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Nutrition and Health in North Korea: What's New, What's Changed and Why It Matters¹

Hazel Smith

Structured Abstract

Article Type: Research Paper

Purpose—To examine the changing health and nutritional status of the North Korean population since the famine of the mid-1990s and the dominant perspective that little has changed since in the DPRK.

Design, Methodology, Approach—Using hitherto neglected data from major international organizations, this research charts the little-known changes in patterns of food availability and food accessibility in aggregate, national terms, with some disaggregation of the data by gender and age. The DPRK is compared to other poor countries, other Asian countries and near neighbors in East Asia.

Findings—Despite a precarious economy, the end of systematic food provision by the government, and a decline in aid from international organizations after 2001, the data shows that by the mid-2010s, national levels of severe wasting, an indication of famine-like conditions in the population, were lower than in other low income countries globally and lower than those prevailing in other developing countries in East Asia and the Pacific. Poverty and ill-health remained—as shown especially in terms of maternal health and infant mortality—but the incidence of malaria sharply declined and although the incidence of tuberculosis was up, the numbers of fatalities from both malaria and TB sharply declined.

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Practical Implications—This research contributes to a shift in North Korean Studies from securitized, opinion-based discussions in which North Koreans are either “victims or villains,” and which very often obscures or ignores mundane but important facts on the ground, towards careful, qualified, data-based analysis of societal change in the post-famine era of marketization in the DPRK.

Originality, Value—The research shows that post-famine DPRK is not the outlier state that is commonly presented in scholarly, policy and global media analysis.

Key words: health, mortality, life-expectancy, North Korea, nutrition

Introduction

The North Korean famine of the mid-1990s is well-known and well-researched in terms of causation, processes, outcomes and consequences.² Much less is known, however, about the changing health and nutritional status of the population since the famine and, indeed, the dominant perspective is that nothing much has changed in the DPRK.³ Yet, despite a precarious economy, the end of systematic government provision of food to the population, and a decline in assistance from international organizations after 2001, the data shows that by the mid-2010s, national levels of severe wasting, an indication of famine-like conditions in the population, were lower than in other low income countries globally and on a par with those prevailing in other developing countries in East Asia and the Pacific. Poverty and ill-health remained—as shown especially in terms of maternal health and infant mortality—but the incidence of malaria sharply declined and although the incidence of tuberculosis was up, the numbers of fatalities from both malaria and TB fell substantially.⁴ The incidence of deaths from vaccine-preventable disease fell. By 2013, the major killers in North Korea were non-communicable diseases including cancers and cardiovascular diseases, which are commonly understood as diseases of wealthy countries.⁵

This article proceeds by outlining the sources and types of data; it then charts changes in food availability and patterns of accessibility in the post-famine period before showing changes in the nutritional and health status of the population in aggregate, national terms with some disaggregation of the data by gender and age. It proceeds by offering comparative analysis between the DPRK and other poor countries, other Asian countries and near neighbors in East Asia. The analysis shows that indications of poverty and ill-health among the population remained worrying but that post-famine DPRK is far from the outlier state that is commonly presented in scholarly, policy and global media analysis.⁶

Data

This research is founded on underutilized primary sources, mainly from international organizations (IOs), including UNICEF, WHO, WFP and FAO; the DPRK,

ROK and United States government agencies; NGOs; and it makes some use of analysis based on defector interviews.

International humanitarian agencies became resident in the DPRK in response to the health and food emergency of the 1990s. They provided food and health assistance but they also, as in every other health emergency in the world in which they are involved, sought to measure nutritional and health status and to report their findings to donors and the DPRK government. The two main objectives of such reporting were to generate funding for humanitarian assistance and to provide an informational base to help shape policies to prevent a recurrence of humanitarian crisis.

Much of the data is in the areas of agriculture, health, and nutrition, as these are the core sectors in which the humanitarian agencies operate in the DPRK. The data is both quantitative and qualitative. It is not comprehensive but it is, perhaps surprisingly, extensive and sufficient to allow for a more profound knowledge of the well-being of the population than was hitherto possible prior to the advent of resident international organizations in the DPRK.

Disaggregated data by gender, age and geographical location became available as the mandate was to target the most vulnerable groups and women, especially mothers, children and the elderly were prioritized for assistance as were those living in the more remote and poorer areas of the country. Nutritional, health, agricultural and educational data was, therefore, routinely collected and analyzed at provincial level, and often at county level. Since much of the data was collected to help fulfill the mission of the humanitarian organizations, rather than for generic, national statistical purposes, the empirical data is fairly rich for women and young children but is relatively sparse for adult males and adolescents of both sexes. Generic data also exists, however; substantial data is available for example from the 1993 and 2008 DPRK censuses, the latter which was developed and implemented with help from the UN Population Fund.⁷

While all this data requires careful evaluation, it nevertheless permits a nuanced analysis of changing conditions of life for the population. The 2008 census, for example, reports teenage pregnancies in the DPRK.⁸ The numbers reported are small but the fact that they are reported at all indicates a change in social attitudes since the first census of 1993, which did not include any teenage pregnancy data, thereby refusing to admit that teenage girls got pregnant in the DPRK.⁹ A systematic comparison of regional nutritional outcomes with regional agricultural productivity also, for example, demonstrates that improved nutritional outcomes for individuals are *not* necessarily synonymous with living in an agriculturally productive area, a long-standing central assumption of much of international organizations' understanding of well-being in North Korea.¹⁰

The DPRK does not publish systematic economic data for outside consumption and this article therefore relies on South Korea's Bank of Korea (BOK) for basic economic indicators.¹¹ The Bank of Korea regularly publishes estimated DPRK economic data but also warns that the data should be used with caution. Nevertheless, the data is useful to illustrate broad trends and, given the widespread acceptance of BOK data

as the standard source that provides a “good enough” picture of the DPRK economy, it is also used in this article.

The 26,000 North Koreans living in Seoul have provided a variety of different agencies and researchers with information relevant to this research although it is difficult to generalize from these experiences as the accounts are statistically unrepresentative of a country of roughly 25 million people. Information gleaned from “defectors,” referred to by Sung Kyung Kim, among others, as “border-crossers,” in an effort to recognize the complexity of the emigration experience of North Koreans has also generated controversies, because of the vulnerability of such testimony to distortion for partisan reasons and/or because of the amateur fashion—“finding facts to fit the opinion”—in which these accounts are sometimes used.¹² Nevertheless, where border-crosser testimony has been combined with other data and professionally analyzed, these sources have provided some high quality analysis.¹³

In summary, the socio-economic data compiled and collated by the major international organizations, especially the United Nations agencies. UNICEF, the WHO, the FAO, the UNDP and the World Bank provide the core material for this research.¹⁴ The advantage of United Nations data is it has been systematically and professionally quality-checked and is generally comparable given the data-sharing arrangements in the UN system (of which the World Bank is part for the purposes of the collection, organization and emission of data). The intrinsic problems of data collection and compilation from poor countries and countries in conflict as well as the difficulties in comparative analysis are well-understood by United Nations statisticians. These data sets are largely uncontroversial and the data is sufficiently robust to allow for reasonably reliable comparative analysis.¹⁵

Famine and the International Response

It is now well-known that the DPRK went into economic freefall in the 1990s. The primary cause of decline remains debatable but the outcomes were uncontestably awful. Best estimates showed that in the resultant famine up to one million of the then population of 23 million died of hunger and malnutrition related disease.¹⁶ The effects of the famine were far-reaching—including, among other things, orphaned children and destitute adults.¹⁷ Unemployment, underemployment and an almost worthless currency (the North Korean *won*) meant that day to day life became a struggle for physical survival. International humanitarian organizations responded to the extreme risks to life and health with the provision of large-scale aid, mainly with food assistance, which reached its zenith in terms of volume and value in 2000/2001.¹⁸

Figure 1 shows the DPRK economy’s precipitous decline in the 1990s and the gradual recovery from the 2000s onwards; it also shows that the DPRK remained a poor country with average per capita gross national income never rising much over U.S.\$1,000.

As a response to famine, the United States, the Republic of Korea, and Japan, the largest food aid donors to the DPRK, donated food aid through, and in coordination

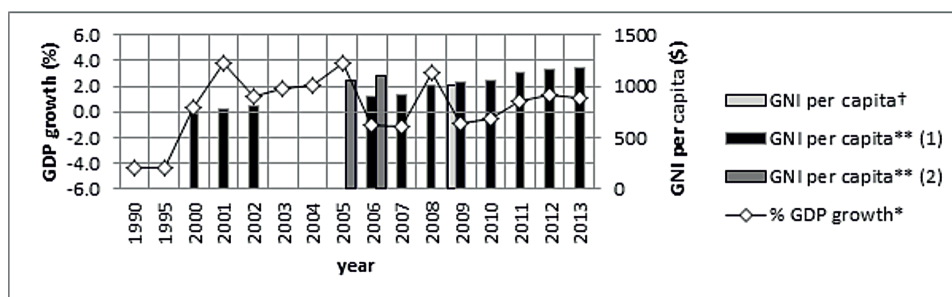


Figure 1. DPRK Economic Indicators

Sources: * Bank of Korea, “Gross Domestic Product indicators for the North Korean economy” (Annual report, 2013).¹⁹

** Bank of Korea, “Gross Domestic Product Indicators for the North Korean Economy” (Annual reports, 2000–2013, except for the years 2003, 2004 and 2005).²⁰

Key:

1: All figures in this row converted from Korean won at the exchange rate prevailing in August 2015.

