by W. Wonders. Edmonton: Boreal institute for Northern Studies, pp. 37-50.

Drawing from a case study of beaver harvesting by the Cree of James Bay, in northern Quebec, Felt provides a useful comparison of science-based and community-based data collection, analysis and management systems. The author provides a good definition of the difference between 'western science and indigenous knowledge and links this to community-based management regimes. The author describes the religious roots of this self-management system, the social organization of knowledge and the community controls on harvesting. Felt argues for a co-management system which combines the strongest attributes of both systems.

Finley, K. 1990. "A Community-Based Conservation Strategy for the Bowhead Whale." in the Canadian Environmental Assessment Research Council draft Background Paper on Traditional Ecological Knowledge and Environmental impact Assessment. 101 pages.

This project, initiated by the Canadian Environmental Assessment Research Council, was designed to assist in the evolution of community-based conservation strategies by securing the participation of community elders, by incorporating their knowledge into the decision-making process and by establishing a casual forum for the exchange of scientific and traditional knowledge,

Gadgii, M., and Berkes, F. 1990. Traditional Resource Management Systems. Draft Report to Resource Management and Optimization. 28 pages.

The western view of humans being entitled to dominate and utilize nature at will has gradually changed since the mid-nineteenth century. Nevertheless the science-based techniques of resource management that have developed are applicable almost entirely to single species populations in highly simplified ecosystems. Alternatively, diverse traditional cultures have elaborated management systems more consistent with the ecosystem view and with current ecological theory. This paper explores the synthesis of traditional and scientific ecology.

Gunn, A.; Arlooktoo, G.; and Kaomayok, D. 1988. "The Contribution of Ecological Knowledge of the Inuit to Wildlife Management in the Northwest Territories." Traditional Knowledge and Renewable Resource Management in Northern Regions, Edited by M. Freeman and L. Carbyn. Edmonton: Boreal Institute for Northern Studies, Occasional Paper No. 23, pp. 22-30.

By examining examples of data drawn both from scientific circles and from the observations made by hunters, the authors point out several issues that require consideration when integrating western scientific and traditional knowledge. The authors suggest that the use of local knowledge of place names as signs of land use would help the researcher identify specific locations as regional patterns **utilized** over long periods of time.

Johnson, M. 1989. "The Role of Traditional Knowledge in Northern Development." Northern Hydrocarbon Development in the Nineties: A Global Perspective. Ottawa: Geotechnical Science Laboratories, Carleton University, pp. 29-34.

Johnson examines the need of northern native peoples to become more actively involved in the documentation and collection of scientific information. The **paper addresses the difficulty** of the inter-relationship between southern scientists and native people when research is conducted. The author concludes with two main questions: (1) how can systems of knowledge **based on** different approaches be compared; **and (2) how can traditional knowledge be used to** develop a system of wildlife management for the north that successfully integrates both scientific and native perspectives?

Lewis, H. 1989. "Ecological and Technological Knowledge of Fire: Aborigines Versus **Park Rangers** in Northern Australia." American Anthropologist, Vol. 91 No. 4, pp. 940-961.

The attitudes held by Euro-Australians about bush-fires are markedly different from those of aborigines. These contrasting perspectives confront each other in different practices of prescribed burning employed by aborigines and Australian National Parks **and Wildlife Service** rangers at Kakadu National Park in the Northern Territories. Lewis points **out that a large part of the knowledge** and practice involves the perceptions which Euro-Australians have about "simple" aboriginal technologies.

**McCullum, J., and Ruben, A. 1990. Northern Canadian Community Conservation Initiatives: A Report from the Community Perspective. Yellowknife: Department of Renewable Resources, 31 pages.**

Communities throughout northern Canada have started to develop conservation **initiatives** to protect the wildlife **and other resources upon which they depend. This report documents community conservation** initiatives from the **perspective of the community using community researchers to interview local people involved** in the following **projects: The Paulatuk Conservation Plan, the Sanikiluaq Adaptive Reindeer Management Plan, the Old Crow Conservation Strategy** and the Clyde River **Bowhead** Whale Sanctuary Project

McDonald, M. 1988. "An Overview of Adaptive Management of Renewable Resources." Traditional Knowledge and Renewable Resource Management in Northern Regions. Edited by M. Freeman and L. Carbyn. Edmonton: Boreal Institute for Northern Studies, pp. 65-71.

