THE COST-BENEFIT RELATIONS OF MODERN INUIT HUNTING: THE KAPUIVIMIUT OF FOXE BASIN, N.W.T. CANADA

by

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Abstract

Economic data concerning the costs and benefits of Inuit subsistence in the Igloolik region of Nunavut were collected during the summer of 1992. The purpose of the research was to develop a method of valuation to showcase the high "profit", in economic terms, that harvested country food provides.

Wildlife harvesting in Inuit communities represents a traditional way of life which is threatened by the increasing expansion of wage employment, industrial development and the availability of store bought food. However, rather than having a marginalizing effect, these changes make subsistence hunting an essential economic activity.

This thesis develops a method to measure the harvest of country food through a dollar value standard thus quantifying the real economic benefits of Inuit subsistence. The value of harvested food can then be compared economically to store bought food. This comparison shows that subsistence hunting provides Inuit with a relatively inexpensive food source, equivalent to $6 million of income "in kind" per community in the Baffin Region. In this era of store bought food and wage employment, Inuit communities remain economically and socially integrated through subsistence hunting. Without harvesting, northern communities would be culturally and nutritionally poorer than at any time in the past.

Résumé

Des données économic concernant les coûtes et bénéfices de la subsistance des Inuit d'Igloolik (Nunavut) ont été collectées durent l'été de 1992. Le but de cette recherche était de développer une méthode de valuation qui met en évidence les retombés économiques de la chasse à subsistance.

La chasse à subsistance par les communautés Inuit représente un mode de vie menacé par la croissance des emploies rénumérés, le dévelopement industriel et l'accessibilité de la nourriture achetée en magasin. Par coutre, au lieu de produire un effet de marginalization, ces changements rendent la chasse à subsistance une activè économique essenciel.

Cette thèse dévelope une méthode pour measure la récolte en viande d'une chasse en terne de valuer monètaire, ainsi démontrant la valuer réel de la subsistance Inuit. La valuer de la nourriture peut ainsi être comparée à celle de la nourriture achetée en magasin. Cette comparaison démontre que la chasse de subsistance représente une source de la nourriture peu coûteuse, équivallent $6 million par communauté dans la région de Baffin. Dans cette ere d'emploies rénumérés et de magazin de nourriture, les communautés Inuit demeurent économiquement et sociallement intégrés à travers la chasse à subsistance. Sans récoltes, les communautés nordiques seraient plus pauvre, culturellement et nutritionnellement, qu'au paravant.

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Chapter 1 - Introduction

The objective of this research is to analyze the socioeconomic importance of hunting to contemporary Inuit society. Snow machines, rifles, outboard motors and boats, not to mention gas and oil, are all tools needed by Inuit to be efficient hunters. However, these tools require substantial amounts of money to purchase and operate in today's north. Indeed, in this modern era, the Inuit economy is dominated by the presence of money, as money is a requirement of hunting.

Without any apparent large monetary return, hunting, and Inuit subsistence in general, acquire the appearance of being at best a money sink, with (often) thousands of dollars going in and "nothing" (in dollars) coming out. It is this apparent lack of productivity, that has led some anaiysts to conclude that modern Inuit hunting is an anachronistic tradition that has lost economic meaning in today's world. This thesis provides information about Inuit subsistence by demonstrating the potential overall economic benefits of hunting through (1) the food harvested and (2) the money saved. Its intent is to develop a deeper understanding of Inuit subsistence practice and ideology in relation to high cost technology and wage employment.

Northern planners and developers (see Wilmott 1961; Vallee 1962; Vallee et al 1984) have long held the view that Inuit subsistence is a lifestyle no longer essential to Inuit life. This is largely because subsistence is considered a drain on Inuit time and money. The reason being, it assumes that the technology required to hunt renewable resource has become to expensive relative to any economic gain. Generally overlooked and ignored, however, is the main output of modern subsistence is an abundant and highly nutritious food (see Mackey 1984). If Inuit communities were no longer able to

rely upon this nutritious food source they would be forced to buy their food from local stores, a costly and far less nutritional alternative. Due to its expense, it's also unlikely that store-food could ever be shared to the extent of country-food. Unlike store-bought food, harvest products (such as seal, caribou, and walrus) are shared throughout Inuit villages (Wenzel 1995). This sharing network is vital in Inuit communities since it provides the population with a healthy supply of free, and nutritious food. Compared to buying food from the store, hunting still provides a way of life which is both more desirable for Inuit and one which makes good economic sense.

This thesis will examine the perceived "high cost, low return" aspect of contemporary hunting in the Igloolik-Foxe Basin region. Its focus is whether there are circumstances in which subsistence harvesting holds socioeconomic advantages for Inuit when compared to a possible lifestyle of "store foods". To do this, a cost-benefit methodology is employed that factors non-cash variables (edible meat and hunter time) of Inuit harvest effort in relation to the cash costs of operating and maintaining hunting equipment.

A key feature of this approach rest in the fact that effort invested by hunters (active hunting time) and the products that result from this investment (edible meats) are assigned an imputed (monetary) value. A quantitative comparison is then made between the formerly monetized and non-cash inputs essential to subsistence. This makes it possible to test whether subsistence hunting provides Inuit with a relatively inexpensive source of food when compared to a store-bought food diet. It hypothesized here that moneys derived from wages, social transfers, or other sources (like gambling) are well spent when invested in subsistence harvesting. Ultimately, it hopes to demonstrate in the

truest economic sense, that money directed into subsistence provides the greatest return per food dollar invested.

In many ways, this study is about Inuit economic choices and the perceived conflict between wage employment and hunting. Put another way, this choice is between country-food and store food. If we assume that Inuit ecological-economic behavior reflects rational choices, then, despite the complexities of mixed northern economy, this thesis develops a more inclusive measure of costs and benefits than is presently found in northern economic evaluations (Wenzel 1985; Smith 1991).

1.1 Outlining Subsistence

Subsistence is a system that involves the local production, distribution of goods, services, and even ceremonial products (Langdon 1984). Its objective is neither self sufficiency nor capital formation but rather a continuous flow of goods, services and other products (ibid.; see also Sahlins 1972). This "informal" economic system, while often interactive with larger market economies, is aimed at the minimization of risk and insecurity through the local provisioning of daily food and other needs (Wenzel 1995). Thus, a subsistence economy is a highly specialized mode of production and distribution of not only material goods and services (including money), but also of social forms (Marks 1976, 1977).

Demonstrating the economic worth of subsistence is difficult precisely because its quantitative attributes differ from Western ideas of individual production and private property. This thesis is designed to provide another means by which to value modern Inuit subsistence. Real dollar values cannot be easily placed on harvested resources

because concepts like production for profit, formal contracts, market structures, surplus value, and capital accumulation are generally absent from subsistence relations. Also, much of what constitutes subsistence, especially some material outputs, no longer has monetary value due to recent changes in the northern economy (Wenzel 1991).

Ultimately, the intent of this research is to show that even in this era of new technologies, wage employment, schooling, and imported food, hunting remains an efficient way for Inuit to obtain their food. To explain this in relation to subsistence, it is necessary to examine all the inputs and outputs of this system. Modern subsistence by its nature now includes mechanized transportation, new storage and capture technologies, all of which require money. But it still depends on "natural or traditional capital"- Inuit labor and environmental knowledge (Olson 1980).

The outputs of a subsistence system include a range of foods (mainly meats), all with superior nutritional value relative to the imported food found in northern stores (Mackey 1984). Byproducts from the harvest include walrus and narwhal ivory as well as furs that can sometimes be sold raw or made into handicrafts. Finally, there is the social value of "being out on the land, " a product that goes far beyond the weighing of material cost and benefits and is sometimes termed "psychic income" (Neale 1971).

To establish this proposition, an econometric, cost-benefit approach will be employed in examining the ecological and economic relations of a single Foxe Basin outpost camp associated with the community of Igloolik, in Canada's Northwest Territories (NWT). This camp is far removed from most sources of cash income normally available to Inuit who reside in Igloolik. The data in this thesis will show that despite only marginal access to money, camp life remains a viable economic choice. The reason

for this that hunting minimizes the costs of the most cash expensive item required for northern living today, namely food. To document this, a cost-benefit approach has been chosen as the best means for testing this proposition. For it provides consistent quantitative parameters which frame the presentation and discussion of all the data.

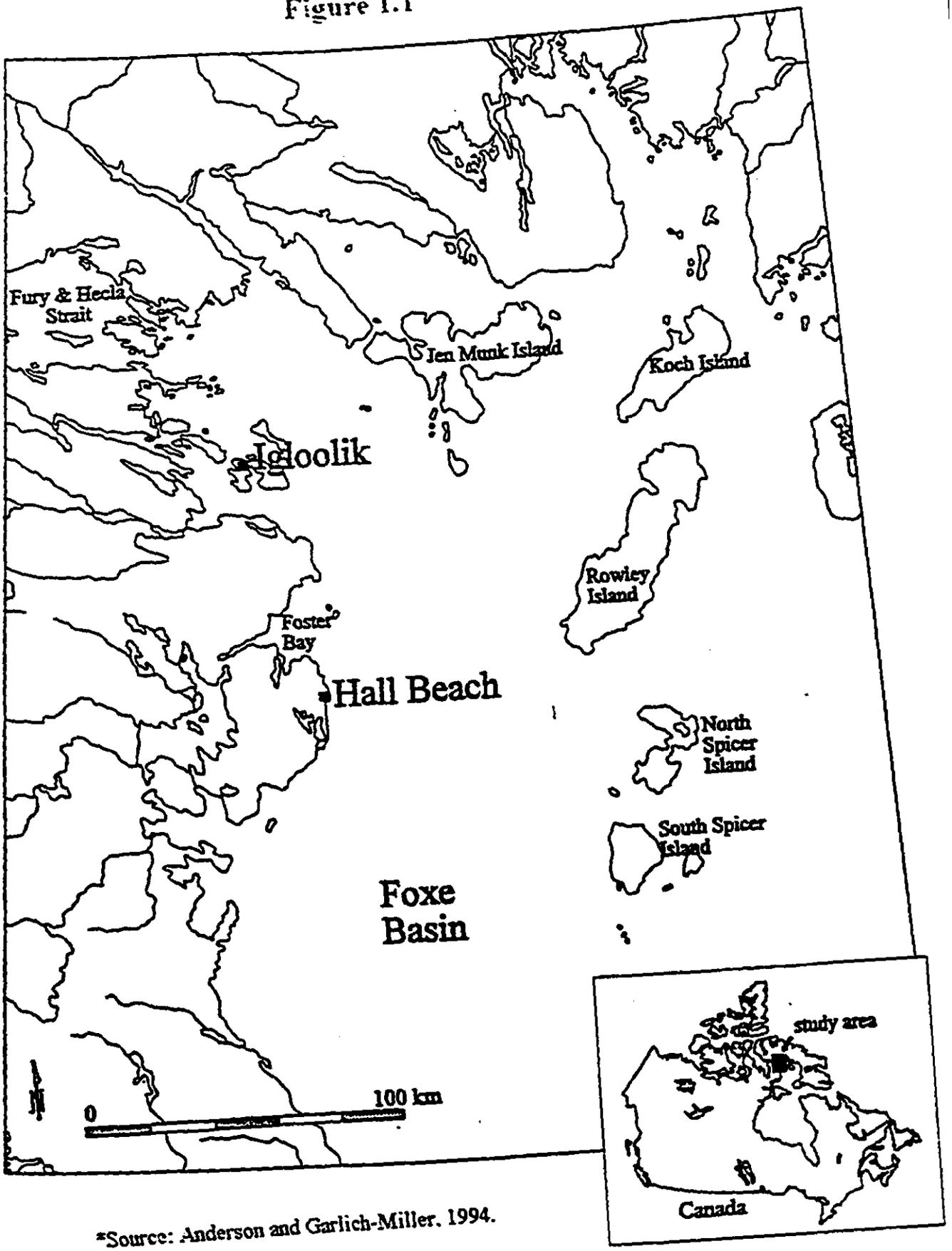
There is no doubt that contemporary Inuit participation in subsistence requires large outlays of money. The core of this research, however, shows that although subsistence is costly for the purchase, operation, and maintenance of transport technology it will in the long run provide Inuit with a way of life that is economically feasible and culturally consistent.

1.2 Field Site and Data Collection

From May to September 1992, field research was conducted in the Igloolik-Foxe Basin region of Canada's NWT (see Figure 1.1). The purpose was to assess Igloolik Inuit subsistence strategies, particularly the value of harvest production in the contemporary mixed economy. Data for this thesis was collected in two main venues; the village of Igloolik and the outpost camp of Kapuivik.

On arrival in Igloolik, two inventory/surveys were conducted at the retail stores in the community. The first survey concerned the "real cost" associated with hunting and fishing while the other was aimed at gathering food prices (especially meats) for future comparisons with the country-food harvest. At the two local stores, the Northern and the Igloolik Co-op, all potential hunting tools were surveyed - from snow machines to

Figure 1.1



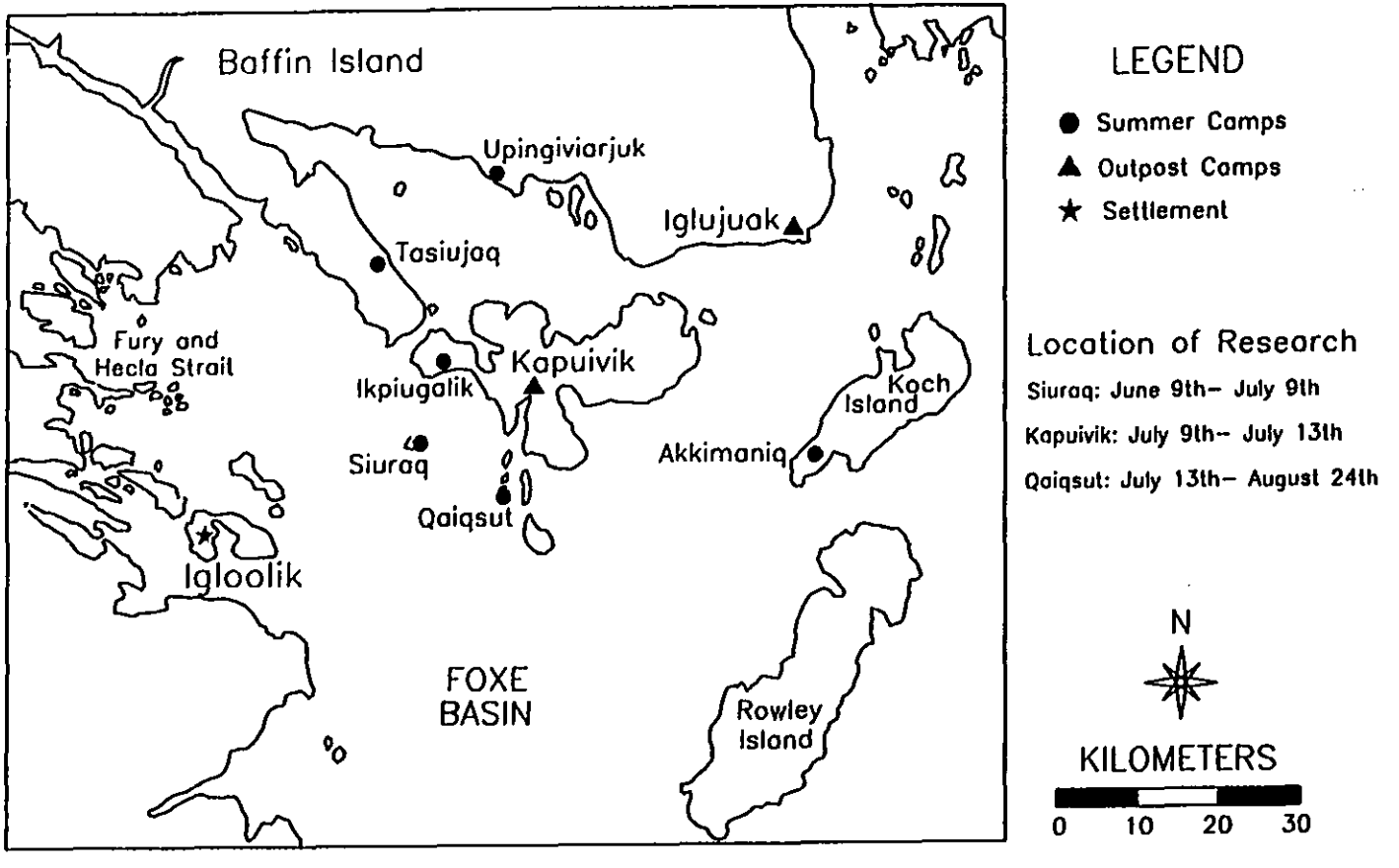
*Source: Anderson and Garlich-Miller, 1994.

tents and Coleman stoves - were recorded by type and price. Also recorded were the price of imported foods at the store, especially meat and fish products. As well, operating expenses like gasoline and oil were also recorded. This information was aimed towards understanding the cash costs of hunting equipment and to understand the cost of food

The hunting data were collected at the outpost camp of Kapuivik and associated summer camps (see Figure 1.2). Hunting data concentrated on actual costs of harvesting per hunt. For instance, data on the amount of gas, oil, and ammunition used during the hunt was measured. Also, data on what was harvested, how much, where, and the amount of time used during various hunting activities were collected on a per hunt basis. Other data collected concerned the approximate "edible weights" of harvested species (amount of meat return from a hunt) and general aspects of daily camp life, such as sharing of the harvest, weather and hunting decisions.

