Aboriginal Community Incomes and Migration in the NWT: Policy Issues and Alternatives

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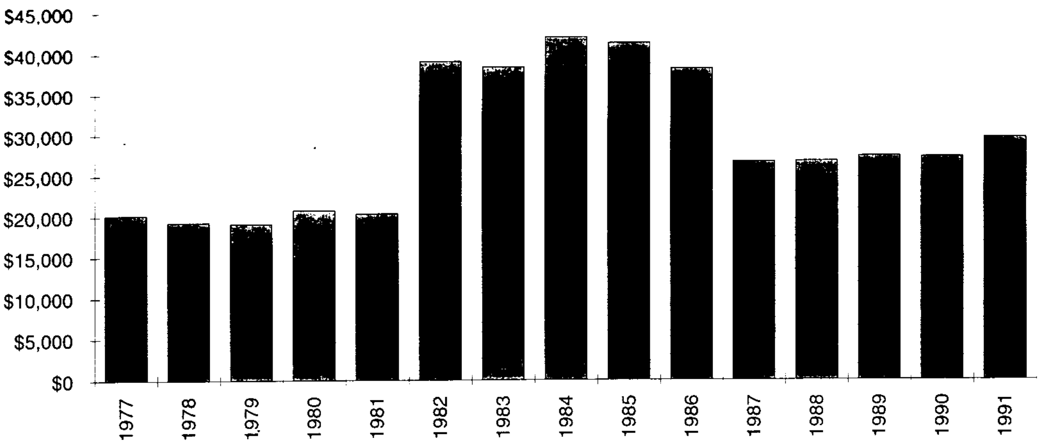
Ce texte utilise des données d'une étude parue en 1969, du recensement de 1986 et d'un certain nombre d'enquêtes sélectionnées pour étudier l'impact probable de la migration, des petites communautés vers les grands centres, induite par des coupures additionnelles des dépenses fédérales dans les Territoires-du-Nord-Ouest. À l'exception des emplois que l'on retrouve dans un petit nombre de communautés situées près d'industries de ressources minières, les postes gouvernementaux et les paiements de transfert constituent les sources principales de revenu pour la plupart des communautés aborigènes. Ces revenus jouent un rôle crucial pour l'investissement dans les machineries et l'équipement nécessaires pour valoriser les activités traditionnelles de ces communautés. Toutefois, la migration induite vers les grands centres va augmenter la dépendance en réduisant l'accès à ces activités traditionnelles et en augmentant le besoin de subventions gouvernementales pour fournir des logements dans les grands centres, alors qu'il y a des logements adéquats dans les petites communautés. Des politiques n'incitant pas la migration sont également discutées.

This paper examines the likely impact of induced migration from smaller communities to larger centres in the event of further cuts in federal expenditures in the NWT. With the exception of a few communities located near mineral resource industries, government employment and transfer payments provide the major source of cash income for most aboriginal communities. This income is critical as a source of money to invest in machinery and equipment to enhance the cash and in-kind income from traditional activities. However, promoting migration to larger centres would increase dependence by reducing access to these traditional sources of income, and by increasing the need for government subsidies to provide housing in the larger centres at a time when adequate housing already exists in smaller communities. Policy alternatives to migration are discussed.

I Introduction

In its 1989 report (NWT, 1989), the Special Committee on the Northern Economy (SCONE) reached the conclusion that an economic crisis was about to start because of threats that real per capita federal expenditures would be cut in the NWT. Other studies also suggested that the federal government would like to freeze or at least slow down the growth in expenditures in the future (Stabler, 1985; Stabler and Howe, 1990). The 1993/94 estimates indicate that 81 per cent of NWT government (GNWT) revenues are presently derived from grants and subsidies from the federal government (Roy Ellis, NWT Bureau of Statistics, 1994, pers. comm.) under the new agreement which reflects the recent transfer of some sources of resource revenue to the GNWT.



SOURCE: Calculated from NWT Bureau of Statistics

Figure 1 Federal expenditures in the NWT in per capita 1991 Edmonton dollars

This is down from 85 per cent in 1989 (NWT. Ec. Development and Tourism, 1989) under the old agreement. Figure 1 illustrates that a per capita decline did indeed start in 1987.

For most communities which are predominantly aboriginal, employment income, and cash and in-kind income earned from hunting, fishing and trapping are not enough to support a population growing at faster rates than the Canadian average. In addition, the costs of living have been rising while the returns on sales of crafts and wildlife products have been in decline (Ames et al., 1989). There are indications that the wildlife resource base in the vicinity of some communities may have suffered some depletion (Berger, 1988; Wenzel, 1981). As these trends are likely to continue, both the SCONE report and the study by Stabler and Howe (1990) recommend policies to develop the larger centres in the NWT and to assist aboriginal people to migrate to those centres.

This paper argues against this policy thrust: aboriginal people want to remain in their small communities, and a policy to foster migration to larger centres is not a viable solution to an economic crisis arising from cuts in federal employment and expenditures (Usher and Weihs, 1989). There is a genuine shortage of market-driven activities in larger centres to act as a source of employment for migrants; and dependence on government programs would increase dramatically as access to traditional ways of earning cash and in-kind income were reduced. Furthermore, a substantial investment has already been made in housing in existing communities; assisting aboriginal people to migrate to larger centres would create an acute housing shortage which would require even more public funds.

In regional studies of this type, certain activities are defined as basic if they are exogenous or determined outside of the internal economy of the community under analysis. Basic income generated through government employment income, rent subsidies and transfers may be affected by federal cutbacks. Basic income ratios have been calculated as the sum of these government sources of basic income divided by cash and in-kind income earned through primary sector employment, and traditional activities of hunting, fishing and trapping. The analysis indicates that most low income aboriginal communities have a government to primary sector basic income ratio that is less than the average for remote regions in Canada, and is significantly less than that for middle income and high income communities in the NWT.

While there are limited opportunities in smaller communities, dependence on government funding can be reduced. Co-management of renewable resources, exploitation of certain under-utilized resources, assistance with training, and the provision of wildlife harvester support would enhance revenues from sustainable hunting, fishing and trapping (Usher, 1986; Usher and Weihs, 1989). Fostering entrepreneurship in small communities through training, output subsidies and assistance with marketing could prove a cost-effective way to provide employment income. Indeed, if such programs were to meet with success, a return migration of aboriginal people from larger to smaller centres could assist in the process of adjusting to cuts in federal expenditures in the NWT.

II Structural Characteristics of Aboriginal Communities

Sources of Data

Data for income generated through the non-traditional sector by way of employment income, rent subsidies and transfer income were obtained from a 1969 study (Palmer, 1973) and from the 1986 census (Statistics Canada, 1988). Data for cash and in-kind income generated through the traditional sector activities of hunting, trapping and fishing were derived from harvest survey studies for 1986 and approximations for 1969. Both middle and low income Inuit and Dene communities in the NWT are compared for 1969 and 1986. These data were used to develop a set of descriptive statistics which can assist in explaining how the economic difficulties facing NWT communities have evolved, and in determining whether migration to larger centres is likely to alleviate the effects of cutbacks in federal expenditures.

