NORTH KOREA

a geographical analysis

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NORTH KOREA

A Geographic Overview

★★★★★★★

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Foreword

NORTH KOREA IS A country about the size of New York, inhabited by about 23 million people. However, notwithstanding its relatively small size, North Korea remains a most volatile and dangerous state, and continues to be a crucial component in the regional stability of East Asia and the security strategy of the United States long after the end of the so-called Cold War. That volatility has been magnified over previous months as evidenced by North Korea's deliberate abrogation of a 1994 nuclear non-proliferation treaty and strident announcements that it will now continue its nuclear weapons development and production program.

Since the end of the Second World War, the seminal issue on the Peninsula has been the rivalry between North and South Korea. North Korea came into existence after the conclusion of the Second World War following decades of brutal occupation by the Japanese empire. Partitioning the peninsula into North and South Korea was the politically expedient solution to one of many post-war political disagreements between the Allied powers. This artificial division of a homogenous nation and culture could be seen as a unintentional social and political human experiment. North Korea was the communist state supported by Red China and the Soviet Union, while South Korea developed under the democratic model supported principally by the United States. Nevertheless, by 1950 this political arrangement degenerated into a bloody proxy war between two dichotomous ideologies that lasted until 1953. More than 36,500 American lost their lives during the Korean War. Even with signing of the armistice in 1953, no real lasting security or political objectives were achieved and America has been deeply involved in the security, politics, and economic development of the Peninsula ever since. Thus, the cease-fire has deferred the final settlement to the political and territorial dispute.

Today, North and South Korea remain in a state of belligerence, each defending their side of the 38th parallel and this rivalry is of singular importance to the long-term security and stability of the entire region. This rivalry is most clearly evident in the military sphere, as evidenced by the vast concentration of military forces along each side of the Demilitarized Zone. Consequently, the United States maintains a force of just under 36,000 troops in South Korea as a deterrent to further aggression from the north. The goal for the United States and South Korea is a peaceful end to the conflict and a return to a free and united Korea. However, there is no reason to believe that this goal will soon be achieved especially in light of recent

events in the north. Thus, Korea has remained one of the most heavily armed, volatile regions on the Earth despite the end of the Cold War. Undeniably, this confrontation is the prevailing issue in the political, economic, geo-strategic, and military decision-making process in North Korea. Therefore, to understand North Korea and place its policies and national objectives into sharper focus, we must develop an understanding of the immutable role of geography in its historical development and contemporary world-view as a nation-state.

North Korea is clearly a regional threat—important to the United States because of its geographic proximity to important allies and other economic/strategic interests. Historically, Korea's location and strategic position made it vulnerable to its much stronger neighbors. Thus, the Korean people have developed over time a philosophy of juche (i.e., self-reliance) driven by the clear recognition of their vulnerability to powerful neighbors and the rugged nature of the physical landscape. Consequently, in the face of isolation, austerity, and adversity, juche coupled with communism has been powerfully identified with North Korean nationalism and is a crucial resource in the maintenance of internal solidarity. Furthermore, loyalty to the Party and the leader has been merged indistinguishably. Essentially, we must try to comprehend a state within which the most conspicuous aspects of society are the subordination of individual desires and interests to the principle of communal well-being and its emphasis on domestic harmony and national consciousness. Thus in the face of crumbling internal solidarity, or a perceived external threat, it is indeed possible that the party and/or leader may act unilaterally with the unfettered support of the people to preserve the *status quo*.

A geographic analysis such as this one is essentially a snapshot in time. The utility of understanding the geography of a region is the recognition of how change has given us present conditions, the spatial and temporal interconnectivity of landscape, and culture, and how it will be manifested in the future. Hence, we use a regional approach to define North Korea's location, physical landscape, and climate; and delineate the geographic components of its human landscape. By connecting the sub-components of North Korea's geography in time and space, we endeavor to communicate an integrated geographic vision of many complex parts. The authors of this book are uniquely qualified to offer this special perspective of North Korea's physical and human landscapes. First, they are trained geographers academically and experientially qualified to examine the country over the gamut of physical and cultural sub-disciplines. However, more importantly, most are also experienced military officers who can add focus to issues that have special military significance. The tools and methods of analysis of the geographer, which describe a place, its people, and how

they interact, systematically yield a strategic analysis that is critical to successful military planning.

Our goal is to offer a complete, but not exhaustive source of information about North Korea. Beyond the obvious benefit to scholars and government officials, it is intended to be useful for anyone interested in learning more about North Korea. Though presented in a concise format, it also has references to more detailed descriptions of the many physical and human geographic features that are described herein.

With the current war on terrorism re-directing our focus toward Southwest and Central Asia, and the on-going war in Iraq, there is a real danger of losing sight of other threats. As we are finalizing this book, two North Korean actions have reemphasized the need understand an important regional threat in East Asia. First, on 10 December 2002, a shipment of North Korean-made SCUD-type missiles was intercepted on their way to Yemen. Second, North Korea has recently confirmed the restart of a nuclear reactor that has significance in their admitted nuclear weapons program. However, just as alarming is the continued political instability and regional insecurity created the by deepening famine in North Korea. How the North Korean people and their government respond should this human suffering continue compounds the uncertain future of the Korean Peninsula. ★

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NORTH KOREA

A GEOGRAPHIC OVERVIEW

1 INTRODUCTION

Eugene J. Palka

Key Points:

- North Korea's recent acknowledgement of its nuclear capabilities has contributed to increased tension on the Korean Peninsula and throughout the Pacific realm.
- A regional geography of North Korea reveals the underlying processes that contribute to distinct physical and human patterns within the country.
- Our regional geographic analysis of North Korea integrates the physical and human characteristics of the country, and is designed to support military and political analyses.

THE KOREAN PENINSULA IS unique in several ways. The territory encompasses nearly 220,000 square kilometers and is home to more than 70 million people. Korea was previously considered a nation-state; i.e., a political entity and sovereign country with a homogeneous population. Since the end of World War II, however, the country and nation have been divided. North of 38th parallel, North Korea occupies more than 120,000 square kilometers and is populated by some 22 million people. By comparison, South Korea covers 98,500 square kilometers and is inhabited by more than 48 million people. Living standards, individual rights, political freedom, and economic development have evolved in different directions north and south of the 38th parallel since the Allied Powers administratively partitioned the country in 1945.

OBJECTIVE

The intent herein is to provide a geographic analysis of North Korea, a state that has had a significant impact on America's foreign policy efforts and military strategy for more than half a century. In light of the United States' enduring military presence on the Korean Peninsula, the ongoing war against terrorism, North Korea's continual pursuit of its nuclear capability, and the country's recent provision of SCUD missiles to Yemen, American interest in North Korea has heightened. In order to provide academics, military planners, leaders, and students with current, accurate, and relevant information, we have integrated material from the appropriate subfields of geography, and further synthesized that material into a single publication that identifies and explains the distinguishing characteristics of the country.

APPROACH

We begin with a focus on the natural environment, introducing various aspects of physical geography. We subsequently transition to a discussion of the inhabitants and their way of life using a human geographic framework. Ultimately we examine the interaction between people and their natural surroundings and identify the unique culture that has emerged within the country. Ours' is not to provide a military analysis of North Korea, but to provide the information necessary to enhance analyses by others. Perhaps more importantly, we aim to provide a scholarly perspective for anyone seeking to unscramble the plethora of journalistic reports that have appeared in the media throughout the past six months. Our final products include a succinct, well-organized, easy-to-use reference. By design, our analysis is based on "unclassified" information that is accessible to other scholars.

METHODOLOGY

We employ the "regional method" to develop our geographical analysis of North Korea, just as we have done previously with our publications on Afghanistan (Palka 2003) and Iraq (Malinowski 2003). Regional geography is the discipline's most important overarching method and has been often referred to as the "highest form of the geographer's art" (Hart 1982). As a way of "doing geography," the regional method is best described as a synthesis of all of the pertinent subfields of the discipline applied to a specific region or place. All regions have area, location, and boundaries and are based on whatever criteria geographers choose to define them. In this case, the region has distinct boundaries, since North Korea is a political entity.

Figure 1.1 depicts the symbiotic relationship between geography and other academic disciplines. Where geography overlaps with other disciplines, distinct subfields of geography emerge. While each of these systematic geographies can be studied individually, they are also routinely examined in a collective fashion within the context of particular places or regions. For our purposes, the regional method enables us to draw from an assortment of pertinent systematic geographies and focus the collective wisdom of our diverse geography faculty on North Korea, with the goal of providing systematic and comprehensive coverage of the country.

When analyzing a region, geographers routinely organize their investigations using the various sub-disciplines to describe the physical and human characteristics of the world. The regional analysis presented herein addresses location, geomorphology, climatology, biogeography, and historical, cultural, political, population, urban, economic, and medical geographies. The physical and human characteristics of North Korea are equally important to understanding the totality of the country; thus, it

becomes necessary to draw from a range of subfields.

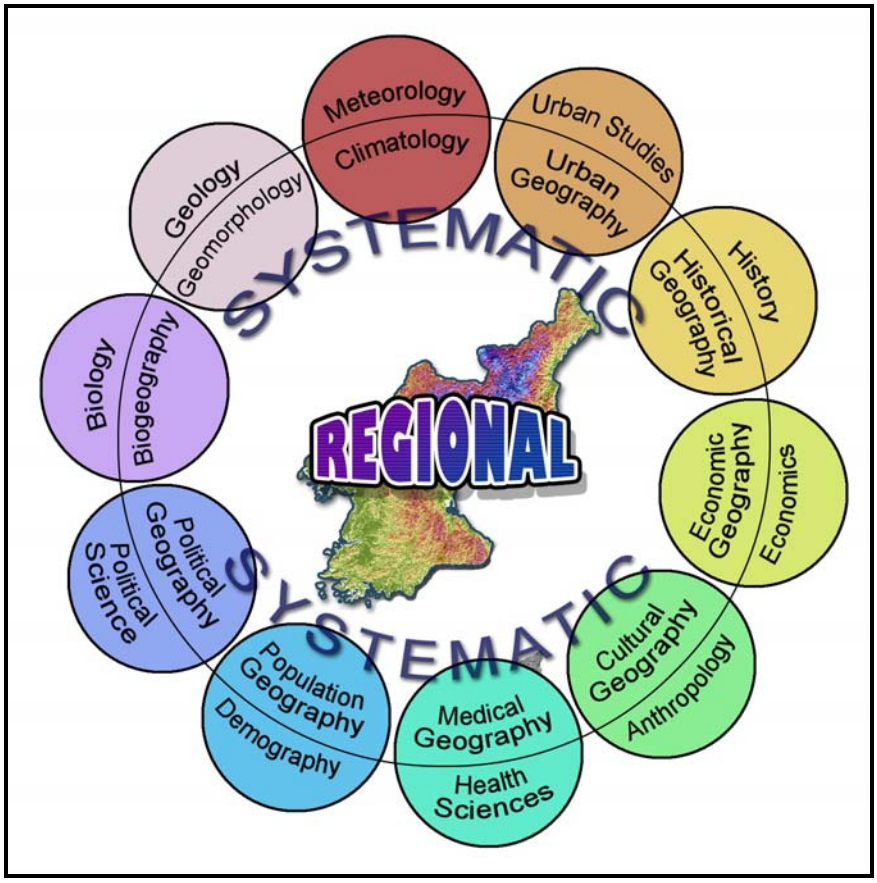

Figure 1.1. Relationship between Regional and Systematic Geography.
Source: adapted from de Blij and Muller with Palka, 2003.

ORGANIZATION

The scope and organization of this book follow the same pattern as our two previous works (Palka 2003; Malinowski 2003). Each of the pertinent subfields are addressed in a separate chapter. We begin by locating the country, discussing its absolute location, as well as its location relative to other places. The chapters on geomorphology, climatology, and biogeography highlight the physical characteristics of the country, independent of human activity. These subfields stem from the physical branch of geography and enhance understanding of the earth's surface, climate, and associated patterns of vegetation within North Korea. Since natural systems exist independent of man-made, political boundaries, some parts of the discussions in these chapters encompass aspects of the entire

Korean Peninsula. The historical geography chapter provides a perspective, which considers the physical and human changes that have occurred over time and serves to bridge the gap between the physical and human subfields. The subsequent chapters on cultural, political, population, urban, economic, and medical geography focus on patterns of human activity and how people interact with the natural environment.

APPLICATION

Military operations are conducted on the earth's surface and in its atmosphere, not at abstract points in space. As such, it should be clear that geography provides essential information for the soldier, leader, military planner, and strategist. The earth's surface and atmosphere constitute the domain for both the geographer and military professional alike. Geographic information, tools, and techniques, have long proven to be indispensable to solving military problems across a spectrum from peacetime to war. It is our hope that this publication reinforces the immutable importance of geography to the military and/or political professional and provides the knowledge necessary to make informed decisions.

For academics, students, and other people with an interest in the region or country, this book provides a rare synthesis of information about North Korea. Given the communist ideology of its regime, and the closed nature of North Korea's society, current and accurate information continues to be difficult to acquire. Nevertheless, we have attempted to combine various subfields in order to highlight the country's distinguishing characteristics. ★

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2 LOCATION

Eric D. Larkin

Key Points:

- To understand North Korea's geography, one has to appreciate its absolute and relative location.
- North Korea's absolute location has a profound influence on its continental climate and rugged terrain.
- North Korea's capital, P'yongyang, is located at roughly the same latitude as Indianapolis or Philadelphia.
- North Korea is surrounded by three major culture complexes: Chinese, Russian, and Japanese.
- North Korea is roughly equivalent in size to New York State.

TO PLACE NORTH KOREA into the proper context in terms of its role in current events, and to appreciate more completely its unique geography, an understanding of its location—absolute and relative—is essential. Absolute location is typically delineated using a geographic grid coordinate reference system such as latitude and longitude. Thus, the geographic center of North Korea is located at 40°00′N latitude and 127°00′E longitude (Figure 2.1). North Korea's capital city, P'yongyang, is located at 39°03′ N (roughly the same latitude as Indianapolis or Philadelphia) and 125°48′E longitude.

The north-south extent of North Korea's landmass extends from approximately 43°N latitude near Namyang-nodongjagu in Hamgyong-Bukto on the North Korean-Chinese border to Sigyo-ri in Hwanghae-Namdo at 37° 48′N in the south (Figure 2.2). From east to west the country extends from Chogumsa in P'yongan-Bukto (124°13′E) on the Korean-Chinese border in the west to Sanso, Hamgyong-Bukto (130°39′E) on the Russo-Korean border in the east. The country is much narrower along the border between North and South Korea due to a proruption in the north. The Demilitarized Zone, a four-kilometer wide, artificial boundary (two kilometers on each side) marks the southern border with South Korea was established after the administrative partition of the country by the Allied Powers after the Second World War; and is an indelible reminder of the perpetual state of friction between the two countries.

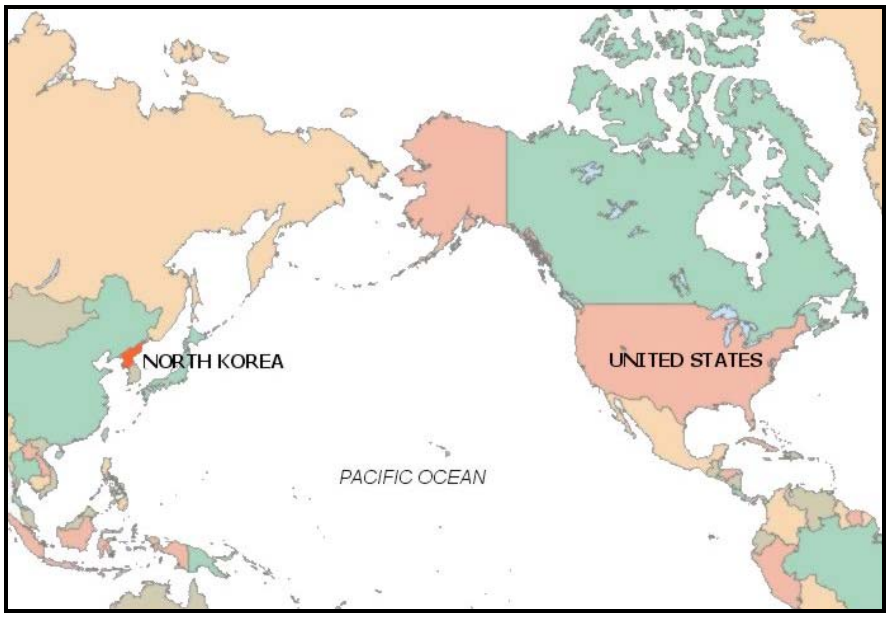

Figure 2.1. Relative location of North Korea and the United States.
Source: Adapted from Map Resources, 2000 (used by permission).

In terms of distance, North Korea's capital, P'yongyang, is 9,300 km from the United States west coast. In terms of global time, the country is +9:00 hours from Greenwich Mean Time. In comparison to some major cities in the United States, North Korea is +14:00 hours from Washington, D.C., +17:00 hours from Los Angeles, CA and +20:00 hours from Honolulu, HI. Thus, the Korean Peninsula is slightly more than a half-day ahead of Washington, D.C. time—when it is 12:00 noon on the United States east coast, it is 2:00 a.m. the next day in North Korea. What does North Korea's geographic location mean in terms of air travel time from the United States? P'yongyang's absolute location means that someone traveling from Honolulu, Hawaii would require approximately nine hours to fly the 7,400 kilometers. A person traveling from Seattle-Tacoma, Washington would require ten hours (8,350 km) and a flight leaving Washington D.C. would take nearly twenty-three hours (11,280 km) to get to North Korea.

North Korea's absolute location has important consequences for its climate and physical geography as well. Climatically, much of the Korean Peninsula experiences a continental climate even though it is a peninsula and should have a significant maritime influence. Korea's location adjacent to the Asian landmass means that it experiences a seasonal reversal of the winds, or monsoon. Thus in the winter months, North Korea experiences very cold, dry northeasterly winds from the Asian landmass, that drive

temperatures well below freezing. Conversely in the summer, the warm, humid southwesterly winds bring warm temperatures and relatively heavy precipitation.

In terms of physiography, the Korean Peninsula's location in one of the most tectonically active zones of the world has created its forbidding terrain. The imposing mountain ranges that dominate much of North Korea's landscape are a manifestation of the convergence of the Eurasian and Philippine Plates. Hence, North Korea is a land of steep mountains with narrow valleys that promote a sense of isolation and fragment land travel and communication. Consequently, North Korea has not been favored with a bounty of level, arable land and the production of food is a pervasive problem driven in part by the rugged terrain. Furthermore, the narrow coastal plain, and lack of quality, deep-water port facilities are additional consequences of its location in this tectonic environment.

RELATIVE LOCATION

Relative location is another method by which geographers describe the location of a place. Relative location considers location in terms of a larger context. Accessibility to resources and external influences in the larger region are examples of important attributes. North Korea's unique relative location helps explain the country's history and importance in world politics. North Korea is a northeast Asian country, bordered by China and Russia to the north and South Korea to the south. The country's two separate coastlines are isolated by South Korea. Both coasts have several major ports (Figure 2.2).

The country's 120,410 km^2 is roughly similar in size to the state of New York. Mountainous terrain dominates the country; hence, only 17% of the land is available for agricultural use. The largest area of flat terrain is along the western coastal plain surrounding the capital. The east coast and interior regions are mountainous with river valleys and high plateaus. The highest point, Paektu-san at 2,744 m, is located in the rugged expanse of mountains on the Sino-North Korean border. Elevation tapers off to the southwest in the relatively flat agricultural area near the capital.

North Korea's relative location (Figure 2.3) places it in the midst of some of the world's oldest civilizations (i.e., Chinese and Japanese). This affords an explanation for North Korea's unique historical, cultural, political, and economic geographies. Because these subfields will be discussed extensively in following chapters, only a brief analysis is presented here.