2: All figures in this row given in the original documents in U.S.\$.

†The two different figures for 2009 GNI both come from the Bank of Korea annual reports. The higher figure is from the 2009 report and the lower figure from the 2010 report.

with, the World Food Programme (WFP), the only global agency with the necessary logistical capacity and experience of bulk aid transfers. The United States, for example, channeled over ninety per cent of its food aid to the DPRK through the WFP.²¹ It is notoriously difficult to give precise figures as to totals of food and other assistance, given the myriad of small non-resident NGOs that were engaged with the DPRK, but because the overwhelmingly largest amount of bulk food aid to the DPRK came via the WFP, Figure 2 provides a useful indicator of trends in food aid to the DPRK.²²

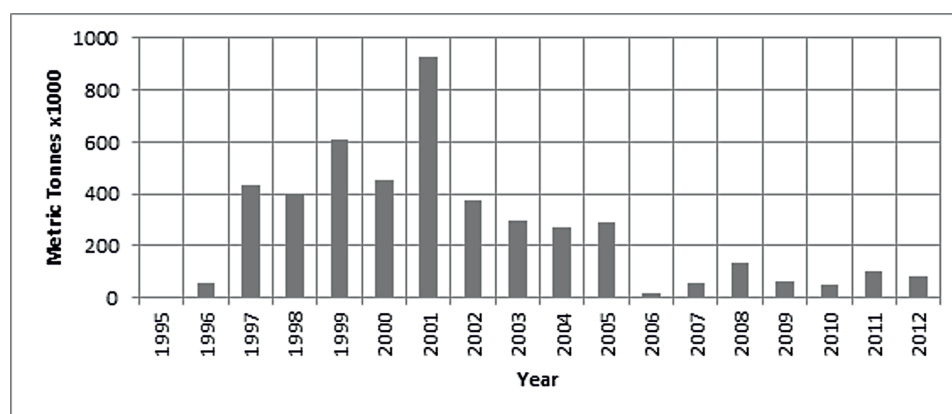


Figure 2. World Food Programme Food Aid to the DPRK (in thousand metric tons)

Source: Figures derived from World Food Programme.²³

World Food Programme food aid rose from 5,000 metric tons in 1995 (not shown in Figure 2 as the scale is too large). Figure 2 shows that at the height of the food assistance programme in 2000/2001, WFP imported almost one million tons of the five million tons of food required to feed the population at a basic level for one year. In 2000/2001 WFP provided food to eight million people, a third of the country's population. Figure 2 also shows, however, the sharp decrease in volumes of WFP food aid to the DPRK from the early 2000s onwards. Volumes of food assistance, in cash and metric tonnes never again reached the astonishing heights of the late 1990s. The U.S. government Congressional Research Service confirmed the downward trend; it reported that "since 2009 donations from all countries except China have dwindled to a minimal amount."²⁴

Despite the decrease in international assistance, the major international humanitarian and development agencies remained in the DPRK. These included the UNDP, FAO, WHO, WFP and UNICEF; the International Federation of the Red Cross and Red Crescent (IFRC); the resident bilateral governmental agencies including the Swiss Agency for Development and Cooperation; and resident NGOs, including Welthungerhilfe (German AgroAction) and Concern Worldwide.²⁵ International organisations food security priorities changed, however; from the provision of emergency relief via bulk grains provision to targeted interventions, focusing on the nutrient deficiencies in the diet of most North Koreans.²⁶ These agencies also continued to collect and systematize data: mainly in the agriculture, nutrition, health and education sectors.

Food Availability

One reason for changing international humanitarian priorities was the improvement in national food *availability*, a term that refers to aggregate food stocks totals from production and from imports. Cereal availability provides an important food availability indicator because cereals provide a cheap way to provide basic energy even though cereals alone do not allow for a wholly nutritious diet. Adequate cereal availability, however, is an indicator that a country has the potential to avoid starvation. In the DPRK the rule-of-thumb basic cereal availability target figure—used to indicate whether there was enough to feed the population at basic levels of sustenance—remained around five million metric tons per annum.²⁷

Figure 3, drawn from UN Food and Agriculture statistical reporting, shows the precipitous decline in DPRK domestic production of cereals in the 1990s and the continued inability to produce the five million tons of cereal from domestic agriculture until the mid-2000s. Figure 3 also shows that domestic cereal production never again reached the reported high output of the early 1990s and international agencies continued to be concerned about the sustainability of the modest agricultural recovery of the 2000s.²⁸

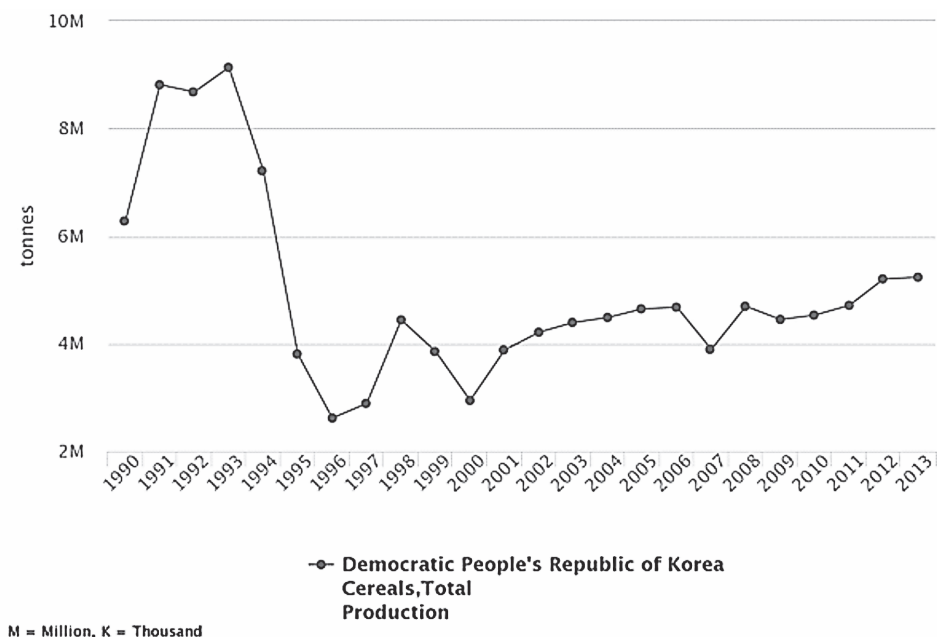


Figure 3. DPRK Domestic Production of Cereals, 1990–2013

Source: FAO, Food and Agriculture Organization of the United Nations Statistics Division, <http://faostat3.fao.org/compare/E>²⁹

Food Accessibility

International agencies continued to warn that DPRK food security remained precarious but priorities changed from that of food availability to that of food *accessibility*, which in development studies and policy refers to the ability of individuals and households to secure their own food through purchasing, household production and/or other means. A shift from reliance on the government to the semi-legal market meant that tracing who got what food became more difficult for the international agencies and also meant that, in the post-famine era, food security for many individuals was neither predictable nor stable.³⁰

Prior to the famine, food accessibility was almost exclusively via the government ration system. The government-directed and -managed public distribution system had allocated and distributed a food ration to every household based on a matrix of age, gender and occupation, at highly subsidized prices.³¹ The old system was fairly transparent and, although it did not always succeed in its aims, as food shortages were a perennial system characteristic and were sometimes severe as in the early 1970s' near-famine conditions, food had remained cheap to the extent of being almost free.³² The universal food rationing system collapsed after the economic and social catastrophe of the mid-1990s, however, and the government never recovered the capacity to re-constitute the system.³³

Post-famine, the government abandoned the objective of providing a universal ration. The new aim was to provide a flat ration of basic grain to “key workers” that included the military (but not their families), the miners and some Party officials.³⁴ Food available through the ration system remained cheaper than market prices but not as cheap as in the pre-famine era nor did the ration apply to the entire household. The key-worker ration was allocated to the individual worker and did not provide food for the worker’s family even in principle and it was also insufficient to sustain life and well-being for the person to whom it was allocated. Furthermore, ration entitlement did not always translate into actual receipt of rations as what remained of the public distribution system was not always supplied with food. Increases in agricultural output or food availability did not translate into a reconstitution of the pre-famine ration system.

Survey after survey of defectors in South Korea reported a shift from complete reliance on government provisioned food and other goods in the pre-famine era to almost complete reliance on the market in the post-famine era.³⁵ In short, post-famine food accessibility was almost entirely a private affair. Markets varied in form from large government licensed market places in all major cities through to petty traders operating on street corners and in apartment blocks. Market pricing, market mechanisms and market values of individual self-interest became institutionalized in the post-famine society even as government pronouncements continued to promulgate the old collective norms.³⁶ One reason for the rapid uptake and inculcation of these new societal norms was that Party and security officials at every level relied on the markets’ operations to feed themselves and their families since the government could not provide a living wage or regular food rations. In these circumstances, there was little incentive for middle or local level officials to crack down on semi-legal or grey area market operations.