The data sources and an explanation of the manipulations used to derive the numbers used in the tables and figures is included in the appendix. A more detailed explanation of the methodology used is available from the author. Every effort has been made to keep the calculations as simple and transparent as possible, however, there are severe limitations to the reliability of the results. The data for employment income, transfer payments, and fur income are reliable, but the data for rent subsidies, and the volumes and values for meat and fish harvests must be treated with great caution.

Ethnic Proportions and Income Groupings

Table 1, column a lists the aboriginal proportions for 1978, which were used to isolate the data relevant for aboriginal groups. Similar proportions were calculated from the 1986 census, although they are likely to be less accurate because no distinction is made between aboriginal ethnic groups. Nevertheless, the proportions are remarkably similar (see also Donaldson, 1983), and the 1978 proportions were used throughout to maintain consistency between 1969 and 1986.

Data are often not available on a consistent basis for communities with less than 2 per cent of the aboriginal population, and these communities were excluded from the study. This is unlikely to bias the results as Inuit/Inuvialuit (Inuit) communities used in the analysis account for more than 85 per cent of that ethnic population, while the Dene/Metis (Dene) communities account for over 93 per cent. Communities were organized into high, middle and low income groups according to 1986 employment income. Those with 1986 per capita employment income in excess of $5,000 were grouped as high income. For the most part, these are predominantly non-aboriginal communities and as the data cannot be distinguished by ethnic group, the use of aboriginal proportions imparts an upward bias due to the much larger incomes earned by non-aboriginals.

For this reason it was decided to ignore this group, except for basic income ratio comparisons, in order to concentrate on middle and lower income communities.

Table 1
Structural characteristics of NWT aboriginal communities

Communities	1978 Aboriginal Proportion (%) a	1986 Completed Grade 9 (%) b	1978 - 89 Spatial Cost Index Edm=100 c	1969 Basic Income Ratio d	1986 Basic Income Ratio e	1986 House Values per cap $ f	1970-86 Houses Built per cap g
Inuit/Inuvialuit Middle Income							
Tuktoyaktuk	87	44	162	0.17	0.94	20,270	0.15
Rankin Inlet	73	44	211	0.46	2.00	19,620	0.19
Cambridge Bay	79	49	237	0.16	1.77	30,362	0.20
Aklavik (Inuit only)	47	49	165	0.29	1.07	18,056	0.14
Inuit/Inuvialuit Low Income							
Baker Lake	87	40	224	0.15	0.55	34,223	0.13
Coppermine	92	32	223	0.16	1.12	30,955	0.12
Pangnirtung	90	31	213	0.08	0.80	20,226	0.13
Pond Inlet	92	40	237	0.14	0.83	16,673	0.11
Clyde River	93	18	224	0.16	0.72	11,447	0.12
Taloyoak (Spence Bay)	93	22	271	0.11	0.66	23,500	0.12
Arviat	94	34	215	0.29	1.13	18,863	0.12
Coral Harbour	87	22	218	0.16	0.73	13,594	0.10
Cape Dorset	94	29	225	0.13	0.79	23,805	0.11
Igloolik	95	31	229	0.16	0.43	6,763	0.10
Arctic Bay	95	39	264	0.10	0.38	22,656	0.10
Broughton Island	95	35	241	0.09	0.76	18,973	0.14
Gjoa Haven	93	23	267	0.08	0.82	12,401	0.12
Sanikiluaq	97	43	259	N/A	0.44	8,910	0.11
Hall Beach	96	31	256	0.14	0.47	4,478	0.10
Dene/Metis Middle Income							
Fort Resolution	87	44	143	0.26	2.27	13,798	0.11
Fort Providence	88	43	136	0.26	1.98	12,699	0.10
Aklavik (Dene only)	44	49	165	0.29	1.07	18,056	0.14
Fort Norman	91	44	189	0.19	1.18	6,529	0.15
Rae-Edzo	91	38	135	0.10	0.70	8,711	0.11
Fort McPherson	91	49	189	0.07	1.11	9,622	0.12
Dene/Metis Low Income							
Fort Good Hope	92	37	204	0.06	0.59	7,934	0.12
Fort Liard	95	33	201	0.14	0.48	5,536	0.19
Deline (Fort Franklin)	93	38	202	0.11	1.32	7,164	0.09
Lac La Martre	99	26	218	0.14	0.29	7,014	0.04
Lutselk'e (Snowdrift)	93	35	291	0.07	0.31	8,047	0.05

Table 1 contd.
Structural characteristics of NWT aboriginal communities

House Values are in per capita 1991 Edmonton dollars.
Sources: column a: NWT, 1979:12-14.
columns b, f, g: Statistics Canada, 1988.
column c: NWT, Bur. of Stat., 1990:72; NWT, Plan. & Res., 1979: Building Cost Table.
column d: calculated from Table 2 using the government proportion of column a plus columns c and e, divided by the primary sector proportion of column a plus the sum of columns g, i and k.
column e: calculated from Table 2 using the government proportion of column b plus columns d and f, divided by the primary sector proportion of column b plus the sum of columns h, j and l.

Low income communities are defined as having 1986 per capita employment income of less than $3,500, and middle income communities are defined as having employment income between $3,500 and $5,000. Within each income group communities are ranked in descending order of 1986 employment income in Tables 1 and 2.

Population Growth Rates, Education Levels and Spatial Costs

Over the years the steady migration of nomadic families from highly scattered outpost camps into more centralized communities accelerated with the increasing availability of employment opportunities, school and medical facilities, transfer payments, and rent subsidies. Since that time, population has grown internally rather than through inter-community migration (Usher, 1986). Data are available for community populations since 1961 and while growth rates have tended to fall over time, they are significantly higher than the Canadian average. The 1981–86 average annual Inuit population growth rate of 2.9 per cent confirms the observation in the SCONE report (NWT. Special Committee, 1989) that the aboriginal population growth rate is about three times the 1981–86 national average of 1.03 per cent.

Column b of Table 1 lists the proportion of each community population which has completed grade 9. Education levels appear to be related to income levels. However, an inverse relationship is discernible between employment income and spatial costs. Employment income tends to be associated with non-aboriginals (Usher, 1986). Unless returns are exceptional, such as for the mine at Nanisivik, most private sector investors find costs too high to locate in isolated communities. The same holds true for the provision of government services; smaller, higher cost communities tend to be serviced through larger administrative centres.

Sources of Income

There are several sources of cash and in-kind income available to aboriginal people as indicated in Table 2. While this study has not examined the income maximizing behaviour of aboriginal people, it is quite remarkable how income disparities were reduced between 1969 and 1986 despite major differences and changes in sources of income in each community. There have been significant increases in employment income and rent subsidies, and to a lesser extent in transfer income. Nevertheless, in almost all low income Inuit communities, in-kind income from meat harvests is still more important than employment income; and the combination of meat, fish and fur income is still more important than employment income in most low income Dene communities.