The research was conducted at and near the outpost camp of Kapuivik. Being away from the settlement of Igloolik provided the opportunity to detail the non-monetized aspects of subsistence for "value comparison" and thus evaluate, quantitatively, the dynamic between Inuit, the ecosystem, and their economic decision making within the general physical, biological and cultural context of the region. The major upshot of this is ultimately to demonstrate that the principle thrust of the Igloolik Inuit economy is toward a sustainable economic adaptation which produces not only a bioenergetic return, but also huge social benefits not offered by wage employment.

Figure **2.1**
Kapuivik Summer Camps, 1992.



Data collection at Kapuivik was done mainly by participant observation. Because it was crucial to itemize hunting activity (especially the time allocated to various hunt elements), I accompanied nearly all the hunting excursions made by outpost camp members. Data from hunts which I did not accompany were recorded in post-hunt interviews with participants. Both participant observation and interview data were recorded on the same form.

The direct observation of Kapuivimiut hunting activities served three purposes in this research. It provided accurate records with details on hunting behavior and associated context that otherwise would have been impossible. Second, it helped developed an understanding of the complexities of modern day hunting. Last, these observation were critical in developing time activity records for all members of the outpost camp and in obtaining field and prepared weight data for the animals harvested.

1.3 Chapter Structure and Content

This thesis is structured into six chapters. Following the introduction, chapter two establishes the context of the study within the theoretical framework of mixed economy research in opposition to acculturation theory. By looking into problems raised by Inuit mixed economy participation (an economy that integrates elements of subsistence harvesting and money), the thesis explores several analytical perspectives partially claimed by anthropology, these are foraging theory and micro-economic theory.

Chapter three describes the cultural history of the Foxe Basin Inuit. The history and the general social milieu of the research site are the concerns of this chapter. The

different sections briefly summarize the prehistory and early ethnography of the study area and trace some of the major changes that have been recorded in the period since Western contact. It also discusses the development of the community of Igloolik. Finally, a description of the outpost camp and the research location are presented.

Chapter four provides an overview of contemporary Inuit harvesting practices and details the methodology employed in collecting qualitative and quantitative data, as specific to Kapuivik and Igloolik research situations. The chapter then explains the analytical methods employed in transforming the raw data into an estimate of labor and time cost. Emphasis here is on sample development, participant observation techniques, and imputed value transformations.

Chapter five presents the results of the field work on the cost and value of contemporary subsistence in the Igloolik region during the summer of 1992. The key question explored in this thesis, "how to develop a defensible way to measure the costs and benefits of subsistence in a contemporary Inuit economy" is fully explained in this section. The data collected during the research period is presented in this chapter in order to paint a picture of contemporary Inuit subsistence and shed analytical insight into its continuing relevance. By doing so, this chapter analyses the profitability of hunting by employing a variety of imputed monetary measures to the non-cash aspects critical to successful hunting. The chapter concludes with a comparison of harvesting-subsistence versus wage-store economics.

Chapter six explores life in an Inuit community void of subsistence and country food. A "hypothetical worker" is derived who is dependent entirely upon store-bought food and wage employment. The purpose behind this is to compare a lifestyle of subsistence hunting versus that of wage employment and store-bought food. This is then followed by the conclusion.

Chapter 2 - Theoretical Context: Hunting in a Mixed Economy

2.1 Acculturation Theory

One hundred and fifty years ago, a subsistence lifestyle based on seal, caribou, and bowhead whale clearly formed the social, economic, and spiritual center of Canadian Inuit culture. From that time until the 1960's, successive developments brought commercial whalers, missionaries, policemen, traders, military personnel and finally government administrators to the Canadian North.

New economic activities resulting from these and other developments, in turn, brought Western goods, institutions, and religious beliefs to Inuit. Finally, with the post-1945 monetization of the north an important intellectual change developed among Euro-Canadians towards Inuit. This modern ideology stipulates that money, now firmly entrenched in the north, created a consumerist and materialist environment in which subsistence, as the way of life, could not be sustained. This perception of negative change has academic roots in acculturation theory which suggested that hunting was "primitive" and that with increased reliance on modern convenience, Inuit hunting would soon become obsolete (Usher 1981; Matthiasson 1992).

Early northern economic planning embraced the view that the subsistence (hunting) aspect of the Inuit economy - mirroring the transformation of Inuit to the environment and its resources - was becoming increasingly unproductive since money, new technologies, and population relocation and expansion inevitably replaced traditional Inuit ecological and economic relations. In fact, Vallee (1962) took the position in the late 1950s that a clear social division was occurring within Inuit society.

This was the result of one societal segment (the "Kabloonamiut") embracing intense participation in the wage economy while "Nunamiut", (Inuit who remained involved in the practice of subsistence) (ibid), gradually lost economic importance. Because of the assumed inevitability of the further erosion of traditional Inuit culture as money exerted greater effect, planners came to see subsistence as an economic burden for Inuit, rather than as an adaptive factor that could contribute significantly to the material and cultural stability of modern Inuit society.

To no small degree, the basic tenets of acculturation theory (see Mathiasson 1992) continue to contribute to the way Southerners perceive Inuit subsistence. Believing that subsistence is at best a tenuous way to earn a living, northern economic planning has largely discounted subsistence as a significant economic or cultural contributor to modern Inuit life. Rather than value country-food hunting as a means of ensuring cultural cohesion and material integrity, subsistence came to be seen as an inhibitor of socioeconomic development. Indeed, this perception remains a very real aspect of non-Inuit awareness of the modern north (see Siddon 1992).

It is clear that, as Wenzel (1991) says, for many non-Inuit, a north that is ostensibly dominated by money, modern guns, snow machines, television, nintendo and alcohol can not support any notion of subsistence, let alone "traditional" Inuit. Ultimately, the dialectical view of Inuit economy stratifies Inuit (Vallee 1962), as being either traditional or modern in lifestyle. An Inuk must be one or the other, with "Kabloonamiut" values and occupations ascending at the cost of traditional economic pursuits.

2.2 The Mixed Economy

More recently, a number of anthropologists and geographers (Smith 1984, 1991; Wenzel 1986, 1991; see also Langdon 1984) have suggested that Inuit harvesting has adapted cash as a feature of subsistence relations, coalescing into what has been called a "mixed economy" (see Berger 1977). The conception of a mixed economy is one in which the indigenous economic strategy is not separate from the introduced economy, but is a co-equal and dynamic product of resource integration. In essence, money has been adapted by the Inuit as a means for meeting the high cost of capitalizing, operating, and maintaining modern hunting. The return is high-quality food for bioenergetic, social, and occasionally commercial exchange. Subsistence harvesting, therefore, makes it possible for individuals to minimize their dependence on imported resources in a most critical area- food- and to optimize the utility function of money.

The essence of the mixed economy approach is simply that the decisions of contemporary Inuit hunters are formed in a highly complex harvest-wage-transfer economy matrix. Out of necessity, Inuit make a synthesis of the diverse cost and benefits inherent in these economic alternatives. Neither kilograms of meat, nor money are excluded from this mix. Rather, Inuit decide whether and at what rate to participate in wage employment, harvesting or even non-economic activities.

Many aspects of the subsistence process cannot be understood outside the context of the monetary economy that supports the hunting economy. By the same token, decisions about earning and allocating money cannot be considered without including harvesting, which, while a minor source of monetary income, is a major input into the food economy of most Inuit communities, as well as the primary target of Inuit monetary

investments (Smith 1991). As a result, although wage employment and the market system are now quite familiar to Northerners, there continues to be a substantial level of economic activity that takes places outside the formal market sphere.

Thus, subsistence does not constitute a separate and distinct economy in northern communities, but is combined, at the individual, the household, and the village level with wage labor and transfer payments. Inuit communities have the appearance of "modern" economic activity, but are underpinned by distinctive ecological, social and property relations (see Wenzel 1991; Usher 1976).

As in the past, the production of income contributed by any single economic resource, shifts with fluctuations in the environmental, market, and wage subsystems. Barring major changes in the region's economic base the subsistence sector will continue to provide a substantial part of a family's total income (GNWT 1985). While subsistence is not based on profit-maximization, the creation of surplus, the elements and methods of distribution are similar to those of market economies- trading, sharing, selling, bartering, gift giving, debt, credit, obligation, reciprocity, partnerships, middlemen, and so on. Such distribution features allow subsistence participants to specialize or divide their labor to maximize skills, minimize redundancy and competition, obtain a sufficient quantity and diversity of goods and services, and provide for the very young, and the very old. In Inuit society these features are not controlled by market principles, but through well defined social rules (Dalton 1971; Wenzel 1991).

The market component of Inuit economics is often subject to change due to external forces: periodic dislocation and re-adaptation is the life experiences of most people in modern, mixed, subsistence-based economies. In the contemporary mixed

economy, individual Inuit are concerned with a set of choices and alternatives quite different from those considered by either classical economic theory or in traditional subsistence studies. Decisions about hunting and the use (consumption and distribution) of resources are not separable from activities in the exchange economy.

The relationship between a cash economy and the traditional northern economy sectors need not be characterized either by total separation or total assimilation, but may occupy some middle ground characterized by an interaction that is beneficial to both sectors. As Tuck (1980) points out, subsistence economies are so different from traditional Western economies that some value conflict must occur, particularly over the issue of economic development. What happens when cash is injected into a traditional hunting economy? Does cash precipitate a progression of transformations in the economy and culture away from traditional systems and toward new socioeconomic patterns? Or, alternatively, does cash become integrated into customary patterns of economic activity so as to preserve and reinforce traditional systems of economy, society, and culture?

Inuit seek sources of cash income because this cash can be converted into useful desirable things (one of which is traditional country-food). Inuit value hunting because it too generates useful and desirable things (one of which is cash), but also because of the cultural and emotional value Inuit place on hunting activities.

Borré (1989) has identified a clear relationship between subsistence harvesting as having continuing nutritional importance for Inuit engaged in wage labor. Likewise, money acquired through wages provides an important fall-back in times when hunting and harvesting country-food is either difficult or impossible due to environmental

constraints. Government and economic planners have, however, generally overlooked subsistence harvesting as having defined and measurable economic value and failed to note that this "informal" sector balances monetized economic relations.

Life in the north is now dominated by money, mechanized technology and southern institutions. This research will show that, despite the presence of these modern intrusions, subsistence harvesting continues to be the most viable and sustainable economic alternative. The view here is that in ecological terms, money plays a resource role that contributes to, rather than disrupts, Inuit subsistence activities and relations. Returns from subsistence activities strengthen Inuit livelihood in times when cash is unavailable or scarce. Without the economic, albeit non-cash, benefit that subsistence harvesting provides, Inuit communities would in fact be totally dependent upon external resources (mainly wages and transfer payments) for their economic well-being.

2.3 How To Value Inuit Hunting

There is an essential difficulty in attempting to assess modern Inuit hunting in cost-benefit terms. This is the problem of how to best quantify the various inputs (costs) and outputs (benefits) that comprise Inuit hunting. Unfortunately, modernity has greatly complicated an already technical and difficult methodological problem.

Twenty-five years ago, Kemp (1971) analyzed the flow of energy between Inuit and their local environment using energy as his currency. Today, a similar analysis is considerably more complex. While effort (calculated as activity time) and energy (typically measured by body weight and energy value) are still critical to the subsistence calculation, there is now the additional factor of cash. Consequently, while dollars can

describe the cost of a snow machine or (at one time) the value of a sealskin it is also the case that many aspects of hunting, like waiting at a seal's breathing hole, have no direct monetary translation (Müller-Wille 1978).

Hunting is still essentially about capturing energy, the reality of modern Inuit hunting is that it now demands substantial inputs of money for the purchase, maintenance, and operation of the tools now generally employed in the north. On the other hand, while money is an adequate yardstick for most of the material inputs needed for modern harvesting, others (like hunters' time), as well as most hunting outputs (wild meat), generally have no standardized monetary value.

One of the problems of this type of analysis is how to commonly value time and food in terms of a single, consistent currency. Put another way, while fuel or ammunition expended in hunting are quantifiable in actual dollars, it is more problematic whether such value can be imposed on a hunter's time or the food produced since no actual monetary relationship exists between the inputs and outputs of this process. To no small extent, this problem of measurement and valuation also underlies our understanding of the mixed northern economy.

If an economic understanding of modern Inuit hunting is to be achieved, a coherent and analytically meaningful set of measures must be established between hunter investment and resource return. As Usher (1971; 1976) points out, the material value of subsistence hunting has been consistently underestimated in most studies of contemporary Inuit society because hunting is understood to be economically, i.e. monetarily, unremunerative. It is clear, however, that the large quantities of high quality food that are harvested by Inuit hunters are consumed directly and should be valued as

income. These outputs, therefore, should be included in any detailed cost-benefit analysis of harvesting.

Thus, the basic analytical issue at the core of this thesis resolves into two related methodological problems. The first is how to measure human inputs to subsistence to accurately achieve an "investment" accounting of hunting activities. The other is how to measure the value of the harvest output, in terms of a standard currency. If an economic understanding of modern Inuit hunting is to be achieved, a coherent and analytically acceptable means of measurement must be established to bridge the currency differential between hunter investment (requiring money and time) and resource return (usually measured by food weight).

2.4 Approaches to the Problem

Studies of hunting under traditional conditions (Kemp 1971; Keene 1979; Smith 1980, 1991; Fienup-Riordan 1983) have frequently adopted a bioenergetic or nutritional approach as the most nomothetically valid means of explicating the cost-benefit aspect of Inuit ecological relations. The bioenergetic approach "accounts" for the energy and effort spent in hunting (as measured by time) and for the energy captured through hunting (measurable as edible food weight) by converting relevant variables into a mutually relatable currency- usually calories or joules (Borré 1989; Kemp et al 1977; Müller-Wille 1978; Nowak 1978; Smith 1980; Usher 1971, 1976; and Wolfe 1979).

This literature also demonstrates an apparent disagreement over the significance of modern Inuit subsistence. Controversy exists because there is a lack of a standard and defensible ways to measure the cost and rewards of subsistence. There is also little

understanding or consideration of subsistence as an economic system; often it is too frequently discussed as a cultural legacy or remnant. While the bioenergetic approach still retains ecological and physiological validity, it does little to explain the mixed cultural-economic environment within which Inuit hunting is currently practiced.

Today's Iglulingmiut still allocate large amounts of time to hunting, expend energy searching for and pursuing game, and derive a significant portion of their diet from wild foods. But all of the traditional feedback characteristic of traditional ecological relations are overshadowed by the presence of money and its overarching role in hunting. Indeed, the analytical problem of the contemporary mixed economy, in which cash and non-cash inputs and outputs interact, is to assign a single unit measure applicable and meaningful to all cost-benefit elements.

The most significant modern Inuit material inputs to hunting are money based. Snow machines, guns, and boats require considerable amounts of money for their purchase. Further, the operational cost incurred in the use of these tools - fuel, oil and ammunition, also requires money. This cash investment element of modern hunting is viewed as the primary dynamic (and determinant) of Inuit harvesting (Vallee et al 1984). As long as harvesting produces commodities exchangeable for money, this dynamic seems as analytically stable as the bioenergetic one. However, as Wenzel (1991) shows with his discussion on the European Community boycott of sealskins, such economic stability in northern communities no longer exists. We still face the problem of how to best represent today's subsistence activities through a single unit standard.

2.5 Cost- Benefit Currency Representation

The methodological approach adopted in this research (which will be elaborated in Chapter Four) follows work done by Smith (1991) on the East Hudson Bay coast of Nunavik at Inujjuaq and by Wenzel (1991) at Clyde River, eastern Baffin Island. These two studies focus on analytical currencies in mixed economy situations. Both recognize that while money is still critical to the input phase of the harvesting system, it has, with some exception, become all but eliminated from the system's output. Smith and Wenzel both demonstrate that Inuit harvesting still has a significant time-energy input component which produces substantial output, at least as long as sufficient moneys for the large scale purchase of imported foods is unavailable.