Based on its relative location, North Korea is surrounded by three major cultures; Chinese, Japanese, and Russian (Figure 2.3). Since Korea is the closest landmass to Japan, it has long been a useful point for movement on and off the Asian continent. Thus, Korea served as a highway for cultural

exchange throughout its history. This proximity explains the great similarity in the three cultures (i.e., Korean, Japanese, and Chinese) as ideas diffused between the various groups as they moved throughout the region.

Figure 2.2. Physical map of North Korea.
Source: Adapted from United States Army 1972.

Unlike South Korea, where the mountainous terrain facilitates north-south movement, the less compartmentalized North Korean mountain ranges increase the provincial insulation of the country. Being surrounded by dominant states, the self-proclaimed policy of "juche" (self-reliance) can be a strong centripetal force binding the people to the government.

Figure 2.3. North Korea and its surrounding region.
Source: Adapted from Map Resources, 2000 (used by permission).

LOCATION AND REGIONAL STRATEGY

Since the mid-70's, North Korea has pursued a ballistic missile program. Prior to 1998, the most advanced missile, the No-dong, was limited to a range of 1,500 km (FAS 2002). Loaded with chemical weapons (VX agent), the No-dong was a limited threat. On 2 September 1998, North Korea test fired its latest, and most advanced missile, the Taepo-dong. The second stage flew over Japan. The Taepo-dong 2 with an estimated range of 4,000-4,300 km (FAS 2002) armed with a weapon of mass destruction (i.e., chemical, biological, or nuclear) has the range to strike Japan (including the American bases on Okinawa), part of China, Russia (Vladivostok and the Kamchatka Peninsula), the Philippines and Guam (Figure 2.4). Thus, North Korea has the capability to alter the regional strategic balance and threaten United States economic partners and bases. This is significant because North

Korea has quietly used this capability as a form of "brinksmanship" in the region. Because of North Korea's proximity to major American interests, it cannot help but be a major focus of United States policy.

CONCLUSION

The concepts of absolute and relative location are essential to the geographic investigation of a region. These axioms will be applied to the study of the various subfields discussed later in this work. At this point, it is sufficient to note that although North Korea is distant from the continental United States, it is situated in close proximity to American interests. Moreover, the country is extremely important to the balance of power in East Asia. ★

Figure 2.4. Range of the Taepo-dong missile with maximum (outer circle) and minimum (inner circle) payloads. Source: Author.

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North Korean guards stand at their post providing protection for a group of people touring North Korean side of the Demarcation line. The North Korean guards are posted to keep people from defecting from North to South Korea. Both sides have guards posted at the same time and stand face to face on a daily basis. Source: U.S. Air Force photo by Senior Airman Jeffrey Allen.

3 GEOMORPHOLOGY

Matthew R. Sampson

Key Points:

- 80% of North Korea consists of mountains and uplands.
- North Korea's steep terrain is a function of differential erosion. Resistant metamorphic rock forms the ridges, and less-resistant granitic rock forms the valleys.
- The major rivers of North Korea include the Yalu, Tumen, Taedong, and Ch'ongch'on.

GEOMORPHOLOGY IS THE STUDY of landforms and the processes that shape them. As a discipline, geomorphology integrates geology with a variety of disciplines that explore the earth's surface. Geomorphologists seek to understand the processes that create landforms by examining these underlying processes from a broad perspective. By integrating diverse fields such as climatology, hydrology, environmental science, and chemistry, geomorphologists draw conclusions and provide recommendations to problems from a holistic perspective.

North Korea's terrain is characterized by successive, rugged mountain ranges that crisscross the peninsula (Figure 3.1). Some visitors describe it as "a sea in a heavy gale" (Savada 1994). About 80% of the country consists of mountains and uplands. Small plains make up the remainder of the country. These are comprised primarily of the P'yongyang and Chaeryong plains on the west coast. The plains on the east coast are even smaller because the mountains drop abruptly to the sea (Savada 1994).

GEOLOGY

Korea is not located along an active tectonic boundary; therefore, it is a generally stable landmass with no active volcanoes and rare earthquake shocks (Korean Information Service 2001). However, there is evidence of past volcanic activity. For example, Mt. Paektu-san near the China border is capped with a caldera lake (Korean Information Service 2001), and the land around Paektu-san includes a basalt lava plateau (Savada 1994). Paektu-san, itself, is an extinct volcano and is North Korea's highest point at 2,744 m (Korean Information Service 2001).

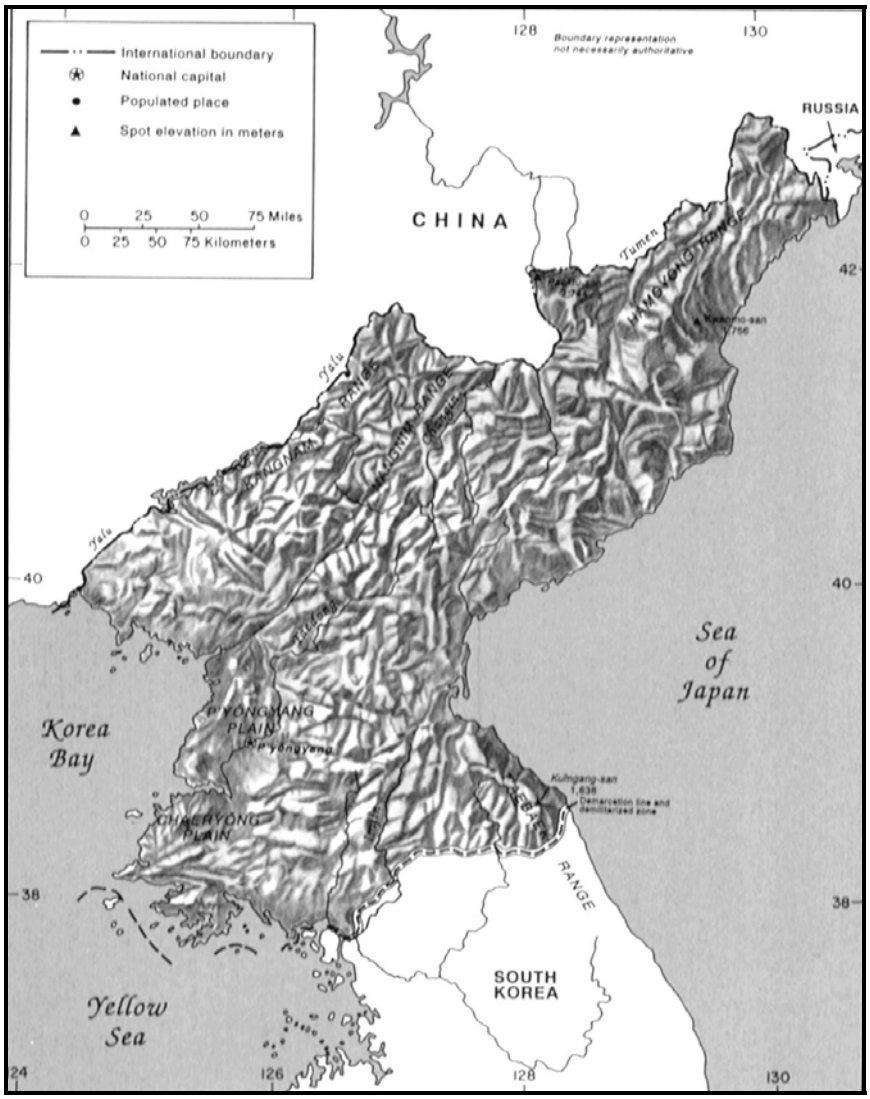

Figure 3.1. Physical map of North Korea
Source: Central Intelligence Agency, 2001.

Earthquakes in Korea are rare. In the past 2,000 years, there have been about 2,000 earthquakes of which only 48 were considered destructive (Korean Information Service 2001). The frequency and intensity of these earthquakes is related to Korea's proximity to the Circum-Pacific Earthquake Belt. Japan is directly on this belt while Korea is some distance from it. Thus, Korea has far fewer earthquakes than Japan, and the ones it does have are usually weak.

Geologically, North Korea is composed largely of granite, gneisses and other metamorphic rocks that are of Precambrian age (Korean Information Service 2001). Through these older rocks, Jurassic and Cretaceous granites intruded in a generally northeast-southwest orientation (Korean Information Service 2001). Meanwhile, there were several orogenic movements including, "major uplifts of the Sino-Korean and Yangtse plate or plates during the Late Cretaceous Bulguksa disturbance, 90-65 [million years before present] (Cameron 1998, 86)." During this time period a northeast-southwest trending rift, the "Chugaryeiong Rift Valley," formed between Wonsan and Seoul, and extensive basalt flows spread along this axis (Cameron 1998).

Two key elements in Pleistocene (i.e., past 2 million years) history influenced the terrain of North Korea. One is that the Korean Peninsula was left largely untouched by glaciers. Small glaciers were limited to the Seurei Range in the far northeast and perhaps in the Shan Alin Range farther to the southwest (Flint 1971). The lack of glaciation, plus a wet climate, produced deep chemical weathering of granite formations. The second element was a drop in sea-level during the Pleistocene. This created a lower base level for streams which greatly increased hydraulic energy. The result was more efficient stream erosion, particularly along structurally controlled joints in the granitic rocks. During the Quaternary (i.e., 65 to 2 million years before present), the granite masses generally weathered deeper and were more easily eroded than the older metamorphic rocks they intruded. Today, the resistant metamorphic rocks generally form ridgelines, while the granite formations generally form valleys and depressions. The combined effect is "a terrain of alternating hard and soft rocks, generally high and steep in the east, low and rolling in the west (Cameron 1998, 87)." This phenomenon is most evident in the T'aebaek Mountain Range that runs north-south along the east coast and extends southward across the Demilitarized Zone (DMZ) into South Korea.

MOUNTAIN RANGES

The T'aebaek Range forms a backbone down the east side of the Korean Peninsula (Figure 3.2). It can be divided into northern and southern portions separated by the Wonsan-Seoul corridor, which is the most favorable passage between the east and west coasts (Military Intelligence Division 1945). The Northern T'aebaek are basically an extension of the North Korean Highlands. Here the ridges trend mostly north-south, but the valleys extend in all directions. The hills and ridges are generally 1,500 to 5,000 ft. high and are steep. Valleys are narrow, gorge-like, and winding. The range measures roughly 220 km north-south and 80 km east-west.

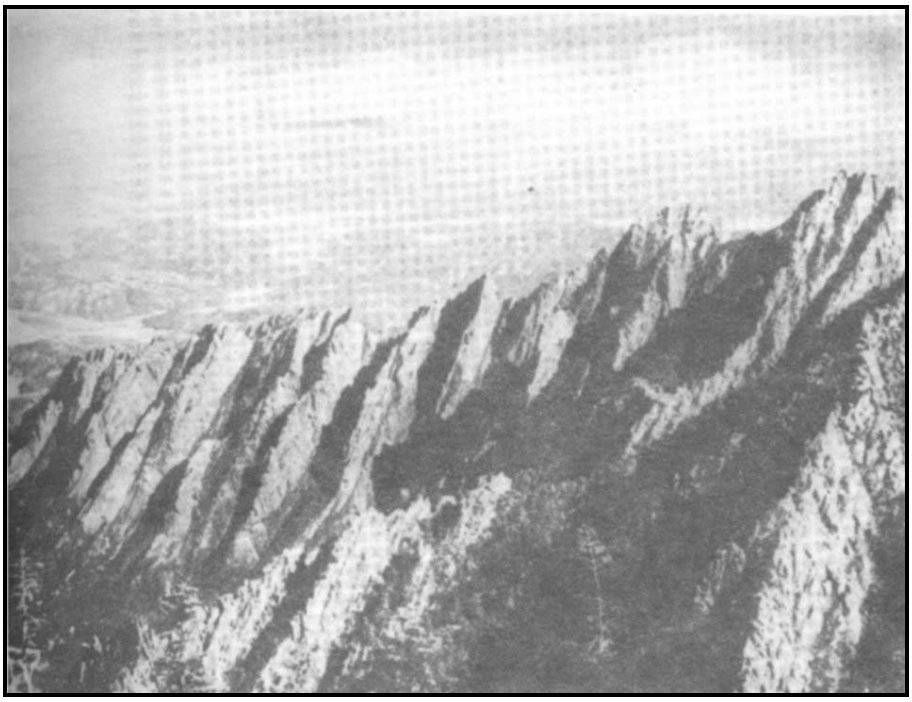

Figure 3.2. Kumnang-san or "Diamond Mountain."
Source: United States Army, 1950, photo VI-10.

Movement through this area is very difficult and may be obstructed by snow in the winter and heavy rains in the summer (United States Army 1950). The Southern T'aebaek Range is similar in character to its northern counterpart—steep and rugged with narrow, winding, gorge-like valleys (Military Intelligence Division 1945). One of the most famous mountains in Korea is located in the Southern T'aebaek Range. Called Kumnang-san, or "Diamond Mountain," it is a favorite tourist attraction and is located about 110 km southeast of Wonsan. The Southern T'aebaek Range extends across the DMZ into South Korea.

Extending northward from the T'aebaek is the Yangnim Range, which constitutes the drainage divide between the western and eastern slopes of the peninsula (Figure 3.3). It is the highest and most inaccessible part of the Northern Korean Ranges with some of the highest summits along this range exceeding 2,000 m in altitude (United States Army 1950). These rugged mountains are drained by rapid streams flowing in steep-sided valleys or gorges.

East of the Yangnim Range is the Kaima Plateau. This is the basalt lava plateau mentioned earlier in the Geology section. It is a high, gently

sloping area dissected by steep valleys, which can be canyon-like in character (United States Army 1950). The upland areas are 1,200 to 2,000 m in elevation. Lying to the east are hills and mountains ranging 300 to 1,000 m in elevation. In this region, the Tumen-gang (river) forms the northern border of North Korea.

RIVERS

Four principal river systems drain most of North Korea. In the north are the Yalu River and the Tumen-gang (the only major eastward flowing river in Korea). On the west are the Taedong-gang and Ch'ongch'on-gang. Except for the Yalu, North Korean rivers are rather short. Generally, they are swift in their upper reaches and slow in their middle courses. Except for those on the eastern coast, these rivers have built up relatively large flood plains.

The Tumen-gang, one of North Korea's widest rivers, flows southeast and empties into the Sea of Japan. The lower Tumen-gang separates North Korea from China and, in its lowest reaches, from Russia. It is 521 km long and flows through a deep, winding, flat-floored valley. Near its mouth, the river is about 800 m wide. The depth of the Tumen is about 2 m at the mouth (United States Army 1950). Its lower course is navigable by light watercraft for about 85 km (Military Intelligence Division 1945). It is generally shallow except during the spring thaws and summer rains when it swells to flood stage.

Taedong-gang and Ch'ongch'on-gang, on the west side of the peninsula, flow into the Yellow Sea. These streams are comparatively long, very sinuous, and have broad tidal flats at their mouths (Military Intelligence Division 1945). The Ch'ongch'on is almost 1.5 km wide at its mouth, but about 8 km upstream is narrows to about 200 m. The main river is about 200 km long and falls about 900 m. The Ch'ongch'on is shallower than the other major rivers along the west coast, and is fordable in many places at normal water level (United States Army 1950).

The Taedong flows from the highlands of the Yangnim Range and flows southwest past P'yongyang to the Yellow Sea. It is nearly 400 km long. In its upper reaches, the stream follows a circuitous route through canyons, while in the lower portion it winds through flat valleys. The Taedong is fordable in many places above P'yongyang, but not downstream. It has a relatively strong current and presents a challenging obstacle to north-south movement (United States Army 1950).

In the northwest, the Yalu River forms part of the border with China and flows southwestward into the Yellow Sea. At 790 km, it is North Korea's longest river. The main channel has several upstream rapids, and there are many islands and sand bars in its lower course. The river is

navigable by small watercraft for about 550 km from its mouth (Military Intelligence Division 1945).

Figure 3.3. Yangnim Mountain Range. NE of the Chosin Reservoir.
Source: United States Army, 1950, Photo VI-1.

North Korea's streams have highly variable flow throughout the course of a year. High flow can be expected in spring from snow melt and again in July and August from the wet monsoon. "Flash floods can occur during high water season, and many streams become raging torrents, forming major barriers to movement (United States Army 1950, VIII-1)." During winter, however, North Korean rivers may freeze for three to four months and they can be crossed on foot or perhaps by light equipment.

COASTLINE

North Korea has 2,495 km of coastline (Savada 1994). It is a highly irregular coastline, particularly on the west coast where there are many small

peninsulas and bays as well as a large number of islands. The west coast is very shallow and has large tidal ranges, above 10 m in some places. Due to these large tidal ranges, it has been difficult to develop harbors. Tidal flats are common coastal features especially near the mouths of rivers that discharge large volumes of sediment (Korean Information Service 2001).

The east coast is markedly different having small tidal ranges, 0.3 m at the most and few islands offshore (Korean Information Service 2001). The Taebaek Range runs near this coast. Where mountains protrude, they form headlands separated by pocket beaches. In many instances, the beaches take the form of sand spits and bars enclosing lagoons.

CONCLUSION

The topography of North Korea is dominated by rugged mountain ranges, comprising about 80% of the country's landscape. Composed of resistant metamorphic rocks that form sharp ridgelines and less-resistant granites that form valleys and depressions, these mountains are formidable barriers to movement in both north-south and east-west directions. Major rivers provide some inland transport, but they are subject to highly variable flows throughout the year. In particular, the rains of July and August can cause flooding, and cold winter temperatures cause the rivers to freeze. As a result, it is routinely difficult to conduct any cross-country movement in North Korea due to the restrictive nature of the terrain. ★

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4 CLIMATE

Mark R. Read

Key Points:

- North Korean climate is dominated by two extreme seasons—a cold, dry winter and a warm, humid summer.
- The Asiatic High dominates North Korea during winter (December–March), resulting in clear skies, northwesterly winds, very little precipitation, and low temperatures.
- Temperatures increase significantly during summer (June–August), which is when North Korea receives most of its annual precipitation.
- Significant hazards include fog, drought, flooding, thunderstorms, and high winds.

NORTH KOREA'S CLIMATE IS characterized by significant seasonal changes in temperature and precipitation. Atmospheric circulation patterns in the region are dominated by pressure changes over the Asian landmass. During winter, high atmospheric surface pressure over Asia (the Asiatic High) results in clear skies, northwesterly winds, low precipitation, and low temperatures. In summer, low pressure over Manchuria results in warm, southerly winds laden with moisture from the East China Sea and the Sea of Japan. Spring and fall are distinct but relatively short transition seasons between the longer, more extreme winter and summer.

Although there are local variations, North Korea has a Humid Continental climate with a cool summer and a dry winter (Dwb) according the Köppen climate classification scheme (Hudson 2000). The coldest mean monthly temperature is below 32°F; the warmest mean monthly temperature is above 50°F but below 72°F. More than 70% of the annual precipitation falls between April and September. Southern locations experience higher average temperatures than northern stations. Northern locations receive less annual precipitation, and generally experience stronger winds. Local topography plays an important role in wind direction and speed.

Several weather and climate hazards are common in North Korea (Table 4.1). Winter can bring fog and high winds. Drought, flooding, thunderstorms, and typhoons pose hazards in spring, summer, and fall. Because North Korea has a fairly uniform climate with four distinct seasons, this chapter will discuss the climate in detail for each season, focusing on

clouds and visibility, winds, precipitation, temperature, and hazards associated with each.

Table 4.1. North Korean weather and climate hazards. Source: Author.

SEASON	HAZARDS
Winter (November – March)	High Winds, Fog, Haze, Yellow Wind
Spring (April – May)	Thunderstorms (lightning, strong winds, hail, flash flooding), Fog
Summer (June – August)	Thunderstorms, Drought, Typhoons (strong winds, flooding), Fog
Fall (September – October)	Typhoons, Fog, Drought

SEASONS

• *Winter*

In November, the Asiatic high begins to build over China, dominating the climate of North Korea until late March or early April. The high is most intense in January. Circulation around the high facilitates the flow of cold, dry continental polar air southward from northeast China. Consequently, for most of the winter North Korea experiences clear skies, good visibility, little precipitation and extremely low temperatures.