Table 2

Sources of NWT community income in per capita 1991 Edmonton dollars

	Non-Traditional Sector						Traditional Sector						Gross Income		
	Employ Income		Rent Subsidy		Transfer Income		Meat Income		Fish Income		Fur Income				Adj.
	1969	1986	1969	1986	1969	1986	1969	1986	1969	1986	1969	1986	1969	1986	1986
Communities	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
Inuit/Inuvialuit Middle Income															
Tuktoyaktuk	1,369	4,999	177	1,809	128	760	3,045	1,348	1,354	721	63	105	6,134	9,893	6,852
Rankin Inlet	952	4,940	620	3,107	118	558	3,169	2,256	196	242	15	12	5,108	11,242	6,688
Cambridge Bay	1,037	4,690	208	2,936	163	444	3,624	2,258	315	220	63	28	5,544	10,741	6,506
Aklavik	1,449	4,258	173	1,773	125	878	2,565	1,284	296	929	387	207	4,995	9,420	6,637
Inuit/Inuvialuit Low Income															
Baker Lake	798	2,652	582	1,447	110	629	7,814	4,784	106	234	12	11	9,422	9,790	7,610
Coppermine	782	2,478	220	1,156	173	482	3,560	1,288	434	302	132	57	5,378	5,793	4,044
Pangnirtung	579	2,399	520	1,094	62	511	11,744	2,538	324	511	199	5	13,554	7,067	5,462
Pond Inlet	633	2,298	468	1,155	56	408	6,478	2,573	362	206	57	15	8,101	6,684	4,779
Clyde River	600	2,289	495	1,439	59	464	6,029	3,359	271	431	57	9	7,511	8,000	5,907
Taloyoak	719	2,281	181	1,370	142	513	5,332	3,072	1,943	922	102	26	8,418	8,204	6,182
Arviat	472	2,272	609	1,442	116	601	3,707	2,256	102	105	75	12	5,080	6,748	4,712
Coral Harbour	806	2,244	599	994	114	804	6,784	3,321	266	205	244	63	8,814	7,673	6,081
Cape Dorset	399	2,224	493	1,040	59	486	5,309	2,268	485	237	79	5	7,850	6,274	4,781
Igloolik	704	2,148	485	923	58	441	5,736	4,528	462	322	69	4	7,661	8,409	6,825
Arctic Bay	530	2,097	420	1,055	50	372	8,618	4,414	432	466	57	4	10,107	8,440	7,035
Broughton Island	915	2,066	461	1,451	55	341	10,008	3,049	651	162	50	9	12,139	7,085	5,003
Gjoa Haven	463	1,686	184	922	145	442	5,881	2,090	625	279	13	7	7,453	5,443	3,994
Sanikiluaq	N/A	1,623	428	555	51	449	6,143	3,136	613	830	122	20	7,357	6,618	5,599
Hall Beach	1,398	1,428	433	948	52	299	6,138	3,323	514	646	72	3	8,607	6,658	5,445

Table 2 contd.
Sources of NWT community income in per capita 1991 Edmonton dollars

Dene/Metis															
Middle Income															
Fort Resolution	329	4,720	344	2,159	227	1,709	1,383	744	801	482	208	654	3,291	10,586	7,719
Fort Providence	842	4,289	362	2,194	239	1,066	928	556	1,922	482	201	386	4,494	9,009	5,152
Aklavik	1,449	4,258	173	1,773	108	878	2,565	1,284	296	929	387	207	4,978	9,420	6,637
Fort Norman	964	4,173	151	1,618	94	641	2,666	1,734	1,005	482	142	372	5,022	9,040	6,204
Rae-Edzo	368	3,830	364	1,093	240	1,114	5,086	3,565	1,958	615	106	356	8,135	10,662	8,309
Fort McPherson	723	3,581	152	1,219	95	690	2,294	1,180	3,250	482	71	192	6,585	7,414	5,046
Dene/Metis															
Low Income															
Fort Good Hope	516	3,332	140	808	87	782	4,022	2,319	3,434	1,206	188	476	8,388	9,022	6,940
Fort Liard	518	3,157	245	539	161	736	3,315	1,966	1,338	482	336	602	5,914	7,557	6,454
Deline	741	2,829	141	1,229	88	675	1,182	515	3,000	482	208	436	5,437	6,181	4,095
Lac La Martre	419	1,882	226	164	149	666	1,519	2,518	2,711	2,756	6	254	5,031	8,263	7,324
Lutselk'e	307	1,539	169	375	111	468	5,523	4,077	675	482	106	212	6,891	7,177	6,417

Sources: columns a, c, e, k: calculated from Palmer, 1973.
columns g, i: calculated from Bissett, 1974; D'Hont, 1993; Donaldson, 1983, 1984; Gamble, 1987a, 1987b; and Jingfors, 1984.
columns b, d, f: calculated from Statistics Canada, 1988.
columns h, j: calculated from Bissett, 1974; Donaldson, 1984; D'Hont, 1992 and 1993.
column l: calculated from Poole, 1991.
column m: sum of columns a, c, e, g, i, k plus "other income" (Palmer, 1973).
column n: sum of columns b,d f, h, j, l plus "other income" (
column o: column n minus rent subsidies and one-half service income .

III Non-Traditional Sources of Income

Employment Income
While 1969 income totals in Table 2 reflect only those amounts earned by aboriginal people, the 1986 income totals reflect amounts earned by both aboriginal and non-aboriginal groups. Aboriginal proportions were applied to these data and are comparable for middle and low income communities. The increases in real employment income for most communities between 1969 and 1986, have led to some significant changes in the rank orderings for employment income as listed in Table 2. The most notable are associated with communities located near DEW line sites such as Broughton Island and Hall Beach which had relatively high incomes in 1969, and with communities which have experienced rapid growth due to mining such as Fort Resolution (although the nearby Pine Point mine has now closed), or a relative reduction in oil and gas activity such as Fort Norman.

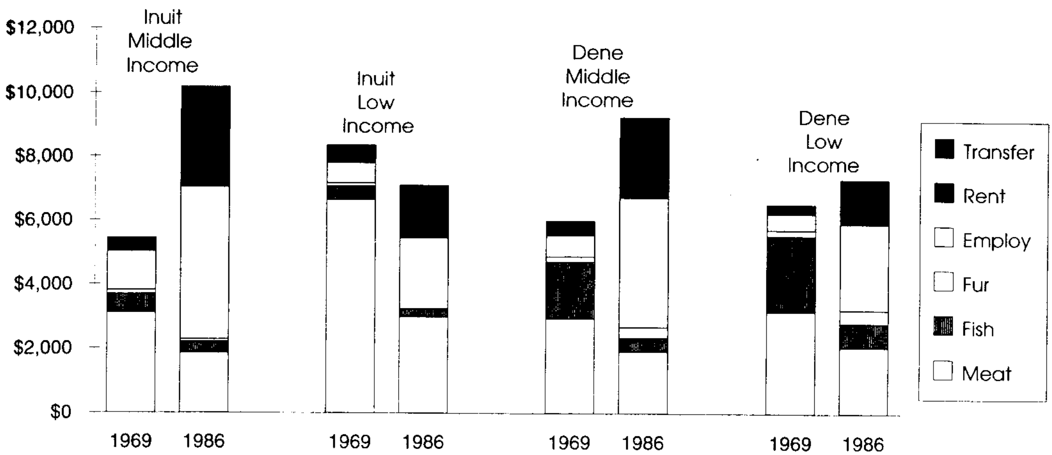
Table 2 and Figure 2 both illustrate the substantial increase in employment income which has taken place in every community. It may appear that employment income has replaced income from meat and fish harvesting, but problems with the comparison between 1969 and 1986 meat and fish harvest data preclude such a conclusion. It is true, however, that employment income has contributed substantially to the increase in per capita income in most communities.