To achieve equivalency between monetary and non-cash inputs and outputs, both Wenzel and Smith have applied an imputed dollar value to all formally non-monetized harvesting elements, like the time spent hunting, and the edible portion of food brought back from a successful harvest. They treat a hunters time (the time spent searching and stalking) in the same way that it is in a "normal" work situation. Thus, time used in harvesting is given an (imputed) dollar standard. In essence, it is assigned an hourly "wage". Likewise, the food return from hunting is "priced" at a standard comparable to imported store foods. The assumption by both Smith and Wenzel, and here, is that if Inuit did not get considerable return in meat from hunting they would have to purchase the equivalent meat substitute from the local stores.

Chapter 3 - Geography and Cultural History of the Igloolik Region

3.1 A General Overview of the Igloolik- Foxe Basin Region

The community of Igloolik (69°23'N.,81°12'W.), with an Inuit population of over 900 individuals, is located on Igloolik Island in northwestern Foxe Basin between Melville Peninsula and western Baffin Island. Foxe Basin is a particularly rich ecological biome (See Dunbar 1968; Crowe 1969) composed of a shallow sea with winter polynyas that are ideally suited for walrus and other marine mammals. Consequently, this region, (see Figure 1.1) which is roughly bounded by the 67th and 71st parallels of latitude north and the 74th and 89th meridians of longitude west, has supported continuous occupation by Inuit for over forty centuries (Meldgaard 1960, 1962). During this long history of sequential occupation there has been a striking continuity in the cultural landscape, history, and ecology of the region.

The landscape of Igloolik Island, as well as that of other northern Foxe Basin islands and the Baffin and Melville mainland, is very flat. Only a few small hills offer any distinguishing relief. In fact, the most characteristic physical feature of the Foxe Basin is the large polynya (several kilometers wide) that forms to the east of Igloolik Island. The open water of this polynya provides excellent hunting throughout the ice season, usually November to July, for a rich variety of marine animals. In the summer, ringed seals (Phoca hispida), bearded seals (Erignathus barbatus), walrus (Obodenus rosmarus) and small whales like beluga (Delphinapterus leucas) and narwhal (Monodon monoceros) are often abundant and assessable. In addition, the proximity of Melville Peninsula and northern and western Baffin Island provides access to terrestrial and

riverine resources, most notably caribou and arctic char, while the wetlands of Baffin and various Foxe Basin islands allow excellent migratory bird hunting and egg collecting through spring and summer.

3.2 Prehistory

Meldgaard (1960), following the work started by Rowely (1940) were the first to recognize a continuous Inuit occupation in the Igloolik region. Their excavations on the Islands of Igloolik and Jens Munk Land (Kapuivik) distinguish a temporal sequence of Inuit occupation which extends through four or five distinct Inuit cultural phases, Pre-Dorset, Dorset, Thule, Neo-Eskimo and Modern, spanning some 4,000 years.

The first people into the Foxe Basin region have been archaeologically identified as being of the "Sarqaq" Tradition (also referred to as Pre-Dorset/ Paleo-Eskimo), living on what would have then been newly emerging islands (Meldgaard 1960). This Paleo-Eskimo occupation has been radiocarbon dated to 2,000 B.C. Because of the ecological relationship of many of these sites to local polynya, Meldgaard (1957) hypothesized that walrus was of prime importance to Pre-Dorset economy.

The majority of these sites are located in the Jens Munk Island area, near the outpost camp of Kapuivik. The richness of this area has lead archaeologists to speculate that the Foxe Basin was the "core area" for Pre-Dorset and Dorset cultural development (Maxwell 1985). McGhee and Tuck (1976) have demonstrated that Pre-Dorset people occupied the Igloolik region since ca. 1860 B.C., making Igloolik one of the earliest known Inuit occupied areas in the Eastern Canadian Arctic.

The geographical sweep of Maxwell's "core area" (1985) includes what ethnologists consider to have been the Iglulingmiut social area since at least the 18th century (see Mary-Rousseliere 1984), extending from North Baffin Island, across western Foxe Basin, to Repulse Bay-Southampton Island. The fact that the Paleo-Eskimo Culture persisted in the Igloolik area until A.D 1350 (Maxwell 1985: 368) suggests that this core area was also a point of important cultural exchange between the Late Dorset people and the immediate biological and cultural ancestors of present day Inuit, the Thule Culture.

The appearance of Thule culture in the Eastern Arctic over a thousand years ago marks the transition to what we may consider to be modern Inuit. The Thule culture is believed to have developed in northern Alaska and to have rapidly spread across the Canadian Arctic. This movement was in relation to the relatively mild warming during the Second Climatic Optimum, which also extended the range of Thule peoples most prized resource, the bowhead whale (McGhee 1970).

By A.D. 1450, Thule Inuit were forced to adapt their culture to a severe climate change, the Little Ice Age. During this time, the Thule Culture in northern Foxe Basin changed from the "classic" whale hunter model to a form of transition between Thule and Central Eskimo Culture (McGhee 1978). The heavy ice cover and the extreme cold of the 16th and 17th centuries shifted subsistence emphasis away from bowhead whales and towards an ecological adaptation similar to what presently exists in the Igloolik region.

3.3 Early Contact in Foxe Basin

By the 1820's sustained contact began with Europeans. The earliest contact with Iglulingmiut came in 1822 when a Royal Navy expedition under the command of Capt. William Parry visited northwestern Foxe Basin. The expedition reports (Parry 1824, Lyon 1824) are some of the earliest available accounts of Inuit settlement and resource patterns in the Igloolik region. After Parry, the Igloolik region was visited again in the late 1860's by C.F. Hall. He observed villages at Uglit, the Tern Islands, and Igloolik Point (Damas 1963:21).

In Hall's brief time in the Igloolik region, he was able to substantiate Parry's population numbers. While Hall did not formally take a census of the local Igloolik population, Crowe (1969: 33), using Hall's notes, was able to estimate that Foxe Basin had a population of roughly 126 people in 1867. Parry's original estimate in 1822 was under 200. One possible explanation for Parry's higher totals might be due to the attraction of his over wintering vessels for trading, drawing Inuit families from a wider region. Rae (1850) also notes another reason for a mid-century population decline; namely, introduced diseases. He noted the deaths of over 21 Igloolik people in a single influenza outbreak in 1846.

The best post-Hall census information comes from Mathiassen (1928) who spent nearly three years traversing the Iglulingmiut region during his participation in the Fifth Thule Expedition (1921-24). Because of Mathiassen's prolonged contact with the Iglulingmiut, he was able to produce detailed accounts on settlement pattern and seasonal activities during which he recorded 143 people in scattered villages across northern Foxe Basin during the winter of 1921-1922. This is the earliest dependable source of data on

settlement size and pattern in Foxe Basin. However, his overall Iglulingmiut population figure of 504 Inuit, closely coincides with Parry's 1822 estimate of the whole Iglulingmiut population.

All these numbers were recently corroborated by Damas (1963: 23) during his research at Igloolik in 1960. The possibility that the Inuit in the Igloolik region were not affected by Euro-American contact, as were other Central Inuit populations, is evidenced by the fact that the size and structure of the population remained virtually the same between Parry's 1822 visit and the Fifth Thule Expedition one hundred years later (Damas 1963; Parry 1969; Mathiassen 1928).

During the period of limited contact prior to 1945, there was little profound change in the Igloolik Inuit regional subsistence system. In fact, up to Damas' study, the process of cultural modification in the Igloolik region followed a gradual course with no major adjustments (Vestey 1973). The presence of Europeans in Iglulingmiut economic life did little to alter their basic adaptation. On the contrary, rather than being responsible for gradual abandonment of the hunting economy, culture contact made possible a new level of prosperity in the Igloolik region (see Damas 1963). Settlement patterns until 1940's still mirrored the pre-contact era and modifications in traditional Inuit technology and economy coupled with increasing control by a distant Federal power posed only a slight threat to the form and meaning of traditional Iglulingmiut lifestyle.

3.4 Igloolik Early Settlement and Development

The first Western institution in northern Foxe Basin region was the Roman Catholic Church. It was established in 1931 at the settlement of Avajuk, close to present-day Igloolik in order to facilitate easier access by supply boats. The Mission moved to its present location on Turton Bay in 1937. According to Vestey (1973: 39), this move also situated the Mission in the center of the Iglulingmiut regional population.

The Hudson's Bay Company (HBC), recognizing the potential that northern Foxe Basin held as a source of fox furs, opened a trading post at Igloolik in 1939. The opening of this post instigated the move of several families from the southern Iglulingmiut region. This marked the beginning of a new kind of regional identity. Annual trading ventures to posts some 300 miles distant were no longer necessary. The arrival of the Church and the trading post also created a center of Western activity in the area that gradually became the focus for centralization of Inuit settlement (Vestey 1973: 32). The post, complemented by the mission, became the service center for the Iglulingmiut around Foxe Basin.

The introduction of the Peterhead boat and Christianity after 1930 each had dramatic impacts on the Iglulingmiut socioeconomic relations. The Peterheads (whaleboats), according to Damas (1963), were often purchased by the Iglulingmiut from the Hudson's Bay store, usually by several men. These whaleboats served to maintain the cooperative structure of the extended family and the authority of its leader at a time when the rifle individualized subsistence activities (see Balikci 1964). The Peterhead boat also increased the productivity of the walrus hunt and thus made sedentary life a possibility during the winter. However, the process of buying Peterhead boats often took several

years, since the supply at the HBC was undependable and the scarcity of polar bears made any profits (to purchase a boat) from trapping relatively small.

By the 1940's, the population in the Igloolik region had doubled. The reason for this was two fold. The availability of the whaleboat and the continued occurrence of walrus in the area were largely responsible for the high level of meat production in Igloolik. This characterized Iglulingmiut economy during the 1930s (Damas 1963). At the same time, Repulse Bay experienced a large drop in the availability of walrus, which initiated a migration of Inuit to the resource rich Igloolik region (Manning 1943).

After 1940, further acquisition of whaleboats, continuing emigration from Repulse Bay and Arctic Bay, as well as encouragement from the local trader and police officer to disperse and relocate, all resulted in the geographical/ physical fragmentation of the population (Vestey 1973). By 1949, there were nine smaller camps in the Igloolik- Foxe Basin along with two large villages Igloolik, with a population of 68, and Qarmat whose population was 83 (Damas 1963).

The indigenous population of Igloolik doubled during this time due to a higher infant survival rate. In 1949, children out-numbered adults 1.2 to 1 (Stevenson 1993). The introduction of family allowance in 1948 attempted to alleviate the impact of an arctic- wide crash in fox prices, so that by 1950 even more whaleboats, many equipped with engines, entered the region. This development, in turn, continued the trend towards the socioeconomic independence of the extended family (Damas 1963:27). The presence of a trading post, Anglican church and rectory, as well as the availability of seasonal employment and plywood from the Distant Early Warning (DEW) station also contributed to attract Inuit to Igloolik (Damas 1963).

Money became increasingly more important to obtain as new hunting technology became available. However, a crash of fur prices (1945), and the lack of many meaningful jobs, made it difficult to acquire money. The only steady source of cash came mainly from government handouts. Wage employment became more widely available in 1956 with the construction of a DEW Line station in Hall Beach (Damas 1963). However, for most of the next decade, full-time work absorbed fewer than ten Inuit. Seasonal employment during the late summer "sea lift" remained the largest source of wages into the 1970's (Vestey 1973).

Despite family allowances, the crash of the world market for fox furs in 1945 added a new factor in the development of Igloolik. This decline in revenue to Inuit hunters lead to an increased presence of the Canadian government caused by the introduction of a welfare system, family allowances, and health services (Crowe 1969: 74). These, in turn, ushered in a new era of wage employment, cash and education.

In his study of Iglulingmiut kinship and local groupings, Damas (1963) records in detail the settlement pattern, population size and distribution, and seasonal activities as he found them in 1961. At this time, both Igloolik and its southern neighbor, Hall Beach, were growing centers, but the majority of the population still dispersed around the growing community in small villages or camps. This can be seen from Brody (1976: Map 30) who shows that before permanent settlement into the village, Iglulingmiut hunting was conducted along the entire south side of Baffin Island, far into Foxe Basin, into Committee Bay, and down the Melville Peninsula to at least Repulse Bay. The spatial arrangement of the Igloolik harvest activities in Foxe Basin today remains as impressive.

Despite movement into the village during the late 1950's, the seasonal and annual economic cycles of the Iglulingmiut seem to have changed little from contact times. Increased sedentarization brought about more effective modes of hunting and more efficient transportation. Thus, even as Iglulingmiut contact with Europeans intensified renewable resource harvesting remained the mainstay of the indigenous economy (see Crowe 1969; Beaubier 1970; and Mary-Rousseliere 1984). Up until the time of permanent resettlement (between 1950 and 1965), the Igloolik Inuit of the Foxe Basin region relied primarily on a mix of marine and terrestrial animals. Seals, walrus, caribou, fish and other wildlife provided the principal food resources for the Iglulingmiut and were the mainstay of the cash-economy through the sale of harvest byproducts, most notably seal skins and walrus ivory.

It was during the 1960's that the administrative and legal machinery of government began to make increasing inroads into Iglulingmiut mobility and economic autonomy. With the expansion of the village infrastructure (new schools, RCMP post, nursing center, etc.) came money and jobs, but employment also disrupted seasonal groupings and hunting activities. At this time, new opportunities and obligations through wage labor became a reality of Iglulingmiut life. With the concentration of Iglulingmiut settled permanently in the village, a new form of life and a new set of socioeconomic forces came into play.

3.5 Field Site Kapuivik

The outpost camp of Kapuivik is located 64 kms from Igloolik on Jens Munk Island (see Figure 1.2). Kapuivik has been occupied almost continuously since Inuit set foot in the Foxe Basin region some 4,000 years ago. Meldgaard (1957) assumes that the low headlands of the island would have been particularly good spots for marine mammal hunting. "Kapuivik" means "place of animal or fish stabbing", due no doubt to the proximity of some excellent fish lakes and rivers where the fish were so plentiful and visible that hunters could spear them without a fish weir.

In both pre-settlement and contemporary times, Kapuivik outpost camp has generally been a winter occupation site located deep within Skeoch Bay. It is sheltered from winter storms and located near a freshwater river. Local lakes provide excellent winter and spring fishing. At the time of the study, two families resided at Kapuivik on a full-time basis. However, during the spring and summer months they are frequently joined by relatives from Igloolik, Hall Beach, and Arctic Bay who stay for a period of weeks or months.

When research began, the two families were camped at different locals, one on the island of Siuraq (which I eventually joined up with) the other on Jens Munk Island. At the time of this study, the population of Kapuivik consisted of eleven individuals, seven of whom were under the age of sixteen. Throughout the research period the number of children would vary in size with grandchildren sporadically joining or leaving the group. Eventually, near breakup the two families joined up with two more families and moved to the island of Qaiqsut to hunt walrus and caribou. The total Qaiqsut camp population consisted of over twenty-six people, of which only seven were over the age of sixteen.

All families had kinship ties to one another (mainly cousins) and, for the most part, lived and hunted together throughout the entire research period.

As previously mentioned, during the spring and summer the families living at Kapuivik moved from their houses on Skeoch Bay to camp closer to resources. Some of these camps were located near good fishing lakes, others by baby seal dens, and later, out on the outer islands to be closer to good walrus hunting areas. Trips to Igloolik were made only when welfare and transfer payments became available. Each month the families would receive an approximate total of $1300.00 which would in turn be spent at the local stores. The money acquired from these cheques would then be used to purchase gas, oil, ammunition, and various food staples like flour, sugar, milk, tea, and coffee. On average, $500 per month would go towards gas and oil and $800 towards food and other supplies.

Other income made available to Kapuivimiut outpost camp came via the Department of Renewable Resources. These funds are assigned to assist in resettling native inhabitants back on the land and away from the community. Records kept by the Renewable Resources officer showed that Kapuivimiut received $8,000 in grants in 1991 to purchase oil, gas, and construction materials. Most of this fund was used to buy heating fuels for the winter and transportation fuels (oil and gasoline) throughout the year. The majority of the money received by Kapuivimiut thus goes directly into the subsistence sector of the economy. Previously, in 1990, when only one family lived out at Kapuivik the camp was given $2,595.78 for heating oil, $2,810.59 for transportation fuel and $1,622.64 for building materials.