The Post-Famine Nutritional Status of the Population

National surveys measuring DPRK malnutrition were carried out by international humanitarian agency staff comprised of international and local (North Korean) officials and were designed and analyzed by global nutritional consultants. These surveys measured chronic malnutrition, acute malnutrition and severe malnutrition through the nutritional classifications of stunting, wasting and severe wasting. “Stunting” or low height for age is the nutritionist’s standard worldwide indicator of chronic malnutrition in a population. “Wasting” or low weight for height is a standard indicator of acute malnutrition in a given population. Rates of stunting and wasting comprise two key indicators of malnutrition in a given population. Nutritionists also measure degrees of malnutrition. “Severe wasting” is an indication of or famine-like conditions in a population while “under-weight” is a more expansive category that indicates dietary deficiencies of differing degrees.

In 2006 UNICEF reported that nutrition surveys in 1998, 2000, 2002 and 2004 had provided comparable data and analysis, despite “select differences ... [because

of] their extensive scope, similar design and sampling methods.”³⁷ Subsequent nutritional surveys in 2009 and 2012 maintained similar methodologies such as to allow for comparison over time. Table 1 shows the findings of the major international agencies in terms of changing stunting and wasting rates in the DPRK.

**Table 1. Chronic and Acute Malnutrition
in the DPRK, 1998–2012 (% of population)**

	1998*	2000*	2002*	2004*	2009**	2012**
Stunting	62.3	45.2	41.6	37	32.4	27.9
Wasting	16.6	10.4	8.5	7	5.2	4
Severe wasting			4***		1***	1***

Sources:

* UNICEF, “Analysis of the Situation of Women and Children in the Democratic People’s Republic of Korea, 2006.”³⁸

** United Nations Country Team, “DPR Korea 2015: Needs and Priorities,” 2015.³⁹

*** World Bank, “World Development Indicators 2015.”⁴⁰

The accumulated survey findings show a profound nutritional crisis in the 1990s: a finding supported by hundreds of qualitative accounts from international officials working in the DPRK from the mid–1990s onwards.⁴¹ From the late 1990s onwards, however, rates of chronic and acute malnutrition fell to the point where the consensus view of the international humanitarian agencies, as reported by UNICEF in 2012, was that a humanitarian food and health emergency no longer existed: “the [humanitarian] situation is not critical and does not suggest emergency operations.”⁴²

The Post-Famine Health Status of the Population

Standard health status indicators of a given population include infant, child and maternal mortality rates.⁴³ Other indicators include the incidence of vaccine preventable disease such as polio, measles, mumps, rubella and diphtheria. The incidence of non-communicable disease like cancer and cardiovascular diseases is an

indicator of the health of a society while the incidence of communicable diseases like TB and malaria, which are classic diseases of poverty, provide further clues as to a society's aggregate health status. Changes in life expectancy rates over time provide an aggregate picture of well-being; in some countries these figures are affected by war and armed conflict but in the DPRK's case, where hot war did not occur in the post-Cold War period, rates are primarily reflective of living conditions. Trends in these health indicators over time also provide significant information regarding the effectiveness of governmental public health policies and programmes.

Mortality Rates

A 2013 South Korean study reported that the DPRK mortality rate was not exceptionally high in global comparative terms. It commented that:

The age-standardized death rate of North Korea was 858 out of 100,000. This value was higher than South Korea's 436 or China's 731, but it was lower than those of fellow SEAR [South-East Asia region] countries like India's 1147 and Indonesia's 961 and around the same level as Egypt's 860 and Jordan's 873, which have been reported to be countries with relatively higher income levels than North Korea. Globally, the age-standardized death rate of North Korea ranked in the middle among all of the WHO member states and was the second lowest in the SEAR countries following that of Maldives.⁴⁴

Nevertheless, neither snapshot nor national aggregated data tells the whole story. Probably more useful for assessing the relative competence of any government is to look at trends over time and to disaggregate the data. Policy-makers world-wide tend to focus on trends in infant, child and maternal mortality rates as indicators of whether the needs of a society's most vulnerable are being met.

Infant mortality is a term used for the death of a child before his/her first birthday. The standard infant mortality rate definition is "the number of infants dying before reaching one year of age, per 1,000 live births in a given year."⁴⁵ Child mortality is a term used for the death of a child before his/her fifth birthday. The child or "[u]nder-five mortality rate is the probability per 1,000 that a new-born baby will die before reaching age five, if subject to age-specific mortality rates of the specified year."⁴⁶ In broad terms, maternal mortality refers to deaths as a result of problems during pregnancy and during childbirth. The maternal mortality rate "is the number of women who die from pregnancy-related causes while pregnant or within 42 days of pregnancy termination per 100,000 live births."⁴⁷

Table 2 shows trends over time in respect to infant, child and maternal mortality in the DPRK. The figures in table 2 sometimes differ from each other for the same year as the standard operating procedures of all international agencies (in all countries where they work) is to review and revise data in the light of new information and changing statistical techniques. The data from more recent publications is therefore likely to be more robust than from earlier publications. The mortality data for the famine years may also be under-stated given there is little evidence of robust state data collection in those years.

Table 2. DPRK Mortality Rates, 1990–2012

	1990	1993	1995	1998	2000	2003	2005	2007	2010	2011	2012	2013
Infant	23*	23****			42*		26*	26*		26*	22.7***	22****
Child	45*	31****		50**	58*		32*	33*		33*	28.8***	27****
					47.6**							
Maternal	97*	54** 41****	140*	105**	120*	87**	85*		81*			

Sources: * UNICEF, “DPRK at a Glance 2013 (February).”⁴⁸

** UNICEF, “Analysis of the Situation of Women and Children in the Democratic People’s Republic of Korea, 2006.”⁴⁹

*** World Health Organization (WHO), “Democratic People’s Republic of Korea Neonatal and Child Health Country Profile.”⁵⁰

**** UNICEF, “Analysis of the Situation of Women and Children in the Democratic People’s Republic of Korea 1999.”⁵¹

**** World Bank, “World Development Indicators 2015.”⁵²

Table 2 shows the worsening infant, child and maternal mortality of the 1990s but it also shows falling mortality rates from 2005 onwards. Even with these post 2005 improvements, however, infant and maternal mortality rates, only fell to the levels prevailing in 1990.

Noticeably improved was child mortality, which shows a drop from 45 in 1990 to 29 in 2012.⁵³ Child mortality was reduced by roughly 50 per cent, from 58 at the immediate aftermath of the famine in 2000 to 29 in 2012. The Millennium Development Goal (MDG) global target for under-five or child mortality, however, was for a two thirds reduction between 1990 and 2015. The DPRK did not achieve these MDG goals as it reduced child mortality by only 30 per cent in those years, approximately 50 per cent less than the average world figure for child mortality reduction.

The Decrease in Vaccine Preventable Disease

The World Health Organization, which has operated in the DPRK since the 1990s but only established an office in-country in 2001, has few data for the famine years, although the post-famine data is useful and revealing. Table 3 shows a spike in the incidence of common vaccine preventable diseases in the first part of the 2000s but it also shows a quite rapid decline in incidence of these diseases after the measles outbreak of 2007.⁵⁴ The spike probably represents better reporting; the figures for the late 2000s seem credible, however, as they mirror mortality rate trends.

Table 3. Incidence of Vaccine Preventable Disease DPRK, 1990–2014

	1990	1995	2000	2002	2004	2006	2007	2008	2010	2012	2014
Diphtheria	0	0		0	0	0	0	0	0	0	0
Japanese encephalitis						0	0	124		0	0
Measles	0	0		0	0	0	3550	0	0	0	3
Mumps				2710	2050	176	176	67	0	11	0
Pertussis	58	130	304	1087	1930	409	1250	395	0	8	0
Polio	0	7	0	0	0	0	0	0	0	0	0
Rubella				520	507	101	0	0	0	1	0
Tetanus (neonatal)	0	3		0	0	0	0	0	0	0	0
Tetanus (total)	0	3		0	0	0	0	0	0	0	0
Yellow fever				0	0	0	0	0	0	0	0

Source: World Health Organization (WHO), “WHO Vaccine-preventable Diseases: Monitoring System. 2015 Global Summary.”⁵⁵

Key: Blank spaces show no data collected or made available to WHO.