Adaptive environmental management is a technique that attempts to address the problem of uncertainty or change in the management of ecological systems. Whereas most modern management techniques, such as EIA, assume there is a solid knowledge base upon which to make predictions and decisions, the adaptive environmental management approach assumes complete ignorance in terms of consequence. In practice the technique involves constant updating and improving of the management system as further understanding is obtained through direct experience. The author proposes that this technique be used as a framework to integrate the traditionally- based, culturally- encoded systems of native people and conventional science- based information.

Osherenko, G. 1988. Sharing Power with Native Users: Co-Management Regimes for Native Wildlife. Ottawa: Canadian Arctic Resources Committee.

Osherenko presents **a survey of co-management regimes** in the arctic including Alaskan whaling, Inuvialuit wildlife harvesting and management, Porcupine Caribou Herd management and Beluga whale management. Osherenko makes the case that a cooperative management approach is a more 'appropriate method to create a climate for sustainable development than is a confrontational [management approach.



Pinxten, R. **1980**. "Dimensions of Science and Science Policy: Some Notes and Queries." Communication and Cognition, Vol. 13 No. 2-3, pp. 127-132.

Using insights gained from previous studies on Indian people in North America, Pinxten describes some philosophical aspects of scientific knowledge. The author discusses the **various dimensions of the Indian knowledge system and argues that science policy-makers may avoid the unbalanced approach to development that results in or from a too-limited and culturally- biased perspective.**

Pitt, D. **1985**. "Towards Ethnoconservation," Culture and Conservation: The Human Dimension in Environmental Planning. Edited by J. **NcNeely** and D. **Pitt**. London: **IUCN/Croom Helm**, pp. **283- 295**.

Pitt examines the difficulty of incorporating anthropology into conservation activities, particularly when these activities cross disciplinary boundaries. In this analysis the author suggests that it is necessary to create a new discipline which crosses boundaries to incorporate both the so-called "hard" and "soft" scientific information. This information can be drawn from many sources including traditional knowledge and folk ecology.

Riewe, R., and Gamble, L.. **1988**. "The Inuit and Wildlife Management Today." Traditional Knowledge and Renewable Resource Management in Northern Regions. Edited by M. Freeman and L. Carbyn. Edmonton: Boreal Institute for Northern Studies, Occasional Paper No. 23, pp. **31- 37**.

By using case studies of Inuit harvesting of geese and eggs, and of caribou management, Riewe and Gamble point out the chasms which exist between those who must enforce southern approaches to wildlife management, and those who rely on wildlife resources for their economic and cultural survival. The authors also examine the problems faced by southern-trained wildlife managers in adapting to another culture in terms of wildlife use and management. This is highlighted by problems faced by younger hunters, caught between southern management styles and a general lack of information from elders with regard to appropriate harvesting techniques. The authors also examine the need to define **what are appropriate customary** modes of harvesting and suggest that the reintroduction **of customary** law may be part of the solution in a co-management structure.

Robinson, J.; Francis, G.; **Legge, R.**; and Lerner, **S. 1990.** "Defining a Sustainable Society." Alternatives, Vol. 17 No. 2, pp. 36-46.

The authors examine the nature of ecological sustainability and develop a working definition based on the desirable characteristics of a future society. Their interpretation of sustainability is grounded **in the principle that the natural world is inherently "good"** and that its ability to regenerate has intrinsic value **for human society. They discuss the relationships between an ecosystem** perspective of the environment and socio-political systems..

Romaine, M. 1974. Canada's Northland: The Opportunity for and Integrated Approach to Inventorying Base-line Data. Ottawa: Environment Canada, 12 pages.

This background paper presents a description of the Northern Land Use Information Database and its ability to store and organize vast quantities of "land" information. While this information is southern-science oriented, the organization of the database into the **categories** of Land Region, Land District, Land System, Land Type and Land Phase - based on naturally occurring environmental divisions - will lend itself to the inclusion of traditional knowledge. Romaine also describes the applications of the data, including land-use planning.

Ross, I-I. 1990. "Community Social Impact Assessment: A Framework for Indigenous Peoples." Environmental Impact Assessment Review, Vol. 10, pp. 185-193.

Ross presents a community, social impact assessment framework for indigenous people which was developed on the basis of a study conducted with a group of East Kimberly aboriginal communities in western Australia. The framework involves community control with an emphasis on community values, perspectives and social context. It requires research methods with which aboriginal people are comfortable and which effectively represent their points of view. The framework also includes a cumulative regional and historical view and takes a social development approach.