The family situation and camp environment at Kapuivik created an ideal setting in which to conduct this research. First, the outpost camp formed a tight and well-defined social and economic group, offering the opportunity to observe and participate in almost all camp activities. If participant observation was impossible, the physical and demographic size of the community facilitated recovery of this information through post-hunt interviews. The camp also provided information on hunting in an environment almost exclusive of wages and store foods, thus providing excellent contrast to the situation in Igloolik.

Another reason for focusing on an outpost camp was that, as with most outpost camps, life at Kapuivik involved only minimum use of store-bought food. This would provide an excellent future comparison when valuing subsistence living and contrasting it with a life of wage employment and store-bought food. A typical meal at camp would usually consist of seal stew (*uujuq*) usually once a day. Though not extensive, store food did provided some important staples for the camp. Table 3.1 shows the kind of foods that were used to supplement country-food in the local diet.

Table 3.1 Typical Imported Food Inventory, Kapuivik, Igloolik Region.

Items	Cost in Dollars	
Tea	4.51	(72 bags)
Flour	86.70	(50 kgs)
Milk	1.56	(per can)
Crackers	5.47	(1 box)
Hot Cocoa	6.44	(500gm)
Salt	1.63	(350 gm)
Peanut Butter	4.75	(500gm)
Jelly	6.15	(500gm)
Baking Powder	3.79	(225gm)
Sugar	8.21	(4kgs)
Ketchup	6.31	(750 ml)
Soup Packages	2.13	(2 packages)
Total Cost	**$137.67**	

Of the staples, the most important was canned milk (for infants). The ingredients to make bannock were also crucial. Flour was consumed quickly as three to four pans of bannocks representing roughly 1.0 to 1.5kgs of flour were eaten each day. Tea, coffee, and sugar was also and important daily need.

Kapuivik proved to be an excellent location to develop the kind of cost-benefit data-set required for the study. Its small size and restrictive location meant that data on time and effort expended in hunting could be easily observed, and that all the animals harvested, as well as post-hunt economic activities, could be measured or observed and roughly quantified. Idle days caused by bad weather were spent visiting among the families, sitting over maps, drinking tea, and talking about past and recent hunts.

Chapter 4 - Research Methodology and Database

4.1 Introduction

The economic realities of contemporary Inuit life revolve around money and food. In this regard, modern Igloolik is unmistakably different from Mathiassen's (1928) and Rasmussen's (1929) descriptions of nearly seventy years ago. However, despite changes there is no mistaking that wildlife and hunting continue to play major roles in day to day Iglulingmiut lifestyle. A walk through the community at any time of the day (and just as often at night) may reveal, by the absence of snow machines or boats, that hunters are away from the settlement. Even more obvious are racks of drying seal and caribou skins outside many houses, while entry into almost any home provides evidence of a recent meal of arctic char, seal, caribou, or *igunnak* (fermented walrus).

What such a walk, in fact, brings home is the very mixed (and sometimes contradictory) nature of the present Inuit economy. In modern Inuit communities, hunters wear home-sewn sealskin boots and caribou parkas. They also depend upon monetarily expensive tools (snow machines, boats, and high-powered rifles) to capture a variety of biological resources ranging from one ton walrus to small seabird eggs. The majority of these resources provide no substantial cash return, only food. Food that the capture of these animals yields permits not only successful hunters to feed themselves and their families, but the majority of the time can benefit those well beyond the hunter's own household (Wenzel 1995).

This mixture of imported and indigenous technologies and "currencies" highlights two methodological difficulties inherent in any study of the cost-benefit relations of Inuit

harvesting. The first of these is that such an approach requires the acquisition of widely disparate types of information - the amount of time spent in actual hunting versus non-productive (from a harvest perspective) activity, the cash costs of various items needed in modern hunting and, finally, the differential nutritional benefits of country-food relative to each other and relative to those meats found at the local store (Boles et al 1983).

4.2 The Elements of the Database

The difficulties of imputing a cost or value to modern subsistence are considerable. Methodological difficulty stems from the analysis of such disparate data sets. It requires that a common means of valuing (what is on the surface informational apples and oranges) must be found. This chapter effectively assigns a common value to measure harvester time and the kilograms of meat acquired as a result of that activity.

Some analyses of Inuit subsistence economy have sidestepped the difficulties of placing an imputed value to modern subsistence by ignoring monetary cost and returns. As several researchers have pointed out (Berger 1977; Usher 1976) this strategy grossly underestimates the value of subsistence production to the mixed economy. Most of these early efforts to measure Inuit and other indigenous ecological-economic activities rely upon energy (see Kemp 1971; Rappaport 1971) or a key variant such as dietary nutrients (see Keene 1985) as their common comparative "currency". In fact, the bioenergetic input-output analyses of harvesting and subsistence done in the 1960s differ very little in methodological terms from most recent cost-benefit studies of the modern Inuit economy.

In essence, where Kemp (1971), in his study of Lake Harbour Inuit harvesting, used calories as the unit of analysis, Quigley and McBride (1987), in their look at economic relations in the modern Inuit village of Sanikilluaq, used dollars. Importantly, neither study attempts to cross-compare non-cash (caloric) and monetized (dollar) measurements. As a result, food harvesting and cash relations among Inuit are relegated to different "accounts" because each is measured by a different currency.

Such cross-comparison is at the heart of understanding the mixed economy that generally typifies the economic situation for most Inuit. In response to this, proponents of the mixed economy approach (Usher 1976; Smith 1984, 1991; Wenzel 1985, 1991; see also Langdon 1991) have applied a single currency approach to their analyses. In this research, all data to be factored in cost-benefit terms, whether hunter's time, fuel consumption, or kilograms of meat produced, are all converted to dollars.

The obvious advantage of such an approach is that a great many of the inputs to modern Inuit hunting are more easily comprehended as dollars (most government agencies or developers understand dollars better than calories). While the gasoline, oil, and ammunition used by Inuit are all convertible to calories, to do so is cumbersome and clouds the real cost issue surrounding their contribution to harvesting. These and other analyses have simply expressed subsistence as cost per unit harvest (Riewe 1977; Nowak 1978). Although avoiding under evaluation of harvesting, this approach ignores non-monetary subsistence inputs (labor time and energy) and hence fails to bridge the gap between the two poles of today's mixed economy. Ignoring the labor aspect of harvesting, for instance, has resulted in researchers taking the view that time spent in hunting is basically a lost wage opportunity.

Clearly, any analysis of contemporary Inuit subsistence presents numerous obstacles for researchers. The perceived presence of two apparently distinct modes of economy, (subsistence versus wage labor) and of two economic spheres, (production for use versus production for exchange) makes analytical closure difficult.

The problem, therefore, is how to integrate money and time and energy units in order to achieve the best analytical perspective on harvesting. As already noted, the general approach in most mixed economy studies has been to assign an "imputed" monetary value to these important non-cash (usually energy) inputs and outputs.

4.3 The Cost- Benefit Approach in Igloolik

If any cost-benefit analysis of hunting is to be conducted, what must first be reconciled is how to compare costs (inputs) and benefits (outputs) of hunting when these are often present in very different forms. Raw data concerning the cost and productivity of harvesting are represented in varying forms, as hours of hunting time, numbers of furs produced, and kilograms of edible meat harvested. In this study, the standardized currency for all final calculations is money. Thus, all inputs and products associated with subsistence, whether direct or indirect, will ultimately be measured and compared in dollars.

It is important to identify what elements form the direct and indirect costs of Inuit hunting. Direct cost refers to the operational cost of hunting, such as fuel, ammunition, general equipment operation, and maintenance. This measurement is relatively straightforward using participant observation and post-hunt interviews. Interviews and

Figure 4.1

IGLOOLIK SUBSISTENCE COST 1992

NAME:_____ **DATE:** _____

TRAVEL COMPANIONS:_____

WHERE:_____

WHAT DID YOU GET?:_____

TIME LEFT	TIME RETURNED
DAY:_____	**DAY:**_____
HOUR:_____	**HOUR:**_____

TIME SPENT HUNTING/ SEARCHING FOR ANIMALS_____

HOW MANY TEA/ COFFEE BREAKS_____

TIME SPENT CAMPING/ SLEEPING_____

TIME SPENT REPAIRING EQUIPMENT:_____

AMOUNT OF GAS TAKEN:_____ **AMOUNT USED:**_____

TYPE OF AMMUNITION:_____ **AMOUNT USED:**_____
OIL USED:_____

ANY OTHER EXPENSES USED DURING THIS HUNT?
(i.e., food, Coleman gas)

HOW WAS THE CATCH DIVIDED AND SHARED WITH WHOM?

PARTS USED FOR REPAIRS (ie, spark plugs, belts, etc)

COMMENTS:

observations focus on gallons of gas consumed, amount of ammunition expended, time allocated to various activities, and so forth (see Figure 4.1).

There is general agreement on approaches to measuring the direct cost of Inuit hunting. Unfortunately, this is not the case with the question of assessing indirect cost to subsistence activities. Indirect costs may encompass a variety of expenditures, in this thesis it is limited to the measurements of the cost of labor invested into hunting. Inuit harvesters invest a certain amount of cash in the equipment and operations associated with hunting and by doing so get back a return in consumable commodities. While indirect cost might encompass a variety of factors, including injury when hunting, it was limited in this study to the cost of labor time while actively hunting. It is important to remember that Inuit investments in the subsistence system usually involve large amounts of time and cash. By doing so, Inuit are making the decision to hunt rather than take part in wage employment opportunities in the community.

The method for measuring or placing a value upon a hunter's time is by considering the potential earnings associated with a wage paying job (Wenzel 1991). In an attempt to be as conservative as possible, it was decided to substitute the minimum (base) hourly wage paid in Igloolik ($6.50) as the wage "earned" per hour of hunting. This monetary assessment of a person's time hunting assumes that the individual had the option to earn money, or, conversely, that harvesting exacts an opportunity cost. To the Inuit of Igloolik, investing one's time in wage work is not always a viable option. Jobs of any sort are extremely difficult to come by. This was made evident by a sign-up sheet at the post office advertising employment for an individual to empty "honey buckets". More

than seventy-five people had signed up hoping to find employment at this minimum level. Hunting certainly can be seen as the equivalent of this minimum standard.

Indirect cost incurred through harvesting is tabulated by considering the 'value' harvested meats have (if any). Objection is often raised over applying cost-benefit analysis to country-food because of a lack of an appropriate substitution. Wild food hunting is seen as existing outside the cash or market economy and since harvest products are generally not sold, there is no established sale value to serve as an analytical benchmark. Consequently, the true value of subsistence (the edible meat) tends to be undervalued, even ignored, and its potential economic importance overlooked.

It is the crux of this thesis to develop a means of measurement, in dollar terms, for the worth of the harvest. A major difficulty in such a study is determining the value of country-food. There are three means which exist in determining the value of harvested food. None of them are intuitively satisfactory and none is uniformly consistent with Iglulingmiut preference, but they are, nevertheless, useful for comparative analysis.

The first is market value. This is the price obtained by hunter who sells the meat to the local store. Although potentially useful when dealing with muktah (narwhal skin) and fish, there is not a market for all of the resources that Inuit hunters harvest. Also, market value evaluation might be useful in macro-economic studies but if the concern is with production choices, then market value is not a useful measure (Chibnik 1978; Usher 1976:113).

A second measure is retail value, or the commercial value paid to harvesters. Again, this applies to only to the few country-foods which are sold commercially (Reeves 1992). Also, country-food sales were originally established by the Canadian Government

(Department of Indian Affairs and Northern Development) as a welfare measure to ensure adequate access to country-food for those who could not hunt. Thus, the low price of country-food in relation to imported meats suggests that retail pricing of country-food is hardly at an equilibrium value determined by supply and demand. Neither of the two previous valuation methods are applicable in this study. In the first case, food is exchanged within the normative framework of reciprocal relations (see Wenzel 1981) while in the second harvested foods are mainly bought for domestic use.

The third method of imputing a standardized value to the harvest is by assigning a consistent substitution cost, usually in dollars, to country-foods. Simply stated, if a hunter does not obtain seal or caribou meat from hunting, how much money would it cost to feed the family the equivalent amount of meat available at the local store? The complication in this type of valuation, especially when used in the arctic, lies with what one attempts to substitute. There is no evidence that imported meats are nutritionally equivalent substitutes for food harvested from the land, and some evidence points to the contrary (Borré 1989). Nutrition aside, certainly nothing available in northern stores is comparable in cultural value to caribou or seal. Nevertheless, the guiding principle is to substitute "fresh" imported food, usually various frozen meats, that would most likely serve as substitutes if wild food could not be obtained (see Wenzel 1991).

The question of what can substitute for wild foods is a tricky one. Culturally, none exists; nutritionally, most imported fish and meats are poor substitutes (Nowak 1978) Nevertheless, when country-food is not present, Iglulingmiut are most likely to replace it with imported meats and fish. Accordingly, the average prices per edible

kilogram of various meats and fish available at the local stores (see Table 4.1) have been calculated.

TABLE 4.1 Frozen Meats and Fish Prices in Igloolik, 1992

Items	Price per kg
Whole Chicken	12.03
Chicken Breast	7.77
Chicken Wings	7.19
Chicken	7.40
Chicken Legs	6.46
Chicken Burger	6.59
Hot and Spicy Chicken	12.79
Sirloin Steak	13.60
T-Bone Steak	10.31
Round Roast	23.63
Beef Burgers	8.29
Ground Beef	10.89
Leg of Lamb	21.98
Pork Chops	14.59
Bologna	7.25
Hot Dogs	5.74
Cooked Ham	4.49
Fish Nuggets	5.30
Cod Fillets	6.75
Haddock Fillets	6.95
TOTAL Average Price	**$10.00 per kg**

This amount, $10.00 per kg, will be used in imputing a replacement value for country-food. The harvest will thus be discussed in terms of "edible", not "live", weights for each subsistence resource. For instance, a small spring ringed seal weighs roughly 33kgs before being dressed. After butchering, what is left to the hunter is the "edible weight" of the seal, some 19kgs, which is then valued at $10 per kg, making a small ringed seal worth about $190.00. The purpose behind this edible weight conversion is to provide a strict kilo for kilo comparison to store-bought substitutes.

The problem with this type of assessment, especially to any cost-benefit study of hunting, is the assumption that store-bought food represents the nutritional and preferential equivalent of wild foods, the assumption being that food is food. In fact, store-bought food is not highly valued in cultural terms. The question of preference, however, is here held at a distance. Rather, with regard to country-food, a cost-benefit figure of $10 kg (based on the average cost of fresh meats available at the stores in Igloolik) was developed only to facilitate comparison. This figure, while admittedly not reflecting the cultural, bioenergetic, or nutritional value of subsistence products harvested, does provide a cautious and conservative baseline for assigning cash value to non-monetized harvest production.

Although far from perfect, substitution cost as measured by the retail price of imported meats and fish, seems to provide the best locally based comparative method for valuing wild foods. This approach also avoids the inherent danger of inflating substitute values because no direct bioenergetic equivalent food is locally present.

During the research period seven different animal species (as well as eggs) were harvested and consumed as food. In order to place an imputed value on this harvest, estimates of edible meat returned from each hunt is required. Using field measurements and secondary sources (Foote 1967; Freeman 1969/1970; Kemp 1977; Usher 1971, and Anderson et al 1994), it was possible to estimate the amount of edible meat return from the seven species and eggs harvested at Kapuivik.

Table 4.2

Average Weights of Animals Harvested In Kapuivik, Spring/Summer, 1992

Species	Live weight (kg)	Edible weight (kg)
Ringed Seal	33	19
Walrus	642	462
Bearded Seal	220	92
Caribou	150	90
Arctic Char	3.0	2.7
Geese	3.0	2.0
Eider Duck	2.6	.68
Eggs	.080	.075

Ringed seal measurements were done in the field on mostly small spring seals combined with estimates from Wenzel (1981). Walrus estimates come from Anderson's and Garlich-Miller's (1994) report of research conducted in the Igloolik-Hall Beach area. Bearded seal (*ujuk*) measurements come from the work of Foote (1967), while weights of caribou, arctic char, geese, and eider ducks represent estimated guesses from partial field measurements.

So, if hunting produces food which can be valued by using substitute store purchases, and time spent hunting is equal to earning a minimum wage salary, the "hidden" benefits of subsistence hunting begin to come to light. It appears that to measure the real costs and benefits of Inuit harvesting, using an imputed monetary measurement is the most desirable. Both Smith (1991) and Wenzel (1991) as noted, have used such an approach to reconcile both the direct and indirect cost incurred by Inuit in harvesting. The results, using this method, is a determination of the net rate of profit attributable to harvesting activities.