Industry Proportions
Aboriginal employment income by industry division for 1969 was available in the Palmer study (1973). Six categories which account for more than 90 per cent of employment income for most communities are illustrated in Figure 3. Aboriginal employment income for 1986 was not available from the Statistics Canada census profile (1988), but employment for both aboriginals and non-aboriginals was broken down by industry division. Wage differentials amongst aboriginal people tend to be small, and employment can be used as a proxy for employment income. These sources of employment income are studied in greater detail in the appendix.

Figure 3 indicates that employment income from government and services has declined significantly in most communities. The most notable increase has been in income from the primary sector. Changes in employment income in the primary sector are important, as this is the most likely alternative form of non-traditional economic activity after government employment. The general increase in the level of oil and gas activity is easily discernible in Figure 3 for Dene communities in the Mackenzie River system. Drilling activity and mineral extraction did increase substantially for some Inuit communities such as Tuktoyaktuk and Arctic Bay (Pond Inlet), although oil and gas drilling and related activities have declined since 1986 in the Western Arctic.

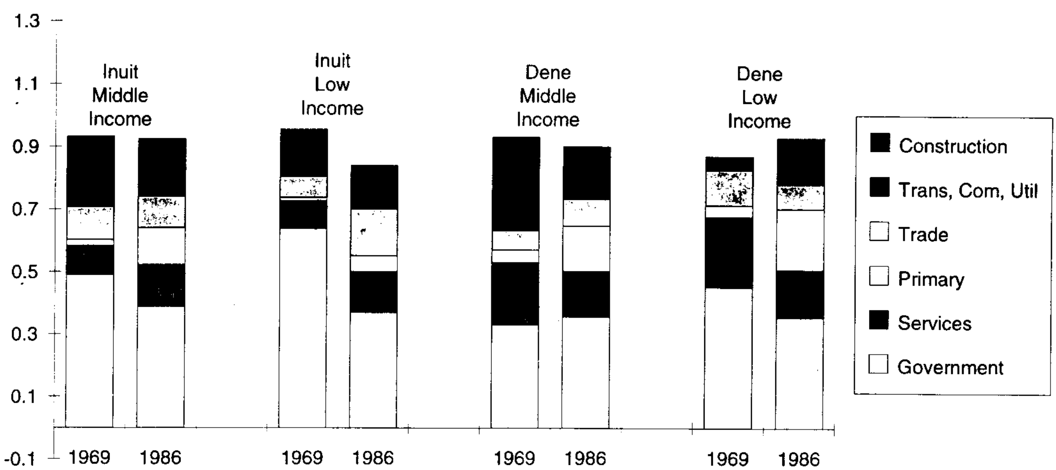
Proportions of income and employment in the trade category have risen for Inuit communities. The high proportions for communities such as Baker Lake, Gjoa Haven, Taloyoak (Spence Bay) and Sanikiluaq reflect fewer employment opportunities in general for these isolated communities, but may also indicate that there are Inuit living in outpost camps who come to these centres to trade. Low income Inuit communities with few employment opportunities tend to produce arts and crafts for sale through the co-operative stores system (Quigley and McBride, 1987), and the proportions have risen because this income is now designated as employment (trade) income rather than other income. The decline in trade employment for low income Dene communities has resulted from the improved system of roads which has encouraged people to shop in high income communities where selection and prices are better.

Construction industry proportions appear to be correlated with rapid increases



SOURCE: Table 2

Figure 2 Sources of NWT community income in per capita, 1991 Edmonton dollars



SOURCES: Calculated from Canada (1988); Palmer (1973)

Figure 3 NWT community employment income: industry proportions

in population growth in preceding periods. While maintenance of the current stock of housing will require some construction workers, the fact that most homes have been built since 1970 means that there is unlikely to be a boom in house construction for most aboriginal communities (Stabler and Howe, 1990).

Rent Subsidies and Transfer Payments

Rent subsidies include imputed mortgage carrying costs for the buildings plus the operating and maintenance costs. For isolated communities in more northern regions, the operating costs can exceed mortgage and maintenance costs simply because of the high costs of heating. Individuals in communities with higher employment income are able to afford larger houses with more rooms. This not only increases imputed mortgage costs but will lead to substantially higher fuel costs.

Differences in transfer payments for Inuit people between 1969 and 1986 can be explained in part by the major changes in the assistance programs in the 1970s which reduced eligibility requirements and increased transfer amounts. Differences amongst communities which were quite marked in 1969 had been reduced considerably by 1986.

IV Traditional Sources of Cash and In-kind Income

Meat and Fish Income

Table 2 and Figure 2 indicate that meat and fish harvests for most low income communities tend to be higher than for their middle income counterparts. Whether or not employment income is preferred or a necessity (Stabler, Tolley and Howe, 1990), it is earned at the expense of in-kind income from traditional activities (Ross and Usher, 1986; Usher, 1986; Usher and Weihs, 1989). Despite significant differences in investment requirements for machinery and equipment for Inuit harvesting of sea mammals and Dene harvesting of land mammals, the value of meat harvests is similar for Inuit and Dene low income communities.

Fish are generally available near most communities, and there is less need for machinery and equipment to travel to difficult places and over great distances. Time series observations on fish harvests do exist for a few NWT communities. Berkes (1990) has found that the fluctuations which occur in fish harvests are not so much a function of fluctuations in fish stocks as a response to the availability of employment opportunities and other preferred meat sources.

The data in Table 2 suggest that meat and fish income has declined substantially for most communities. These results should be treated with great caution. The most accurate sources of data have been the Native harvest studies, and some of those were done just three or four years before 1986. Except for the few cases where 1969 data were used for 1986 for fish or other species not covered in the 1986 surveys, the 1986 data were compiled by NWT Renewable Resources, using methods quite different from the Native harvest surveys. It is quite possible that underreporting in 1986 may explain a significant proportion of the apparent decline in meat and fish harvesting.

The Potential for Meat and Fish Income

There does not appear to be an impending crisis for this source of in-kind income. While there may be some reduction in wildlife around some communities (Berger, 1988; Derek Melton, NWT Renewable Resources, 1992, pers. comm.; Wenzel, 1981), this is not the case for most migratory species. Some herds have recovered from previously reduced levels, while other stocks are actually larger than those associated with maximum sustainable yield (Derek Melton, NWT Renewable Resources, 1992, pers. comm.; Fuller and Hubert, 1980; Stabler and Howe, 1990; Usher, 1986).