During winter, most nights are clear, while about half of the days are clear. Dust suspended in the air as high as 15,000 ft. blowing in from China (called "yellow winds," Figure 4.1) may reduce visibility to two miles from 1-3 days a month during winter (AFCCC 1997). In valleys and especially near cities, pollution can reduce visibility to less than six miles, especially during early morning. Morning fog, also prevalent in valleys, reduces visibility to less than a mile on 5-20% of winter mornings (AFCCC 1997).

Winter precipitation is infrequent, and is associated with intense low pressure systems that occasionally migrate across the Korean peninsula (Barry and Chorley 1997). Fewer than ten days a month experience precipitation during winter, with the far north receiving the least. Most precipitation falls as snow—snow cover is common from December through March over much of the country (coastal plains have a shorter period of snow cover). Maximum snow depths range from 6 to 25 inches (AFCCC 1997).

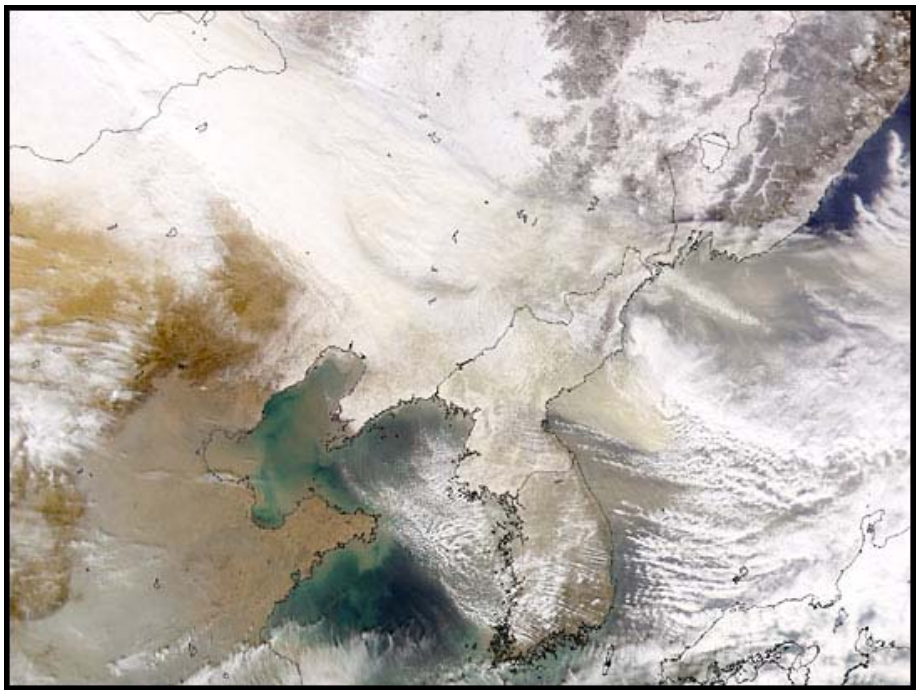

Figure 4.1. Satellite image of northeast Asia. This image, taken January 2, 2001, shows dust blowing from China east across the Yellow Sea toward Korea. These dust storms, called yellow winds, are responsible for reduced visibility in North Korea. Source: NASA, 2002.

Weather stations gather daily, monthly and annual meteorological data, which can be displayed in a climograph. A climograph is a graphical representation of monthly mean air temperature and monthly precipitation for a location. Climographs depicting meteorological conditions at selected locations are given in Figure 4.2. Winter temperatures vary greatly depending on terrain and proximity to the coast (Figure 4.2). Freezing temperatures occur nearly every day from mid-November until the end of March. The northwest hills and northeast highlands experience the lowest temperatures. Coastal locations do not get as cold as the interior because of the moderating effect of ocean water. Strong northwesterly or northerly winds drop the wind chill below -50°F.

Climate and weather hazards during the North Korean winter include high winds, yellow winds, haze, and fog. Strong northwesterly winds can create low level turbulence over 90 kilometers downwind of mountains (AFCCC 1997). Winds may also hinder truck transportation in mountain passes and create extremely rough seas. Fog and pollution haze reduces visibility in valleys through midday on many mornings.

• *Spring*

North Korea transitions from winter to spring during April. The Asiatic high weakens, and the polar front (and jet stream) occasionally migrates north across the Korean Peninsula. By the end of April, northwesterly winds from the Asiatic High cease, and surface winds become weaker and westerly. Local topography dominates surface wind speed and direction. The sun heats the land, creating sea/land breezes and mountain/valley breezes in mountains. The northeast highlands experience the strongest winds.

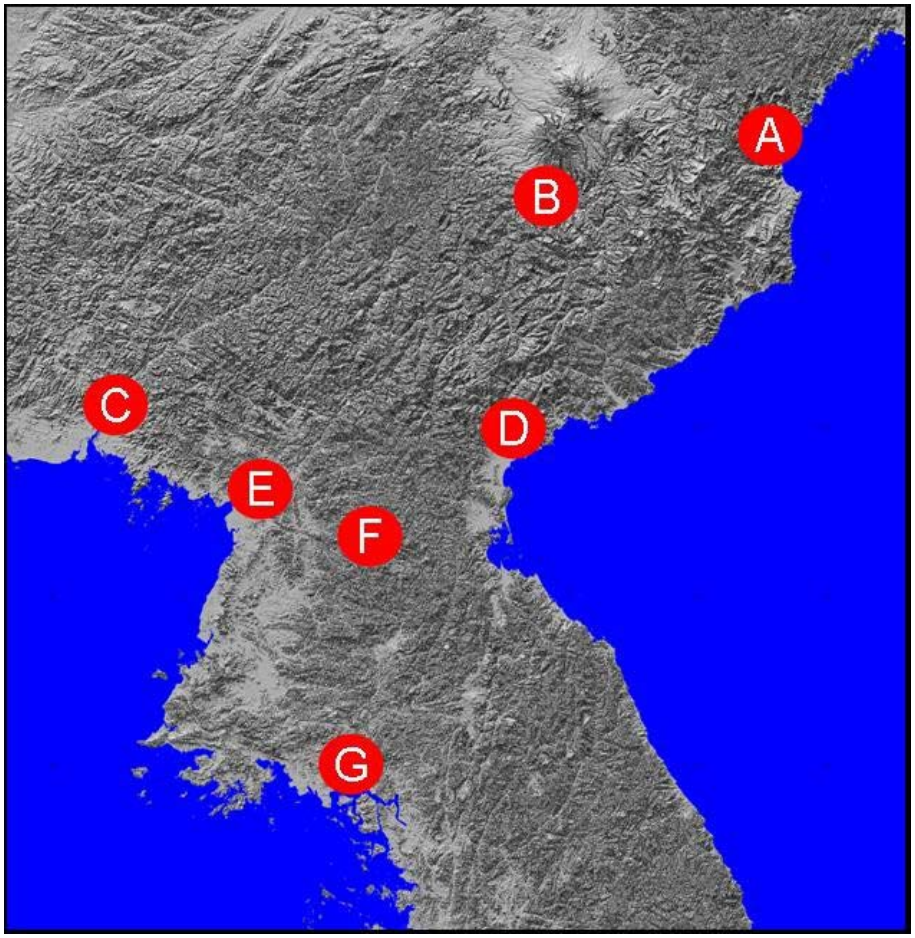

Figure 4.2. Climographs for selected stations in North Korea. Climographs correspond to letters on map. Source: Air Force Combat Climatology Center, OCDS, 1998.

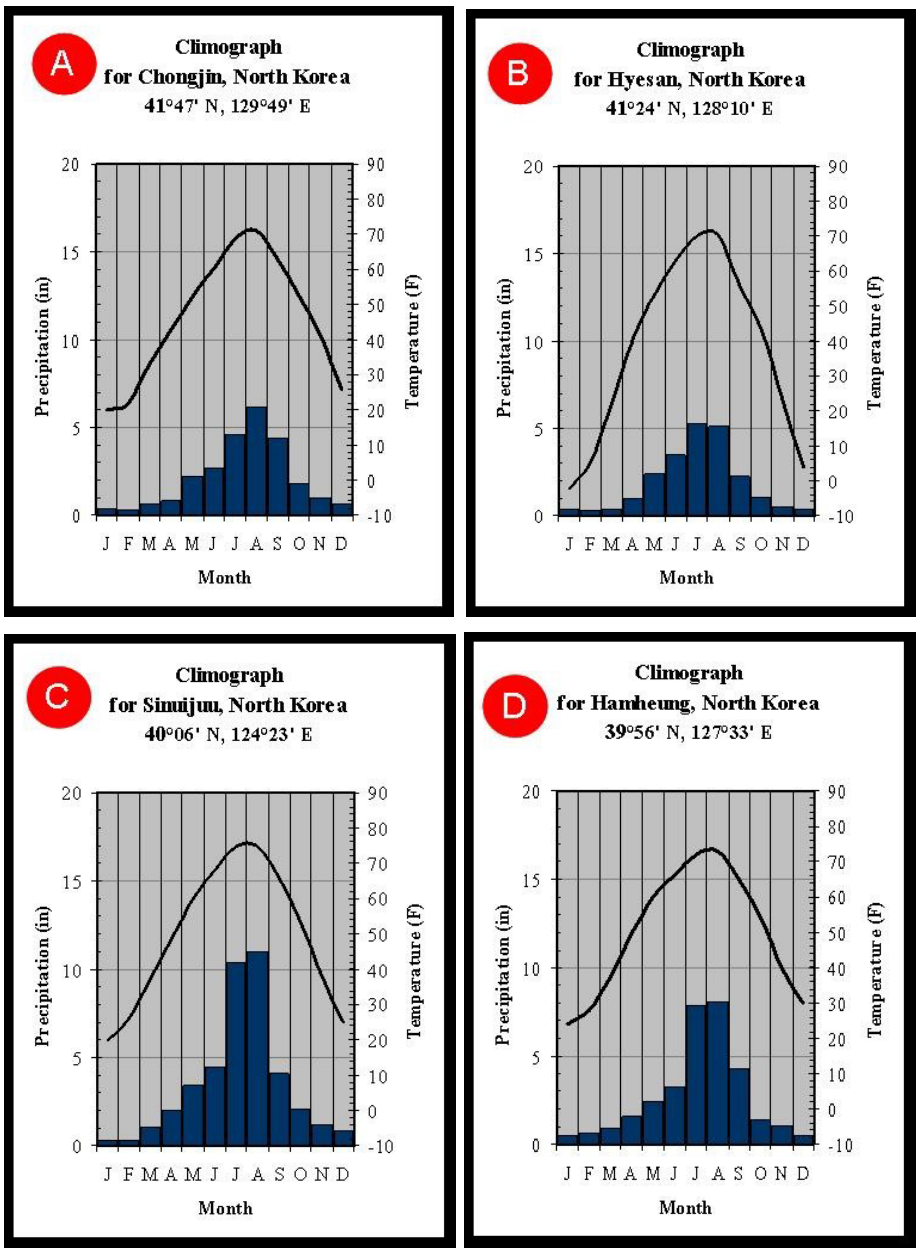

Figure 4.2. (continued) Climographs for selected stations in North Korea. Climographs correspond to letters on map.

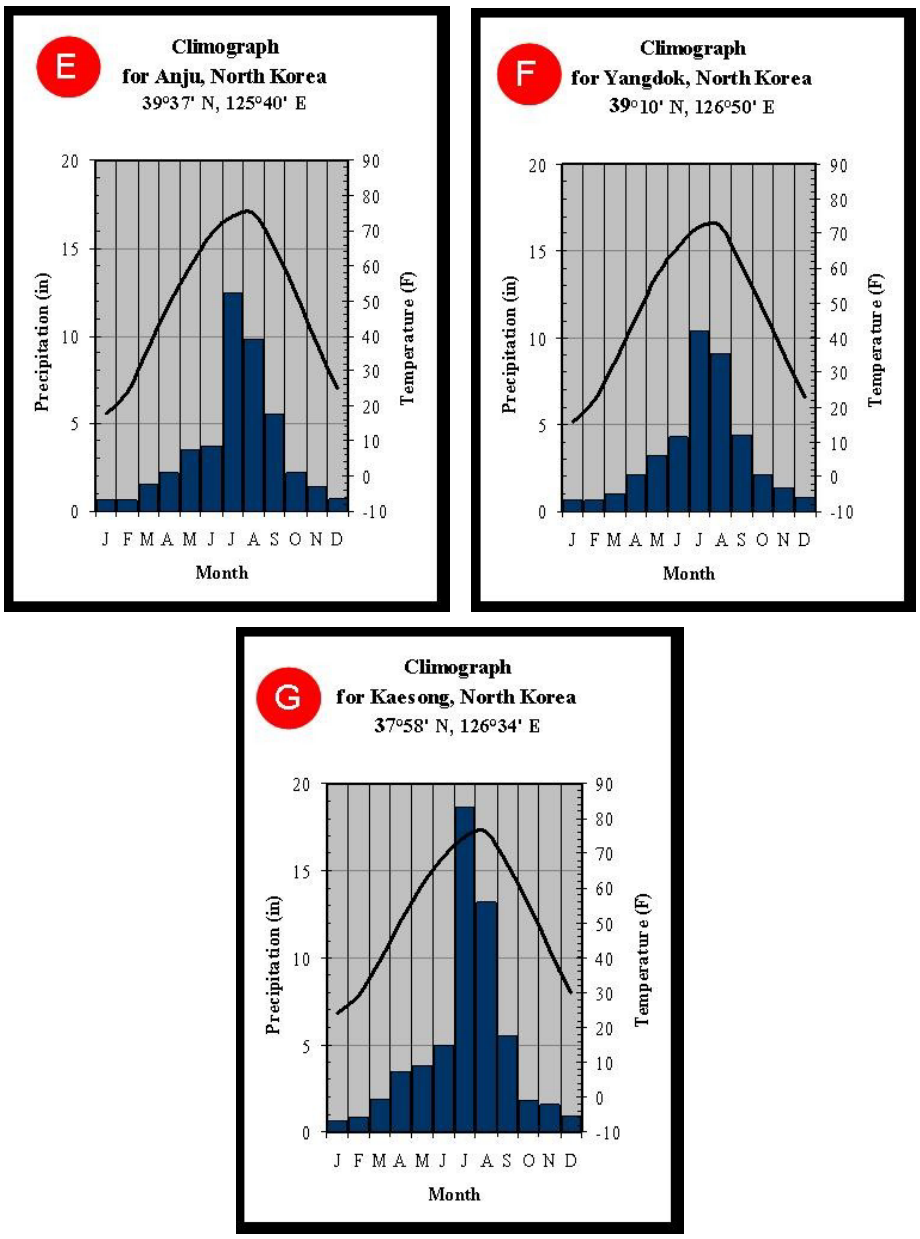

Figure 4.2. (continued) Climographs for selected stations in North Korea. Climographs correspond to letters on map.

Skies remain clear about half the nights during spring, but only about ten days a month experience clear skies (AFCCC 1997). Valley haze and fog common in winter continue into spring, reducing morning visibility,

especially near cities. Yellow winds reduce visibility one to two days a month during spring. Spring winds are lighter and more variable than winter winds. Migratory low pressure systems from China can produce strong onshore winds on the east coast along the Sea of Japan. Gale force winds are not common, but occur most frequently in the northeast highlands approximately two days a month (AFCCC 1997).

Low pressure systems migrating from China bring more precipitation than in winter (Figure 4.2). For example, about 15 days in May experience precipitation, for a total of 2.5 to 3.5 inches during the month. Although most precipitation falls as rain, snow is possible through April. Higher elevations, especially the northeast highlands and northwest hills, maintain snow cover well into April.

Mean monthly temperatures in April range from the low 40s in the north to the low 50s in the south (Figure 4.2). In May, mean temperatures rise about ten degrees to low 50s in the north and low 60s in the south. The northwest hills and northeast highland have the lowest temperatures during spring, with 10-20 days in April experiencing sub-freezing. Southerly air flow in late spring can result in extreme high temperatures of 85°F, with average highs around 60°F, particularly in the south. Extreme low temperatures drop to 20°F (AFCCC 1997).

Thunderstorms are the only significant hazard during spring and are associated with lightning, strong winds, hail, heavy rains, and flash flooding. However, thunderstorms are infrequent in spring, occurring on only one to four days a month in North Korea (AFCCC 1997).

• *Summer*

The North Korean summer is warm, cloudy, and is the wettest season of the year. Summer climate is dominated by a seasonal reversal of prevailing winds (i.e., the East Asian monsoon). High pressure builds over the East China Sea, while low pressure builds over Manchuria. The southerly flow of air from high to low pressure transports warm, moisture laden, maritime tropical air from the Sea of Japan and the East China Sea over North Korea.

Migration of the polar front northward over the Korean Peninsula brings frequent low pressure systems across North Korea (Barry and Chorley 1997). Twenty to 25 days a month experience cloudy skies. Due to the abundance of moisture in the air, fog is more frequent in summer than other seasons. Fog reduces visibility during mornings 75% of the time, and can persist into the afternoon. Coastal areas are prone to sea fog in June and July. Local terrain dominates wind direction and velocity—along the coast land/sea breezes are strongest in summer. Gale force winds are rare.

Precipitation is abundant throughout North Korea during summer. July and August are the wettest months, with many places receiving half their annual precipitation in these two months. Three factors contribute to this precipitation peak. First, more low pressure systems (and their accompanying frontal precipitation) track from west to east across North Korea during summer than during any other season (Barry and Chorley 1997). Second, warm humid air undergoes convective lifting and produces showers and thunderstorms. Finally, late summer can bring heavy typhoon rain to North Korea. Summer precipitation is greatest in the northwest hills and plains and the far south (Figure 4.2).

Temperatures peak during North Korea's summer, with average monthly temperatures reaching 70°F – 80°F for most of the country (Figure 4.2). Daily highs are in the upper 70s to low 80s; daily lows range from the low 50s in the north to the low 70s in the south. Extreme high temperatures occasionally exceed 100°F. Relative humidity is highest during summer (78-88 percent in the morning, 60-85 percent in the afternoon; AFCCC 1997).

Thunderstorms continue to present a weather hazard, particularly in the northwest hills and plains during June. An average of twenty storms a year hit northern parts of the country, most during late spring and early summer (United States Army 1950). Summer is also the beginning of typhoon season in the Western Pacific. North Korea averages about one typhoon each year, and typhoons can strike from many directions. The most devastating effect of typhoons is heavy rain and resultant flooding. Maximum 24-hour rainfall during a typhoon can be up to 16 inches (AFCCC 1997). Typhoons also bring high winds, reduced visibility, and coastal flooding. Finally, if summer rains fail, drought presents a significant climate hazard. In 2001, for example, North Korea received only 11% of its expected rainfall from March to June (normally the beginning of the wet season). The dry conditions affected 72% of the country's arable land, resulting in severe food shortages (NOAA 2001).

- *Fall*

Like spring, fall is a short transition season between the longer, more extreme summer and winter. As the Asian landmass cools in September, the Asiatic high begins to build, and prevailing winds reverse from southerly to northwesterly. Additionally, the polar front migrates well south of North Korea (Barry and Chorley 1997). The results are clear skies, moderate temperatures, and much less precipitation than during summer. Thus, about half of fall days and nights experience clear skies. Visibility also improves during fall, but morning fog will reduce visibility, especially in the northwest hills and plains. Local terrain continues to dominate wind speed and direction, with land/sea breezes dominating coastal areas (Korean

Meteorological Administration 2002). By late October, stronger northwesterly winds take over, especially in the north.

Stable, dry air moving from Asia over the Korean peninsula reduces the amount of precipitation during fall (Figure 4.2). By October, mean monthly precipitation is less than three inches. Northern regions experience snowfall on as many as five days a month in October. Snowfall is usually less than five inches, and tends to melt within a day (AFCCC 1997).