The major problem in assigning imputed dollars to harvesting activities reflects an assumption that subsistence effort and products are equivalent to time spent earning real dollars in wage employment and buying one's food from the local store. Certainly, placing a monetary value on subsistence has both empirical and theoretical problems. Paramount is whether ascribing imputed dollars to the time spent and to the food obtained from hunting can account for the cultural value the Inuit themselves place on hunting. It is apparent that Inuit recognize a cultural and social value in hunting that cannot be transferred exactly to wage work or to the dollars it may earn.

One danger of a purely economic analysis is that it can wrench the production process from its social and cultural context and the texture of the total lifestyle can become lost. An assessment of the inherent cultural value of subsistence activities is one which is not entered into here, but should be addressed in a more expansive analyses of Inuit economics.

4.4 Data Sources

The first week in Igloolik was spent conducting various store inventories for the purpose of understanding the cost of equipment and harvest related goods. Inventories of imported foods were conducted to establish prices of relevant meat substitutes. The inventories of equipment included the pricing of such items as snow machines, canoes, outboard motors, guns, ammunition, oil, gas and various equipment parts, while store food inventories priced relevant meats in order to devise a value substitute for harvest foods (see Table 4.1). Both food retail outlets in Igloolik, the Northern Store and Igloolik Cooperative, were surveyed for these data. Food surveys also priced all foods available at

the stores in order to develop a hypothetical, non-harvest menu (see Chapter Six) to better estimate the real dollar cost of food exclusive of harvest production.

In the course of the research, direct participant observation was possible in nearly 90 percent of hunting events. These observations served three purposes in this study. First, they enabled the recording of specific hunting events including human behavior and environmental particulars associated with subsistence which are difficult to elicit through formal interviews. Second, spending time with various hunters provided greater insight to the range of Kapuivik hunting behavior. This facilitated later interviews on hunts with in which it was not possible to participate directly. Third, participant observation allowed detailed and accurate records of the amount of time used in hunts and of harvest-related expenditures.

The data recorded during or after the hunts included such things as the division of the catch, total distances traveled, the relationship between hunters, division of labor, gasoline expenditures, ammunition and oil used, and the time expended in various activities. This data was largely collected through personal observation. For instance, the operation costs of hunting, such as gas consumption, was tallied by counting gallons before leaving the camp and then counting the remaining gallons after the hunt. Ammunition shot during the hunt was recorded at the time of use, Naphtha gas was recorded in the same manner as transportation fuels.

Detailed time-harvest data could be collected only from observed hunts. For all of the harvest activities in this sample, time data were collected on the duration of the active pursuit of prey, on various breaks (for tea and rest), and on repairs to equipment so that the total hours per hunt could be specifically quantified.

A decision had to be made as to what constitutes active hunting time and what does not. Within this analysis, only the time spent in active hunting, that is, in the searching for, pursuit, capture and field preparation of prey (Laughlin 1968; Wenzel 1991) are positively valued at the settlement minimum hourly wage rate. Time devoted to sleep, tea breaks, travel, extended rest, equipment repairs, and meals were recorded and analyzed separately from time spent directly in hunting. The purpose of differentiating between time spent in subsistence activities was to assign imputed value to time allocated only to hunting. Time spent resting or on a break was assigned with neutral (0) value, while time spent repairing equipment was assigned a deficit or negative value of $6.50 per hour. The reason for this was in order to be conservative as possible and, since these activities take place whether or not hunting occurs. While it is frequently the case that the mechanized equipment used in hunting breaks down unpredictably, a "negative wage" is assigned to such incidents because a significant minority of breakdowns may be the result of maintenance neglect when an item is not in use.

These data thus provide a comparison between hunting for a living versus working for wages. It is also a very conservative approach, essentially viewing subsistence as employment and as a way of earning "income". It does this, not only by assigning a monetary value to the harvest products equal to that of imported meat and fish, but also by assuming a monetary value for the activity of hunting equal to that of local minimum wages.

To estimate the cost involved in hunting, the first task of data collection at camp concerned inventory equipment used for hunting, most notably snow machines, boats, and rifles (see Table 4.3). While the capital cost and depreciation cost of hunting gear was not a direct factor here (Smith 1991), it is nonetheless useful to see the various means by which such equipment is acquired, its original and maintenance costs, and how long it is kept in use.

In this present analysis, time, as in bioenergetic studies, remains a measure of hunter effort but is expressed in dollars (as opposed to calories) using the minimum hourly wage ($6.50 per hour) normally paid for casual labor in Igloolik. In a similar fashion, the meat obtained in hunting is assigned a dollar value per kilogram to which a value of $10.00 per kg is used. Again, this value was derived by calculating the average retail price of all imported fresh-frozen meats sold in Igloolik retail outlets. The next chapter looks at the actual costs and benefits of Kapuivimiut subsistence using the above measurements as a means of valuation.

Table 4.3 Harvest Equipment Inventory for Kapuivik, 1992

	SKIDOO	BOAT	MOTORS	RIFLES	HONDAS	TOTAL COST
FAMILY # 1						
EQUIPMENT	2	1	2	4	0	
COST	$2,000	$8,500	$16,000	$80	0	$26,580

COMMENTS: The snow machines each cost $1,000. Both of them were running but in a constant state of disrepair. No skidoo mechanic in household. Both machines were manufactured in 1988. The boat was refurbished by the camp head after it sank a few years ago in Igloolik. It is a large, heavy, fiberglass boat which consumes huge amounts of gas and oil. The engine was brand new costing over $9,000 replacing the one he bought last summer when his $7,000 died. Four rifles were owned a 222 which cost $80, a 303, 22m and a 22, all in poor condition except for the 222. No Hondas owned.

FAMILY # 2						
EQUIPMENT	2	1	1	3	2	
COST	0	$4,000	$5,500	$100	$300	$9,900

COMMENTS: This family operates two snow machines, one of which is a year old. The new machine was traded for 13 dogs to a hunter from Arctic Bay. The other machine, although older and in need of repairs was pretty dependable. This family also owned a 22 ft canoe powered by a 70hrp engine. The canoe was over ten years old and suffered tears in the canvas throughout the summer. The outboard motor was also a few years old, and although temperamental worked well throughout the summer. Two three-wheeled Hondas ('87 and '85) were own by this family, both were in average condition. Rifles own were a 222 (Christmas gift), a 6.5 which cost $100, and a 22 which was found at the dump.

FAMILY #3						
EQUIPMENT	2	1	1	4	1	
COST	$3,800	$5,000	$5,000	$280	$1,500	$15,580

COMMENTS: The two 1987 snow machines were both in OK condition. Both were bought second hand at a cost of $1,200 and $2,600 respectively. A 22 ft freighter canoe which cost over $5,000 was about seven years old. Like most older canoes, it frequently needed some canvas repairs. The outboard engine was brand new two years ago and cost over $5,000, it was still in good condition. One three-wheeled Honda was owned by this family. It was over five years old, and cost $1,500 (second hand). Rifles owned consisted of a 303 (traded), 223 ($200), 22m ($90), and a 22 ($90).

Total Cost	**$5,800**	**$17,500**	**$26,500**	**$460**	**$1,800**	**$52,060**

Chapter 5 - Kapuivik Inuit Hunting

5.1 Overview of The Season

As explanatory background to this analysis, several factors cogent to the research must be known. The research occurred during a 14 week period that extended from late May to early September, 1992. It was based exclusively (except for imported equipment and foods inventories) at the outpost camp of Kapuivik, approximately 65 kms northeast of the settlement of Igloolik.

The core population for the study totaled 27 people, residing in four households. Each household was related by various kinship ties, most inhabitants being first generation cousins. In addition to the camp population, visitors from Igloolik, Hall Beach, Arctic Bay, and Pond Inlet were present for varying lengths of time. One group of hunters in search of caribou in early August was stranded on the island of Qaiqsut for over two weeks due to severe wind conditions. Of the resident core population, four men (between the ages of 16 and 57 years) were full-time hunters. Although others hunted occasionally, the activities of this full-time hunters group formed the baseline for the harvest study.

The four large prey species harvested through the research period yielded 4,838.56 kgs of usable meat. Thirty-six ringed seals provided 684 kgs; walrus (6 adults and 3 calves) supplied 2,929 kgs, 9 caribou totaled 810 kgs; and 3 bearded seal amounted to 276 kgs of edible meat. During the periods of inclement weather, 32 arctic char were harvested yielding 86.4 kgs of fresh meat. Finally, 10 geese and 7 eider ducks were caught providing 20 kgs and 4.76 kgs of meat, respectively. In sum, these 106

animals, plus 372 eggs (27.9 kgs) supplied the Kapuivik community with just over 4,838.56 kgs of edible food.

Table 5.0 Number of Animals Harvested in Kapuivik, 1992

	Seal	Walrus	Caribou	*Ujuk*	Geese	Char	Ducks	Totals
Skidoo	32	0	2	0	5	9	1	49
Boat	2	9	7	2	0	3	3	26
Walking	2	0	0	1	5	20	3	31
Totals	**36**	**9**	**9**	**3**	**10**	**32**	**7**	**106**

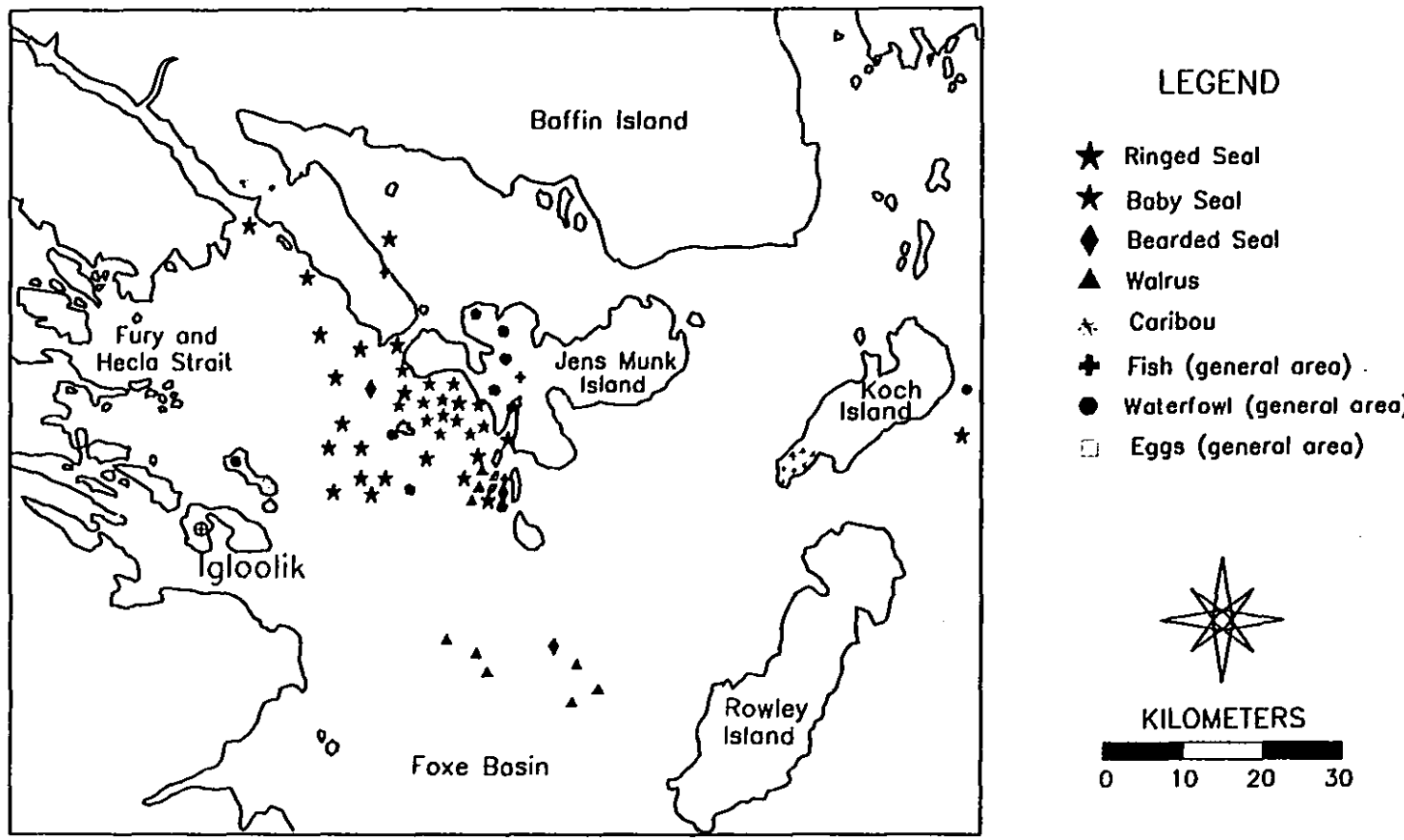
During the period of this field work, Kapuivik hunting was primarily focused on baby ringed seals in the spring and walrus during the summer. However, while walrus were seen as a primary resource, hunters by no means limited their activities to this single species. As Table 5.0 indicates, resource exploitation was varied and extensive during the spring and summer of 1992.

The islands and waters nearby allowed ample ringed seal hunting to be carried out, often no more than 30 to 40 meters in front of the camp. Not surprisingly, Kapuivimiut frequently commented that seals approach more closely and resurface more quickly near the camps than they do in the heavily traveled waters around Igloolik.

Hunting activities focused on four primary species: ringed seals, walrus, caribou and arctic char. For the most part, Kapuivimiut concentrated harvest operations in and around Jens Munk Island (see Figure 5.1). Although most hunting trips took place close to the camps, it is important to note that throughout the research period, Kapuivimiut hunters carried out harvest activities over a wide area. During boating seasons some hunters from Kapuivik traveled more than 200 kms to hunt caribou. Even in the spring, it was not uncommon for a hunter to travel as much as 95 kms by snow

Figure 5.1

Kapuivimiut Harvest, June 9th– August 28th, 1992.



machine. In fact, it is this mobility which characterizes Kapuivimiut summer activities (see Crowe 1970; Riewe 1992).

Throughout the research period, Kapuivimiut traveled to various locations throughout a highly variable weather season, in order to exploit available resources (see Figure 5.1). In the spring (early June) Kapuivimiut moved from their semi-permanent winter camp on Jens Munk Island to set up their tents next to nearby fishing lakes. Another family moved out to Siuraq island, a small sandy island known as an excellent location to hunt baby seals through breathing holes in the spring and also the home for nesting arctic terns during the month of June.

Hunting in the spring was conducted primarily by using snow machines. In total, snow machines were used eleven times to hunt seals (using 66 gallons of fuel) with a successful harvest of 33 seals, thirteen of which were baby seals. The majority of the seals were hunted while basking on the ice and at the polynya. This was done mostly with just one or two hunters. Some trips out to the polynya, however, were family "picnic trips". On the other hand, hunting for baby seals which occurred at breathing holes was primarily a camp effort utilizing the entire family (eight people) by standing over breathing holes. Only one caribou hunt occurred while camped at Siuraq. This hunt took place in Gifford Fjord, some 70 kilometers north, of Siuraq. The reason for only one caribou hunt was due to the distance needed to travel, bad ice conditions, and lack of snow on the land. Due to this lack of snow, hunters were forced to search for caribou by foot. Despite these difficulties, two caribou were harvested.

Meanwhile at Kapuivik the camp was situated next to excellent lakes to fish for arctic char. It also provided reasonable access to hunt geese and waterfowl nests on the

islands. This was especially important during the first two weeks in July when ice conditions started to deteriorate. When the sea ice became unstable for snow machine travel, yet too thick for boating, hunters were forced to remain at camp unable to hunt. At this time, subsistence activities at Siuraq and Kapuivik were limited to a daily search for eggs (mostly tern, eider, with the occasion goose and oldsquaw) by the children. Collecting eggs was, for a considerable time during the research period, the only activity that provided fresh food to the camp families.

Throughout this twenty day period of bad ice conditions, only five seals were caught (providing approximately 95kgs of edible meat). The children collected over 372 eggs during this period which accounted for most of the food consumed at camp. Arctic char provided the same security during the late summer months when hunting was impossible due to high winds. Ducks and rabbits played a smaller role in this "secondary" form of gathering and hunting.

Once the melt water drained off the ice and snow machine conditions improved, camp was moved to Qaiqsut for the remainder of the summer (Qaiqsut is a small rocky island about 16 kms south of Kapuivik). Here, the remains of many sod houses underline the importance of this island as a successful hunting area and campsite. This traditional summer camping ground is located near good walrus hunting area and the gravel beaches of Qaiqsut are ideal for burying and caching walrus meat to make *igunaq*.