Given estimates of stocks and reproduction rates, and required protein levels needed to sustain adults, fish and meat harvesting at maximum sustainable yield could potentially supply sufficient protein to support a modestly larger aboriginal population (Duerden, 1992; Derek Melton, 1992, pers. comm.; Fuller and Hubert, 1980; Usher, 1986; Usher and Weihs, 1989). These estimates assume that wildlife will be managed intensively using predator control programs, that harvesting and fishing effort is more evenly spread out than is currently the case, and that none of the harvest is used to feed dogs.

Sources of Cash Income

The drop in fur income for Inuit communities reflects the disappearance of the sealskin market. Discussions with Inuit community leaders indicate that fox fur harvests are also down because equipment and machinery costs are high and fur prices are low. What is interesting is that even by 1969, fur harvests were not of critical importance as a source of income for most Inuit communities. The reverse is true for Dene communities which now earn a significant amount of cash from sales of furs.

Fur trapping is less arduous and requires less machinery and equipment for Dene communities inside the tree line. Discussions with Dene trappers indicate that the increase in employment income has permitted the purchase of enough equipment and supplies to allow greater penetration into areas which have never been trapped, resulting in rich harvests of premium priced furs. This may also explain why the fur catch was much more evenly spread out amongst Dene communities by 1986. While there is no outright ban on the type of fur harvested by the Dene, downward pressure on prices arising from antifur legislation and lobbies and competition from fur farms in southern Canada may make it difficult for this industry to grow in the future.

Craft income is now larger than income from furs (NWT. Special Committee, 1989), but it is difficult to isolate for 1986. Manufacturing income reported in the 1986 census profile is so small that it could not have captured the major part of craft income. The only alternative is to assume that much of it is reported as employment income through the co-operative store system. Quigley and McBride (1987) estimate that over 70 per cent of carvings are sold through the co-op retail system. This may explain the high proportion of employment income received in the trade category (see Figure 3) for craft-oriented, low income Inuit communities, such as Cape Dorset. Other income as reported by Palmer and in the 1986 census does capture some of the craft income and is included in gross income figures.

V Gross Income

Because of the problems in estimating costs and the likely underestimation of in-kind income from harvesting wildlife resources, gross incomes rather than net incomes are compared in Table 2. The data are descriptive of income sources and cannot be used to confirm earlier observations that aboriginal people may substitute between alternative sources of both in-kind and cash income (Ames et al., 1989; Quigley and McBride, 1987; Ross and Usher, 1986; Usher and Weihs, 1989). Nevertheless, there are significant differences between middle and low employment income rankings for both 1969 and 1986, and yet when transfers, rent subsidies and in-kind income are included, only a faint pattern of descending amounts is discernible for the gross income figures for these predominantly aboriginal communities.

Low levels of education (Table 1, column b) and the lack of employment opportunities to develop work skills in smaller communities (NWT. Special Committee, 1989) preclude many aboriginal people from participating in the labour force in larger centres (Brian Carr, NWT Dept. of Education, 1991, pers. comm.). There are other migration disincentives, including the high social costs of relocating to a larger centre as well as the significant levels of foregone in-kind income earned through fishing and hunting in the home community. Despite the vagaries of weather and changing migration routes for both land and marine mammals, traditional activities are often quite predictable; and sharing systems associated with community life (Ames et al., 1989; Usher, 1986; Usher and Weihs, 1989; Wenzel, 1981) reduce uncertainty below that associated with economic prospects in the larger centres.

VI Policies to Promote Migration to Larger Centres

This study is designed to illustrate the simple fact that financial support for traditional activities may indeed be a cost-effective and viable alternative to forced migration to larger centres in the event of cutbacks in federal expenditures. The data presented in the tables and figures suggest that migration of aboriginal people to larger centres may increase the dependence on government funding. This would not be sustainable at a time when real dollar funding for both the federal and the territorial governments is declining. As illustrated in Figure 3, basic income generating activities are mainly concentrated in the government and government-supported service sectors, with only a small proportion earned through primary sector activities.

In a study of 21 remote regions in Canada, including the NWT, Knowler (1989) found that the proportion of basic sector employment in primary extraction and processing was 15 per cent for the NWT compared to an average of 28 per cent for all remote regions; for transfer income it was 5 per cent for the NWT compared with 8 per cent for all remote regions; and for transfer services it was 31 per cent for the NWT compared with 15 per cent for all remote regions (1989:54–55).

Basic Income and Employment Ratios

It is clear that government has replaced the primary sector as the most important source of basic cash income in the NWT. If in-kind income is included, however, a different picture emerges for predominantly aboriginal communities. Basic income and employment ratios listed in Table 1 are calculated by dividing the total basic economic activity earned through government by the total cash and in-kind income earned through primary sector and traditional activities in each community. Total basic employment income generated through the government sector includes government employment income as listed in Table 2, plus rent subsidies and transfer payments. As explained in the appendix, government employment proportions for 1986 have been adjusted to include half the employment earned in the 1986 service employment category.

To account for the basic income proportion of TCU (transportation, communications and utilities) income generated by the primary sector (mining, oil and gas), half the TCU employment income proportions illustrated in Figure 3 have been added to primary sector and traditional activities totals. The basic income generated through the primary and traditional sectors includes primary income, one half of TCU income, fur income, 'other' income, plus the in-kind income calculated for meat and fish harvests. As explained in the appendix, while employment income was available for 1969, employment income for 1986 was approximated by using employment ratios.

The resulting basic income ratios are higher for those communities more dependent on government activity. Table 1 indicates that all communities increased their dependence on government between 1969 and 1986. While low income Inuit communities tend to be more dependent than their Dene counterparts, dependence on government by Dene middle income communities is about the same as for middle income Inuit communities.

Using Knowler's (1989) employment data to calculate basic employment ratios similar to those listed in Table 1 yields an overall average of 0.81 for the 21 remote regions he examined. All middle income Inuit and all but one middle income Dene community were above that average in 1986, while 75 per cent of low income Inuit communities, and 80 per cent of low income Dene communities were below. All of the predominantly high income, non-aboriginal communities were well above the 0.81 ratio.

The Impact of Potential Cuts in Federal Expenditures

It is difficult to speculate how federal cuts might affect communities, but it is unlikely that transfer payments and government administration positions would be cut. Table 2, column o lists the gross incomes for 1986 minus half the service employment income and all the rent subsidies. These are likely to be the most vulnerable areas, and the reduction in gross incomes in column o indicates the devastating effect such cuts would have on all communities. Fostering large-scale migration to larger centres would substantially reduce opportunities to engage in traditional activities, and would increase, rather than decrease, the need for government assistance.

Aboriginal people should be supported in their attempts to engage in traditional activities to re-establish in-kind income at 1969 levels, and be provided with the skills to enable them to succeed in the non-traditional sector whether in primary sector employment in their communities or in business opportunities in larger centres. Only in this way can dependence on government be reduced and the economic difficulties already being experienced in smaller communities be prevented from spreading to other communities.

Potential Increase in Housing Costs
Inuit communities with a spatial cost index in excess of 220 do have substantially more expensive homes than would appear to be warranted by the employment income rank orderings. Discussions with an official from the NWT Housing Corporation (Gary McLellan, pers. comm., 1991) indicate that houses built more recently in the high arctic tend to have heavier insulation in order to reduce the costs of heating. Furthermore, the NWT government has tried to reduce rent subsidies by offering houses free to aboriginal people, in return for them paying their own operating costs. These houses are constructed with the heavy insulation package in order to reduce the substantial operating costs in colder communities. Where this is the case, savings on operating costs are being capitalized into the higher values of houses recently constructed in colder communities.