Temperatures decline significantly during fall (Figure 4.2). Average daily highs during October generally reach the 50s; average lows are in the upper 20s and lower 30s. Northern parts of the country experience freezing temperatures on 10-20 days during October. Temperatures can drop as low as single digits in the far north.

Fall experiences the fewest climate and weather hazards. Typhoon season continues through September. Fog, a year-round threat, is less likely during fall than in summer. Summer drought can continue into fall.

CONCLUSION

Long summers and winters dominate North Korea's climate. Spring and fall are short transition seasons between the more extreme summer and winter. The Asiatic high pressure system centered over Siberia drives North Korea's winter from November until March. Cold, dry continental air flows southward over the Korean peninsula, providing clear skies, little precipitation, extremely low temperatures, and sometimes strong winds. Occasionally, westerly tracking low pressure systems bring snow across North Korea. Summer begins once the Asiatic high weakens and is replaced by low pressure over Manchuria. Prevailing winds reverse, bringing warm, humid air from the East China Sea and Sea of Japan over North Korea. Frontal activity also increases as the polar front migrates north over the Korean Peninsula. Average daily temperatures in summer are in the 70s and 80s, relative humidity is high, cloud cover increases, and most of the country's precipitation falls in July and August.

Each of North Korea's four distinct seasons presents weather and climate hazards. Fog and haze are hazards year round, especially in valleys, near coasts, and in summer when humidity is high. High winds can be problematic in winter, especially in the northeast highlands and the northwest hills. Winter is also the most likely season for yellow winds, or airborne dust blowing in from China, which can reduce visibility to two miles from ground level up to 15,000 ft. Thunderstorms (and their associated lightning, strong winds, hail, heavy rain, and flash flooding) threaten the country in spring and summer, especially in the northwest hills and plains. Summer is also the beginning of typhoon season, which continues into fall. North Korea experiences one or two typhoons each year. Typhoons bring heavy cloud

cover, intense precipitation, inland and coastal flooding, and winds up to 75 mph. Finally, failure of early summer rain results in drought that devastates the country's agriculture. ★

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5 BIOGEOGRAPHY

Peter G. Anderson, Ph.D.

Key Points:

- The Korean Peninsula has experienced near-complete deforestation.
- Northern and higher elevations may retain natural vegetation; valleys do not.
- Much of North Korea's forest cover consists of closely spaced, young trees.
- Degradation of North Korea's forest cover has contributed to environmental problems.

BIOGEOGRAPHY IS THE STUDY of the distribution of biological entities and the processes that maintain and alter these distributions. A biogeographer might study the composition, structure, and ecology of communities; ecosystem and landscape dynamics; local, landscape, regional, and/or global distributions and patterns; and/or human use and modification of biological communities. Contributions by biogeographers are important in the use and management of land resources: soil, water, plants, and animals. This chapter examines the distribution of plant communities in North Korea.

INTRODUCTION

The preceding chapters characterize the Korean Peninsula as a mountainous region that is influenced in summer by warm, moist, monsoonal weather, whereas the winter season brings cool to cold, drier weather. These features and centuries of human use have created the Korean Peninsula's vegetation mosaic and altered its ecological systems. Natural forests remain in small protected areas that are located primarily in the high elevations of northern North Korea. Lowland and valley vegetation have long since been altered, replaced by human inhabitation and cultivation. One exception to this is the Demilitarized Zone, where, due to almost 50 years of minimal human activity, successional dynamics have begun to reclaim a once highly degraded landscape.

Pfeffer (1968) indicates that the Korean Peninsula is about 560 miles long and 140 miles wide, encompassing 78,400 square miles; North Korea comprises about 55 percent of the peninsula. The Korean Peninsula is primarily a mountainous region: 80 percent is classified as mountains. A mountainous landscape is defined here as one that has a local relief of greater

than 2,000 ft., and the slope angle frequently exceeds 25 percent. The average elevation of North Korea's mountains is 1000-1500 m (3280-4920 ft.), with elevations exceeding 2000 m (6,560 ft.) in the northeast area of North Korea. Mount Paektu-san, located on the North Korea–China border, is the peninsula's tallest mountain, reaching 2,744 m (9,003 ft.) above sea level (AmericasRoof 2002). Elevations that exceed 2,000 m are characterized by alpine vegetation and bare ground. Spatially this is a small portion of North Korea's land area, as are the coastal valleys. Figure 5.1 illustrates the mountainous nature of the country.

The largest valleys are located along the west coast; inland and east coast valleys are much smaller. Most of North Korea's valleys have been used for agriculture, with the western valleys having the greatest potential and development. Throughout the country, lands that exceed 400 m (about 1,300 ft.) have poor cultivation potential (Chung 1994) due to elevation-climate relationships, slope angle, and soil conditions. Approximately 14 to 18 percent of North Korea is arable land (Microsoft Encarta 2001; Chung 1994), the remainder is mountainous, where natural and cultivated forests exist, interspersed with grassland and barrens areas. Lower elevations may support specialized forest development, such as orchards.

Natural vegetation and ecosystems of Korea vary with terrain and the influence of the summer monsoon and winter cold. The Korean Peninsula receives abundant precipitation; about 60 percent of the moisture falls during the summer monsoon (Seekins 1994). North Korea experiences a continental climate, with summers and winters that are cooler than South Korea's, and has a drier winter. Additionally, the summer and winter seasons tend to be longer, whereas the transitional seasons are shorter (Ok 2001).

KOREA'S NATURAL VEGETATION

The Korean Peninsula is part of the Boreal floristic kingdom (Good 1964), the midlatitude broadleaf and mixed forest terrestrial biome (Christopherson 2000), and humid temperate ecoregion (Bailey 1998). These classification schemes characterize the Korean Peninsula's natural vegetation as forest. This forest cover bears resemblance to parts of Japan, China, Russia, northern Europe, and the northeast United States. This suggests that plant and animal communities of these various locations have compositional, structural, and ecological likeness. Although the species will differ, many of the genera are the same. Thus, a person familiar with the forest vegetation of the northeastern United States would be able to identify many of the plants, at the genera level, of the Korean Peninsula, and conceptualize the forest dynamics. However, quantitative information about North Korean forests, natural or otherwise, is minimal to nonexistent (Srutek and Koblbek 1994), thus conclusions developed using a qualitative approach are subject to interpretation.

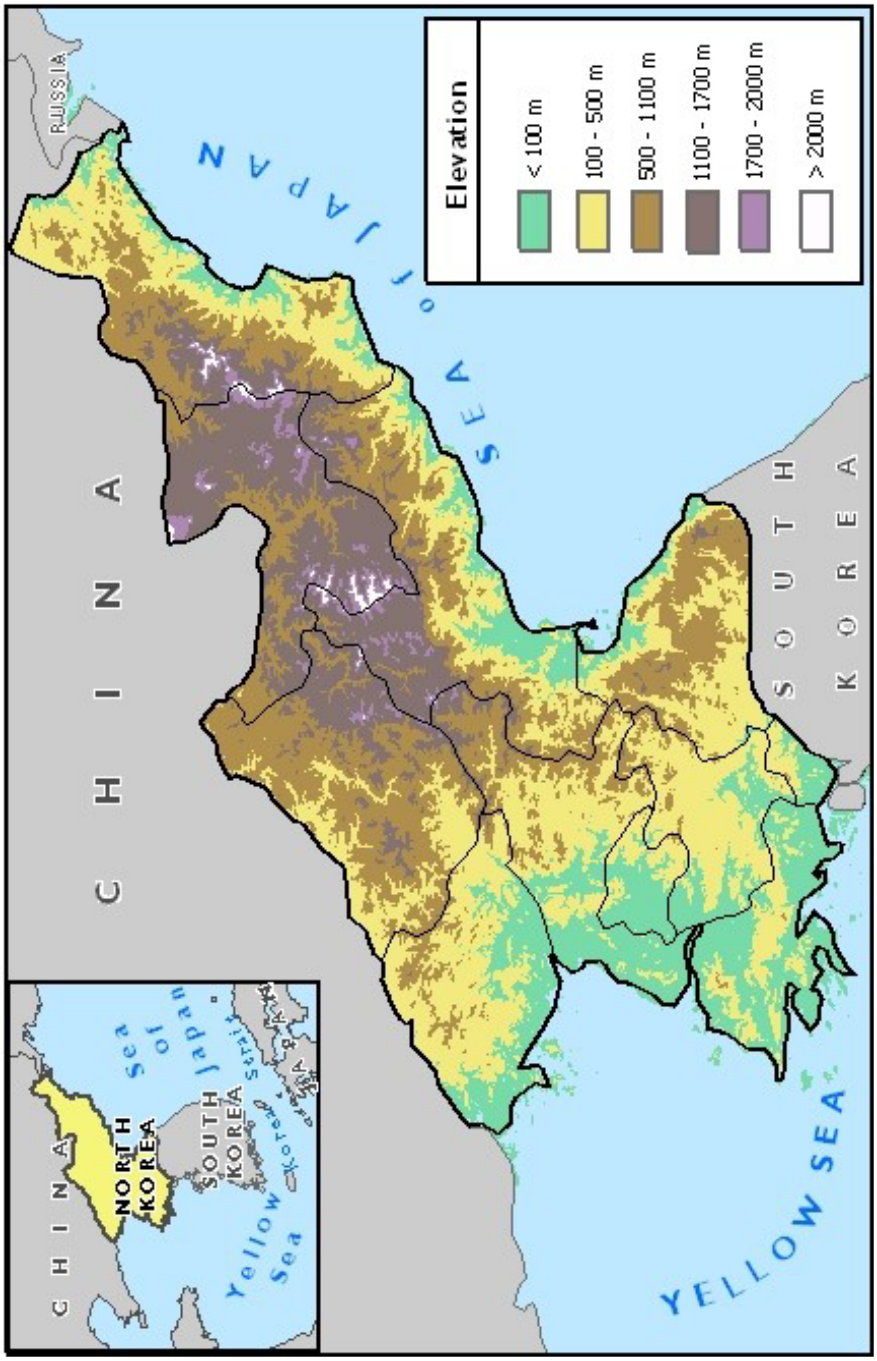

Figure 5.1. North Korea as depicted by elevation zones.
Source: Author.

If the seasonal forests of the Korean Peninsula have a commonality with the forests of the northeastern United States (de Laubenfels 1975), what are some of the common trees? Mather (1990) and Bailey (1998) state that beech, birch, maple, oak, hickory, walnut, elm, ash, basswood, and hemlock are common trees in the eastern United States and eastern Asia. Pfeffer (1968) indicates that the northern forest of Korea also has many conifers: pine, spruce, fir, and larch. The prevalent tree species of Korean Peninsula forests are listed in Table 5.1.

The Korean Peninsula experienced nearly complete deforestation during colonial occupation by the Japanese and as a result of the Korean War (Lonely Planet 2002; 1upinfo 1993). Chung (1994) states that in the early 1990s, about 80 percent of North Korea was forested to some extent, whereas Microsoft Encarta (2001) indicates that in 1995, 51 percent of the country was forested. The extent of North Korea's natural forest should be considered very limited, found primarily in the mountainous northern provinces (Figure 5.2), which possess about 70 percent of North Korea's forest reserves (Chung 1994) (Table 5.2). Thus, most of the forest cover that might be encountered throughout the country is relatively young, 50 or fewer years of growth. However, due to natural disasters and forest overuse, many areas may have forests that are less than 20 years old.

NORTH KOREAN FORESTS: LAND USE

A primary factor influencing the present status of the forest cover of North Korea is the nearly complete deforestation that occurred during the first half of the 20th century, primarily by the Japanese (Bailey 1998; LonelyPlanet 2002; Ok 2001). Extensive areas of Korean forests were cut between 1910 and 1945, during Japanese colonization (Seekins 1994). The landscape was severely degraded by tree cutting activities during the last years of colonial rule (1upinfo 1993). This, combined with the devastating effects of the Korean War, 1950-1953, left the hill slopes and mountain sides ravaged and bare. Ok (2001) states that the effects of these activities could still be seen in the early 1970s. Byung-seol (2001), on the other hand, states that the "North Korean forest reduced to ashes during the 1950-53 Korean War had been restored to a considerable extent by the 1970s."

Other human related factors that influence the forest cover of North Korea are agricultural, settlement, forestry, and reforestation activities. Essentially, valley forests have disappeared, replaced by human structures: agricultural fields and dwellings. Paddy rice cultivation is prevalent in the lowland areas of the western coastal region. Centuries of rice cultivation have eliminated the natural vegetation in these low-lying, riparian environments. Additionally, greater than one-half of North Korea's population lives in the lowland valley areas; these densely inhabited areas are devoid of natural vegetation. The vegetation that occurs in these areas is an

artifact of human activity, with a species composition and ecology that does not reflect hundreds of years of natural processes.

Table 5.1. Common trees of the Korean Peninsula. Source: Pfeffer 1968, Ok 2001, and Ji 1990.

COMMON NAME	SCIENTIFIC NAME
Red pine	*Pinus densiflora*
Pine	*Pinus thunbergi*
Korean pine	*Pinus koraiensis*
Black fir	*Abies holophylla*
Khingan fir	*Abies nephrolepis*
Yezo spruce	*Picea yeozensis*
Siberian spruce	*Picea obovata*
Larch	*Larix olgensis*
Birch	*Betula castata*
Mongolian oak	*Quercus mongolica*
Manchurian maple	*Acer mandshuricum*
Manchurian linden	*Tilia mandschurica*
Manchurian walnut	*Juglans mandshurica*
Manchurian ash	*Fraxinus mandshuria*
Amur linden	*Tilia amurensis*
Small-leafed elm	*Ulmus pumila*
Hornbeam	*Carpinus laxiflora*
Hornbeam	*Carpinus tschonoskii*
Ash	*Fraxinus* spp.
Poplar	*Populus spp.*
Alder	*Alnus spp.*

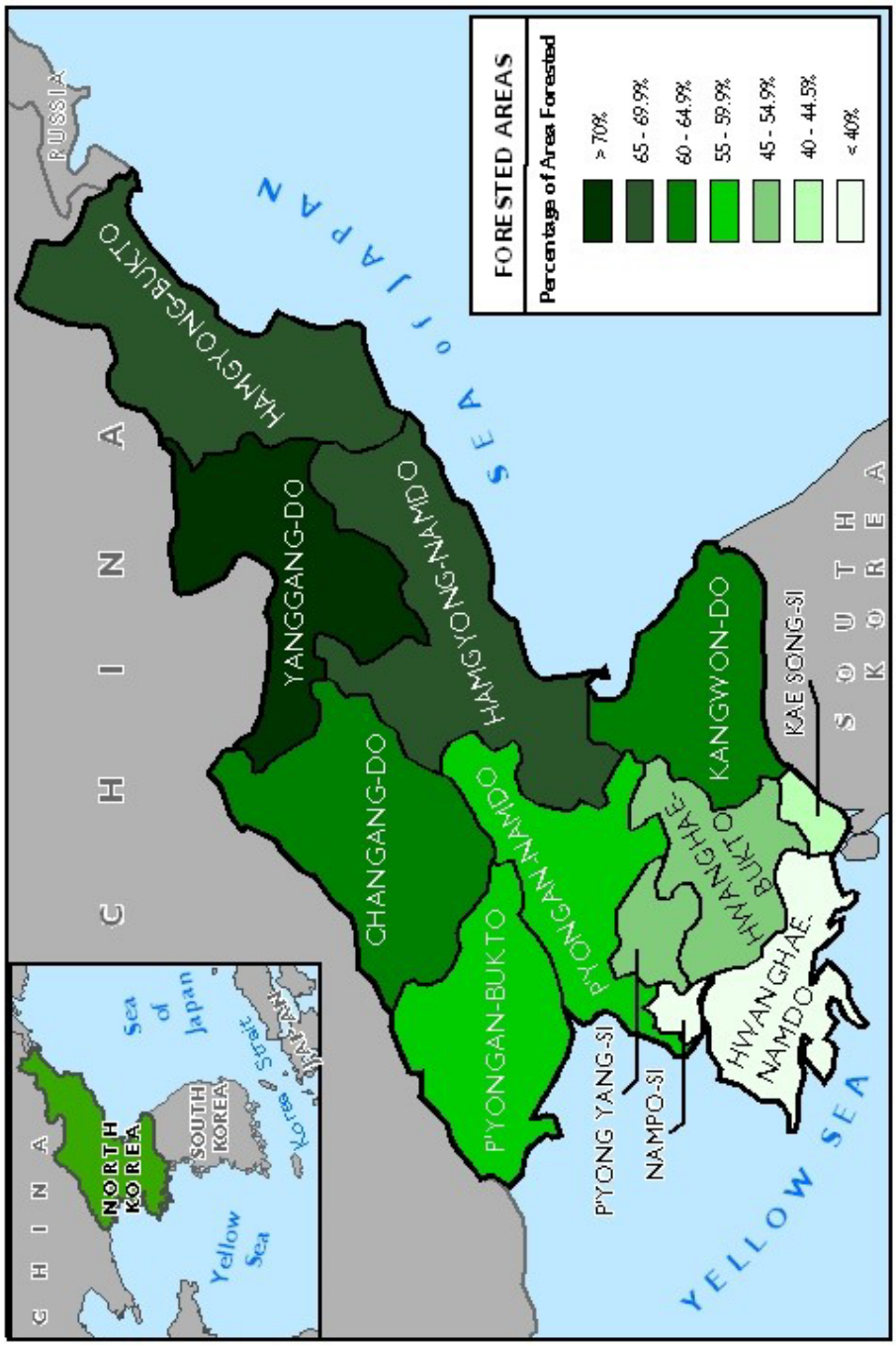

Figure 5.2. North Korea forest cover, percent of province forested.
Source: CIA Fact Book 2002 and Park 2001.

Table 5.2: Forested area of North Korean provinces and special cities. Source: CIA Fact Book, 2002 and Park 2001.

PROVINCE	AREA (MI^2)	AREA (KM^2)	FOREST LAND IN 1997 (HA) MAN-MADE	NATURAL	TOTAL	% FOREST
Hamgyŏng-namdo	7324	18,969.16	207,097	1,076,007	1,283,104	67.59
Hamgyŏng-bukto	6784	17,570.56	166,793	1,045,984	1,212,777	68.97
Yanggang-do	5528	14,317.52	141,046	983,974	1,125,020	78.52
Chagang-do	6551	16,967.09	208,413	859,045	1,067,458	62.86
Kangwon-do	4306	11,152.54	103,369	619,250	722,619	64.74
P'yŏngan-bukto	4707	12,191.13	91,387	579,683	671,070	55.00
P'yŏngan-namdo	4470	11,577.30	90,180	575,249	665,429	57.43
Hwanghae-bukto	3091	8,005.69	90,071	309,447	399,518	49.87
Hwanghae-namdo	3090	8,003.10	80,956	150,432	231,388	28.89
Special City (si)						
P'yŏngyang-si	772	1,999.48	7,118	93,061	100,179	50.06
Kaesong-si	485	1,256.15	20,287	33,007	53,294	42.39
Nampo-si	291	753.69	3,368	16,767	20,095	26.66
Total	47,399	122,763.41	1,219,025	6,341,906	7,551,931	--

Maize, wheat, barley, millet, buckwheat, potatoes, low growing vegetables, apples, pears, persimmons, and walnuts are grown on hill slopes below 400 m (Far East Command 1950; Park 2001) that have a slope angle of less than 20 degrees (Byung-seol 2001). Animal grazing also occurs on grasslands in this landscape. Much of North Korea's landscape is composed of steep, mountainous terrain; these uplands have a climate that is not conducive to agriculture. Where agricultural practices have encroached upon steeper slopes and higher elevations, environmental degradation has occurred. Agricultural practices have also contributed to soil contamination via too heavy an application of chemical fertilizers and pesticides. In totality, hundreds of years of use, combined with increased cultivation to support a growing population, have reduced the capacity of the land to feed the people of North Korea.