The camps movement to Qaiqsut coincided with a shift away from snow machine travel to hunting and traveling with motorboats. The last day of snow machine use was the 16th of July during which seals were harvested and the extraneous equipment, not

needed in the summer, was transported back to Kapuivik. However, ice and bad weather conditions made the transition to hunting by boat impossible until the end of July.

The boating season finally started in earnest on the 23rd of July when Kapuivimiut hunters traveled 32 kms south near Rowley Island to hunt walrus on drifting ice pans. Six walrus (3 adults and 3 calves) were harvested that afternoon, along with a bearded seal (ujuk). After the initial success of the walrus hunt, hunting from boats became nearly impossible for the remaining summer due to inclement weather. Severe winds grounded any hunting activities which required boat travel. During only 9 of the next 46 days at Qaiqsut was it possible to hunt using boats. However, as the data shows, those nine days provided the camp with a considerable amount of food.

During the summer a wide range of harvest events and activities were observed and recorded. In total, these observations cover 76 days with members from the outpost camp of Kapuivik. During this period 66 discrete harvest events were recorded and analyzed, despite severe weather in August which allowed only 5 days for marine travel.

Table 5.1 represents the time, place, transportation, camp location, and the resources that were harvested during the study period. It must be noted that the summer of 1992 saw Kapuivik subsistence activities heavily affected by bad weather. Despite the camps good location and excellent capture and transport technology, there was little that the Kapuivimiut could do when bad weather prevailed. Out of the 65 days available for hunting (excluding Sundays), 43 were unusable due to bad wind and ice conditions. In total, there were only 33 days in which some manner of harvesting activity occurred. Individual hunts totaled 44 trips of which 37 were successful to some extent.

Table 5.1 Kapuivik Hunting Timeline, June- August, 1992

Month	Environmental Settings	Resource Harvested	Transportation Method Used	Camp Location
June 1-20	Polynya	Seals/eider	Skidoo	Kapuivik
June 10-13	Inland lakes	Geese/ Fish	Skidoo	Kapuivik
June 10-13	Land	Stalking geese	Skidoo/walk	Kapuivik
June 1- July 13	Ice/breathing holes	Basking Seals	Skidoo	Ikpiugalik
June 1- July 13	Polynya	Seals	Skidoo	Siuraq
June 13-29	Ice/ breathing holes	Baby Seals	Skidoo	Siuraq
June 22	Land	Caribou	Skidoo/walk	Siuraq
June 26- July 18	Land	Eggs	Walking	Siuraq
July 16	Ice Breakup	Nothing	None	Siuraq
July 17	Shore Ice	Bearded Seal	Walking	Qaiqsut
July 19	Open Water	Nothing	Nothing	Qaiqsut
July 23	Ice Floes	Walrus/ seals	Boats	Qaiqsut
July 28	Land/ Sea	Caribou/ Seals	Boats/ Walk	Akkimaniq
July 24- August 22	High Winds	Nothing	Little boating	Qaiqsut
August 8- August 20	Shoreline	Arctic Char	Boats/Nets	Qaiqsut
August 22	Shoreline	Walrus	Boats/ Walk	Qaiqsut

In general, outpost camp living allows hunters to remain close to their families while continuing to harvest an assortment of species. Unlike living in the community, hunters living at outpost camps rarely need to travel long distances to reach preferred hunting areas where animals are abundant. In addition, the short traveling distance makes it easier for other family members to follow along on hunting trips.

5.2 Kapuivik Hunting Output, Snow Machines and Boats

The field season consisted of two main types of hunting. These were spring snow machine travel and summer boating. Because the field work portion of this thesis was limited to one summer, the most realistic and analytically useful way to categorize Kapuivik harvesting is to separate harvest activities by these two mechanized modes of transportation. The specific use of either snow machine or boat may be associated with a particular prey species, specialized methods of searching and hunting, and particular seasons or environmental conditions. The economic benefits of the two different modes of transportation are analyzed with reference to these factors.

During the course of the summer, 44 hunting trips took place, with 32 trips requiring mechanized transport (20 hunts by snow machine and 12 by boat). Another 12 hunts were walking trips to collect eggs, fishing, or for goose hunting. In most cases, hunting and gathering occurred close to camp. The walking hunts were usually conducted by youth (4-16 years old) at a time when both skidoos and boats were impossible to use.

For the most part, spring snow machine travel occurred mainly at night when lower temperatures solidified soft snow. This allowed snow machines to tow sleds and alleviate potential overheating problems. Spring hunting was focused mainly on baby ringed seals (*natsiak*). However, when fresh meat was low, the selection of seals was not limited to pups. At these times adult seals were hunted while basking on the ice, at breathing holes, and in the open water of the polynya.

Table 5.2 Total Breakdown of Harvest Time and Food Return Per Hunt

Date	Active Time (Hrs)	Rest Time (Hrs)	Repair Time (Hrs)	Edible Kgs	Resources
10/6/92	7	2	0	42	seal/ geese
12/6/92	22	5	0	26.4	seal/ geese/ char
13/6/92	11	2	0	28.4	seal/ geese/ char
22/6/92	12	0	0	199	seal/ caribou
23/6/92	7	0	3	57	seal
24/6/92	4	0	0	0	nothing
26/6/92	5	0	1	.975	eggs
29/6/92	6	0	0	19.75	seal/ eggs
07/7/92	2.5	1	0	1.65	eggs
08/7/92	10	1	0	4.66	eggs
08/7/92	3	0.5	0	23.43	seal/ duck/ eggs
08/7/92	2	0	0	4.65	eggs
10/7/92	4.5	1	0	11.18	eggs/ char
11/7/92	3.5	0	0	24.25	seal/ eggs
11/7/92	2.5	0	0	1.58	eggs/ duck
11/7/92	3.5	0.5	0	38.9	seal/ eggs
12/7/92	0.5	0	0	92	ujuk
13/7/92	8	1	0	190	seal
13/7/92	3	0.5	0	76	seal
14/7/92	2	0	0	27.1	seal/ char
15/7/92	4	0	2	19	seal
18/7/92	3	1	0	38	seal
21/7/92	1	0	0	19	seal
21/7/92	0.16	0	0	19	seal
21/7/92	2	0	0	0	nothing
23/7/92	10	1.5	.5	1,635.5	walrus/ujuk
24/7/92	1	0	0	0	nothing
28/7/92	12	10	1.5	209.68	caribou/seal /goose
28/7/92	11	5	3.5	450	caribou/duck/fox
29/7/92	5	3.5	2	0	nothing
30/7/92	0.16	0	0	19	seal
08/8/92	3	0	0	0	nothing
08/8/92	6	3	0	92.68	*ujuk*/ duck
08/8/92	8	4	0	2.7	char
14/8/92	20	4	0	5.4	char
14/8/93	6	0	0	0	nothing
15/8/92	0.5	0	0	24.4	char/ seal (in net)
15/8/92	2	1	0	.68	duck
16/8/92	0.5	0	0	16.2	char
17/8/92	0.5	0	0	2.7	char
18/8/92	0.5	0	0	16.2	char
19/8/92	0.16	0	0	0	nothing
20/8/92	0.5	0	0	13.5	char
22/8/92	2	0	0	1,386.00	walrus
Total	**217.73**	**47.5**	**-13.5**	**4,838.56**	

As seen in Table 5.2, seal hunting figured prominently in Kapuivimiut overall hunting activities. Seals were desirable not only for meat but also for their skins which could either be sold or made into clothing. Hunting seals is an activity which becomes

more successful with the participation of the extended family. Since baby seals are located in or near breathing holes, chances for capture are improved by covering as many breathing holes as possible.

On average, baby seal hunts last about 10 hours. Once hunters locate a denning area, people would be left to stand next to all of the visible breathing holes to wait with either a small caliber rifle, a harpoon, or a hook. If no pups surfaced after a few hours of waiting, the holes would be covered with snow and the hunters would move on to other areas.

During the research period, hunters from Kapuivik went out 8 times in search of baby seals. Five of these trips were unsuccessful. Although there were opportunities to hunt adult seals, they were generally ignored. In total, 13 baby seals were harpooned during the course of the spring, 10 in one day when relatives from Igloolik joined the hunt.

Basking adult seals were usually sought by lone hunters who would attempt to approach within shooting range of the seal either by snow machine or by stalking. This type of hunt is relatively quick, one shot usually was all a hunter had, and the stalking process (either by snow machine or foot) usually lasted no more than a few minutes. If a hunter missed, the seal would dive below the ice and the hunter would go on to another locale. This sort of hunting technique was often conducted when the camp was low on fresh meat or when seals hauled out within view and access was easy.

Trips to the open water to hunt seals were rare for Kapuivik hunters mainly because the camp did not own a retrieval boat. However, five seals were successfully harvested from the polynya in the early spring using another family's retrieval boat, and

also by hooking them. In all, snow machine hunting was successful during the spring, with a total of 33 seals harvested on 20 trips.

Snow machines were also used in day long fishing and goose hunting trips, and a caribou hunting trip on Baffin Island. Although the machines were old, breakdowns were surprisingly rare. A reason for this might have been the particularly good year for ice conditions around the camp. The ice was generally flat and smooth causing minimum wear on the under-carriage of the machine. When problems did occur hunters were fortunately near to camp (a distinct advantage of hunting from outpost camps) and repairs could be made quickly.

During the spring portion of the research, there were 38 potential days for hunting with the snow machine. Since Sundays was a day of rest; as a result the total available days for hunting were 33. Out of these potential days, hunting by snow machine occurred 20 times, with 114 hours of searching and hunting for animals, or an average of almost 6 hours per hunt.

Table 5.3 Snow Machine Hunting Hours

Spring Hunting by Snow machine	Available Days	Hunting Days	Hunting Time	Negative Time	Resting Time
Average Per Hunt	33	20	6 hours	18 mins.	45 mins.
TOTALS	**33**	**20**	**114 hours**	**6 hours**	**15 hours**

As mentioned above, hunting for baby seals at breathing holes took the greatest amount of time, roughly 10 hours per hunt, while stalking basking seals consumed an average of 1.5 hours per hunt. During the 114 hours of active hunting, just over 15 hours were lost to rest stops and tea breaks, (rest stops averaged about 45 minutes per hunt to

boil tea and eat). Repair time during the course of spring snow machine season came to just 6 hours, or an average of 18 minutes per trip. Most of the major breakdowns occurred from water entering fuel lines and wires, breaks in the undercarriage of the snow machine and repairs to a broken sled. Only one of these major breakdowns could be considered major, with repairs taking over three hours.

The 33 ringed seals that were harvested during the spring provided 627 kgs of edible food (see Table 5.5). In addition, spring activities netted one bearded seal (92 kgs of edible weight), two caribou (for a total of 180 kgs of edible meat), 9 char (24.3 kgs edible meat), 5 geese (10 kgs of edible meat), 4 eider ducks (2.72 kgs) and roughly 372 eggs were collected providing 27.9 kgs. The total edible meat harvested during the spring was 963.93 kgs or 29.2 kgs per hunting day. Considering that hunters only spent $602 on oil, gasoline, ammunition and naphtha fuel and spent 129 hours in active hunting time, a return of almost a 1,000 kgs of meat certainly reflects time well spent.

With the onset of ice break up (mid July), hunting for seal pups and basking seals by snow machine became a very risky endeavor and soon ceased. During the transition from breakup to when boat hunting became possible, the camp was supported by the children who spent the days (and many nights) walking the islands collecting eggs. All variety of eggs were collected at this time. Large goose eggs and eider eggs were special treats, but the staple food at camp (for over a week) was a large supply of tern eggs (close to 200). The average weight per egg was approximately seventy-five grams, and almost 30 kgs of eggs were collected. While the children were roaming the island of Siuraq and Qaiqsut for eggs, adult hunters were busy preparing their boats for summer travel. However, a two week period of bad winds delayed any hunting until the last week of July.

When boat travel finally got under way, hunting was immediately successful. The days leading up to the first day of boating was spent preparing to hunt walrus out on the drifting ice pack (see Figure 5.1). For various weather reasons, particularly the high winds, hunters remained at camp waiting for the elders to give permission to head out. This came only when the weather and the seas had calmed. Calm seas are vital, not so much for the actual hunting of the walrus, but for a safe return with a canoe loaded full of meat.

Due to the enormous size of the animal, walrus hunting is a group activity. Two hunters can successfully harvest walrus, but it takes a large group to butcher and to haul over 600 kilograms out of the water onto the ice. In the case of Kapuivik, a total of 8 hunters, (four in each of the two boats) searched among the pack ice for walrus that were basking and sleeping on ice pans.

Butchering walrus is a labor intensive chore requiring a certain amount of specialization (see Anderson 1994). Depending on the size of the walrus, butchering usually took up to three hours. Once finished, the meat from an adult walrus was bundled into nine "packages" and divided between the two boats and the whole hunting process would start again. In the end, six walrus were harvested and the loaded boats returned to camp. Although other walrus were seen they were not hunted. Once back at the camp large pits were dug in the gravel beach and the walrus meat was buried to ferment for future consumption as "*igunaq*".

Overall, hunting with boats produced far greater meat return than snow machine hunting. However, boating was less productive on a daily basis. Whereas snow machine hunting provided a steady supply of fresh meat, boating provided a huge surplus of meat but only at irregular intervals. This irregularity was compounded by the fact that ringed seals tended to be ignored when hunters were pursuing large resources like walrus or caribou. Compared to the springtime, when 33 ringed seals were harvested, only 3 seals were harvested while hunting with boats.

There were 36 potential days for hunting by boat. However, bad weather limited the camp to just 12 useable days. During that period, 86 hours were spent hunting, averaging roughly 7 hours per hunt. The longer hunting hours also produced longer breaks for tea and rest (see Table 5.4). Not surprisingly, repair time was high: 8 hours were spent repairing equipment over the course of 86 hours of hunting. The majority of these repairs were to fix tears in the canvas of the canoes from collisions with ice floes or rocks.

Table 5.4 Hunting Hours By Boat

Boating Trips	Available Days	Hunting Days	Hunting Time	Negative Time	Resting Time	Total Boating Hours
Per Trip			7 hours	1.5 hours	2.5 hours	11 Hours
Totals	**36**	**12**	**86 hours**	**8 hours**	**32 hours**	**126 Hours**

During the 12 good boating days, when hunting was not impeded by weather, nine walrus, seven caribou, three ringed seals, two bearded seals, five geese, twenty-three char, and three eider ducks were harvested all totaling 3,874.64 kgs of edible food at an average of 322.8 kgs per day. The majority of this return was walrus 2,929.5 kgs. Caribou provided over 630 kgs of edible meat, two bearded seal yielded 184 kgs, while ringed seal provided only 57 kgs of edible food. Arctic char was essential during the lean period of hunting, providing 62.1 kgs. Geese added 10 kgs and three eider ducks (2.04 kgs) provided further supplement. Despite these resources, the camp was still forced to consume walrus meat originally cached for the winter months. Even with the resultant lack of hunting time caused by bad weather, the period of boating activity surprisingly produced more than four times the meat than the more "successful" hunting of the spring/ snow machine season (see Table 5.5).

Table 5.5 Seasonal Breakdown of Resource and Total Kilograms Harvested

Spring Harvest (Pre-breakup) **Summer Harvest** (post-breakup)

Animals Harvested	**Number**	**Edible Kgs**	**Animals Harvested**	**Number**	**Edible Kgs**
Ringed Seal	33	627	Ringed Seal	3	57.0
Bearded seal	1	92	Bearded Seal	2	184.0
Caribou	2	180	Caribou	7	630.0
Arctic Char	9	24.3	Arctic Char	23	62.1
Geese	5	10	Geese	5	10.0
Eider Duck	4	2.7	Eider Duck	3	2.04
Eggs	372	27.9	Walrus	9	2,929.5
Totals	**54***	**963.9**		**52**	**3,874.64**

(*does not include egg total).

During the spring and summer, the hunters at Kapuivik traveled over 2,900 kilometers in search of animals. This search activity consumed 316 gallons of fuel (see Table 5.6). The greatest consumption of gasoline was through boating, at approximately 5.5 kms per gallon, while snow machines averaged 12 kms per gallon. All said, the hunters went over 2,200 kms on snow machines using only 185 gallons, while boating used 181 gallons while traveling 740 kms.

Table 5.6 Transportation Cost and Harvest Amount

Type of Hunt	No. of Trips	Amount of Gas (gallons)	Amount of Gas (dollars)	Amount Harvested (kgs)
Snow machine	20	135.5	$330	828.38
Boat	12	181	$438	3,791.64
Walking	12	0	$0	218.54
Totals	**32**	**316.5**	**$768**	**4,838.56**

To summarize, snow machines offered a fuel efficient method of traveling, but summer boating paid dividends in terms of its total edible meat return through successful walrus hunting. Whereas snow machine hunting is more of a day to day activity acquiring small packages of food, boating tends to be less frequent, more expensive, but producing potential big returns in kilograms harvested.