The rather simple explanation for the trend towards falling disease rates for vaccine preventable disease, despite a stuttering economy, is the continued national vaccination campaigns that the government continued to implement, supported by funding from the international organizations and governments, including the Republic of Korea.⁵⁶ South Korean analyses are right to call into question the complete efficacy of these campaigns given the “cold-chain” issues of keeping a vaccine at optimal temperatures in its travel from central stores to recipient but they also note that “North Korea reports that its vaccination rate for essential communicable diseases has reached the level of the developed countries.”⁵⁷

Malaria and TB: A Mixed Picture

Prior to the collapse of Kim Il Sungism, malaria and TB were probably largely controlled, although the data is not sufficient to quantify the incidence and preva-

lence of these diseases for that period. WHO data from the late 1990s, however, shows the country experienced a very rapid rise in malaria and TB cases. This is perhaps unsurprising given the rapid economic deterioration of the 1990s. TB and malaria are diseases of poverty and state incapacity, which flourish when public health systems are inadequate, badly organized and under-resourced, when governments are too weak and/or unmotivated to implement necessary organizational prevention and control measures and when people are under-nourished and have compromised immune systems.

The DPRK’s prevalent strain of malaria causes sickness rather than fatalities but is nevertheless a serious problem as malaria can be a chronic illness. Figure 4 shows that malaria cases fell from the 2001 peak of 300,000 to 23,409 reported cases in 2008.⁵⁸

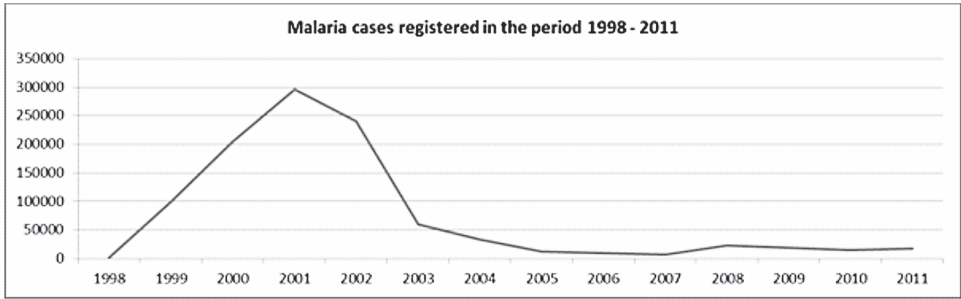


Figure 4. Malaria Cases DPRK, 1998–2011

Source: United Nations DPR Korea, “Fighting Malaria and TB in DPR Korea—A Partnership Approach.”⁵⁹

TB is highly contagious and deadly; without appropriate treatment two-thirds of TB patients will die, yet it is curable and preventable.⁶⁰ In 1997 there were a reported 11,050 cases of TB compared to 97,665 cases in 2013.⁶¹ The 2013 incidence rate, comprising new and repeat cases, was a high 429 (per 100,000 of the population).⁶² Even allowing for under-recording in previous years, the trend shows a worsening TB incidence. The upward trend in the incidence of TB contrasts with the global trend of a gradual decline in the incidence of TB. The DPRK incidence rates are also much higher than the global average of 122 cases per 100,000 population in 2012.⁶³ More positively, however, the trend in mortality from TB is downwards. Figure 5 shows the declining TB mortality rate from the late 1990s. In 2013, the reported TB mortality rate (per 100,000 of the population) was 27, the same as the Philippines and Pakistan.⁶⁴

The DPRK’s economic recovery was not substantial enough to provide major resources for national malaria and TB disease control and it relied heavily on international agencies for resources to support these campaigns. Nevertheless, control of both diseases relies on effective transmission of public health messages and state organizational capacity as much as resource capability. The relative success in control of malaria and the reduction in mortality rates from TB indicate a revived organi-

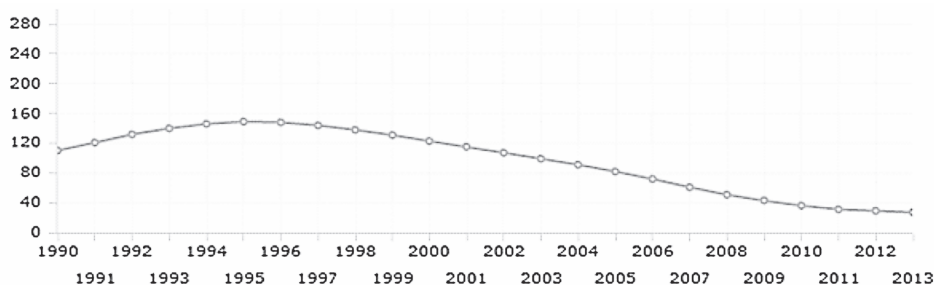


Figure 5. Mortality from TB Cases DPRK, 1990–2013

Source: World Health Organization, “Estimated Tuberculosis (TB) Cases and Deaths, 1990–2012.”⁶⁵

zational capacity capable of systematically mobilizing administrative and medical resources, including human resources, nationwide on a systematic basis. The continued rising TB incidence however shows that a large number of the population are still highly vulnerable to disease and the breakdown of the figures shows that, as with everywhere else in the world, a disproportionate number of vulnerable people are women.⁶⁶

In 2013, the reported global sex ratio for TB incidence was 1:7 (male: female). In comparative terms, however, the DPRK sex ratio, while still disproportionate, was slightly less so than world averages. The World Health Organization reports that in the DPRK in 2013, for every one male, six women contacted TB.⁶⁷ Nevertheless the DPRK sex ratio reflected the global picture of TB incidence as disproportionately affecting women rather than men.

The Big Killers: Non-communicable Diseases (NCDs)

The WHO reported in 2009 that around 60 per cent of DPRK deaths were from cerebrovascular diseases, cancer, chronic respiratory disease and neurological diseases, based on data from 2002.⁶⁸ In 2015, using data collected in 2008, the WHO reported that “80.2% of all DPRK deaths were due to NCDs ... and 46.5 percent of all deaths were caused by cardiovascular diseases (2008).”⁶⁹

The Domestic Balance-Sheet

Continuing economic stagnation with only a modest recovery might create the expectation of little improvement or even worsening in nutritional and health status given the also modest population growth. Instead, the trends outlined above demonstrate a recovery from the famine period, a reversal of worsening mortality rates and a significant improvement in controlling and reducing the incidence of global killer communicable diseases, with the important exception of TB. Even in the case of TB

incidence, however, the sharp downward trend in mortality indicates an improvement in government public health capacity.

The data also indicates that, irrespective of improvements in aspects of health and nutrition, chronic problems of underdevelopment and post-Cold war economic decline remained embedded. Life expectancy, for example, was reduced, as the population continued to face economic hardship. Prior to the famine period, between 1946 and 1993, population numbers had doubled, from 9 million to 21 million and, at more or less the same time, life expectancy for the increased population had also doubled, from just 38 years in 1936–1940 to 74 years in 1986.⁷⁰ In the post-famine period, life-expectancy dropped from 73 in 1993 to 69 in 2008, with the World Bank reporting a slightly improved figure of 70 in 2013.⁷¹ These figures illustrate the declining capacity of the DPRK government to improve the well-being of the population compared to its Cold War capacity.

The health and nutritional status of mothers and young children remained precarious. The high prevalence of non-communicable diseases indicates an inability to transmit effective public health messages, on smoking in particular and, also, very likely, the continuing stress of an economically and politically stressful environment, inadequate nutrition, and insufficient hot water and heating in the punishing winters.

International Comparisons of DPRK Nutritional and Health Status

North Korea was officially classified by the World Bank as a low income country and, as a low income country one might expect poor nutrition and health in the population. Irrespective of macro-economic status and policy, however, nutritional and health status of a population does not necessarily correlate directly with economic standing. India, for example, is categorized as a middle income countries, yet has relatively high malnutrition and mortality rates. So far, this research has charted nutritional and health status over time as a first cut in assessing the DPRK government's record. Now the analysis compares DPRK data and trends in nutrition and health with those of other countries.

World Bank categorizations and data are relied on for comparative purposes as these are largely uncontroversial and widely used internationally for policy analysis. The geographical comparators are (i) global (ii) East Asia and the Pacific (including developed and developing countries) and (iii) East Asia and the Pacific (developing countries only).⁷² The economic comparators are with other low income countries, and that of the least developed countries (according to UN classifications). The choice of geographical categories reflects the DPRK's regional location and the choice of economic category reflects the World Bank categorization of the DPRK (low income) and the common assumption that the DPRK is one of the most impoverished countries in the world (least developed). The following series of global comparisons chart malnutrition rates, mortality rates and life expectancy rates. This

section does not systematically compare disease incidence as it was already alluded to by global disease incidence comparators above. The time period covers the famine period of the 1990s and the post-famine era.

Malnutrition and mortality figures provide a standard “first cut” indicator of any population’s poverty and well-being. They therefore provide a useful way to take the discussion back to the central theme of this article, which is to demonstrate that the DPRK, in terms of the nutritional and health status of the population, is not unique. DPRK malnutrition figures are far from the worst in the world and cannot either be understood or representative of other low income countries as, since the 2000s, DPRK malnutrition figures have been consistently better than for other low income countries.

Malnutrition

The World Bank holds comparative data for the category of “severe wasting prevalence” which in technical terms means “the proportion of children under five whose weight for height is more than three standard deviations below the median for the international reference population ages 0–59.” It does not, however, list comparative data for the broader category of wasting, which is the category used in Table 1 above and encompasses different degrees of low weight for height.⁷³ Neither is there a full data set for the DPRK nor relevant data for the UN classified least developed countries or East Asia and the Pacific as a whole. Comparative stunting data for the world, other low income countries, and developing countries in East Asia and the Pacific is sufficient, however, to indicate relative national nutritional status and the comparative severe wasting data is useful as it indicates the relative risk of famine-like conditions for a population. Figure 6 shows therefore comparative stunting rates, as a way of comparing chronic malnutrition, and Figure 7 goes on to compare severe wasting rates.