Houses built per capita are listed in Table 1, column g. With the exception of the poorest Dene communities and some Inuit communities, there is virtually no relationship between houses built and employment income. This demonstrates the concerted effort by government to improve housing in all aboriginal communities. Policies to foster large-scale migration to larger centres would negate the value of this investment in middle and low income communities and create severe housing shortage problems in high income communities where new houses would have to be built.

VII Mitigating the Effects of Reduced Federal Expenditures

Even with the recent transfer of some resource revenues to the GNWT, federal government grants and subsidies to the NWT are still very substantial. Given the current federal government concern to cut expenditures to reduce the deficit, it is unlikely that expenditures in the NWT will remain intact. The data suggest that policies to promote migration to larger centres are likely to increase rather than decrease dependence on government. Alternative policies and programs must be developed to foster cash and in-kind income earned through traditional activities, employment in the primary sector, and entrepreneurial activities.

After adjusting for the cost of living, Morehouse (1989) found that average US per capita incomes were about four times those for aboriginal communities in Alaska. Per capita Canadian income in 1986 was $19,621 (in 1991 dollars), which was more than twice the per capita spatial cost adjusted gross income for most middle and lower income communities and more than three times gross income for many poorer communities. While aboriginal people in the NWT are better off than their Alaskan counterparts, they are not well-off by Canadian standards, and at least half live below the poverty line.

Despite wide differences in 1986 employment income, Table 2 and Figure 2 illustrate how important cash and in-kind income from traditional activities have been in helping to reduce the gap between gross income for low and middle income Dene communities. This is not true for Inuit communities where income from traditional activities, particularly trapping, has not been enough to offset the gap between most middle and low income communities. Nevertheless, the data do not support the conclusion that the gap has been widening between more and less affluent communities, and that poorer communities are getting poorer (NWT. Special Committee, 1989). Indeed, most of the communities classified as middle income in 1986 were actually worse off than most low income communities in 1969.

Renewable Resources and a Wildlife Harvester Support Program

If employment incomes fall because federal and GNWT employment are cut, the amount invested in machinery and equipment will be reduced. Increased effort will be expended on fishing, hunting and trapping the wildlife resources in dwindling numbers in the immediate vicinity of aboriginal communities. As long as wildlife resources are managed properly through abstention from over-harvesting, aboriginal people have demonstrated that traditional activities can provide a steady source of cash and in-kind income in the future. Perhaps a most important first step toward mitigating the effects of any further cuts in federal expenditures is to give aboriginal people complete control over their internal affairs and over subsistence and commercial hunting, fishing and trapping (Morehouse, 1989; Ross and Usher, 1986; Usher, 1986; Usher and Weihs, 1989). Aboriginal management of non-migratory species and co-management of migratory species with the territorial government would give aboriginal people greater control over a major source of income.

In addition to providing the scientific studies needed for a co-management regime, senior levels of government could assist in exploiting new resources on a sustainable basis (Duerden, 1992) in such areas as forestry and limited forms of market gardening in the southwest, and saltwater fisheries in the north (NWT. Special Committee, 1989; Usher and Weihs, 1989). Output subsidies and assistance with marketing could overcome significant transport costs and substantially increase income from existing fishing and trapping activities (Usher and Weihs, 1989). While European and North American fur markets are likely to remain depressed for some time, there does appear to be potential for furs in Pacific Rim countries which do not have anti-fur legislation or lobbies.

The success of the Income Security Program for the James Bay Cree (Colin Scott, 1991, McGill University, pers. comm.; Usher and Weihs, 1989) would suggest that a wildlife harvester support program (WHSP) may be the most cost-effective way to ensure that aboriginal people have the necessary funding to engage in traditional activities. Governments in southern Canada provide many types of infrastructure and subsidies to support production through investment in education, transportation, and communication. A WHSP in the order of $8,000 per hunter family to assist with the machinery and equipment costs each year could be viewed as a producer subsidy. It is unlikely to reduce transfer payments or rent subsidies to any great extent, but could lead to a significant reduction in transfer services, particularly any 'work-fare'.

Experience with employment creation in other remote regions would indicate that permanent government workplaces are more expensive to create (Gardner, 1984) than providing tax incentives and subsidies to encourage job creation in the traditional and private sectors in existing communities. A WHSP could be administered by the Hunter and Trapper Associations (HTAs) in each community, and could be based on a combination of effort and success rather than just time spent in traditional activities as with the James Bay Cree program (Usher and Weihs, 1989). Increases in hunting and fishing activity can stimulate the market for local wildlife products (Ames et al., 1989; Colin Scott, 1991, McGill University, pers. comm.). Figure 2 illustrates the significant increase in cash income from furs resulting from greater investment in machinery and equipment. Some HTAs have already introduced very basic leather and meat processing and freezing facilities with a view to promoting trade in country food (John Colford, 1991, NWT Dept. of Economic Development, pers. comm.; Usher and Weihs, 1989). On a more basic level, the WHSP would provide benefits to non-participating families because of the kinship harvest sharing system (Ames et al., 1989; Usher and Weihs, 1989).

For many aboriginal communities the scramble to get cash to engage in traditional activities has led to disruptions in normal hunting activities with the result that hunters cannot respond to changes in weather conditions and alterations in migration routes (Ames et al., 1989). This has led to a tendency to specialize in hunting only those species which appear in large numbers at specific times and places. The result may lead to over-harvesting of certain species (Usher, 1986). For aboriginal management of non-migratory species and co-management of migratory species to be successful, there must be a return to more traditional ways of utilizing renewable resources. Meat and fish income for 1969 as listed in Table 2 illustrate the potentially large in-kind income that could be earned through hunting and fishing. The problem is that it is very difficult to convert even a small part of this return into cash. A WHSP could provide a route to exploiting that potential on a sustainable basis while creating employment and reducing dependence on government (Quigley and McBride, 1987). A return to indigenous wildlife management systems based on a shared, consensus responsibility would ensure sustainable renewable resource utilization (Usher, 1986).

Mineral Resources

While mineral exploitation has provided a limited source of tax revenue to support the current economic system, preservation of wildlife has been considered to be of greater importance for most aboriginal people (Berger, 1988; Ross and Usher, 1986; Usher, 1986). This attitude is slowly changing as a smaller proportion of younger people are involved in traditional pursuits (Stabler, 1989; Stabler and Howe, 1990) and are more anxious than older people to find wage employment. Nevertheless, the federal commitment to provide assistance for the development of the Hibernia field off Newfoundland and the heavy-oil upgrader project in Saskatchewan indicates that these limited funds will not be available for the development of oil and gas resources in the NWT in the near future. Without federal assistance, it is unlikely that this sector will provide much employment in the future (Stabler and Howe, 1990).