**Shapcott, C.** 1990. "Environmental Impact Assessment and Resource Management: Learning from the Process and Practice of Native People." **In the Canadian Environmental Assessment Research Council draft Background Paper on Traditional Ecological Knowledge and Environmental Impact Assessment**. 101 pages.

This report focuses upon environmental impact assessment and resource management within the context of native society. This translates in two ways: one addresses native participation within established processes and practices while the other considers how native people envision their own **processes** and practices, in the event that they regain sovereignty over their lands.

**Shiva, Vandana.** 1989. Staying Alive: Women, Ecology and Environment. London: Zed Books Ltd.

**Shiva analyzes** the assumptions and myths within western patriarchy and science to provide a more complete understanding of development issues as they affect women's lives. She develops a feminist ecological approach to addressing our environmental crisis. **This approach incorporates** the knowledge and experience of both men and women.

Warren, D. 1990. Indigenous Knowledge and Development. Revised Version From Original Background Paper for Seminar Series on Sociology and Natural Resource Management, The World Bank, 1991.

This World Bank discussion paper reviews three types of project scenarios: **(1)** projects where **local** knowledge provided an improved approach to managing natural resources than did proposed project technologies; **(2)** projects that inadvertently ignored indigenous technologies; and **(3)** projects whose success in meeting their objectives **can be** linked to the deliberate incorporation of indigenous knowledge components. Warren points out that the **case** for using indigenous knowledge in project work is straightforward: technical solutions to unperceived problems are not readily adopted, new technologies that duplicate - or mimic - indigenous ones are superfluous, and ignoring local approaches to **local problems is** wasteful.

\_\_\_\_\_; Brokensha, D.; and Slikkerveer, L., eds. 1991. Indigenous Knowledge Systems: The Cultural Dimension of Development. London: Keegan Paul International.

The broad scope of this volume reflects a growing recognition and use by development professionals of indigenous knowledge **in many environmental and agricultural fields.** The volume consists of **45 papers in total.** **Some are case studies drawn from various developing countries.** **Others are conceptual papers examining a wide** range of subjects including indigenous decision-making, indigenous **organizations,** indigenous experimentation **and indigenous** institutions and knowledge. The volume also includes bibliographic essays on indigenous knowledge.

Wolfe, J.; Bechard, C.; Cbek, P.; and Cole, D. 1991. Indigenous and Western Knowledge and Resource Management Systems. Guelph: University School of Rural Planning and Development.

This paper introduces western and indigenous knowledge systems and explores ideas about intuitive and analytical modes of cognitive knowledge systems. The study also reviews work done by other authors in examining and comparing the nature of indigenous and scientific knowledge systems and some of the barriers to bridging these two knowledge paradigms. The final section presents some implications for effective co-management between the state and indigenous people with reference to the requisites for effective self-government.

### **III. Audio-Visual Materials, Canada**

#### **FIRES OF SPRING**

Canada, 1978, 33 minutes, colour, English

Production: Boreal Institute for Northern Studies, University of Alberta

This film shows how the Slavey Indian Nation of Alberta ignites yearly spring fires to control overgrowth, improve local conditions and reduce risks of uncontrolled fires from lightning and spontaneous combustion.

#### **FORT GOOD HOPE**

Canada, 1977, 47 minutes, colour, English

Production: National Film Board

Filmed during the Berger Inquiry into the Mackenzie Valley Pipeline, this film presents the native view that the pipeline would destroy their traditional hunting areas and upset the balance of nature. The film raises important questions about the impact of northern development on traditional native livelihoods.

#### **JAMES BAY AGREEMENT (THE)**

Canada, 1987, 9 minutes, colour, English/French

Production: Department of Indian Affairs and Northern Development, Government of Canada

This brief narrative examines the 1975 James Bay and Northern Quebec Agreement and its significance in the lives of the 17,000 Cree and Inuit people in northern Quebec. The video develops a theme concerning the degree of cooperation achieved among the aboriginal people of the region and the governments of both Canada and Quebec.