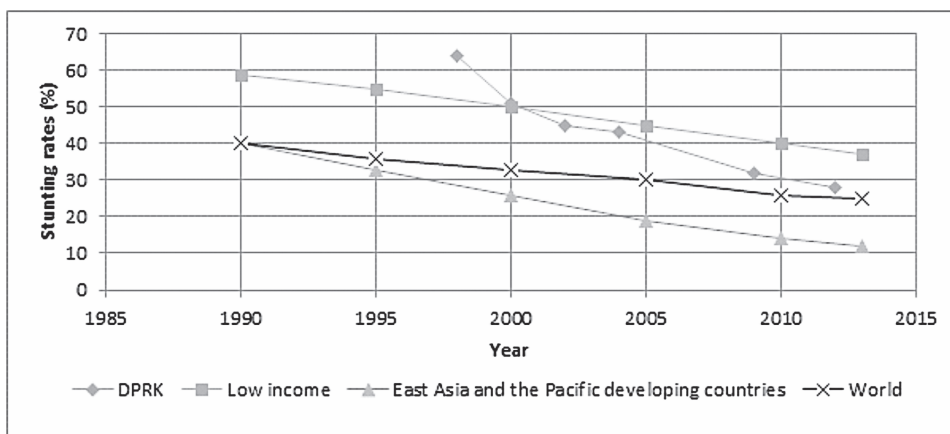


Figure 6. Stunting (Low Height for Age) DPRK and World Comparators, 1990–2013

Source: World Bank, “World Development Indicators 2015.”⁷⁴

Figure 6 shows extremely high DPRK stunting rates during the famine years that were among the world’s worst. The DPRK stunting rate fell from 64 in 1998 to 28 in 2012, still worse than the global average, falling to 25 in 2013.⁷⁵ The DPRK remained some way off the developing countries of East Asia and the Pacific’s 2013 lower stunting rate of 12. The DPRK was, however, by no means unique in the high prevalence of chronic malnutrition nor was its stunting rate the worst in the world. The chronic malnutrition rate for all low income countries followed the global trend for improved nutritional standards but remained at a very high 37 per cent in 2013.

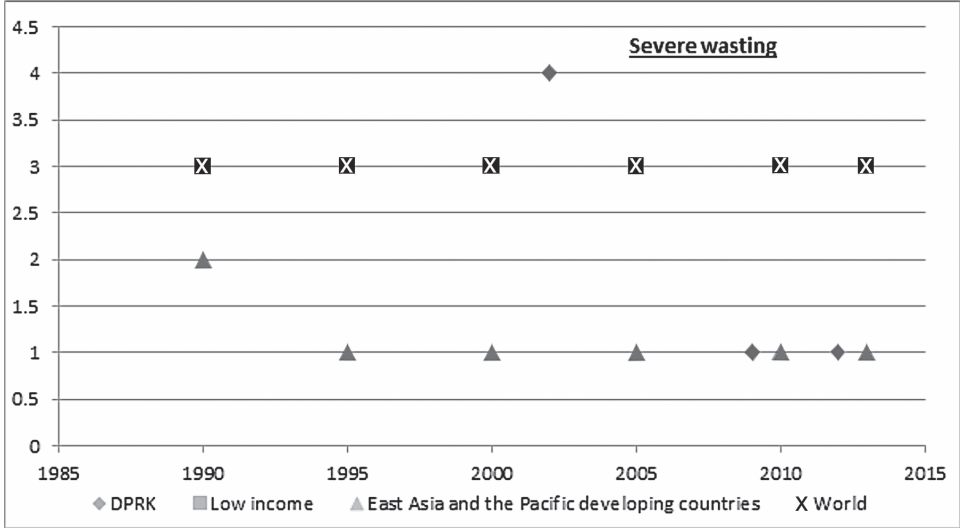


Figure 7. Severe Wasting (Weight for Height) DPRK and World Comparators, 1990–2013

Source: World Bank, “World Development Indicators 2015.”⁷⁶

Figure 7 shows, similarly to Figure 6, that severe wasting figures, characteristic of famine-like conditions, were worse than other low income countries even in 2002 when the economy was beginning to recover. By the late 2000s, however, the prevalence of severe wasting had dropped to 1 per cent, compared to static rates of severe malnutrition at 3 per cent in low income countries.⁷⁷ From 2009, the DPRK severe wasting rate was on par with severe wasting rates for all developing countries in East Asia and the Pacific.

Mortality Rates

Figures 8 and 9 show that infant mortality rates increased sharply during the famine years while every other geographical group saw a downward trend in infant mortality. They also show that DPRK infant and child mortality rates *always* remained lower than the least developed countries, other low income countries and word averages, even during the famine years.

Figure 8 shows that the 2013 DPRK infant mortality rate was 22 and therefore significantly lower than the world figure of 34.⁷⁸ In 2013, DPRK infant mortality rates were closer to those of East Asia and Pacific, including the developed and developing countries in East Asia, than they were to other low income countries at 53, the least developed countries at 55, or to world figures.⁷⁹

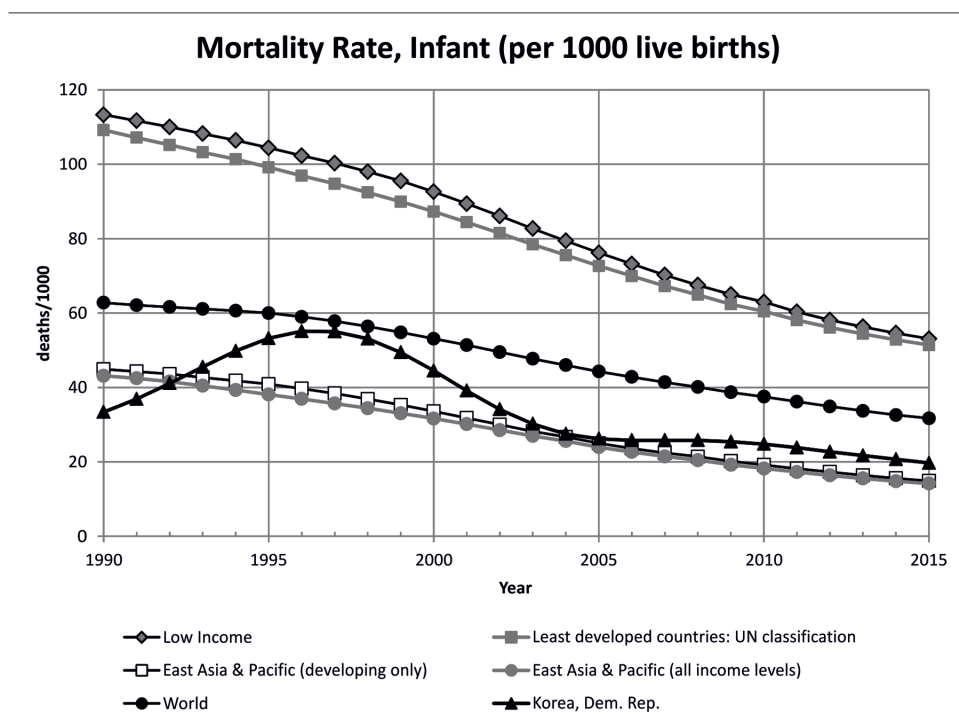


Figure 8. Infant Mortality Rates DPRK and World Indicators, 1990–2013

Source: World Bank, “World Development Indicators 2015.”⁸⁰

Figure 9 shows that comparative under-five or child mortality rates display similar trends to infant mortality rates. In 2013, the DPRK child mortality of 27 was closer to the figure of 19 for East Asia and Pacific, including the developed countries of East Asia, than it was to the world figure of 46 or to the significantly higher figure for other low income countries at 76.⁸¹

What is different about the DPRK, as illustrated in figures 8 and 9, is the trend between 2005 and 2009 (child mortality) and 2005 and 2010 (infant mortality) towards a gradual worsening in infant and child mortality rates before the slight improvement in subsequent years.⁸³ In all other comparator geographical groups the trend was towards sustained gradual reductions. It is this precariousness of the improvement in DPRK infant mortality rates that alarms the international humanitarian community, which has persistently called for targeted interventions to help build sustainable improvements in life chances for infants and their mothers.