5.3 Cost and Benefits of Kapuivik Hunting

As previously noted, to look at subsistence economics in terms of direct cost alone (the cost of equipment, gas, ammunition, oil, and spare parts) against the monetary returns of subsistence activities (sales of ivory, skins, and sometimes selected pieces of meat) inevitably produces a huge monetary loss. This is because the present commercial value of such items is virtually nil. Clearly then, when measured in monetary terms, hunting appears to be far from economical. It is crucial to consider, however, that the bulk of the harvest is used domestically, in most cases, substantially replacing food the high cost of store food. A truly fair cost-benefit rendering of Inuit hunting should then account for the cost of imported food that need not be bought.

Inuit hunting has two quantifiable values. The first relates to subsistence goods used for domestic purposes. These may include seal or caribou skins (used for clothing) or ivory or antler (manufactured into tools or art work). Mostly, however, it refers to the large quantity of meat consumed for food. The other, is the exchange products, like seal or fox pelts and walrus ivory, for which a monetary return is realizable. In the case of Kapuivik, cash exchange concerning subsistence involved only the sale of five walrus tusks, a monetary value of $470.

The $470 dollars represents the entire cash return from hunting for the Kapuivik hunters during the summer of 1992. When considered against the immediate monetary investment of operational costs, $1,597.71 (see Table 5.7), it would appear that subsistence is nothing but a huge black hole for cash, distinctly uneconomical. In direct monetary terms, the income earned from the sale of Kapuivik subsistence products barely covered a fraction of the camps operating costs, resulting in a deficit of $1,127.09. Left

there, these data appear to support the general argument that hunting is a drain upon the contemporary Inuit economy.

Table 5.7 Total Operation Cost for Kapuivik Hunters, Spring and Summer, 1992

Items	Cost (dollars)
Gasoline	$ 768
Motor Oil	$ 330
Ammunition	$ 196
Naphtha Gas	$ 86.71
Food/ Parts	$ 217
Total in Dollars	**$1,597.71**

Usher (1976) and Nowak (1978) offer an alternative viewpoint on this relationship. They see the whole of the harvest as including domestically used production (harvested food), not just the salable portion (which Wenzel [1991] has termed "byproducts") of Inuit hunting, as the correct measure of net economic yield. To value only the exchange portion is to lose sight of the costs that would incur by the need to buy imported foods as replacements for subsistence products.

The dimensions of the domestically utilized portion of the harvest at Kapuivik are impressive. When the volume of edible meat is calculated against the actual dollars invested in hunting over the span of research, wild food is obtained at a price of .33 cents per kilogram ($9.67 less than the average store-bought meat and fish). Viewed another way, the cash investment (operational cost) made by Kapuivik harvesters per hunt (total hunts=44) was $36, while the return in meat (averaged per trip) was 110 kgs, or the equivalent of $1,100 of imported store meats per hunt.

However, the set of operational inputs required in harvesting must also include harvesters' time. Specific calculations of the effort expended by subsistence hunters, as

represented by the time input of participants, is needed in order to determine whether the hours in which hunters invested in resource activities raised or reduced the cost of hunting. This is necessary if only because participation today in hunting can be thought of as a lost opportunity to earn money through wage work (see Smith 1991).

Table 5.8 Hunting Time Breakdown

Transport	Hunting Trips	Active Hours (Hunting)	Resting Hours	Negative Hours (Repairs)	Imputed Value ($6.50 per Hour)
Skidoo	20	111	16	6	$682.50
Boating	12	86	32	7.5	$510.25
Walking	12	20	0	0	$130.00
Totals	**44**	**217.00**	**48**	**13.5**	**$1,322.75**

The above Table shows the imputed value of Inuit time while hunting. As explained in chapter four, if Inuit are given an imputed salary of $6.50 for every hour hunting and charged a negative value of $6.50 for hours missed while repairing equipment, the hunters would have "earned" an imputed value of $1,322.75 for the 44 hunting trips. The twenty hunting trips in the spring (using snow machines) Kapuivik hunters spent 111 hours searching for, and hunting animals. Factoring in that they also spent 6 hours repairing equipment, the total estimated value for spring hunting is an imputed $682.50, or viewed another way, $34 per hunt. Boating was more valuable in actual hours spent per activity with an estimated $42.50 per hunt, while walking activities breaks down to an average $10 per trip.

Table 5.8 shows one of the advantages of living in outpost camps, in closer proximity of resources. During the spring and summer of 1992, the total time for

Kapuivik hunters searching and hunting for animals, as well as repairs and resting, tally only 278.5 hours. Forty-eight of these hours were spent on breaks and hence were not valued. So, a total of 230.5 hours was valued as having imputed worth. Of these hours, 217 were spent in active pursuit of resources. By viewing hunting as a job, Kapuivik hunters potential earned $1,410.50 in 44 hunting trips. However, throughout the season there was 13.5 hours of down time due to breakdowns. This negative time, in essence, takes away $87.75 making the total imputed earnings of Kapuivik hunters $1,322.75. Looked at as an hourly net rate, before factoring in the value of the harvest, Kapuivik hunters roughly earned $30.05 per hunt or $5.73 (after negative time is deducted) per hour.

Of the forty-four hunts recorded, only seven where unsuccessful. These hunts represent a negative value once operational costs are added. In total, thirteen hunting trips value figures in the red. The biggest deficit occurred during a seal hunting/ fishing trip in which the parents had spent $150 dollars on store food for the children. Since only a few char and eggs were harvested that hunt suffered a deficit of $-91.79. The next largest deficit came during an unsuccessful caribou hunt in which the operational costs were over $66. At the other end of the spectrum, one successful hunt brought in over 1,635 kgs of food in ten hunting hours. After subtracting the operational cost of this hunt ($137.20) this single hunt provided Kapuivimiut with an imputed dollar value of $16,217.

Table 5.9 Harvest Effort

HUNT TYPE	# of Trips	Harvest Numbers	Hours (+)	Hours (-)	Harvest (kgs)	Return ($)
Canoe	12		86.5	7.5	3,791.64	38,429.9
Snow Machine	20		111.23	6	828.38	8,967.8
Walking	12		20	0	218.54	2,315.4
MARINE HUNTS						
Walrus Hunts	3	9	17.5	.5	2,929.5	29,405.5
Baby Seals	8	13	22	3	247.0	2,593.5
Breathing Holes	5	8	13	0	152.0	1,604.5
Basking Seals	10	7	8	2	133.0	1,369.0
Lead/Polynya	6	6	18	2	114.0	1,244.0
Open Water	3	2	4	1	38.0	399.5
Bearded Seal (in water)	3	2	4.5	0	184.0	1,869.3
Bearded Seal (on ice)	1	1	.5	0	92.0	923.3
Eider Ducks	7	7	10	0	4.76	112.6
Char (nets)	7	23	7	0	62.1	666.5
TERRESTRIAL HUNTS						
Caribou	4	9	55	5	810.0	8,425.0
Char (by hook)	12	9	7	0	24.3	288.5
Geese	5	10	12	0	20.0	278.0
Eggs	10	372	39	0	27.9	532.5
TOTALS	**44**	**106***	**217.5**	**13.5**	**4,838.56**	**49,711.9**

*does not included egg total

5.4 Harvest Totals for Kapuivimiut: Spring and Summer, 1992

Using the imputed average $10.00 per edible kg, the harvest supplied Kapuivik (without factoring time) with a total of $48,385.65. This gross return is particularly striking when the severity of the summer and the lack of hunting opportunities/ days are considered. However, even with the lack of hunting opportunities, the averaging together all 44 hunts during the spring and summer of 1992, as Table 5.10 illustrates, shows a profit of $1,099.60 per hunt for Kapuivik hunters.

Table 5.10
Actual Cost and Imputed Return of Hunting by Month and Hunt Type

Month/ Hunt Type	# of Trips	Direct Cost	Edible Weight (kgs)	Harvest Value ($)	Imputed Return Per Hunt
June	8	$328.19	373.52	$3,735.5	+ 467.0 $
July	23	$956.41	2,904.58	$29,045.5	+1,263.0 $
August	13	$312.49	1,560.46	$15,604.6	+1,200.0 $
TOTALS	**44**	**$1,597.09**	**4,838.56**	**$48,385.6**	**+1,099.6$**
Skidoo	20	$789.33	828.38	$8,283.8	+414.19 $
Boating	12	$797.34	3,791.64	$37,916.4	+3,159.7$
Walking	12	$10.42	218.54	$2,185.4	+182.1 $

Table 5.10 shows both the month and transport method used, the total cost of the hunt (without the time factor), the amount of food harvested, the value of this food (at $10 per kg) and lastly the total value of the hunt with operational cost deducted from the total value of the harvest. Again, it is striking to notice the difference in harvest value and imputed dollar return per hunt in July and August compared to June, as well as boating compared to skidoo. This is due to the successful walrus hunts in late July and early August.

Ringed seal hunting was the day-to-day mainstay for Kapuivik hunters. Hunting for larger game like caribou and walrus were hunts that required more time, and more

money, and possibly special equipment. However, these hunts if successful, also provided a huge return of meat making the initial cash investment a worthwhile endeavor. Indeed, because of the larger size of these animals, caribou and especially walrus, had an important long term benefit to the camp. A lot of the meat from these hunts would be stored for future use. So, the greater the meat package that the resources offers usually requires greater effort and more money to pursue and capture. But the hunt is justified (even if only a few are successful) by the potential huge pay back in meat return.

Since the families in this study occupied camps in proximity to their prey species, hunting was very economical in terms of actual operational cost (gas) and time. Looking for animals closer to home saved on one of the largest expenses affecting Inuit, travel. (Table 5.7 and 5.11).

Table 5.11 Operation Cost (Transportation Fuels)

Transportation Fuels	Snow machine	Boating	Total Cost
Gas	$330	$ 438	$768
Oil	$177	$ 153	$330
Total Cost	**$507**	**$ 591**	**$1,098**

During the summer, seals were hunted from vantage points virtually just outside the tents, or within walking distance from camp. This cut down on the expensive operation cost. This included, 316 gallons (costing $768) of gas, $330 worth of oil, 264 rounds of ammunition ($196), $86.71 on Naphtha fuel, and roughly $217 on spare machine part. In total, 1,597.09 real dollars were spent to conduct harvest operations (see Table 5.7).

Table 5.12 Calculation for Contemporary Kapuivimiut Hunting

Measures	Kapuivik Harvest (Non imputed)	Kapuivik Harvest (imputed)	Kapuivik Food and Time Imputed Harvest
Total Harvest (kgs)	4,838.6	4,838.6	4,838.6
Food sold	0	0	0
Ivory sold	$470.00	$470.00	$470.00
Imputed Value of Harvest $10 per kgs	0	$48,386.00	$48,386.00
Total Value of Harvest	$470	$48,856.00	$48,856.00
Operation Cost	$1,597.09	-$1,597.09	-$1,597.09
Net Yield	-$1,127.09	$47,258.91	$47,258.91
Time: ($6.50 per hour)			
A) Hunting (Positive Time)	217 = $0	217 = $0	217 = $1,415.24
B) Repairs (Negative Time)	13.5 = $0	13.5 = $0	-13.5 = -$87.75
C) Resting (Neutral Time)	48 = $0	48 = $0	48.0 = $0
TOTALS IN DOLLARS	**-$1,127.09**	**$47,258.91**	**$48,586.40**

When the harvest is assigned an imputed dollar measurement, hunting shows an immediate and marked rate of net profit. Looking at subsistence without this calculation suggests that hunting is at best a huge economic drain. When substitution costs are considered, hunting becomes a sustainable and highly profitable activity. As noted above, active hunting during the study period averages nearly five hours per hunt. If we extend this average to include the returned harvest then for each of the 44 hunts 109.9 kgs of food was attained at an imputed rate of $1,099.67 per hunt. The average subsistence hunt in Kapuivik during the summer of 1992 breaks down as providing an average net imputed return of $239.37 per hour for each hunt (see Table 5.13).

Table 5.13 Average Cost and Return per Hunt

	Direct Cost	Imputed Net Time	Edible Meat ($)	Real ($) Return	Total Imputed Value
Per Hour	**$-5.75**	**$5.73**	**$237.70**	**$1.69**	**$239.37**
Per Hunt	**$-36.29**	**$30.05**	**$1,099.60**	**$10.68**	**$1,104.05**

With these imputed values in place, subsistence becomes an eminently "economic" system. It appears now that Inuit, instead of embracing the supposed benefits of wage economy, in actuality utilize the wage economy to support subsistence. As Wenzel (1984) states, the cash sector of the northern economy has not replaced the traditional food sector, but has itself been adapted by Inuit to the needs of subsistence.

The analysis presented above quantifies the inputs and outputs of the mixed economy by converting food value and time into money. Indeed, when the cost of food is

calculated by per kilogram cost, or when hourly "earnings" is figured (see Table 5.12), the advantage of continued hunting for the Inuit, even in a monetized setting becomes comprehensible.

When food from hunting is valued, subsistence activities become a highly profitable means of earning a living in relation to the money invested. Given that the average kilogram of meat has a value of $10 and Kapuivik hunters harvested 4,838.56 kgs of edible meat, the camped "earned" $48,385 worth of food in just 217 hours of work (see Table 5.2). After subtracting the operational costs of the hunts, $1,597, (see Table 5.7) the harvest still provided an imputed dollar value of $46,788.56 in edible meat (see Table 5.12), or as Table 5.13 indicates, an imputed return of $239 per active hour hunting.

With these numbers, some hypothetical calculations can be reached. Considering that the harvest was accomplished by four hunters in a period of 44 days or 217 hours, lets try extending this as a yearly prediction. Projected over a full year (excluding Sundays and holidays and being conservative as possible for weather conditions), lets say roughly, 137 of a possible 240 days will be suitable for hunting, or 688 active hours.

Therefore, to extend as a prediction, in a possible 688 active hunting hours offered in a year (a conservative estimate using the 217 active hour data), the same four Kapuivik hunters could harvest an estimated 15,345.84 kgs. This yearly harvest, after deductions for operational cost ($4,971.73) would have an imputed value of nearly $148,398.16. This represents an imputed income of $37,085.85 per hunter, this is after operation cost are deducted. If one hunter can produce this on an annual basis, then a village of 1000 people (roughly Igloolik) which may have 150 active hunters, could in theory supply

almost $6,000,000 worth of food. Seen with the Baffin Region, with a population of 11,000 (Baffin Handbook 1993) it can be estimated that a conservative 15 percent of that population (1,650 Inuit) could be active hunters. Using that as a guideline, 1992 subsistence hunting in the Baffin region potentially provided some $61 million of income in kind.

Chapter 6 - Subsistence in Modern Context: Summary and Conclusions

6.1 Introduction

Is hunting more profitable for Inuit than wage labor in terms of the food economy? This question seems especially important if we are to understand and plan a future beneficial to the development of Nunavut. The changing relationship between Inuit and the cash economy has taken on importance because of the view now frequently put forward that the hunting adaptation which Inuit live is no longer viable from an (southern) economic viewpoint. The logic here alleges that hunting is just to expensive and therefore can not justify its high investment rate. This view is exacerbated by the belief that cash invested in hunting, both for equipment and for sales, has removed the traditional aspect from subsistence leaving only a commercial realm (see Wenzel 1991). It is propagated by the assumption that contemporary Inuit focus more on schooling and "getting a job" than learning how to hunt and live off the land.

Outsiders, who examined Inuit culture in an acculturate framework, have suggested that increasing job opportunities and the rising monetary incomes of village residents would eventually lead to a decrease in the need for subsistence food. According to this reasoning, work for wages would compete with, and replace, the time a person spends out on the land hunting for food. Extended as a prediction, working for wages and purchasing imported foods would therefore inevitably replace the need to hunt. The logic of this assumption is that time spent in wage work is real, producing real money, while subsistence time, because it lacks extensive cash return, is unproductive.

In the contemporary mixed economy, subsistence hunting is combined with commercial actions and with the cash earned in other sectors of the economy in order to finance hunting activities. Inuit hunters presumably make decisions on the basis of a valuation that includes all of these factors, yet existing analyses fail to deal adequately with a major element, which is cash. Indeed, Usher (1971, 1976) and Nowak (1977) earlier argued that the economic worth of subsistence is being consistently undervalued and will continue to be until the large quantities of country-food harvested and consumed are quantified and accepted as "income in kind".