Terrain, soils, and climate influence tree growth and forest composition and ecology, with lower elevations and southern locations favoring plant growth and species diversity. With an increase in elevation and a northern location, plant growth and diversity and soil quality diminishes. In rural environments, the population is still dependent on wood for cooking and heating; in these areas, forests are severely impacted. As firewood collection advances into these locations, with minimal reforestation, further landscape degradation occurs. Tree cutting for timber production also adds to the growing forest deterioration and environmental problems of North Korea.

NORTH KOREAN FORESTS: DISTRIBUTION

Information related to Korean forest distribution and ecology is limited, however a general picture may be inferred based on species/genera information and ecological equivalents in the northeast United States. Forest ecology of the Catskill Mountains in New York State is described in McIntosh (1962) and Kudish (2000), while Klyza and Trombulak (1994) and Dobbs and Ober (1996) discuss the Northern Forest of the northeast United States. Borman and Likens (1979), Irland (1982), Marchand (1987), Siccama (1974), and Yahner (1995) provide further information about forest ecology of the northeast United States.

Figure 5.3 indicates vegetation zonation based on the following elevation classification: <100, 100-500, 500-1100, 1100-2000, and >2000 m. Yim (1977) reviews seven vegetation maps of the Korean Peninsula, created between 1922 and 1974; none of these maps exhibits the same vegetation zone boundaries. However, a very general pattern emerges; this pattern is reflected in Figure 5.3. The more southern and lower locations, less than 500 m (1,640 ft.) above sea level (a.s.l.), are either *warm temperate, broadleaf forests*, or devoid of natural forest due to human activities. This condition exists in North Korea primarily in the western coastal region, and in other

lowland river valleys. Some of these hillsides have been replanted with food crops; nut, fruit, or timber tree plantations; or have regrown as grassland. Common trees are: *Pinus thunbergi, Acer formosum, Quercus mongolia, Quercus serrata, Ulmus pumila, Carpinus tschonoskii, Betula spp., Populus spp., and Salix spp.* (refer to Table 5.1). In general, the deciduous trees of North Korea do not attain the size of similar species, their ecological counterparts, in Japan, Europe, and the northeast United States (Military Intelligence Division 1945). This forest zone is part of the warm southern temperate forest of the Korean Peninsula.

The *mixed broadleaf – coniferous forest* occurs between 500 and 1100 m a.s.l. (1,640 – 3,608 ft.). This zone has experienced extensive forest modification, and the present forest cover may not represent the expected natural cover. Timber tree plantations are common, with an emphasis on fast-growing species such as pine, larch, and spruce (Park 2001). Due to the significant deforestation of the Korean Peninsula during the first half of the twentieth century, most of these forests and plantations are young. Tree height is probably less than 15 m (50 ft.), with diameters between 15 and 25 centimeters (five to ten inches). In a young forest, there may be thousands of closely spaced (less than two meters or six feet) trees per acre. In a natural forest, the lower portion of the tree trunk will have dead branches, reducing mobility through the forest. In a plantation, there will be fewer stems per acre and these trees will have the lower, dead branches removed. The removal of trees and branches facilitates tree growth and reduces the time between planting and harvest.

At lower elevations, with southern exposures, broadleaf deciduous trees are common. As elevation increases and on more northern exposures, coniferous tree species increase. Common trees are: *Larix olgensis, Pinus koraiensis, Pinus densiflora, Abies holophylla, Ulmus pumila*, *Carpinus laxiflora*, *Quercus mongolica, Fraxinus mandshurica, Tilia amurensis, Betula spp., Acer spp.* (refer to Table 5.1). One tree species that is not present in Korea that is common in Japan and the northeastern United States is beech (*Fagus* spp.) (Yim 1977). No reason was offered for the absence of this tree in Korean forests.

Korean pines may attain a height of 30 to 40 m (98-131 ft.), while red pines grow to 20 to 30 m (66-98 ft.) in this forest (Ji et al. 1990). The straight trunks, that may attain three to five ft. in diameter (Military Intelligence Division 1945), are prized for timber. Ginseng (*Panax ginseng*) is found in this forest type and has been extensively exploited for human use. Another plant native to this region, *Actinidia chinensis* and *A. arguta,* has been planted and cultivated in New Zealand, its fruit picked and exported under the name Kiwi fruit (Ji et al. 1990).

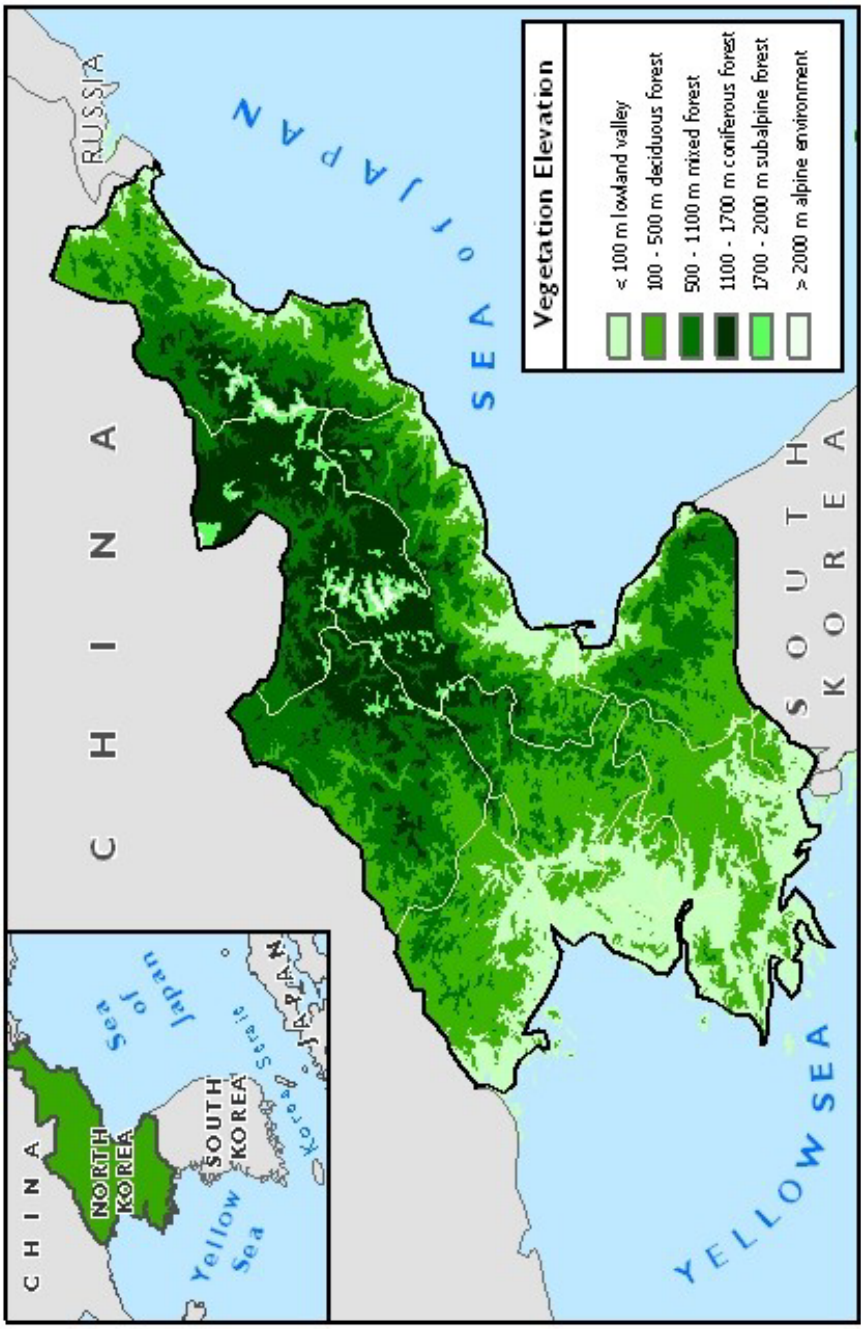

Figure 5.3. North Korean vegetation zones, based on elevation.
Source: Author.

Military Intelligence Division (1945) states that the transition from mixed to coniferous forest occurs between 4,000 – 5,000 feet. Site conditions, such as topographic position, slope exposure, angle, and configuration (Parker 1982), and soil structure, texture, and depth influences species occurrence and vitality. An ecotone (ecological transition zone) may be a gradual change of site conditions and ecological community composition and function, barely detectable to the human eye, or, as in mountainous environments, a rather abrupt change, due to rapid changes with increasing elevation, dependent on slope angle. Mountainous environments are usually classified as highlands in many climatic and vegetation systems, due to these complex relationships. The mixed broadleaf - coniferous forest zone most likely represents the transition between the warm southern and cool northern temperate forests of the Korean Peninsula.

The *coniferous forest zone*, 1100-1700 m (3,608 – 5,576 ft.), is characterized by cold-resistant trees, adapted to short, cool summers and long, cold winters. As elevation increases, the warm temperate species disappear and the cold tolerant species become abundant; overall species diversity decreases. With increased elevation, herbaceous understory species decline, and a dense moss, ground cover is common (Ji et al. 1990). This forest zone is the cool northern temperate forest of the Korean Peninsula.

Common trees of the coniferous zone are: *Larix olgensis, Pinus koraiensis, Abies holophylla, Abies nephrolepis, Picea jezoensis, Picea obovata* (refer to Table 5.1). Birch (*Betula castata*), maple (*Acer ukurunduense*), and mountain ash (*Sorbus pohuashanensis*) are common sub-canopy trees (Carpenter 2001); these genera are common mid- to upper-elevation species in the northeast United States.

The *subalpine zone*, 1700-2000 m (5,576 – 6,560 ft.), is a landscape that is influenced by cool summer and cold winter temperatures, and frequent windy conditions. Precipitation falls primarily during the warm summer season. Desiccating winds of winter blast exposed plant parts with snow and ice particles, killing unprotected tissue. Military Intelligence Division (1945) states that tree growth ceases at an elevation of about 1,829 m (6,000 ft.). This is in agreement with Srutek and Kolbek (1994), who indicate that the forest edge on Mount Paektu-san is at approximately 1920 m (6,298 ft.). The only trees that survive the harsh environment above this altitude are low-growing trees in protected areas.

Erman's birch (*Betula ermanii*) and larch (*Larix olgensis*) are the dominant trees of this region. At the lowest elevation of the subalpine zone, *Picea jezoensis* and *Abies nephrolepis* may be found in protected sites. Srutek and Kolbek (1994) state that subalpine forest—alpine zone ecotone on the southeast slopes of Mount Paektu-san is a gradual transition. Larch and *Pinus pumila* occur here in a krummholz form. *Calamagrostis langsdorfii,*

Linnea borealis, Potentilla fruticosa, Aquilegia japonica (Srutek and Kolbek 1994), Grass of Parnassus (*Parnassia palustris*) and Japanese globe flower (*Trollius japonicus*) are found below the low, open canopy of the birch trees (Ji et al. 1990). These and other herbaceous plants may be found above treeline in protected areas. Only those plants adapted to minimal protection from the winter cold and wind survive as part of the alpine flora.

The *alpine zone* is the landscape higher than 2000 m a.s.l. (6,560 ft.), an environment of low-growing plants, transitioning to barren ground. The cold and winds of winter, combined with more than six months of snow covering the ground, strongly influence plant life in this environment. Carpenter (2001) suggests that sheltered sites are characterized by low-growing, woody shrubs, where snow cover protects exposed buds, whereas herbaceous plants and lichens inhabit more exposed sites. Common low-growing shrubs are: azalea (*Rhododendron redowskianum* and *Rhododendron conferrissimum*), whortleberry (*Vaccinium uliginosum*), cowberry (*Vaccinium vitis-idaea*), and Changbai willow (*Salix tschanbaischanica*) (Shidong 1999). Common herbaceous plants are: *Dryas octopetala, Papaver radicatum, Lloydia serotina, Oxytrpois anertii, Potentilla nivea, and Saxifraga laciniata* (Srutek and Kolbek 1994). Eventually all herbaceous plants disappear and only lichens remain as the highest growing, visible life form.

NORTH KOREAN FORESTS: CONSERVATION

Due to the nearly complete elimination of the Korean Peninsula forests, little consideration might be afforded to conservation concerns. However, such an approach has contributed to continued environmental deterioration of the North Korean landscape. Environmental problems such as deforestation, increased landslide, and flooding activity, soil nutrient depletion, and contamination by over use of fertilizers, pesticides, and herbicides, and the loss of plant and animal habitat, are evident in North Korea (Byung-seol 2001).

North Korea's environmental concerns in the 1990s cannot be attributed solely to the loss of forests during Japanese colonization. Current governmental policies and actions are part of the problem. Timber cutting for export, to create new agricultural fields, and to make charcoal for charcoal-fired bus engines (Byung-seol 2001), have contributed to deforestation and environmental damage. Additionally, rural inhabitants depend upon wood for heating and cooking (Ok 2001), often eliminating local forests. Overuse by these various activities contributes to deforestation. Sung-jin (2002) states that replanting North Korea's hill sides will result in employment now and green hills in the future. Although the costs may appear to be prohibitive, the costs will only increase in the future. Also, North Koreans will have to learn the skills needed to plant seedlings and

monitor their growth for successful reforestation (Sung-jin 2002). They will also have to learn the relationships between land use, ecological change, and environmental damage.

The North Korean government has taken steps to mitigate environmental degradation. Beginning in the 1970s, governmental policies were developed to replant denuded hill sides; updated versions of these policies are currently implemented (Ok 2001; Park 2001). Government policies and incentives have not been created explicitly for conservation purposes, i.e., profit-earning trees (timber, fiber, food items, furniture, etc.) are planted (Korea-np 1998). However, government supported reforestation efforts helps reduce soil erosion and flooding potential, while increasing hill slope stability and habitat diversity. If the government does not continue current reforestation efforts, future landscape degradation will contribute to further environmental deterioration.

A unique conservation opportunity has developed on the Korean Peninsula: the Demilitarized Zone (DMZ) as a potential international biosphere reserve and peace park. At the end of the Korean War in 1953, the border between North and South Korea became known as the Demarcation Line. This line runs through the middle of the DMZ (Seekins 1994), a four kilometer wide, 238 kilometer long, 95,200 hectare, heavily guarded strip of land.

Minimal human activity has occurred in the DMZ, no settlement or industrialization, since the end of the Korean War in 1953, however ecological activity has been considerable. Dae (2001) states that this land is one of the few terrestrial locations that has remained almost free from human activity for the past fifty years. Ecological processes have returned the land to a more natural condition. Although baseline ecological surveys and studies of the DMZ are essentially nonexistent for this fifty year period, recent studies indicate that the DMZ is one of the most biologically diverse areas of the Korean Peninsula (Glausiusz 2000; Dae 2001). The current biodiversity estimate includes: 1,200 flowering plant species, 83 fish species, several rare animal species including musk deer, the Korean mountain goat, the Asiatic black bear, and possibly leopards, and the wintering grounds of two globally endangered birds: the white-naped crane and the red-crowned crane (Glausiusz 2000; Burlingame 2001; Dae 2001).

Dr. Ke Chung Kim, of Pennsylvania State University (PSU), proposed a DMZ nature park in 1995 that he refers to as the Korean Peace Bioreserves System (Burlingame 2001). This system of nature reserves within the geographically diverse DMZ would provide a unique opportunity for biological conservation and cooperation between two countries. If this nature park were to become a UN designated biosphere reserve, it would be the world's sixth trans-boundary biosphere reserve (UNEP 2001).

Several conservation organizations, such as The Nature Conservancy and the Sierra Club, are lending support to the project, as has PSU and the South Korean government. However, before the proposal can become a reality, both governments must fully embrace and support the idea. Additionally, barbed wire and land mines that have been placed in the DMZ would have to be removed. Of course, such drastic measures would only occur if unification were to come to fruition.

CONCLUSION

In some respects, the biogeography of the Korean Peninsula reveals the artificial nature of the superimposed boundary between the two Koreas. Commonalties exist between the flora, fauna, and vegetative regimes of each country. Variable relief, location on the peninsula and variations in climate contribute to biogeographical differences between the two countries. However, human interaction with the natural environment has arguably had the most profound impact, especially in North Korea. Deforestation and associated environmental problems will likely continue to plague the country as it wrestles with conservation issues, while trying to maintain its self-reliance and meeting the needs of its people. ★

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Villagers from Tae Song Dong harvest rice from rice paddies outside of the village. Tae Song Dong, also known as Freedom Village, is one of two villages that stand inside the DMZ and the only one to stand on the South Korean side of the Military Demarcation Line (DML). The DML is the line that divides North and South Korea. Source: U.S. Air Force photograph by Senior Airman Jeffrey Allen.

6 HISTORICAL GEOGRAPHY

James B. Dalton, Jr.

Key Points:

- Korea has influenced and has been influenced by Chinese and Japanese cultures.
- Despite long periods of foreign intervention, Korea has maintained its identity.

THIS CHAPTER EXAMINES PIVOTAL time frames in Korean history and links them to the modern cultural landscape of the Korean Peninsula. Hence, I focus on the geography of the past and delineate how it influenced and shaped modern Korea. To accomplish this analysis, this historical geography examines five important periods in Korea's history: Early Korean History, The Three Kingdoms, The Chosŏn Dynasty, Japanese Rule, and World War II.

EARLY KOREAN HISTORY

The earliest recognition of Korean people came through the creation of the Chosŏn State[1] founded along the Taedong River (Figure 6.1). Prior to the development of this early state, nomadic tribes migrated throughout the peninsula and Manchuria with little regard for contemporary boundaries between China and Korea. The Yalu and Tumen Rivers were easily crossed either with rafts or during winter when the rivers froze. The Chosŏn State rose to power over time as tribes gathered for common defense, and later, as a means of expansion northward into what is today China. The state was primarily a bronze culture and remained so until the diffusion of iron technology from China. Expansion was finally halted when the Chosŏn State extended to the border of the Yen Northern Chinese state along the Liao River (Figure 6.1). The Chosŏn State remained vibrant until its last 100 years, after which, it slowly declined and was finally conquered by the Han Chinese in 109-108 BC. The defeat of the Chosŏn State ushered in a 400-year period of Chinese rule. Those areas south of the Han River enjoyed more autonomy, merely paying a tribute to the Chinese and adopting many Chinese customs and forms of government as a model to develop their own ways (Savada and Shaw 1990; Tennant 1996).