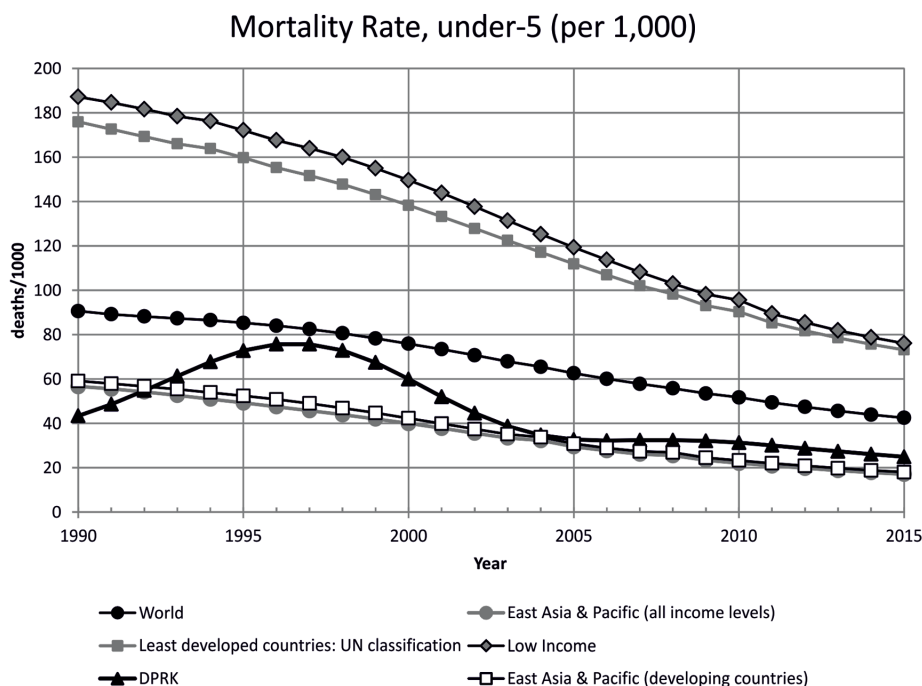


Figure 9. Child Mortality Rates DPRK and World Indicators, 1990–2013

Source: World Bank, “World Development Indicators 2015” (Washington, D.C.: International Bank for Reconstruction and Development/The World Bank, 2015).⁸²

DPRK maternal mortality rates showed a similar but not identical pattern to child and infant mortality in international comparative terms. The data is not sufficiently granulated to tell whether there was a similar worsening of mortality in the first part of the 2000s as with child and infant mortality. The overall comparative patterns, however, remain congruent. Figure 10 shows that, similarly to infant and child mortality rates, maternal mortality rates never reached the highs prevailing in low income and least developed countries and remained below world averages.

The World Bank figures show the DPRK maternal mortality ratio in 2013 was, at 87, closer to East Asia and Pacific’s figure of 71, including the developed countries of East Asia (and 75 for the developing countries of East Asia and the Pacific), than it was to the world figure of 210 or to the significantly higher figure for other low income countries at 510.⁸⁴

These figures do not show that mothers had an easy time in the DPRK. They do however indicate that North Korean mothers faced similar conditions to many women in large parts of the world.

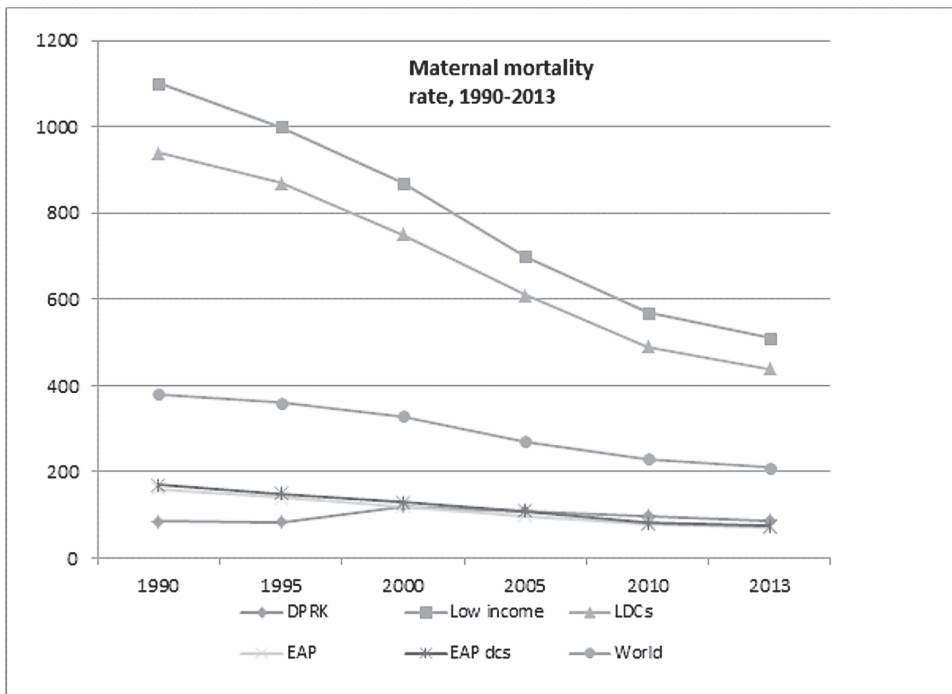


Figure 10. Maternal Mortality Rates DPRK and World Indicators, 1990–2013

Source: World Bank, “World Development Indicators 2015” (Washington, D.C.: International Bank for Reconstruction and Development/The World Bank, 2015).⁸⁵

Life Expectancy

Figure 11 shows that in 2013 DPRK life expectancy of 70 was close to the global figure of 71.⁸⁶ DPRK life expectancy was lower than for East Asia, whether including both rich and poor states whose life expectancy rate was 75, or in comparison to the developing states in the region, whose life expectancy rate was 74 in 2013.⁸⁷ Despite the fact that Figure 11 shows that, life expectancy in the DPRK remained better, even throughout the famine period, than for low income countries and the least developed countries, the data also indicates a government that struggles to maintain global well-being for its population as compared to either its own achievements in tis respect in the Cold war period or as compared to its neighbors.

Poor, Improving, Uneven but Not Unique

A 2014 United Nations Commission of Inquiry report on DPRK human rights abuses expresses the conventional view on the nutritional and health status of the population in asserting that “[d]espite the large amount of international assistance provided in the last 20 years, the malnutrition and stunting figures in the DPRK continue to be very high and unevenly distributed. The Commission is particularly

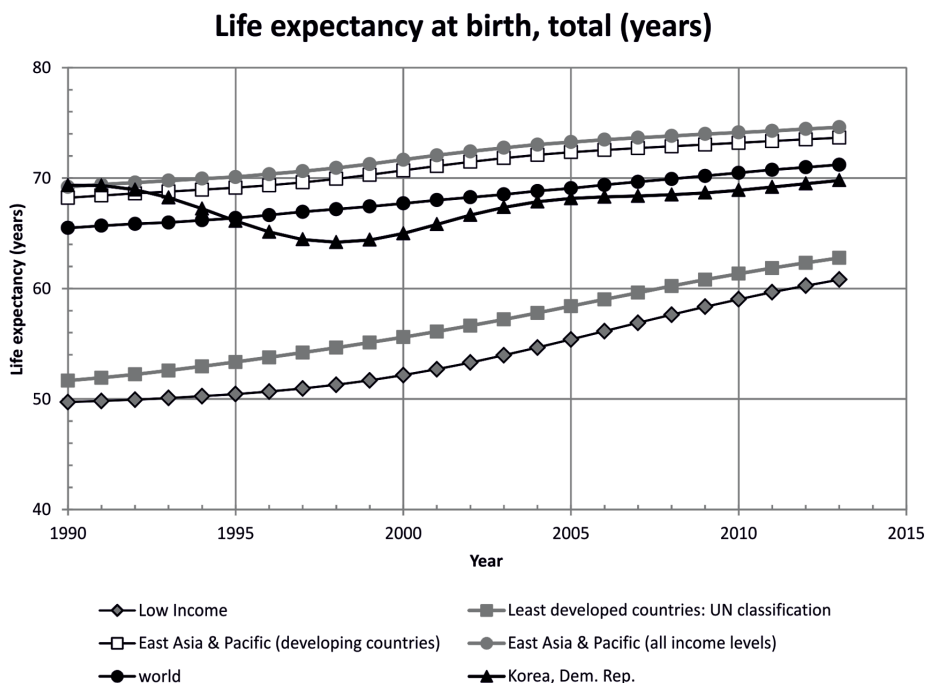


Figure 11. Life Expectancy DPRK and World Indicators, 1990–2013

Source: World Bank, “World Development Indicators 2015” (Washington, D.C.: International Bank for Reconstruction and Development/The World Bank, 2015).⁸⁸

concerned about the on-going situation of the DPRK’s children.”⁸⁹ The narrative of the report presents the view that nothing much has changed since the famine years, that the health and nutritional status of the population is uniquely awful and government policies guilty of breaching the human right to food of the population at large. The data presented above, however, indicates that this picture is erroneous.

The picture is erroneous in that it recognizes neither the scale of improvement in health and nutritional terms since the famine years nor the comparative global picture, which is that the nutritional and health status of DPRK citizens is fairly typical of low income developing countries. Indeed children’s health and nutrition is significantly better on a number of indicators than in many other Asian countries although naturally not on par with children in the wealthier East Asian countries—especially Japan and South Korea. It also leads to a perhaps logically contradictory position in that if the culpability for poor nutrition and health is placed unambiguously with the government, unlike the UN agencies in the DPRK who also, for example, point to the rise in world food prices and natural disasters as key explanatory factors, then the logic must be that praise should be given to the DPRK government for any improvements in disease incidence, malnutrition and mortality rates.