This thesis specifically seeks, through the construction of a common currency measure that incorporates monetary, energetic, and time inputs and outputs, to show that the "in kind" productivity of harvesting provides a measure of the value of subsistence. This approach is facilitated by incorporating methods devised by Wenzel (1991) and Smith (1991) for imputing monetary values to the "in kind income" produced through harvesting. Methods employed in this thesis provide an integrated measurement of harvesting costs and yields, notably through the conversion of time and energy values into imputed dollars. This is done so that a comparison can be developed between wage-based and subsistence-based adaptations.

To make such a comparison, a "hypothetical worker" model is constructed to emphasize the results of this analysis. This hypothetical example demonstrates the real cost to an individual who may hold a full-time community job working for the minimum wage ($6.50 an hour) and who must feed a family of four solely with store-bought food.

6.2 The Hypothetical Worker Construct

This final chapter demonstrates the relative economic merits of subsistence in a contemporary Inuit village using "in kind" accounting. This view is enhanced when compared to the situation of a hypothetical Inuk wage earner. For the sake of comparison, this example is constructed as a wage earner who buys all the food for his family from the local community store.

The purpose behind this "hypothetical" illustration is to estimate the actual dollar cost of food in the north, exclusive of hunting. Also, such an example provides a "formal" economy baseline against which the benefits and costs of subsistence can be compared. Ultimately, we will be able to compare a northern economy devoid of country food to one in which country-food is included.

If we assume that subsistence hunting will give way to wage employment and store-bought food, then it is important to understand what the real dollar costs may be in the absence of hunting. A full-time wage employee (who was also a very active weekend hunter) once told me that even though he tries to feed his family almost entirely on country-food, he still ends up spending over a thousand dollars every two weeks to buy groceries (mostly snacks and staple items, like flour, cokes, and coffee). Although he has one of the highest paying jobs in the community, it remains very difficult, from a financial perspective, to feed his family even food staples from the store.

In the following example, one hypothetical wage employee is earning the minimum wage paid in Igloolik (the same value imputed to hunters' time, $6.50) and works a forty hour week, earning approximately $13,520 for 52 weeks. Although it is unlikely that any northerner could subsist entirely on this minimum wage salary (or want

to), it does offer a useful comparison between a lifestyle which takes place entirely within the formal economy to that of a full-time hunter.

As seen in chapter five, imputing "value" to the subsistence economy sheds light on just how "profitable" subsistence can be to Inuit hunters. Looked as a yearly "job" and under a very conservative estimate of 688 active hours (see Section 5.4. page 76) a year, a single Inuit hunter will "earn" an imputed income of $41,557.85 ($37,085.85 in edible meat and $4,472 in active time).

The other end of the spectrum is the wage employment- imported food scenario. In it, a hypothetical wage employee works a 40 hour work week for 52 weeks, thereby earning $260.00 a week, or a gross income of $13,520 a year. Applying a device used by Wenzel (1991:119), the following Table (6.1) has been developed to facilitate comparison between the subsistence and wage economies. In his work, Wenzel (1991) used an itemized sample menu at then current (1984) retail prices in Clyde River, N.W.T.. A similar menu is presented here for Igloolik in 1992. (Note Wenzel's 1984 Clyde River data are included for comparison with the 1992 Igloolik prices of the same items). In both cases, these sample menus represent a compromise between nutritious and affordable foods and actual popular items.

It was thought that with better transportation to northern villages, food prices would eventually become affordable, and if not affordable, then certainly priced at a level where it would become economically feasible to buy imported food instead of the expensive equipment needed for subsistence. However, contrary to this notion (as Table 6.1 indicates) the actual price of food has risen substantially in the seven years since Wenzel's exercise.

Table 6.1 A Northern Imported Food Menu

One Day	Sample Menu (for four people)	Igloolik '92	Clyde '84*
BREAKFAST:	8 large eggs	2.75	2.85
	4 whole oranges	3.80	3.28
	175 g canned ham	4.29	3.51
	1 liter whole milk	3.99	3.40
	8 slices white bread	0.90	0.81
	4 tea bags	0.24	0.20
	sugar, margarine and jam	0.50	0.40
SUBTOTAL		**16.47**	**14.45**
LUNCH:	227 g processed cheese	4.30	2.75
	8 slices white bread	0.90	0.81
	1,183 ml. canned soup	5.24	1.25
	539 g canned peaches	2.51	2.08
	4 sodas, 280 ml each	7.00	3.40
SUBTOTAL		**19.95**	**10.29**
DINNER	330 g T-bone beef steaks	60.66	21.88
	500 g frozen vegetables	3.15	4.30
	dehydrated mashed potatoes	0.70	0.61
	1 liter whole milk	3.99	3.40
	8 slices white bread	0.90	0.81
	400 g apple-raisin cake mix	2.90	2.29
	4 tea bags	0.24	0.20
	sugar, margarine, spices	0.50	0.40
SUBTOTAL		**73.04**	**33.88**
SNACKS	8 sodas, 280 ml each	14.00	6.80
	potato chips 200 g	3.39	2.29
	4 candy bars	4.00	2.40
SUBTOTAL		**21.39**	**11.89**
Total One Day Cost		**130.85**	**70.51**
PER PERSON COST		**32.71**	**17.62**

*estimated for a four-person family. *Source* Wenzel (1991; 119).

This table immediately illustrates the dramatic rise in food prices over the last eight years, most notably in cost of imported high carbohydrate foods and fresh meats. Although it might be unreasonable to assume that people are going to eat steak every night and eggs daily, this menu nevertheless provides a good example of the real cost associated with a dependence on store-bought food. Furthermore, the presence of steak in

the sample menu provides some relative qualitative comparison to country-food and is faithful to the emphasis Inuit place on meat protein.

Using the sample menu as a guideline, predictions can be made concerning the potential cost to northern residents exclusive of country-food. If, in 1984, northern residents were forced to depend upon store-bought food and to adopt a southern diet, they would be required to spend roughly $32 per person per day on food, or $130 each day to feed a family of four. In essence, this exercise demonstrates that it cost a ludicrous $2,115 a month to feed a family of four exclusively store-bought food. By 1992, this cost is up to $4,000 per month. Further, the escalating cost of imported foods is exacerbated by a general lessening of overall nutritional quality compared to country-food (see Mackey 1984). Thus, the option of switching from a highly nutritional and modestly "priced" activity like subsistence to a life consisting of a higher cost, nutritionally weaker diet is clearly not efficient.

What Table 6.1 also demonstrates is that no matter how much money Inuk may earn, eating exclusively from the store is economically impossible. Using the menu devised above, it would cost an estimated $47,768.52 per year to eat reasonably well. Indeed, with these prices, even the highest wage earning members of the community, who earns about $50,000 per annum, would find it difficult to have an exclusive reliance upon imported foods. Ultimately, this hypothetical worker incurs a deficit of $34,000, even before adding up other costs of village life. Simply stated, the cost of imported foods are economically prohibitive, making it virtually impossible for an individual to sustain oneself without relying to some extent on harvested country-foods. This is

especially true with the lack of meaningful full-time employment in most northern settlements.

While it is often expensive and difficult to buy nutritious imported foods, opportunities for wage employment in northern communities are even more difficult to secure. Jobs simply are not available. To say that the labor force participation rates are significantly lower among Inuit than the national average is a huge understatement. Unemployment in small Baffin communities is often as high as 50 % (Department of Social Service 1985). These indicators are, of course, designed for industrial economies, and are not entirely applicable to an economy in which subsistence production and self employment are a matter of both circumstance and preference. Although major resource development projects in the Arctic have provided jobs and training for many Inuit, they alone, to date, have not proved to be the solution to Inuit unemployment problems. Government and service industries in communities like Igloolik are presently the most active northern employers, but they have not been able to fulfill employment demands of entire communities.

Inuit must therefore pursue a strategy of economic development that ensures that hunting continues to be a viable part of the economy. Comparing the cost of a store food menu and its $130 a day to a "average day" camp menu at Kapuivik (see Table 6.2) shows just how inexpensive and healthy one can subsists on by using a northern diet.

Table 6.2 Sample Kapuivik Household Menu, 1992

SUNDAY:	Menu Items	Dollar Cost
Breakfast:	20 Eggs (tern eggs)	0
	10 Tea bags	.50
	Bannock	3.98
	Sugar	.50
Subtotal		**4.98**
Lunch:	Boiled Seal 9 kg	0
	2 Lipton Soup pk.	.89
	1 Tang pk.	.73
	10 Tea bags	.50
	Sugar	.50
Subtotal		**2.62**
Dinner:	Boiled Seal 10 kg	0
	2 Lipton Soup pk.	.89
	1 Tang pk.	.73
	Bannock	3.98
	10 Tea bags	.50
	Sugar	.50
Subtotal		**6.60**
Snacks:	Bannock	3.98
	20 eggs (tern eggs)	0
	Peanut Butter/ jelly	1.00
	10 Tea bags	.50
	Sugar	.50
Subtotal		**5.98**
TOTAL COST		**20.18**

This is a one day menu recorded on a Sunday (a typical day of rest for the camp). The seal stew was shared with all members of the camp. These Sunday meals were considered a "real feast", the cost of this "feast" in real dollars is listed above.

It becomes glaringly obvious that without the "outdated" tradition of hunting, northern communities would be in even more difficult economic straits. Removing subsistence hunting from the economic equation would make the Inuit more dependent upon southern solutions like family allowances and welfare payments.

6.3 Conclusion

The Inuit of Igloolik have always relied on the harvesting of wildlife for their well-being. Until the 1980's an economic loop was developed in which the monetary investment required to purchase and operate hunting equipment was supplied primarily by two species, arctic foxes and ringed seals. These, in turn, provided the investment necessary not only to continue fox trapping and seal hunting, but also to harvest non-cash producing species such as caribou, fish, other marine mammals and lesser resources. Unfortunately, crashes in the fur market (first with foxes and, more recently, with seals) has had devastating effects on hunters' abilities to purchase the technology needed to continue subsistence hunting.

With the formal economic loop broken, Inuit are forced to seek new sources for acquiring cash needed to pursue a subsistence lifestyle. Money has now become an important, though scarce, resource and Inuit look to seasonal, if not permanent, wage jobs to provide cash for subsistence investment. With forced importance placed on wage employment, the non-Inuit perception of a shift away from the rigors and hardships of hunting to the purchase of store-bought food seems realized. Contrary to popular opinion however, Inuit enter the job market as much to acquire the cash needed to purchase tools

and equipment to continue hunting as for a new "lifestyle". Instead of the formal economy replacing Inuit subsistence, it has been adapted to maintain a subsistence way of life. Today, employment plays a major and necessary role in allowing people, especially younger hunters, to make the very large sums required to begin hunting as a livelihood.

The great rise in cash investment required for hunting in recent years, coupled with the weak market for furs and carvings, has placed much greater emphasis on employment as a source of money. While there have been business developments in some of the regional centers, (usually tourism, crafts or fishing) the basic employment situation in the north will probably not change significantly in the near future. The non-renewable resource boom, that has been expected ever since the 1950's to employ the majority of the adult Inuit population, is no nearer now than it was then. When we consider that, according to the 1981 census, almost half of the Inuit population in the NWT was under 15 (Department of Indian and Northern Affairs 1985). Lack of employment opportunities will likely be an increasingly serious problem over the next two decades.

The state of employment today is already one in which a significant portion of the general population has to rely heavily on social assistance and other government transfer payments. In 1985, the territorial government spent $5.3 million on social assistance in the Nunavut region of the NWT (Department of Indian and Northern Affairs, 1985). Over 50 % of the total population of Nunavut received some form of social assistance and over 90 % of the population in some communities were receiving social assistance at one time or another during that year (Department of Social Services 1985).

Social programs in the north have faced many difficulties. One of the main problems, however, is that the programs were designed for the urban south and were set

up to meet the needs of urban Southerners, not those of Inuit hunters. One manifestation of this is that most social assistance is not paid in cash but in food vouchers. Thus, a hunter can only use this assistance to obtain store food. The cash equivalent of these food vouchers cannot be used to finance hunting activities which, as the data show, if invested in the harvesting economy could return ten times their value in highly nutritional country-food.

The harvest economy is currently undergoing a cash crisis which is causing serious disruption in the subsistence economy. People who want to hunt are finding it difficult to purchase gas or finance new equipment. In turn, any significant disruption in the subsistence economy seriously effects the local economy of the entire community. As the data show, if country-food is not obtainable for the community, either because of insufficient finances or due to bad weather, people will be forced to depend on imported foods, a high cost-low return option.

Unlike store food, country-food is generally shared with and made available to the entire community. If hunting and fishing were to decline as a major source of sustenance, country-food would have to be replaced by more expensive, less nutritional alternatives. This, in turn, would require a higher level of total cash input to support the quantitative, if not nutritional, needs of Inuit. A decline in the harvest of wildlife would thus represent significant economic decline for northern communities.

On the positive side, a stable hunting economy may be able to provide the basis for economic development and employment at the community level. As previously calculated, the imputed value of harvested food for the Baffin Region could potentially be well over $60 million per year. Harvest of wildlife, however, is much more than just a

source of food and income for the Inuit. Inuit society and culture revolve around their relationship with the land and the harvesting of wildlife. These provide the most important sources of the "psychological" well-being of individuals and communities and the cultural identity of Inuit as people. This was made evident to me when surveying a group of young hunters about hunting. A 19 year old expressed depression in being "in town" for so long (he been about a week without hunting) saying "I have to get out of this town to clear my head". Sure enough the next day he was gone for over a week hunting seals. This is just an example of the importance that hunting still holds for many Inuit youths (Wenzel and Loring in press)

The preceding chapters have been an attempt to look at the economics of contemporary Inuit subsistence, viewing subsistence econometrically, and comparing a subsistence-wage employment lifestyle to that of one embedded in the formal economy. The value of such a study lies not in what it tells us about the economics of subsistence, but rather presents an insight into the complexities of modern subsistence activities.

Damas (1963) once observed that the Central Inuit of Canada since 1950 appeared to follow a trend whereby the Inuit youth were disassociating themselves from their traditional culture and embracing a "quasi-urban" existence. Van Stone (1960), in writing about Northern Alaska, noted a similar trend with the Inupiat. There is little doubt that participation in the subsistence economy is changing and will continue to change. There is certainly an increasing emphasis upon having a wage earning job (witness the sign up sheet for picking up honey buckets in Igloolik). It is unlikely that this pull to join the labor force will diminish the role of subsistence. Yet, it is also clear that without money, subsistence is also in jeopardy.

The data concerning Inuit subsistence presented in this thesis emphasize the economic importance of hunting in northern communities. Despite the bad weather during the course of the study, three families at Kapuivik still managed to provision themselves with over $48,000 (4,838 kgs of edible meat) worth of food in just 44 days of active hunting. This accounts for $48,000 which the Canadian government might otherwise have to put toward welfare checks or social assistance.

This thesis then serves to explain why Inuit subsistence is not only socially desirable and ecologically sustainable, but also economically feasible. It disputes the assumption of some who believe that subsistence will eventually reach a point where it becomes cheaper to purchase food from a store rather than hunt. This theory is based on the fact that the rising cost associated with purchasing equipment needed for hunting will become too expensive. Usher (1992) believes that subsistence will continue to flourish despite numerous obstacles only if: 1) the natural resources base remains healthy, abundant and accessible; 2) kinship continues to be the organizing principle of production, distribution and consumption ; and 3) the material and non-material needs of its members continue to be met. To date, subsistence clearly continues to met these criteria.

Government support for harvesters and harvesting combines matters of social policy and economic objectives. A healthy renewable resource economy benefits both the government and its constituents. A renewable resource program that delivers uncoordinated and under funded projects, no matter how well intended, is of little to no use to the people it is meant to serve. Moreover, programs that generate diminutive

economic return are a drain on government resources. Meaningful economic support for harvesters in a renewable resources economy could overcome these problems.

Social problems and cultural disruption are tied, to a large extent, to unemployment, dependence on social welfare and to a lack of economic opportunity. In order to break this cycle, and develop attitudes essential for the development of appropriate harvest support policies and programs, there must first be official recognition that harvesters are "employed" and that hunting is an economically meaningful occupation.

Ultimately, this thesis has been an attempt to record operating as well as capital costs in hunting with the hopes of developing a more accurate economic profile of subsistence and Inuit hunters. It attempts to place the "formal" economy in modern day perspective to subsistence. The modern need for cash to cover operating and equipment costs for hunting must be recognized and reconciled with the traditional ways of sharing the proceeds. With escalating costs related to food and equipment and the lack of much meaningful employment, feeding northern people is a critical issue. Store-bought food, although handy, remains a luxury which most find is impossible to finance.

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