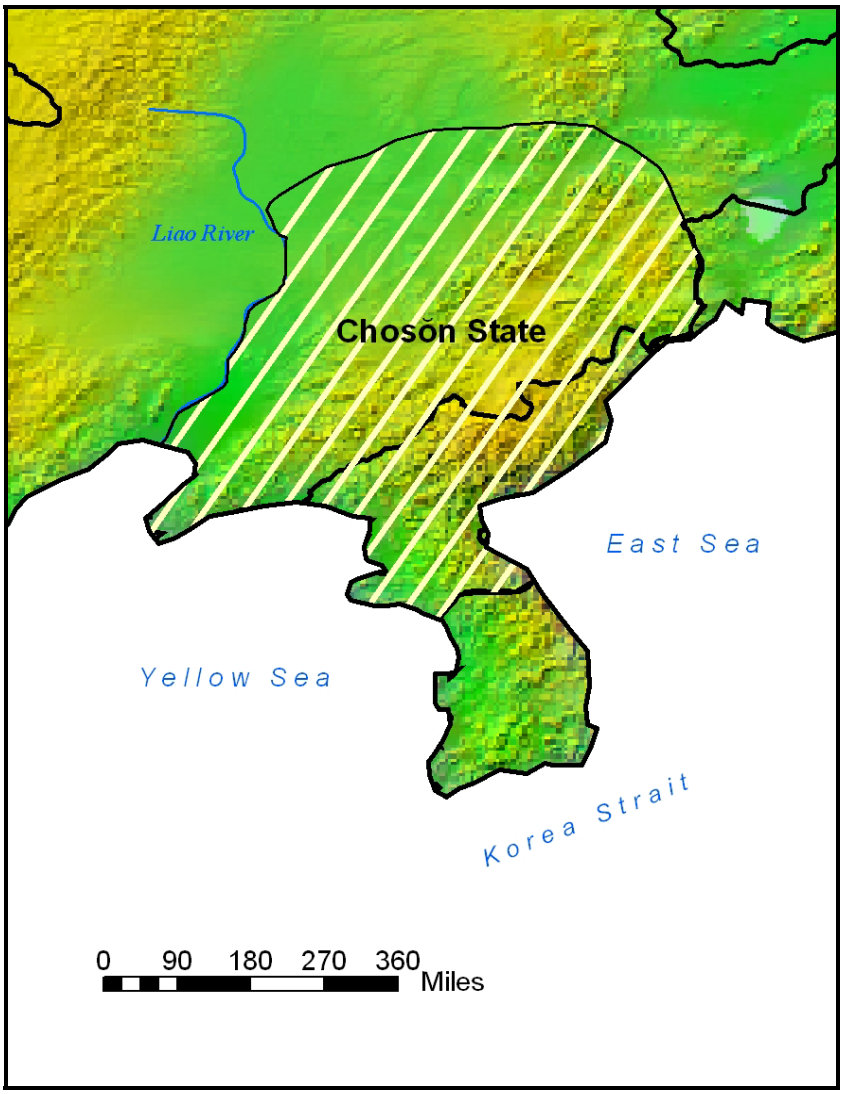

Figure 6.1. Map illustrating the location and areal extent of the Chosŏn State.
Source: Author.

THE THREE KINGDOMS

The Three Kingdoms developed between the 1st century BC and the 3rd century AD following the end of Chinese domination. The Three Kingdoms were essentially a confederation of the many nomadic Korean tribes. The kingdoms developed in geographically distinct areas: *Koguryo*, in the Yalu River basin in the north; *Paekche*, in the Han River basin in the west; and *Silla*, in the southeast. Figure 6.2 illustrates the geographic extent of each kingdom. For a short period the Kingdom of *Kaya* existed between

the territories of the Silla and Paekche kingdoms before being absorbed by Silla in 544 AD (Tennant 1996). A brief review of the geography of each kingdom demonstrates how this historical period helped to shape what was to become Korea.

The northern Koguryo Kingdom was created from indigenous people living along the Yalu River and, notwithstanding a considerable Chinese presence, established a sovereign kingdom around 53 AD (Figure 6.2). The kingdom was not initially strong enough to dominate the Chinese, but slowly expanded its territory and developed military strength. Thus, when the Han dynasty finally collapsed, the Koguryo expanded to fill the power vacuum that developed. At its height, the Koguryo Kingdom controlled a large segment of Manchuria and firmly established itself on the northern and western coasts of the upper two-thirds of the Korean Peninsula almost to the Han River (Figure 6.2). In 427 AD, the kingdom moved its capital city from the open plains of Manchuria south to P'yongyang. This move was important because of the concern it generated within the developing kingdoms of Silla and Paekche to the south. They viewed this move as a precursor to Koguryo expansion into their territory (Savada and Shaw 1990; Tennant, 1996).

In the southwest, the Paekche Kingdom evolved from tribes that were buffered considerably from Chinese influence (Figure 6.2). However, they were close enough to the Chinese to feel threatened; consequently, this perceived danger accelerated their unification. The walled towns were integrated into the Kingdom around 246 AD, which continued to consolidate and organize its territory into an efficient, aristocratic state. The Paekche Kingdom continued to expand northward, pressuring the Koguryo Kingdom, finally making major territorial gains in the 4th century AD. Furthermore, the Paekche opened diplomatic ties with Japan and the Chin Dynasty in the Yangtse River area as well (Eckert et al. 1990; Savada and Shaw 1990).

In the southeast, the Silla Kingdom (Figure 6.2) also developed from a walled town and the territory was consolidated under one royal family; however, at a much slower pace than the other two kingdoms. Thus, it did not complete its unification and have in place a fully developed government, army, and bureaucracy as early as the other two and was vulnerable to invasion and foreign interference. Faced with threats from China, Japan, and the other two Korean Kingdoms, Silla initially formed an alliance with the Paekche Kingdom. This alliance was short-lived, however, because the Silla were viewed by the Paekche as having failed to live up to the terms of the alliance. As a result, the Paekche ultimately sided with the Koguryo Kingdom against Silla. Consequently, the Paekche, who viewed the Silla as traitors, invaded whenever given the opportunity (Eckert et al. 1990; Savada and Shaw 1990).

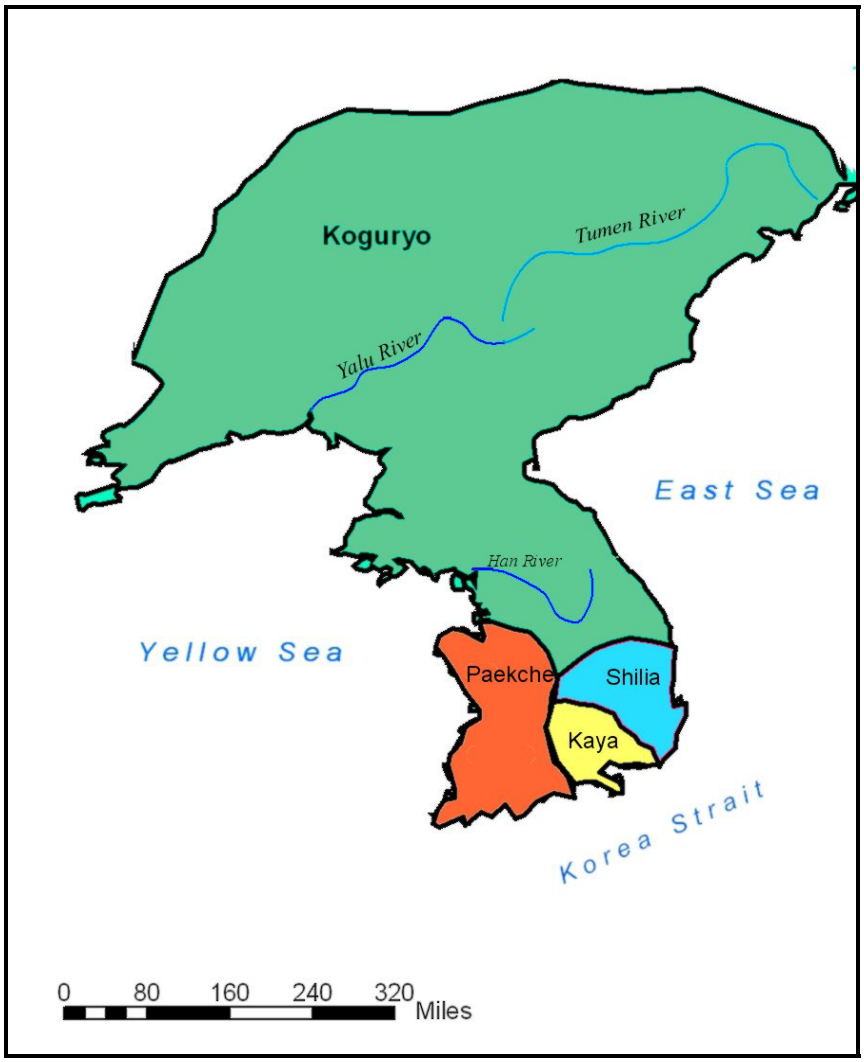

Figure 6.2. Map of the Three Kingdoms, circa 1 BC – 3 AD.
Source: Author.

All three Kingdoms contributed to the development of Korea in a number of important ways. Most importantly they established a territory where a common language was spoken, a common religion was practiced[2], formal administration was fashioned after the Chinese (i.e., with a central authority in a royal family), diplomatic and economic relations were established and maintained with other governments (i.e., Japan and China), and each Kingdom developed relatively effective military forces. Thus, the Three Kingdom period was important in that it served to unite nomadic tribes and establish the fundamental underpinnings of a modern nation-state. At their height-of-power, the territory controlled by these three relatively

independent kingdoms encompassed the entire Korean Peninsula and a large segment of Manchuria (Figure 6.2).

By mid-660 AD, Silla (with the help of the Chinese Tang Dynasty) defeated the Paekche Kingdom and began a military campaign to take control of the Koguryo Kingdom. The Silla Kingdom was successful, but it relied heavily on the Tang Dynasty. As a consequence, by 668 AD, Silla unified the Korean Peninsula and initiated a period in which a series of stable dynasties ruled Korea (Savada and Shaw 1990; Tennant 1996). The Silla dynasty lasted until 935 AD and was followed by the Koryo Dynasty, which came to an end in 1392 AD. The third and final dynasty, the Chosŏn Dynasty, remained in power until 1910. The Koryo Dynasty was important for what it accomplished in terms of forming and consolidating a flourishing civilization on the Korean Peninsula, and for becoming a notable ally of Kublai Khan during his two attempts to invade Japan. It was the Chosŏn Dynasty, however, that became Korea's most enduring dynasty and the one that most clearly imprinted modern Korean culture (Savada and Shaw 1990; Tennant 1996).

THE CHOSŎN DYNASTY

The Chosŏn Dynasty was named after the former Chosŏn State and was established by Yi Song-gye, a former general officer in the Koryo Dynasty. He was aided in part by the need for land ownership reform, especially that owned by Buddhist monks. Even before seizing the throne in 1392, Yi was a strong advocate for land reform, and followed through with his ideas upon becoming king. However, his actions went well beyond simple land reform and he did much to solidify and stabilize the kingdom. Farmers had been frustrated in two ways by land ownership policies of previous dynasties. First, the government taxed them heavily, and second, they were forced to pay excessively high rents—typically in the form of rice—to the monks who owned much of the land. Hence, farmers lost both income and food because of these laws. Accordingly, when Yi implemented his land reforms, he eliminated the fundamental causes for much of the discontent that had been prevalent in the previous dynasty.

After land reform, perhaps one of the most significant transformations implemented by the Chosŏn Dynasty was the separation of state and religion on the Korean Peninsula. Buddhism was certainly the most pervasive religion on the peninsula and enjoyed wide acceptance among Royalty and common people alike. After many generations, Buddhist monks became very wealthy and powerful, and their influence was clearly felt in the government and economy of the kingdom. In fact, monks and Buddhist monasteries became some of the largest landholders in the country. Their growing wealth and control over large tracts of arable land added to their

power, generated economic hardship for common farmers, and fostered corruption. Recognizing this, the Chosŏn Dynasty put into practice a number of reforms aimed at transforming land ownership and decreasing the power of the Buddhist monks. Some of these decrees went so far as to ban monks from selected cities, although this harsh measure varied at different times and places during the dynasty. Reducing the power and wealth of the Buddhist monks solidified the separation of religion and state in Korea. From this time forward, Korean leadership was chiefly Confucianist with only minority members of the royalty adhering to Buddhism (Savada and Shaw 1990; Tennant 1996).

Under the Chosŏn Dynasty, the Korean Peninsula enjoyed a period of growth and stability that included arts, science, technology, and the development of the Korean written script known as hangul[3]. Another important area that witnessed improvement during this period was agricultural research. Rice cultivation techniques were improved by importing methods from central China and adapting them to meet the climatic (cooler and drier) and topographical (steeper slopes) requirements of Korea. Great strides were made in productivity (through technology) and increasingly larger areas were brought under cultivation (Tennant 1996). Prosperity and growth continued but the enlightened leadership of the early period of this dynasty came to an end midway through the 15th century.

The Chosŏn Dynasty witnessed the implementation of significant foreign policy measures as well. Under Chosŏn leadership the Koreans developed relationships with China, Japan and later, Russia. Although the persistent love-hate relationship with China endured throughout this period, Korean culture benefited from their Chinese neighbors. The exchange of ideas and technologies are positive examples of the close relationship enjoyed by the two countries. Meanwhile, territorial encroachment and attempts to form alliances (military or trade) at the expense of the other are examples of the occasional tension. Throughout the period there were members of the ruling class that favored the Chinese and worked hard to foster and maintain good relationships with the ruling Chinese Dynasty. Many times the Chinese came to the aid of Korea, especially when it involved Japan (Savada and Shaw 1990; Tennant 1996).

The Chosŏn Dynasty's relationship with the Japanese was remarkably similar to their relationship with the Chinese in that it fluctuated between peaceful cooperation and overt war. Several aspects of Japanese culture can be traced to the Koreans as agents of cultural diffusion. Leading examples are Buddhism and Neo-Confucianism and numerous trading arrangements. The negative contributions consisted of Japanese attacks along Korea's southern coast. At different periods Japanese military units controlled portions of the Korean Peninsula; however, they never completely

occupied the peninsula. Military attacks[4] by the Japanese occurred in the 16th and 17th centuries, but were relatively minor in nature (Tennant 1996; Savada and Shaw 1990).

Sporadic military incursions by the Chinese and the Japanese throughout the course of the dynasty did, however, devastate large agricultural areas. This loss of farmland brought about extreme hardship for many areas and resulted in social unrest. This condition, combined with the fluctuating loyalties of the different factions in the Royal House, led to a period of decline in the influence of the Chosŏn Dynasty. Additionally, the added pressure of Western countries trying to gain influence on the Korean Peninsula increased political demands on the ruling family. Their reaction was to suppress social unrest and become increasingly isolationist as they closed doors to Westerners, who were trying to gain access to Korean markets. By the 19th Century, the combined pressure of Chinese, Japanese, and Western powers took its toll on Korean leadership. For example, the Japanese were modern and more militarily capable and threatened Korea in war-like fashion, forcing the latter into a treaty that was extremely favorable to the Japanese. To offset Japanese influence and power, the Koreans entered into treaties with Western powers, and Russia was the major beneficiary from this policy. The Koreans sought Russia's help after noting that the latter had a shared border and the apparent strength to resist Japanese expansion. Although many in the Korean Court saw this as a means to stop the Japanese, others interpreted this policy as yielding to a Western power. Even with the Chinese Dynasty in decline, there were members of the Korean Royal Family who still actively sided with the Chinese based on historical and cultural ties. Finally, there was a young faction that saw a modernized Japan as the model that Korea should follow. These competing interests accelerated the weakening of the Chosŏn Dynasty. Different factions within the Royal Court were divided between three groups: pro-Chinese, pro-Russian, or pro-Japanese. This situation was extremely destructive for the Korean people who became increasingly upset with their government and revolt ensued.

The first response to expanding civil unrest by the Korean Court was to invite Chinese forces to enter Korea and help subdue the revolts. Using this as a pretext, Japan sent its own forces to Korea, spawning a direct conflict between China and Japan. Japan won this military dispute, which further hastened the demise of the Chinese Dynasty, while strengthening Japanese influence in Korea. Thus, the Japanese enjoyed complete control over the Korean Peninsula, along with major sections of China, and were successful at ruling through the last Korean emperor. The two final acts that solidified Japan's hegemony over the Korean Peninsula came with the defeat of Russia in the Russo-Japanese War (1904-05) and the signing of the Anglo-Japanese Alliance. The events leading to Japanese control of Korea starting

in the late 1800s came to a formal end with the Japanese annexation of Korea in 1910 (Eckert et al. 1990; Savada and Shaw 1990; Tennant 1996).

JAPANESE RULE

Japan's declaration of annexation, signed on 29 August 1910, ended the 518-year rule of the Chosŏn Dynasty and began perhaps the most horrific period of Korean history, lasting 35 years. This period would create tremendous social and economic changes for Koreans, all under the direction of the Japanese (Eckert et al. 1990). The first year of Japanese control was characterized by their consolidation of power, implementation of colonial rule and complete repression of any form of resistance. After crushing all resistance and gaining complete political and military control of the peninsula, the Japanese set about assimilating the Korean people. They envisioned a centrally governed colony where the Korean language would be replaced with Japanese and all Koreans would become Japanese citizens. Classes were required to be taught in Japanese, and foreign teachers were given five years to learn the language (Eckert et al. 1990; Tennant 1996)[5]. Furthermore, Japanese colonial polices were geared to suit their needs and promote their expansion throughout Asia. As a consequence, Korea became a source of raw materials, food supplies, and labor for the Japanese empire; and due to the close proximity to Japan, Korea was an attractive location for emigration. Many farmers and fishermen were encouraged to move to Korea, along with Japanese who went to serve within the colonial government. This migration and colonization was so substantial that by 1940, 3.2 percent of the population was Japanese (Eckert et al. 1990).

This 35-year period of Japanese rule had a lasting imprint on the cultural, economic, and political landscape of the Korean Peninsula. Japanese colonization inhibited the development and modernization of an indigenous Korean government; contributed to the loss of an entire generation of Korean cultural development; increased the extraction of raw materials (timber, fish and metal ores), which left the environment in a disastrous condition; and finally, agitated the people to develop a deep hatred of the Japanese. Japanese attempts to assimilate the Koreans failed by most measures. As an example, there were very few marriages between the two ethnic groups (Tennant 1996). Furthermore, the Japanese made extensive use of Korean collaborators to enforce their rule, hence a sense of mutual mistrust developed among Koreans as well. Japanese rule did not come to an end until they were defeated in World War II.

WWII AND ITS AFTERMATH

The Japanese exploited Korea for natural resources, as a source of labor, and as a base of operations for their military campaigns into mainland Asia. However, Korea's peninsular location also provided Japan with a

measure of protection from direct military attack during World War II. Actual fighting on the Korean Peninsula was minimal and limited to sporadic resistance efforts against the Japanese (Savada and Shaw 1990). Although the Korean landscape escaped the ravages of war in World War II, the Korean people were not, however, spared from combat operations. The Japanese made extensive use of forced labor units, conscripted from Korea, to build fortifications, harbors, and airfields throughout their empire. Furthermore, the Japanese attempted to draw military recruits from the Korean population. Initially, the Japanese tried to enlist Korean youths into its military, but finally resorted to conscription to help fill the ranks.

Koreans did fight against the Japanese on a limited basis. Small elements of free Koreans formed units and fought against the Japanese in other Asian theaters of operations, most notably in Burma with the British and in China with the Chinese Nationalists or Chinese Communists (Tennant 1996; Korean Broadcasting System 1995; Eckert et al. 1990). The unintended consequence of the division of Korean opposition forces fighting with different Allied forces was that they each drew different experiences and ideologies from their anti-Japanese endeavors. No single group gained a majority claim on freeing the peninsula from the Japanese, hence no group could lay claim to sole leadership rights in a post-liberated Korea. This circumstance contributed to the wide range of individuals and small political groups who had very different ideas about the shape of a post-colonial Korea once the Japanese were defeated.

After the war, however, the defeat of Japan led only to the replacement of one colonial power with two military super-powers and thrust the Korean Peninsula into the front lines of the Cold War. The defeat of the Japanese by the United States and the eleventh-hour declaration of war on Japan by Russia, placed Korea squarely in the middle of an escalating conflict between two post-war world powers, much to the dismay of many Koreans (Eckert et al. 1990). In 1945, Soviet and United States Forces entered Korea to disarm and repatriate Japanese units[6]. At that time the United States and the Soviet Union agreed that a Korean government should be restored to lead a free and independent Korean people. However, the super powers fundamentally disagreed on the nature of that government. Thus, the political and cultural landscape of modern Korea was born. The two super powers agreed on the 38th parallel as the temporary line of demarcation between their forces. The United States envisioned a trusteeship lasting five years and managed eventually by the United Nations, with the Soviets agreeing in principle. At that time, the Americans did not foresee the 38th parallel becoming the border between a divided country (Eckert et al. 1990; Tennant 1996). The combination of disparate super power objectives in Korea and the numerous and diverse groups vying for power in a liberated Korea created the conditions that led to the Korean nation being divided, and

ultimately led to the Korean War[7] (Savada and Shaw 1990; Eckert et al. 1990).