The picture is not even. The North Korean state has recovered the capacity to implement effective national public health programmes in terms of the very successful vaccination coverage and anti-malaria campaigns, but there is still a lot more to do to control the incidence of TB. The health and nutritional status of mothers and infants, and others, remains far from satisfactory. Yet, tragically, the poor health and inadequate nutritional status of many in the population in the DPRK is far from exceptional world-wide.

Why Does It Matter?

The contrary reactions of China and Russia vis a vis South Korea, Japan and the United States to the UN COI report cannot be simply chalked up to differing strategic interests; they reflect a lack of shared understanding of what, for most other countries of the world, would be an uncontroversial knowledge-base about basic societal trends.⁹⁰ This research therefore hopes to contribute to building a better, common understanding of North Korean society so that the very real problems of North Korean politics, economy and society can be addressed in a more coherent and better informed manner. In North Korea, although income data is not robust or meaningful, health and nutrition data can stand as proxy well-being and poverty indicators, and these indicators, as in other countries, can provide useful information about patterns of societal change. Broadly, this research contributes to a shift in North Korean Studies from securitized, opinion-based discussions, in which all North Koreans are either “victims or villains,” towards careful, qualified, data-based analysis of societal change in the post-famine era of marketization in the DPRK.⁹¹

Acknowledgments

This article was written while I was a POSCO Fellow at the East-West Center, Hawaii in Summer 2015. I would like to thank both organizations for their generous support.

Notes

1. I would like to note that this article is written partly to correct an editing mistake in my recent book *North Korea: Markets and Military Rule* (Cambridge University Press, 2015), <http://dx.doi.org/10.1017/CBO9781139021692>. The book correctly reports the fall in deaths from TB (p. 270) but also infers a fall in the incidence of TB (p. 270). The falling incidence of disease should have referred, in this context, only to the falling incidence rate of malaria. In fact, TB incidence rates have increased while fatalities from TB have decreased. The correct and more granulated figures are given in this paper.

2. Standard accounts include Stephan Haggard and Marcus Noland, *Famine in North Korea: Markets, Aid and Reform* (New York: Columbia University Press, 2007); Suk Lee, “Food Shortages and Economic Institutions in the Democratic People’s Republic of Korea,” doctoral dissertation (Department of Economics, University of Warwick, January 2003); Hazel Smith, *Hungry for Peace:*

International Security, Humanitarian Assistance and Social Change in North Korea (Washington, D.C.: United States Institute of Peace Press, 2005).

3. The United Nations Commission of Inquiry (COI) on human rights in the DPRK that identifies food rights as a key issue in terms of alleged abuse such that, if verified, would justify identifying the DPRK government as committing crimes against humanity. The COI did not, however, engage in a detailed analysis of the extant data on nutrition and health in the DPRK from the United Nations agencies food, agriculture and health agencies that had been resident in the DPRK for 25 years and those agencies did not endorse the COI report. For comment see Hazel Smith, "Crimes against Humanity? Unpacking the North Korean Human Rights Debate," in Hazel Smith and Christine Hong (eds) *Critical Asian Studies* 46. 1, March 2014, pp. 127–143. In the process of writing this article, I came across a technical analysis of some of the issues I touch on here. It deserves to be very widely known. See Yo Han Lee, Seok-Jun Yoon, Young Ae Kim, Ji Won Yeom and In-Hwan Oh, "Overview of the Burden of Diseases in North Korea," *Journal of Preventive Medicine and Public Health*, Vol. 43, No 3, May 2013, pp. 111–117, <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3677063/>, accessed August 9, 2015.

4. I give some comparative data in Smith (2014). Much more detail is in this article.

5. World Health Organization, "Democratic People's Republic of Korea WHO Statistical Profile," <http://www.who.int/gho/countries/prk.pdf?ua=1>, accessed August 9, 2015.

6. It remains common to read throwaway remarks in the scholarly literature from very reputable academics such as, in 2012, "The North Korean economy has been in disastrous shape for many years, causing starvation and extreme poverty." See Kim, Byung-Yeon and Roland, Gerard, "Scenarios for a Transition to a Prosperous Market Economy in North Korea," *International Economic Journal*, Vol. 26. No. 3, September 2012, p. 511, <http://dx.doi.org/10.1080/10168737.2012.707878>. Perhaps the best example of the policy discourse are President Obama's remarks in his 22 January 2015 YouTube broadcast, when he stated that that "[North Korea] can't really even feed its own people" and that "over time, a regime like this will collapse." White House, 2015, The YouTube Interview with President Obama, available on <https://www.youtube.com/watch?v=GbR6iQ62v9k>, accessed 27 July 2015.

7. Hong Sun Won, "Analysis of 1993 Population Census Data DPR Korea" (Pyongyang: Population Center, 1996); "Democratic People's Republic of Korea Preliminary Report of the National Nutrition Survey, October 2012" (Pyongyang: Central Bureau of Statistics, 2012); Chang Su Kim, "DPR Korea 2008 Population Census National Report" (Pyongyang: Central Bureau of Statistics Pyongyang, 2009), https://unstats.un.org/unsd/demographic/sources/census/2010_PHC/North_Korea/Final%20national%20census%20report.pdf, accessed July 24, 2015.

8. Chang Su Kim (2009)

9. Hong Sun Won (1996).

10. Hazel Smith, "North Korea: Market Opportunity, Poverty and the Provinces," *New Political Economy*, Vol. 14, No. 3, June 2009, pp. 231–56, <http://dx.doi.org/10.1080/13563460902826005>.

11. Bank of Korea, "Gross Domestic Product Indicators for the North Korean Economy," Annual Reports, 2000–2013, except for the years 2003, 2004, and 2005, <http://www.nkeconwatch.com/north-korea-statistical-sources/>, accessed August 5, 2015.

12. Minkyu Sung, "The Psychiatric Power of Neo-Liberal Citizenship: The North Korean Human Rights Crisis, North Korean Settlers, and Incompetent Citizens," *Citizenship Studies* Vol. 14 No. 2, pp. 127–144, <http://dx.doi.org/10.1080/13621021003594783>; Sung Kyung Kim, "'I am well-cooked food': Survival Strategies of North Korean Female Border-Crossers and Possibilities for Empowerment," *Inter-Asia Cultural Studies* Vol. 15., No 4, pp. 553–571, <http://dx.doi.org/10.1080/14649373.2014.972663>; Andrew Wolman, "North Korean Asylum Seekers and Dual Nationality," *International Journal of Refugee Law* Vol. 24, No 4, 2013, pp. 793–814. <http://dx.doi.org/10.1093/ijrl/ees052>.

13. Hyung-min Joo, "Visualizing the Invisible Hands: The Shadow Economy in North Korea," *Economy and Society*, Vol. 39, No. 1, 2010, pp. 110–145, <http://dx.doi.org/10.1080/03085140903424618>; Hyung-min Joo, "Hidden Transcripts in Marketplaces: Politicized Discourses in the North Korean Shadow Economy," *The Pacific Review*, Vol. 27, No. 1, 2014, pp. 49–71, <http://dx.doi.org/10.1080/09512748.2013.846931>; Byung-Yeon Kim and Dongho Song, "The Participation of North Korean Households in the Informal Economy: Size, Determinants, and Effect," *Seoul Journal of Economics*, Vol. 21, No. 2, Summer 2008, pp. 361–85.

14. See, notably, UNICEF, “Statistical Tables: Economic and Social Statistics on the Countries and Areas of the World, with Particular Reference to Children’s Well-Being,” in UNICEF, *State of the World’s Children 2014 Executive Summary, Reimagine the Future: Innovation for Every Child* (New York/ Geneva: UNICEF, 2015), pp. 27–116, http://www.unicef.org/publications/files/SOWC_2015_Summary_and_Tables.pdf, accessed July 28, 2015; World Health Organization (WHO), *World Health Statistics 2015* (Geneva: WHO, 2015), http://www.who.int/gho/publications/world_health_statistics/WHSt2015_IndicatorCompendium.pdf?ua=1, accessed July 28, 2015; FAO, IFAD and WFP, *Achieving Zero Hunger: The Critical Role of Investments in Social Protection and Agriculture* (Rome: FAO, 2015), <http://www.fao.org/3/a-i4777e.pdf>, accessed July 28, 2015; UNDP, Human Development Report 2014, *Sustaining Progress: Reducing Vulnerabilities and Building Resistance* (New York: UNDP, 2015), <http://hdr.undp.org/sites/default/files/hdr14-report-en-1.pdf>, accessed July 28, 2015; World Bank, *Atlas of Global Development*, Fourth Edition (Glasgow/Washington, D.C.: Collins Bartholomew/World Bank, 2013), <http://data.worldbank.org/products/atlas>, accessed July 28, 2015; World Bank, *World Development Indicators 2015* (Washington, D.C.: International Bank for Reconstruction and Development/The World Bank, 2015) available on <http://data.worldbank.org/products/wdi>, accessed 28 July 2015.