Discussions with the General Manager of the NWT Chamber of Mines (Tom Hoeffer, pers. comm., 1990/91) indicate great interest on the part of the mining industry in training and hiring significant numbers of aboriginal people to do basic sample-taking on a regular basis in many areas of the NWT which are difficult to access. These labour intensive jobs require little classroom training and could provide employment opportunities which would blend well with traditional activities and yet save mining companies the expense of flying in non-aboriginals to do the work. By co-operating with aboriginal people in the development of mineral resources, mining interests would find it easier to negotiate access to the land, with less pressure to disclose information and with greater certainty about tenure (Schneider, 1990).

Entrepreneurship

There are complaints that the federal government approach to economic development through the promotion of mineral resource exploitation has resulted in few backward and forward linkages: subsidies leak out of the region to pay for imported machinery and equipment, and the salaries of transient skilled workers are not spent in the NWT (Quigley and McBride, 1987). At the same time, there are complaints (NWT. Special Committee, 1989) that the economic development policies of the GNWT have put too much emphasis on promoting small business: most have been successful only in predominantly non-aboriginal communities and require subsidies in aboriginal communities.

Until recently, aboriginal businesses have often had only limited access to commercial debt financing. In part this has been a result of the lack of entrepreneurial experience and the distance of the communities from commercial bank lending facilities. The most important legal limitation has been the restriction under Section 89 of the *Indian Act* on reserve assets being pledged as security for commercial loans (Canada, 1991). The 1988 amendment to the *Indian Act* did permit the pledging of leasehold interests on designated lands, but the Section 89 limitation is still a barrier for aboriginal businesses.

There have also been a number of regulatory and bureaucratic constraints which have prevented adequate training and mentoring to provide the entrepreneurial, organizational and capital budgeting skills needed to successfully run a small business (Canada, 1991; Lloyd Binder, 1991, Inuvik community economic development officer, pers. comm.). In response to these criticisms, the federal government has developed a comprehensive program (Canada, 1991) which is designed to provide better access to program administrators and facilitate processing of applications for loan guarantees to overcome the Section 89 limitations. One of the key elements is the greater emphasis on aboriginal decision-making which will require government departments to relinquish unilateral control (see also Canada, 1990).

In contrast with the federal program which is attempting to provide greater access to credit in smaller communities, the GNWT (NWT. Ec. Development and Tourism, 1989) is putting greater emphasis on developing entrepreneurship and supporting small businesses in larger centres. A comprehensive education and training program is proposed for smaller centres which would equip people to migrate to the 'market based' economies in larger centres to replace the skilled workers brought in from outside the NWT. This approach is likely to lead to a relative decline in support for entrepreneurial activity in smaller communities, and policies may be developed to assist aboriginal people to migrate to the larger centres. Smaller communities would lose people with potential skills in management and business, and existing job holders in larger centres may resist an influx of immigrants for fear of any resulting unemployment.

There is increasing interest in promoting import replacement in these larger centres to support new and existing small businesses. Private sector jobs are needed to replace government direct and contract employment, but these jobs must be both feasible and viable in the long term. Problems with transport costs, low productivity, unreliable sources of supply, and quality control (Ference, 1987; Stabler and Howe, 1990) are likely to severely hamper the creation of viable long-term jobs through import replacement.

The traditional federal and territorial approach to small businesses has been to offer subsidies on the input side in recognition of the difficulties of doing business in the NWT. These become impounded in cost structures, leading to costs which are often 25 per cent higher than for equivalent suppliers from the south (Ference, 1987). Emphasis could be switched from subsidizing inputs to providing output subsidies and assistance with marketing to overcome the numerous problems associated with operating in and exporting from the NWT (Usher and Weihs, 1989). Education and retraining are also important if aboriginal people are to develop an understanding of how the market-driven sector operates. They have already demonstrated a ready ability to grasp business management concepts through the co-operative retail trade system (NWT. Special Committee, 1989) and the many small service firms which operate as viable businesses.

VIII Conclusions

Aboriginal people have shown that they are responsive to market incentives and remarkably adept at shuffling activities to provide a modest income in the NWT. Most low income aboriginal communities have a government to primary sector basic income ratio that is less than the average for remote regions in Canada. While there are limited opportunities in smaller communities, dependence on government funding can be reduced. Co-management of renewable resources combined with a wildlife harvester support program, exploitation of certain underutilized resources, and assistance with training and marketing could enhance revenues from sustainable hunting, fishing and trapping. In addition to ensuring genuine linkages into local communities for large-scale mineral projects, startup assistance for grassroots geological sampling would provide a vital service to mining companies while creating an important source of income to enhance returns from traditional activities. As well, fostering entrepreneurship in small communities through training, output subsidies and assistance with marketing could prove a cost-effective way to provide employment income.

Aboriginal people should be provided with the skills and opportunities which will enable them to succeed in both the traditional sector and the non-traditional sector. What is required is a combination of many sources of cash and in-kind income working in concert rather than competing for time which is critically scarce in certain hunting and fishing seasons (Quigley and McBride, 1987; Usher and Weihs, 1989). At the same time, a significant proportion of aboriginal people wish to engage in the non-traditional sector (Stabler, Tolley and Howe, 1990) and should be supported with training which will allow them to engage in primary sector activities if they are available to them in their communities, or offered assistance to migrate to larger centres. What they need is a choice between real options rather than the very meagre choices which confront them at present.

Notes

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Appendix: Data Sources and Manipulations

Sources Of Non-Traditional Income

Government employment income in 1969 and 1986 are not strictly comparable because of the trend toward government subcontracting (NWT. Special Committee, 1989). Income earned from all government sources is included in 1969 data, while 1986 data included only employment in public administration. Discussions with an official from Statistics Canada (Brian Drysell, pers. comm., 1990) indicate that it is impossible to rectify this problem as private subcontractors to government do not tell their employees the source of income.

In the absence of any guide, 1986 data used in Figure 3 have been adjusted so that 1986 government employment includes both public administration and one half of the reported figure for 1986 service employment. In turn, the data listed for 1986 service employment include only half the reported amounts. These adjusted figures for government employment are also used in the calculations for the basic income ratios listed in Table 1 and described below. Despite these adjustments, it is interesting to note in Figure 3 how the government employment proportions for 1986 have fallen for most communities compared with 1969.

Employment income in predominantly non-basic sectors has evolved into a roughly similar pattern for most communities, with trade employing 10–11%, construction employing 6–9%, and TCU employing a still smaller proportion. TCU tends to be higher in those centres servicing the oil and gas and mining industry, indicating a potential source of basic income if aboriginals are hired in the communities involved.

Rent Subsidies and Potential Housing Costs

Rent payments are not distinguished by ethnic group in the 1986 census profile, and adjustments were made to allow comparisons with predominantly aboriginal communities. Figure 2 and Table 2 indicate that rent subsidies for the Inuit were higher than for the Dene in both 1969 and 1986, and were also significantly higher for middle income communities.

The 1986 house values listed in Table 1, column f were not converted by the spatial price index because they already include the extra construction costs associated with isolation and a cold climate. The rank orderings for 1986 house values for the Dene are very close to those for employment income; the size of houses and the number of rooms are likely to be income dependent as they are for most Canadians. However, house values are also dependent on the costs of heating in winter. Low income communities tend to be more isolated and colder, and this is reflected in smaller houses with fewer rooms.