CONCLUSION

Geographies of the past have clearly shaped the Korean nation and ultimately led to the division of that nation into two separate political entities. The division of Korea can in a large measure be attributed to the Japanese colonial period. This colonial period "shattered the foundations of a remarkably stable nineteenth-century bureaucratic agrarian society and unleashed, new forces in conflict with the old (Eckert et al. 1990, 327)." These opposing forces, each with the support of larger, more powerful countries, led inevitably to the division of the peninsula, and turned it into the single most fortified land in the world. The division represents a small piece of a much larger struggle that developed in the aftermath of World War II. Through it all, however, the Korean people have maintained their culture and against great odds, some have sought a unified peninsula. ★

Endnotes:

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[1] Choson has been the name for the governing organization twice in history. Some authors refer to the oldest as the Old Choson and the New Choson (Eckert, et al. 1990), while others call the oldest the Choson State and the later one the Choson Dynasty (Tennant 1996).

[2] Buddhism was the state religion in the kingdoms and royalty led the way in its acceptance; the religion was not most prevalent in the Silla Kingdom. Paekche was instrumental in the diffusion of Buddhism to Japan (Eckert, et al. 1990, 37; Tennant 1996). Also see Chapter 7.

[3] This written script, developed during the fourth monarch of the Choson Dynasty (1418-1450), and not come into common usage until the 20th century (Savada and Shaw 1990).

[4] Major attacks occurred in 1510, 1555, and 1597 in the 16th Century, but smaller attacks happened as well (Tennant 1996).

[5] Teachers served mainly in American missionary schools, which the Japanese saw as useful as long as they did not preach during the school hours (Tennant 1996, 243).

[6] The United States forces were sent to Korea only after Soviet Forces had landed and Washington became aware of the danger of the Soviets occupying the entire peninsula (Savada and Shaw 1990).

[7] See Chapter 8.

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North Korean soldiers watch a repatriation ceremony from a tower on the North Korean side Military Demarcation Line (MDL). During the ceremony the remains of what is believed to be five U.S. soldiers that served in the Korean war were returned to the South. Source: U.S. Air Force photograph by Senior Airman Jeffrey Allen.

7 CULTURAL GEOGRAPHY

Jon C. Malinowski

Key Points:

- North Korea's culture and cultural geography are unlike any on the planet.
- The juche ideology of the government is the driving cultural force.
- The Korean language is spoken by almost the entire population.
- Religion is allowed by the government only to support official goals.

NORTH KOREA'S CULTURAL LANDSCAPE poses unique challenges for geographic analysis. Cultural geographers study the distribution, in space and time, of culture and the elements of culture, such as language, religion, customs, and beliefs. But North Korean culture, because of history and political ideology, is remarkably homogenous, with little to no spatial differentiation throughout the country. Furthermore, travel restrictions and repressive policies limit severely the quality and quantity of information available to the outside world, making detailed analyses difficult. To complicate further the situation, North Korean culture, including language and religion, has been uniquely, and oddly, shaped by a cult of personality centered on Kim Il Sung and his son, the current ruler Kim Jong Il.

JUCHE, SURYUNGRON, & THE RED FLAG

To understand North Korean culture, it is necessary to understand the importance of the juche (chuch'e) ideology. Commonly translated as "self-reliance," but carrying a subtext of national identity, juche was introduced in the 1950s to justify internal purges of political opponents and to separate North Korea's leadership from its Stalinist roots in the Soviet Union, where Stalin's cult of personality was being denounced by Cold War era Soviet leaders. At the heart of juche is the principle that "the people are the sovereign creators of revolutions and the ones who drive its processes (Republic of Korea National Intelligence Service [RKNIS] 2002)." From this philosophy, the Korean Worker's Party (KWP) developed four self-reliance principles: 1) autonomy in ideology; 2) independence in politics; 3) self-sufficiency in economy; and, 4) self-reliance in defense (Encyclopedia Britannica 2002). This enabled the KWP, and more importantly its leader

Kim Il Sung, to break away politically and economically from the ideological shackles of both China and the Soviet Union.

Nevertheless, despite the claim that people "drive" the processes of revolution, juche did not bring power to the masses. In fact, juche included an idea known as the "Supreme Leader Hypothesis", or *Suryungron*. This philosophy, considered unquestionable and absolute, holds that a precondition to the people's control of their destiny is the guidance of a "Supreme Leader" (RKNIS 2002). The absolute control by Kim Il Sung and his son Kim Jong Il is directly related to this ideological position.

In the 1960s, the KWP declared that juche was an adaptation of Marxist-Leninist ideas to the realities of North Korea, but this position changed in the 1970s. In 1976 Kim Jong Il referred to his father's ideology as something more than just Marxist-Leninist. Increasingly, reverence for Kim Il Sung, known as the "Great Leader," became part of the political ideology. Kim Jong Il declared that North Koreans should "unconditionally accept the instructions of the Great Leader, and … act in full accordance with his will (Cheong 2000)." Juche had thus been merged with the Suryungron to create an ideology often referred to as *Kimilsungism*, although juche is still used as a catchall term.

A final ideological principle that affects North Korea's culture is the "Red Flag Ideology," a name derived from a song sung by Kim Il Sung while fighting as an anti-Japanese guerilla during the 1920s and 1930s. This ideology emphasizes struggle in the face of difficult odds, self-reliance, and optimism for the goals of the revolution. With the collapse of the Soviet Union, the death of Kim Il Sung in 1994, and horrific famine, the Red Flag Ideology has been a popular way of encouraging the population to persevere (RKNIS 2002).

Together, these ideologies emphasize self-reliance, the guidance of a Supreme Leader, and struggle through adversity. The impact of these concepts on basic culture traits such as language and religion has been great, affecting nearly every aspect of North Korean life.

A CULT OF PERSONALITY

With juche ideology to support his legitimacy, Kim Il Sung created a state in which he controlled, guided, or determined every aspect of traditional and popular culture. His picture was placed everywhere, stories about him dominated the state-controlled media, and a mythology was created to make him the most important man in history. Kim's death in 1994 only strengthened the cult of worship, which grew up around the "Great Leader."

Posters of Kim Il Sung and Kim Jong Il adorn the walls of every household. Statues of them dot the landscape. Kim Il Sung's birthday is a

national holiday and his birthplace a national shrine. The residents of P'yongyang wake to loud speakers across the city playing "The Song of Our Great Leader Kim Il Sung" (Struck 2002). The Kims appear on stamps, lapel pins, murals, and posters. They are truly ubiquitous features of the cultural landscape.

The educational system plays a strong role in reinforcing state ideology. According to one source, as much as 44% of the elementary school curriculum is dedicated to ideological courses (Koreascope 2002). The lives and teachings of the Kims are mandatory in all curriculums and include biographies that are largely fabricated to increase their position as superhuman leaders. By some accounts, Kim Il Sung is said to have engaged in 100,000 battles against the Japanese during a 15-year period, or about 20 per day (Koreascope 2002). Kim Il Sung's father and great-grandfather are also credited as being heroes during the Japanese occupation.

When the school curriculum is not directly teaching about juche, it does so in an indirect way. For example, a 2nd grade Korean language uses the example, "The villagers rushed to the scene with clubs in hand, and shouting, "Let Us Knock Down American Imperialist Wolves!" (Koreascope 2002). This not-so-subtle propaganda continues to the university level, where Departments of Kim Il Sung or Kim Jong Il continue the state-controlled brainwashing.

Some thought that North Korea's cult of personality would fall apart after Kim Il Sung's death in 1994, but the worship of Kim Jong Il is as strong as it is for his father. In 1998, Kim Jong Il received 680 nominations for the national parliament, enough that he could have won every seat. No other candidates were nominated, but Kim accepted only one, a move heralded as a sign of his compassion for the people and country. At the time of his nomination, the official news agency reported that a double rainbow was sighted over a tower of immortality that Kim had built for himself (Goode & Lehrer 1998). By some government accounts, Kim Jong Il is said to possess magical powers (Buzo & Hoon 1994).

The following, an excerpt from a routine Korean Central News Agency press release, is typical of the propaganda used to support the importance of the country's leader and ideology:

- Very popular song composed by Kim Jong Il:

> *Pyongyang, September 11 (KCNA)* — Song "Korea, I Will Glorify Thee" is very popular among the Korean people. This famous song was written and composed by Kim Jong Il.

> One day in September Juche 49 (1960) he, after being enrolled in Kim Il Sung University, climbed Ryongnam Hill and recited an impromptu poem "Korea, I Will Glorify Thee."
>
> In the poem, he renewed his firm faith and will to bring a bright future to this land without fail, aware of being the master of the Korean revolution.
>
> Remaining true to his pledge made that day, he led the "arduous march" and the forced march to victory, defending and glorifying the DPRK.
>
> Early last year, Kim Jong Il told officials that the path the people are taking is that of Juche hewed out by President Kim Il Sung, reiterating his firm will to build the country into a powerful socialist nation as desired by the president in his lifetime ("Very Popular Song" 2002).

* * * * *

A direct link exists between this cult of personality and North Korea's culture because Kim Jong Il, as his father before him, guides the lives of his citizens. There is little that a North Korean reads, sees, or hears that has not been approved by the government. Because culture is learned, the government, through tight control of society, has been able to completely and thoroughly shape the beliefs of its citizens.

Media sources, a prime source of culture transmission around the world, remain under tight government control. There are no satellite dishes to bring in outside ideas and television sets are fixed so they only receive Central Television, which tends to cover national news and government related special events, such as Kim Jong Il's birthday. Radios are also rigged to prevent listening to foreign stations. Domestic radio includes propaganda news reports, soap opera serials that praise the country's leadership while attacking South Korea and the United States, and fictional, but passed off as real, stories of freedom fighters within South Korea. No alternative media sources challenge the government's position. Foreigners are not allowed to visit anywhere in the country without a government escort, so news of the outside world is almost nonexistent for the average citizen. In addition, North Korean citizens are not allowed to travel within the country without permission.

When foreign culture is allowed to penetrate the borders of the Hermit Kingdom, the choices often seem odd. For example, during a two day period in 1995, and with Muhammad Ali in the stands, over 300,000 people watched Japanese and American pro-wrestlers compete in

P'yongyang as part of the World Peace Festival ("North Korea Wrestles" 1995).

Opposition to the government is immediately crushed and dissenters sent to reeducation camps where they conduct hard labor with inadequate food or clothing (Chol-Hwan 2001). An estimated 200,000 people live in these camps and public executions are not uncommon (Koreascope 2002).

LANGUAGE

Nearly all North Koreans speak Korean. Consisting of 10 vowels and 14 consonants, Korean is written using a script known as *Choson muntcha* in North Korean and *Hangul* in the south (Encyclopedia Britannica 2002). There are some dialects within the language, usually corresponding to Provincial boundaries. Some of the dialects are different enough from others as to make conversation difficult (Ethnologue 2002).

North Koreans and South Koreans can speak with each other, but over time the government in the north, to support the ideas of Kimilsungism, has removed Russian and Chinese loanwords from the language, while in the south Japanese and English words are becoming more common. This has resulted in a reduction in mutual intelligibility between the written and spoken language of the two countries.

ETHNICITY

As is to be expected, the ethnic composition of North Korea is as homogenous as the linguistic makeup. Nearly all of the North Korea's citizens are ethnically Korean. Many traditional Korean folk traditions have been allowed to remain under Communist rule. Kim Il Sung supported traditional culture to emphasize that Koreans were a unique people with a unique destiny. Folk dances, costumes, and arts are common parts of festivals and celebrations. The arts, however, have not escaped the grasp of the central government. All professional artists, musicians, and performers are assigned to government institutions such as the National Theater for the Arts and are expected to support the state ideology through their performances (Encyclopedia Britannica 2002).

Minority groups account for less than 1% of North Korea's population. A small Chinese community, numbering under 200,000, can be found in the northern parts of the country near the border with the People's Republic of China. In addition, a small number of North Koreans are ethnically Japanese. Estimates are that about 93,000 Japanese have moved to North Korea since 1959, lured by state propaganda promising a paradise (Koreascope 2002). North Korea also recently admitted to having kidnapped 13 Japanese citizens off beaches in Japan during the 1960s and 1970s, forcing them to teach Japanese language and customs to North Korean spies.

In the fall of 2002, five of the surviving kidnapped were allowed to visit their families in Japan, causing a squabble between the two governments about whether they should be forced to return to North Korea, where many had started families.

RELIGION

Many people assume that religion is completely outlawed in North Korea. This is essentially, but not exactly, true. Religious groups are allowed to exist in North Korea, but their practices and beliefs have been co-opted to serve the state ideology, which in its own right can be considered a religion. In fact, Kim Il Sung and Kim Jong Il are considered to be gods in the eyes of North Korean propagandists, so putting any other god before them is heresy. But by allowing a small number of people to practice traditional religions, the government can claim to be upholding the country's law as outlined in the Constitution, which allows freedom of religion. The Constitution also states that, however, that, "No one may use religion as a means by which to drag in foreign powers or to destroy the state or social order (Koreascope 2002)."

Historically, religion and spirituality played important roles in the lives of Koreans and today traditional religious beliefs are still said to be practiced by many North Koreans. Beyond traditional religious ideas, Confucianism, Buddhism, Christianity, and a syncretic religion known as Ch'ondogyo have all been important at one time or another and all have left some mark on Korean culture and cultural landscape.

Opposition to religious groups began in earnest following the end of the Korean War. Religiously active citizens were identified as "counterrevolutionaries" and either executed or sent to reeducation or concentration camps (U.S. Department of State 2002). These tactics continued in the 1970s with the addition of a "freedom of antireligious activity" clause to the Constitution (which was later removed in 1992). At the same time, P'yongyang created puppet organizations such as the "North Korean Buddhists' Federation" to make it appear that it allowed religious activity. A period of slight liberalization has occurred since the late 1980s and famous religious figures such as Billy Graham have been allowed to speak in P'yongyang. But harsh crackdowns on unauthorized religious groups remain common. According to the State Department's *International Religious Freedom Report 2002*:

> The regime appears to have cracked down on unauthorized religious groups in recent years, and there have been unconfirmed reports of the killing of members of underground Christian churches. In addition, religious persons who proselytize or who have ties to overseas

> evangelical groups operating across the border with the People's Republic of China (PRC) appear to have been arrested and subjected to harsh penalties, according to several unconfirmed reports (U.S. Department of State 2002).

• *Confucianism*

Confucianism is named for Confucius, who lived from 551-479 BC in what is now eastern China. Confucius did not invent the ideas he taught. Rather, he amplified traditional values from the past that he felt needed to be revived. Focusing primarily on individual ethics and morality, Confucian thought emphasizes love and respect of parents, honesty, benevolence towards others, and loyalty to the state. Confucianism is sometimes classified as a religion and sometimes as just a philosophy, but many Asians who profess a religious preference still hold on to Confucian ideas.

Confucianism has remained important in Korea for more than a millennium. Being in close proximity to China, Korea was often affected by Chinese culture. By the 7th century, Confucianism was an important part of society under the rulers of the Silla Kingdom. In the 10th century, the Koryo Kingdom established a national academy to promote Confucianism, and by the 14th century, it had become the state religion (Encyclopedia Britannica 2002). From this era forward, Confucian thought, even when not heavily promoted by the government, has contributed to the cultural foundation for Korean society. Even today, under the dictatorial rule of Kim Jong Il, the Confucian ideals of loyalty to the state and respect for one's parents can be used to support allegiance to the state and the Kims.

• *Buddhism*

Buddhism, founded in India during the 6th century BC, spread through China and into the northern Korean kingdom of Koguryo by the 4^{h} century AD. Under the unified rule of Silla in the 7th century, Buddhism prospered throughout the country. In the 8th century, the Chinese Ch'an (Zen) sect was introduced, and in time, it became the dominant school of Korean Buddhism (Encyclopedia Britannica 2002). The height of Buddhism in Korea is said to be the period from the 10th-14th centuries, when it was the state religion of the Koryo kingdom. Towards the end of this period, corruption and challenges by Neo-Confucians caused the state to limit the activities of Buddhist monks and Confucianism was elevated to the status of state religion (Encyclopedia Britannica 2002). Although Buddhism never regained the importance it had during the Koryo period, it did not disappear from the peninsula by any means.

At the end of World War II, there were an estimated 35,000 Buddhists in Korea (Koreascope 2002). In 1947, the government confiscated all Buddhist temples and associated land under the guise of land reform. Without land, the temples could not support themselves and many became dilapidated. Buddhist adherents were not allowed by law to give money or food to monks, so the latter were forced to work (Koreascope 2002).

The 1960s brought even tougher times as the central government sought to get rid of all religions. Any Buddhists who wanted to practice their religion had to do so in secrecy and under threat of severe persecution. Buddhism had been all but wiped out.

In the early 1970s, the North Korean government began a political dialogue with South Korea. To show that they allowed religions to practice freely, the North Korean government established a "North Korean Buddhists' Federation". The group, however, is an organ of the state and engages in propaganda against the South and the United States. The monks tend to wear western suits and do not shave their heads. Furthermore, they live with their families, which is not a common practice for Buddhist monks (Koreascope 2002). Some temples are maintained as culture relics, but the interiors display political messages. Buddhist monks from other countries are forbidden from visiting North Korea to worship unless invited by the government (Adherents.com 2002).

• *Christianity*

Koreans first interacted with Catholic missionaries while on trade missions to China in the 16th and 17th centuries. By the late 18th and early 19th centuries missionaries arrived in Korea, where their message of equality for all under God and the promise of life after death led to many conversions. But Catholicism conflicted with the Confucian tradition of ancestor worship, which seemed like idolatry to the missionaries. The Korean government was afraid that Catholicism would undermine other tenets of Confucianism and would weaken loyalty to the state. In 1801, 1839, and 1866, Catholic converts were killed or forced to denounce their beliefs and priests were driven out of the country or beheaded (Encyclopedia Britannica 2002). The Catholic Church survived but was persecuted again during the Japanese occupation of the 1920s and 1930s.

When the Second World War ended, about 500,000 North Korean Catholics practiced at over 50 churches across the county, but like their Buddhist countrymen, they were persecuted out of existence during the 1950s and 1960s. In 1988 a North Korean Roman Catholics Association was established by the government and a church was built in P'yongyang, but like the Buddhists' Federation, it engages in political activity in support of state

policies. Furthermore, the church has no priest or nuns, with mass being conducted by "representatives" (Koreascope 2002).

Protestant Christianity in North Korea followed a similar pattern to Catholicism. Protestant missionaries entered Korea in the 19th century and the religion took hold, especially in P'yongyang and Sunchon, but persecutions during the Japanese occupation reduced the influence of Christianity a great deal. By the end of World War II there were 120,000 Protestants in North Korea, including 20,000 in P'yongyang, dubbed the Oriental Jerusalem, but no missionaries remained (Encyclopedia Britannica 2002; Koreascope 2002).

The North Korean government outlawed the North Korean Christianity Foundation in 1959, but when North-South dialogues increased in the early 1970s, they created the "Christians Association" as part of the Korean Workers' Party. Like the equivalent Buddhist and Catholic groups mentioned above, this group engages in political activities. Two churches, the Bongsu Church and the Chilgol Church, were built in Pyongyang at the end of the 1980s, but evidence suggests that members of these churches are not worshipping in a free and open environment. The government, it is alleged, uses these churches to foster ties with international groups, thus bringing more sympathy towards North Korea and creating pressure on South Korea to normalize relations (Koreascope 2002). The U.S. State Department estimates that there are about 10,000 Protestants and 4,000 Catholics in North Korea today (U.S. Department of State 2002).