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16. Suk Lee (2003); Daniel Goodkind and Loraine West, “The North Korean Famine and Its Demographic Impact,” in *Population and Development Review*, Vol. 27, No. 2, June 2001, pp. 219–38, <http://dx.doi.org/10.1111/j.1728-4457.2001.00219.x>.

17. Hazel Smith (2005).

18. Ibid.

19. Bank of Korea, “Gross Domestic Product Indicators for the North Korean Economy” (Annual report, 2013), http://www.nkeconwatch.com/nk-uploads/GDP_of_North_Korea_in_2013_F.pdf, accessed August 5, 2015.

20. Bank of Korea, “Gross Domestic Product Indicators for the North Korean Economy” (Annual report, 2000–2013, except for the years 2003, 2004 and 2005), <http://www.nkeconwatch.com/north-korea-statistical-sources/>, accessed August 5, 2015.

21. Mark E. Manyin and Mary Beth D. Nikitin, *Foreign Assistance to North Korea* (Washington, D.C.: Congressional Research Service, 2 April 2014), p. 10, <https://www.fas.org/sgp/crs/row/R40095.pdf>, accessed August 6, 2015. It should probably be noted that the COI reported that “[m]ultilateral agencies have played a relatively minor role in the delivery of aid to the DPRK.” This is the exact opposite of the truth. See United Nations Human Rights Council, “Report of the Detailed Findings of the Commission of Inquiry on Human Rights in the Democratic People’s Republic of Korea, A/HRC/25/CRP.1,” in *Human Rights Council*, Twenty-fifth session, Agenda item 4 (Geneva: Human Rights Council, 7 February 2014), p. 199, <http://www.ohchr.org/EN/HRBodies/HRC/CoIDPRK/Pages/Documents.aspx>, accessed August 6, 2014. The COI report goes on to assert that “An estimated 75 percent of the total amount of food aid delivered since 1995 has been provided by China, the Republic of Korea, the United States of America, and Japan.” See Ibid. Here presumably the report is conflating “funding” and “delivered” and does not understand the difference between the two and why it matters.

22. Hazel Smith (2005).

23. World Food Programme, <http://kp.one.un.org/content/uploads/2013/03/WFP-Factsheet-2013.pdf>, accessed August 5, 2015.

24. Mark E. Manyin and Mary Beth D. Nikitin (2014).

25. The DPRK government banned residential NGOs in 2005 (although not non-residential foreign NGOs) but in practice six resident foreign NGOs work in the DPRK. They have been rebranded as “European Union Support Units” and work under the aegis of the European Commission. See UN DPR Korea, “Non-UN Actors in DPRK,” <http://kp.one.un.org/non-un-actors-in-dprk/>, accessed August 5, 2015.

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Korea 2011–2015 (Pyongyang: UN Country Team, 2011), http://kp.one.un.org/content/uploads/2012/01/DPRK-UNSF-2011–2015_print_version.pdf, accessed August 6, 2014; United Nations Country Team, *DPR Korea 2015: Needs and Priorities* (Pyongyang: UN Country Team, 2015), http://kp.one.un.org/content/uploads/2015/04/Humanitarian-Needs-and-Priorities-DPR_Korea_-2015.pdf, accessed August 6, 2015.

27. This is a rule-of-thumb figure and although it has not changed much since the mid-1990s it has of course risen with population increases. The actual figure used every year by the FAO and WFP—the two UN agencies most involved in DPRK food security analysis—was based on the estimated population numbers combined with an assumed basic target of calorific supply per person per year and that assumed level of calorific intake has also changed over time. The FAO reported in 2013 that “the annual per capita consumption of 174 kg of basic food commodities covering cereals, potatoes and soybeans is assumed. Specific food requirements used are: 150.2 kg of cereals (including 64 kg of milled rice, 77.2 kg of maize, 6.75 kg of wheat and barley and 2.25 kg of other cereals), 13.8 kg of potatoes in cereal equivalent, and 10 kg of soybeans. Slightly more rice and slightly less maize are included in the anticipated diet to reflect changes in the crop production this year compared to 2012. The estimated per capita food requirement of 174 kg is slightly higher than the apparent national consumption average of the previous five years, but is also considerably below the Government’s target weighted average consumption rate of 213 kg (milled) per person per year. The Mission’s assumed level of consumption on average represents about 1,640 kcal. The remaining energy and other nutrients required are assumed to be derived from the limited quantities of available fish, poultry, meat, sweet potatoes, vegetables, fruits, and wild foods.” See FAO/ WFP, The FA/ WFP Crop and Food Security Assessment Mission (CFSAM) to the DPRK (Rome: FAO/ WFP, 28 November 2013), p. 25, <http://www.fao.org/docrep/019/aq118e/aq118e.pdf>, accessed August 8, 2015.

28. United Nations Country Team (2015).

29. FAO, Food and Agriculture Organization of the United Nations Statistics Division, <http://faostat3.fao.org/compare/E>, accessed August 6, 2015.

30. Hazel Smith, *North Korea: Markets and Military Rule* (Cambridge: Cambridge University Press, 2015), <http://dx.doi.org/10.1017/CBO9781139021692>.

31. Lola Nathanail, *Food and Nutrition Assessment Democratic People’s Republic of Korea*, 16 March–24 April 1996 (Pyongyang: World Food Programme, 1996).

32. Suk Lee (2003).

33. Hazel Smith (2005); Hazel Smith (2015).

34. Key worker information in WFP/FAO/UNICEF, *Special Report: Rapid Food Security Assessment Mission to the Democratic People’s Republic of Korea*, 24 March 2011 (Rome: WFP, 2011), p. 18, http://ko.wfp.org/sites/default/files/english_rfsa.pdf, accessed June 22, 2014.

35. Hyung-min Joo, “Visualizing the Invisible Hands” pp. 110–45; Changyong Choi, “Everyday Politics” in North Korea,” *The Journal of Asian Studies* Vol. 72, No.3, August 2013, pp. 655–673, <http://dx.doi.org/10.1017/S0021911813000545>.

36. Hazel Smith (2005); Hazel Smith, “North Korea: Market Opportunity, Poverty and the Provinces,” pp. 231–56; Hazel Smith (2015).

37. UNICEF, *Analysis of the Situation of Women and Children in the Democratic People’s Republic of Korea 2006* (Pyongyang: UNICEF, 2006), p. 33, http://kp.one.un.org/content/uploads/2012/03/03.19_ChildrenWomen2006.pdf, accessed August 8, 2015.

38. Ibid.

39. United Nations Country Team, “DPR Korea 2015: Needs and Priorities” (Pyongyang: UN Country Team, 2015), http://kp.one.un.org/content/uploads/2015/04/Humanitarian-Needs-and-Priorities-DPR_Korea_-2015.pdf, accessed August 6, 2015.

40. World Bank, *World Development Indicators 2015* (Washington, D.C.: International Bank for Reconstruction and Development/The World Bank, 2015), <http://data.worldbank.org/products/wdi>, accessed August 13, 2015.

41. UNICEF, *Analysis of the Situation of Women and Children in the Democratic People’s Republic of Korea 1999* (Pyongyang: UNICEF, 2000); Hazel Smith (2005).

42. UNICEF, “DPRK National Nutrition Survey: Executive Summary,” http://www.unicef.org/dprk/support_20884.html, accessed August 6, 2015.

43. The United States Center for Disease Control and Prevention points out that “The infant

mortality rate... is often used as an indicator to measure the health and well-being of a nation, because factors affecting the health of entire populations can also impact the mortality rate of infants" [emphasis in original]. Center for Disease Control and Prevention, "Reproductive Health." <http://www.cdc.gov/reproductivehealth/maternalinfanthealth/infantmortality.htm>, accessed August 8, 2015.

44. Yo et. al., "Overview of the Burden of Diseases in North Korea," (2013), pp. 111–117, available on <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3677063/>, accessed 9 August 2015.

45. World Bank, Data, <http://data.worldbank.org/indicator/SP.DYN.IMRT.IN>, accessed August 8, 2015.

46. Ibid.

47. World Bank, Data, available on <http://data.worldbank.org/indicator/SH.STA.MMRT>, accessed 8 August 2015.

48. UNICEF, "DPRK at a Glance 2013 (February)," http://www.unicef.org/dprk/DPRK_at_a_glance_April_2013.pdf.

49. UNICEF, *Analysis of the Situation of Women and Children in the Democratic People's Republic of Korea 2006* (Pyongyang: UNICEF, 2006), p. 33, http://kp.one.un.org/content/uploads/2012/03/03.19_ChildrenWomen2006.pdf, accessed August 8, 2015.

50. World Health Organization (WHO), "Democratic People's Republic of Korea Neonatal and Child Health Country Profile," http://www.who.int/maternal_child_adolescent/epidemiology/profiles/neonatal_child/prk.pdf, accessed August 9, 2015.

51. UNICEF, *Analysis of the Situation of Women and Children in the Democratic People's Republic of Korea 1999* (Pyongyang: UNICEF, 2000).

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