Sources of Traditional Income

Meat and Fish Harvest Data

Volume problems are moderate for big game, but are large for seals and migratory birds, and very large for fish and small game (Usher, 1976). The absence of any reporting requirement, inconsistent and unrecorded reporting rates, unreliable hunter recall, and lack of incentive on the part of participants has led to large underestimates of native wildlife harvests (Ames et al., 1989; Berger, 1988; Quigley and McBride, 1987; Usher et al., 1985; Usher and Wenzel, 1987). Furthermore, there are virtually no studies of harvesting by women, including gathering and small game hunting. Nor are there any widely accepted estimates for the value of clothes and tools made from wildlife products or fuel derived from wood and marine oils.

The NWT Department of Renewable Resources has just completed a major revision and compilation of all meat and fish data for several recent years including 1986. Much of the data being withheld pending resolution of Native land claim settlements has been released, and reliable results from several scientific studies have been integrated.

While Palmer's estimates of meat and fish harvests were path-breaking for their time, they are not accurate enough to be used as a baseline for comparison with 1986 data. With the survey work done by Bissett (1974) for the Task Force on Northern Oil Development, and the Native harvest surveys conducted between 1981 and 1983, more accurate records of meat and fish harvests were obtained (Usher et al., 1985; Usher and Wenzel, 1987).

Per capita averages for harvests were obtained from the following studies and used as approximations to the 1969 data. Bissett (1974) estimates derived from data collected between 1960 and 1972 were used for Aklavik, Déline (Fort Franklin), Forts Good Hope, Liard, McPherson, Norman and Providence, and for Tuktoyaktuk. Donaldson's (1983; 1984) estimates derived from data collected in 1982 were used for Arctic Bay, Broughton Island, Cape Dorset, Clyde River, Hall Beach, Igloolik, Pangnirtung, Pond Inlet, and Sanikiluaq.

Estimates reconstructed by D'Hont (1993), using harvest summary data obtained from General Hunting licence holders and from fur trapping returns for 1968/69, were used for Fort Resolution, Rae-Edzo, Lac La Martre and Lutselk'e (Snowdrift). The fur trapping data are reasonably accurate but the big game numbers are likely to be underestimated. While these estimates are less reliable than those obtained from the Native harvest surveys, in every case they were significantly higher than the Palmer estimates.

Gamble's 1983/84 estimates (1987a) were used for Arviat, Baker Lake, Coral Harbour, and Rankin Inlet. From discussions with Gamble it is quite legitimate to use the 1984 estimates as approximations for the harvests in 1969 (Gamble, 1993, pers. comm.). Jingfor's (1984) estimates based on surveys during the 1982/83 hunting season were used for Cambridge Bay, Coppermine, Gjoa Haven, and Taloyoak (Spence Bay).

With the exception of one community, all the per capita approximations are well above the totals reported by Palmer (1973). Nevertheless, it is likely that these reports still underestimate the volume of harvesting particularly for fish harvests but also for meat harvests as even the best surveys did not achieve more than an 80% coverage (Usher et al., 1985; Usher and Wenzel, 1987). Estimated harvests were used where possible, but in many cases only reported harvests were available which could mean that the numbers understate the harvests by as much as 20%.

Harvest survey data for 1986 are not complete. Some Dene communities have not reported caribou and moose kills for many years, pending resolution of the Dene land claims. Since there is little or no firm data on moose and caribou harvest trends for these communities between 1969 and 1986, they are presumed constant (Adrian D'Hont, 1992, pers. comm.), and 1969 estimates are used for a few Dene communities where there are gaps in the 1986 reports. With the collapse of the sealskin market it has been difficult to obtain accurate seal harvest numbers for some Inuit communities. Consultation with Department of Fisheries and Oceans and with GNWT Renewable Resources officials has assisted in supplying missing numbers. However, the data are not reliable and can only serve as a guide.

Prices and Costs

Price Estimates for In-Kind Income

A problem arises over the prices used to value the in-kind income. In most economic studies opportunity cost utilizes market data on prices and costs. However, there are very few markets for country food (Usher, 1976), and prices in the markets that do exist do not reflect the true value of country food (John Colford, 1991, pers. comm.). Prices must be imputed on the basis of replacement (substitution) value or standard of living (GDP) value. Replacement value means using Edmonton prices adjusted by the spatial cost index in Table 1 to arrive at the welfare equivalent measure of the cost of replacing country food with store bought food. While this approach would certainly highlight the very significant contribution of country food, it would not provide a reliable standard of living comparison.

Valuing country food using Edmonton prices without spatial cost adjustments does provide a way of comparing the standard of living amongst communities, and between those communities and the rest of Canada. This is particularly true for the basic income ratio comparisons which are explained in greater detail below.

Costs of Production

A final valuation problem concerns adjustments for the costs of production. Estimates for costs have ranged from as little as 10% of the food substitution value for full-time hunters to as much as 50% for part time hunters (Ames et al., 1989; Nowak, 1977; Quigley and McBride, 1987; Smith and Wright, 1989; Usher, 1976; 1986; Usher and Weihs, 1989). Hunters may harvest more meat than they report consuming (Smith and Wright, 1989; Usher et al., 1985; Usher and Wenzel, 1987) which tends to deflate values without reducing costs. At the same time, much of the wear and tear on machinery and equipment for those involved part-time may actually occur through recreational use rather than through hunting, fishing or trapping (Nowak, 1977).

Food-sharing and pooling of equipment in most communities also makes it difficult to sort out the values and costs involved. Many animals trapped or hunted for fur pelt sales, actually provide sustenance as well (Stabler, Tolley and Howe, 1990). In fact, the decline in the fur market has meant that revenue from pelt sales has become a side benefit to meat hunting.

In 1991 dollars for each hunter each year, Ames et al. (1989) estimated costs at about $7,000, Nowak (1977) estimated them at $6,200, and the average for the Usher and Weihs (1989) range estimate would place costs at $7,500. On a per capita basis, this would imply costs were approximately $1,000 per year which is roughly 25% of the value of the harvest for most communities, very close to the proportion estimated by Usher (1976). However, this amount has not been deducted from the value of harvests because hunting and fishing are underestimated for the reasons cited above, and there is no attempt to account for the value of small game, food gathering, clothing, and fuel values. To simplify the analysis, gross values are listed and no attempt is made to adjust for costs.

Conversion to 1991 Edmonton Dollars

In order to make effective purchasing power comparable for different communities, both in terms of cash and in-kind income, the major sources of income listed in Table 2 have been converted into 1991 dollars. The spatial price index listed in Table 1, column c was used to convert these 1991 cash income values into Edmonton equivalents. Prices in the Eastern Arctic are more influenced by Winnipeg and Montreal prices than by Yellowknife prices. Furthermore, Yellowknife prices are simply calculated by the NWT Bureau of Statistics as equivalent to 1.3 times Edmonton prices (Roy Ellis, 1993, pers. comm.). For these reasons, prices were converted to Edmonton dollars to allow a benchmark for comparison purposes.