**MACKENZIE VALLEY PIPELINE: A NATIVE PERSPECTIVE**

Canada, 1975, 28 minutes, colour, English  
Production: Native Communications Corporation

This film presents a cross-section of native opinion in the aftermath of the Berger Report into the Mackenzie Valley Pipeline and attempts to dispel certain misconceptions concerning how native people live in the Northwest Territories and how they wish to live. The people in this film agree that development should be controlled by the native people themselves, and that their land claims should be equitably settled prior to northern development proceeding,

**NORTH OF 60: DESTINY UNCERTAIN**

Canada, 1985, 13 programs of 26 minutes each, colour, English/French  
Production: TV Ontario for the Department of Indian Affairs and Northern Development, Government of Canada

**BEAUTIFUL ADVERSITY**

This film looks at the limited but beautiful plant, animal and bird life north the 60th parallel. It also examines the relationship of the native people to the land and at the importance of that relationship. Another theme is the necessity of creating national parks to preserve some measure of the wilderness.

**NEW WAYS OF KNOWING**

This film examines how traditional native knowledge is often ignored by southern Canadians who believe that only their technology can solve the pressing concerns of the north. The film also explores ways in which scientific knowledge and indigenous knowledge can be combined and integrated for the mutual benefit of all. It looks at how various technologies such as communications are being adapted to fit northern needs.

**NORTHERNERS TAKE CHARGE**

This film examines the issue of resource development in the north and poses certain questions pivotal to northern development. These include what roles should governments, natives and non-native residents play and what will be the environmental impact of large-scale resource development. The film underlines the substantial efforts currently underway to address the implications of change.

### **THE THIRD NEW ECONOMY**

This film examines some of the issues facing northern **natives** today and suggests that the question of self-determination poses the greatest political challenge. Although native people seek to retain - or to regain - traditional skills, traditional values and their traditional relationship with the land and with those living things that sustain them, the film suggests they cannot "turn back the clock." Instead they must find a balance between old and new.

### **NUNATSIAQ - THE GOOD LAND**

Canada, 1978, 14 minutes, colour, English

Production: Crawley Films and the Inuit Tapirisat of Canada

This film presents a brief history of the Inuit people, emphasizing their relationship with the land. It provides an examination of their culture, their reaction to the threat of assimilation and their determination to control their own destiny.

### **OUR LAND IS OUR UFE**

Canada, 1974, 58 minutes, colour, English

Production: National Film Board

In March 1974, the Cree of the Mistassini area in northern Quebec met to discuss their long-term future. After 300 years of minimal contact with white society, they are facing encroachment because of the James Bay project and have been offered "compensation", by the government of Quebec, for the anticipated impact of the project on their daily lives. The film watches them as they decide that nothing - neither jobs nor money - means more to them than their land.

## RENOVATION OF TREATY NO. 8

Canada, 1985, 27 minutes, colour, English/French

Production: **AKO Productions for the Department of Indian Affairs and Northern Development, Government of Canada**

In this film native people and government officials discuss Treaty Number 8, negotiated in 1899 and covering an area rich in resources. Interpretation of this Treaty varies from area to area and sometimes affects the livelihood of native trappers in the area. Certain Treaty guarantees have been ignored by the government, especially those relating to hunting, fishing and trapping. A commission has been created to study the impact of this Treaty so the Crown can enter into discussions with the native people.

**SAMI - FOUR LANDS, ONE PEOPLE (THE)**

Canada, 1978, 23 minutes, colour, English

Production: **National Film Board**

There are some 35,000 Sami living in Norway, Sweden, Finland and the Soviet Union. Accustomed to an economy based on reindeer-herding, they are finding that northern development is affecting their traditional way of life. The film examines how they are trying to find a new balance between old traditions and new developments.

## WE REMEMBER

Canada, 1978, 58 minutes, colour, English

Production: Raymond Yakeleya

This two-part film presents, first, historical background on the lifestyles of native people. Based on the recollections of elders, part 1 of the film examines traditional styles of accommodation, travel, food sources and child-rearing. Part 2 of the film examines the opening of northern Canada, the fur traders, resource development and timber operations, and the declining health of native people.



WHERE **THE RIVERS** MEET

**Canada, 1980, 10 minutes, colour, English**

**Production: Films North incorporated**

**This film studies the life and work of Father Rene Fumoleau who, in 1952, arrived in northern Canada as a missionary priest. He spent many years living with the Dene, gaining an understanding of their way of life and their view of the world. As he witnessed the arrival and ever greater encroachment of white society, Fumoleau grew disturbed by the changes being demanded in the traditional value systems of the Dene. The film presents his views on the changes that occur when two distinct cultural systems come in contact.**