• *Ch'ondogyo (Chondoism)*

Ch'ondogyo, formerly *Tonghak*, is an indigenous Korean religion founded in 1860 by Ch'oe Che-u (Encyclopedia Britannica 2002). Claiming to have seen a vision of the Heavenly Emperor, Ch'oe Che-u professed religious ideas that combined Confucianism, Taoism, traditional shamanism, Buddhism, and Roman Catholicism. The goal of this syncretic faith was to affect social change, which did not sit well with the government. Especially disturbing to the central powers was that this new religion was gaining a foothold among the rural population, thus threatening the concentration of power in the cities. In an attempt to destroy the fledgling movement, Ch'oe Che-u was executed in 1864. His successor, Ch'oe Si-hyong led the movement for three decades, but was also executed in 1898. The third leader, Son Pyong-hi, changed the religion's name from Tonghak to Ch'ondogyo in 1905 (Encyclopedia Britannica 2002). The 1919 Independence Movement against the Japanese had strong support from Ch'ondogyo leaders.

In terms of basic beliefs, Ch'ondogyo is a monotheistic religion emphasizing the equality of humanity and the oneness of humans and God, known as *Hanulnim*. Because man and God are the same, there must be

equality among humanity. Doing evil deeds runs counter to the will of the universe and distances a person from his or her true nature as part of the cosmos. Therefore, salvation is achieved through self-perfection rather than through ritual alone. Ceremonies always include the use of clean water as a symbol of the benevolence of Hanulnim.

The estimated number of Chondoists in North Korea today is about three million (Adherents.com 2002). But like other religious groups, the religion today serves political aims. Chondoists disappeared in the 1950s and 1960s when the government sought to eliminate all religions, but, like other religions, reemerged in the 1970s as an affiliated organization of the KWP. South Korean critics contend that North Korea allows Chondoists to practice so it can maintain contacts with the tens of thousands of practicing Chondoists in South Korea and place spies within their organizations (Koreascope 2002). A few prominent South Korean Chondoists have defected to the North in the past two decades, where they became anti-South spokespeople.

CONCLUSION

The culture and cultural geography of the North is primarily influenced by the philosophy of juche and the cult of personality centered on Kim Jong Il and the late Kim Il Sung. Language has been altered to remove foreign influences. Religion serves the propaganda goals of the central government. Folk culture is emphasized to encourage nationalistic feelings centered on Korea's uniqueness. Even popular culture, an extremely powerful force of cultural change worldwide, is strictly controlled. The sum of this manipulation is that North Korea's cultural landscape is unlike any on the planet. ★

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A North Korean observation post in the Demilitarized Zone. Source: U.S. Air Force photograph by Senior Airman Jeffrey Allen.

8 POLITICAL GEOGRAPHY

William M. Reding

Key Points:

- North Korea is a communist state with an autocratic regime.
- Kim Jong-Il has controlled the government since the death of his father, Kim Il-Sung in 1994.
- Although there is a representative legislature, these members run in unopposed elections and the Head of State, Kim Jong-Il is firmly in control of all governmental policies.
- Support from communist countries like the former Soviet Union and China has been greatly reduced, and North Korea has faced severe droughts and economic difficulties that have prompted unrest within the country.

THE DEMOCRATIC PEOPLES REPUBLIC of Korea is relatively young, created under Kim Il-Sung in 1948. After the ravages of World War II and the end of Japanese occupation, Korea was partitioned. North Korea was administered by the Soviet Union and quickly fell under the communist ideology. Kim Il-Sung became the leader of the country and quickly turned North Korea into a communist dictatorship, with massive government control and a society based on the idea of juche, self-reliance, and self-sufficiency (US Department of State 1998). In recent years this ideal has become transparent, as support from Russia has all but ended and China has substantially reduced aid. The political climate has changed drastically since the death of Kim Il-Sung, due primarily to economic and environmental difficulties. Recent droughts have reduced crop yields and led to large-scale famine in the country. Lack of support from China and Russia, which both demand cash payments for trade goods now, has led to infrastructure breakdown and productivity at less than 25% in factories. Improvements have been slow, but in 1999, North Korea posted the first positive growth in agricultural production and factory output. This is the first increase in over ten years (Country Watch 2002). To understand the current political situation in North Korea one must look at three key areas: the boundaries of the state and its relations with neighboring countries, the political development of the country since World War II, and finally, the governmental structure.

THE STATE

North Korea encompasses approximately 120,410 sq km, or an area slightly smaller in extent than the state of New York (CIA World Factbook 2002). North Korea has over 2,400 km of coastline divided between both its east and west coasts, with access to both the Yellow Sea on the west coast and the Sea of Japan on the east coast. North Korea shares boarders with China (1,416 km), South Korea (238 km), and Russia (19 km). The most disputed border is the area it shares with South Korea, along the Demilitarized Zone (DMZ) (Figure 8.1). This area has been subject to numerous disputes and incursions since it was established following the Korean War (Country Watch, 2002). North Korea still desires to reunite with South Korea, but Kim Jong-Il has been quoted as saying, "he will decide the time of this reunion."

Although North Koreans share ethnic and cultural ties with their neighbors to the south, only limited efforts have been made by the north to ease the tense relationship. In 2000, North Korea allowed the first in a series of limited family reunions with South Korea. This was done in an effort by both governments to improve relations on the peninsula and to ease tensions. This act in itself was considered by many to be momentous (de Blij 2001). This initiative was the first of several instituted by Kim Jong-Il to reach outward. The opening of a free-trade zone at Rajin-Sonbong was another step towards a more open North Korea. The area located in the extreme northeast corner of the country is tightly controlled, but has been seen as a sign that the north is undergoing change.

The most controversial change in North Korea in recent years has been the continued development of a nuclear weapons program. North Korea has used this program to its advantage, after test firing a missile across northern Japan in 1998; the country was able to negotiate a multi-billion dollar technical aid program with South Korea and Japan. The program was designed for building nuclear reactors for peaceful purposes, but recent findings regarding continued work on nuclear weapons may prove otherwise. In 2002, the United States confronted North Korea on their nuclear weapons program, which was in direct violation of a 1994 Nonproliferation Treaty banning such work (US Embassy 2002). The North Korean government freely admitted to the program and offered to discuss the issue with the United States in exchange for opening a dialogue over trade issues.

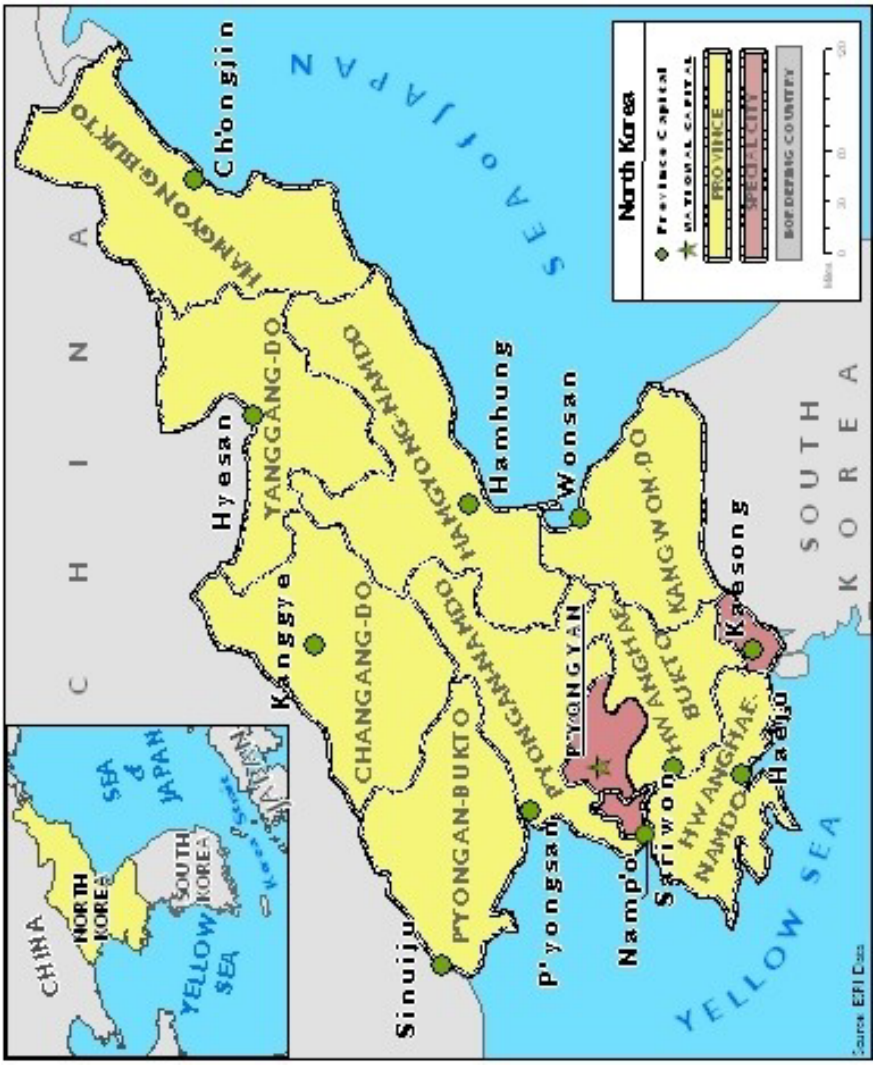

Figure 8.1. Political map of North Korea.
Source: Author.

POLITICAL DEVELOPMENT

Korea was freed from Japanese occupation in August of 1945. This liberation did not, however, bring about the immediate independence of Korea. Under the terms of the Japanese surrender, Korea was divided at the 38th parallel. The Soviet Union administered the area north of the 38th parallel and the United States the area south. The intent of the division was to facilitate the Japanese surrender and removal from Korea; however, by 1947 the Soviet Union and the United States could not come to terms on the type of government to ultimately administer an independent Korea. In

November 1947, the United Nations (UN) adopted the United States' proposal for elections in Korea and free elections were set for May 1948. The U.S.S.R. blocked UN access to the northern portion of Korea during the elections and failed to recognize the government elected in the south. The United States formally recognized The Republic of Korea (South Korea) in August of 1948 and recognized that government as the officially elected representatives of the entire country. Controversy ensued as the Soviet Union recognized the Democratic People's Republic of Korea (DPPK) in October 1948 and Kim Il-Sung was appointed premier. The soviets held that this was the true government of Korea and refused to acknowledge the election in the south (Country Watch 2002). As the Cold War continued, the issue of Korean unification was placed on hold for the immediate future, but in June 1950, the issue surfaced again with the invasion of North Korea into South Korea.

June 25, 1950 marked the beginning of the Korean War, as North Korea moved south across the 38th parallel and invaded the Republic of Korea. After three years of intense combat and the introduction of China on the side of North Korea, an armistice was signed in July 1953. The armistice maintained the 38th parallel division line, but established the Demilitarized Zone along the border. There is much debate over the causes of the Korean War and what prompted the North Korean's to attack, but conventional wisdom indicates that the Soviet Union and North Korea misinterpreted the level of American interest in South Korea. The interpretation stems from the limited assistance given by the United States to South Korea after 1948. Both the Soviet Union and North Korea felt the United States would not intervene if an invasion were launched. This assumption was as an obvious miscalculation (George 1974).

Following the Korean War, the two Koreas had no direct contact until 1971. During the 1970s both sides worked towards reaching an agreement on the issue of reunification, but nothing concrete could be agreed upon except three key reunification principles: independence, peace, and national unity (Country Watch 2002). In 1992, both countries signed a non-aggression treaty and a summit was scheduled for 1994, but the death of Kim Il-Sung cancelled the summit.

After the death of Kim Il-Sung and the rise to power of Kim Jong-Il, North Korea entered a period of political uncertainty. Kim Jong-Il has made few public appearances and has never spoken to his people publicly. Recent events, such as prolonged droughts followed by severe flooding have devastated North Korea's agricultural production. The loss of support from the former Soviet Union and the greatly diminished support from China has created a tremendous reduction in industrial output and the country's infrastructure is in disrepair. North Korea has begun to look outward and

one of the first positive steps towards reunification came in 2000, with the first of several, small-scale family reunions. In addition, North Korea has begun to open free trade zones in parts of the north to try to stimulate the economy and encourage foreign investment (de Blij 2001).

GOVERNMENTAL STRUCTURE

The government of North Korea is divided into three branches very similar to the United States. The executive branch is dominated by the Korean Workers' Party and was headed by Kim Il-Sung until his death in 1994. His son, Kim Jong-Il inherited his position as head of the government after his father's death, but was officially named General Secretary of the Korean Workers' Party in October 1997. After the death of Kim Il-Sung, the title of President of North Korea was abolished in honor of his leadership and the position of Chairman of the National Defense Commission (NDC) was named as the "Highest office of state." Kim Jong-Il was appointed chairman of the NDC in 1998 (Country Watch 2002).

The Supreme People's Assembly (SPA), oversees North Korea's legislative branch of government. It is the highest assembly of state officials and consists of one body containing 687 members (CIA 2002). Members are elected every five years, but run unopposed and are selected to run by political party heads and the NDC Chairman. When the SPA is not in session, a 15-member committee runs the legislative process for North Korea. The SPA's function is primarily one of ratification rather than legislation, since the KWP is the decision-making force in North Korean government. In recent years, the SPA has met infrequently and Kim Jong-Il has governed the country with a close circle of advisors.

The Central Court controls the judicial branch of North Korea's government. The members are elected to three-year terms by the SPA. There are also provincial courts throughout North Korea, with judges elected by local people's assemblies (Country Watch 2002).

The most recent trends in North Korean governmental policy point to a smaller central group of military and legislative officials meeting directly with Kim Jong-Il to establish policy within the country. As many of the old guard from the days of Kim Il-Sung depart the government, Kim Jong-Il is replacing them with his own appointees. This accounts for many of the most recent changes in North Korean policies and the limited amount of information shared outside this central group.

North Korea is divided into nine administrative provinces and four special cities. Each of these provinces elects governmental officials and are directly responsible for the economic plans for their respective provinces (Figure 8.1 and Table 8.1). As the economic and infrastructure problems

have increased throughout North Korea, more of the responsibility for the prosperity has been shifted to local officials.

There are no opposition groups within North Korea and anyone who may be considered as a potential threat to the central government is removed from population centers. As conditions within North Korea have degraded in the past ten years, there have been more incidents of civil unrest. These increased incidents have resulted in large-scale increases in both the size and power of the state police agencies. Human rights issues have become a major point of concern for the North Korean government. Reports of "extrajudicial" killings continue to be reported in North Korea, as well as, the forced removal of citizens. North Korean law allows for capital punishment for crimes such as: "collusion with imperialists," "suppressing the national liberation struggle," and other crimes such as "ideological divergence" (State Department 1998). North Korea has made various efforts to improve the public perception of their country's civil rights, at least externally.

There is no system for citizens to change the government or the leadership within North Korea. The political system is completely controlled by the Korean Worker's Party (KWP) and Kim Jong-Il. The greatest threat to Kim Jong-Il and the KWP, comes from within the government and high ranking military officials, so Kim Jong-Il has placed a high priority on the surveillance and monitoring of these officials.

Table 8.1. Provinces of North Korea. Source: CIA Fact Book, 2002.

PROVINCE (DO)	CAPITAL	AREA SQ. MILES	POPULATION	LOCATION
Chagang-do	Kanggye	6551	1,481,200	NW
Hamgyõng-bukto	Ch'õngjin	6784	2,566,600	NE
Hamgyõng-namdo	Hamhúng	7324	3,263,600	EC
Hwanghae-bukto	Sariwõn	3091	1,805,400	SC
Hwanghae-namdo	Haeju	3090	2,452,500	SW
Kangwon-do	Wõnsan	4306	1,572,200	SE
P'yõngan-bukto	Sinuiju	4707	3,085,500	NW
P'yõngan-namdo	P'yõngsan	4470	3,399,400	WC
Yanggang-do	Hyesan	5528	804,700	NE
SPECIAL CITIES				
Ch'õngjin-si	Ch'õngjin	no data	no data	no data
Kaesong-si	Kaesong	485	424,100	SWC
Nampo-si	Nampo	291	916,200	WC
P'yõngyang-si	P'yõngyang	772	3,017,600	WC

CONCLUSION

North Korea has historically followed the philosophy of juche, or self-reliance and self-sufficiency, but recent changes in the regional political landscape have forced the country to look outward. The demise of communism in the former Soviet Union and the greatly diminished support from China, have forced North Korea's government to seek new ways to remain in power. With increased concerns over North Korea's nuclear capability and support of terrorism, the United States has directed a spotlight on North Korea. The country now appears to be using uncertainty to leverage economic deals with many western countries. North Korea continues to develop politically with respect to its international policies and relations with South Korea.

North Korea has begun to open up to the international community more in the past ten years than during the previous fifty. Much of the recent changes in North Korea are due to the issues related to declining infrastructure and lack of support from communist regimes in the region. North Korea is likely to continue this gradual process of "looking out" over the next several years out of necessity, rather than choice. Recent pressure from the United States and others over their nuclear weapons program and support of terrorism, have begun to force North Korea to be more forthcoming with information. Rest assured this new era of "cooperation" will come with a price tag.

The relationship between North and South Korea is one area where both countries are striving to improve. The desire for cooperation is greater now than ever before on both sides of the DMZ. North Korea has by far the most to gain from improved relations, both economically and politically. With greatly reduced agricultural and industrial output, North Korea requires large-scale improvements to its economy and infrastructure. Although reunification is not likely in the foreseeable future, the potential for increased trade, the resolution of political differences regarding cross-boarder visits, and the greater emphasis on resolution of issues related to the Demilitarized Zone are hopeful.

Economically North Korea is in a dire situation, with decreases in all aspects of production over the past twenty-five years and continued problems related to modernization. If there is one area that spawns opposition in North Korea is the state of the countries economy. The economic situation and outlook for North Korea will be addressed in Chapter 11, but improving the economy will be critical to the long-term survivability of the north as an independent state. ★

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9 POPULATION GEOGRAPHY

Dennis D. Cowher

Key Points:

- North Korea has an estimated population of 23,200,000 living in an area the size of New York.
- The country's population is concentrated in the coastal plains and broad river valleys.
- North Korea ranks far below South Korea in measures of socio-economic development such as infant mortality and life expectancy.
- It is possible that North Korea underreports its male population in an effort to hide the size of its military.

INTRODUCTION

DEMOGRAPHY, OR THE STUDY of characteristics of human populations, is an interdisciplinary undertaking. Geographers approach the study of population with a unique perspective. *Population Geography* is the study of the ways in which spatial variations in the distribution, composition, migration, and growth of populations are related to the nature of places (de Blij and Muller 2002). Geographers are interested in the reasons for, and consequences of, the distribution of population from the international to the local level. While historians study the evolution of demographic patterns and sociologists the social dynamics of human populations, geographers focus special attention on the spatial patterns of human populations, the implications of such patterns, and the reasons for them. Using many of the same tools and methods as other analysts, geographers think of population in terms of the places that people inhabit.

Demography, or the systematic analysis of the numbers and distribution of human populations, is important because it enables the analyst to explore the interrelationships and interdependencies between people and locales. Given geography's emphasis on different people and places, the discipline offers unique opportunities to examine North Korea's population distribution and characteristics. This chapter is divided into six sections. First, the basic characteristics of the country's population are discussed. Second, population patterns are explained. Third, the composition of the North Korean population is analyzed. Fourth, key demographic indicators

are compared and contrasted to South Korea. The fifth section discusses how migration impacts North Korea's population geography. The final section summarizes the key points in the chapter and offers some conclusions.

CHARACTERISTICS OF THE POPULATION

Ethnic Koreans make up almost the entire population. There is a small Chinese community and a few ethnic Japanese, but for all practical purposes, there are no significant numbers of ethnic minorities in the country (CIA World Factbook 2002).

The Korean language plays a key role in the identity of the Korean people. Korean is spoken in both North and South Korea, and is written in a phonetic alphabet created in the mid-15th century. There are some differences in vocabulary between North and South, influenced by politics and by the contact each country has with other nations. Russian, Chinese, and English are taught as second languages in the schools in North Korea (Microsoft Encarta 2002).

North Korea's government has constitutionally confirmed freedom of religion. In reality, however, religious activity has been discouraged and a majority of the people are nonreligious. Yet the lifestyles and philosophy echo traditional patterns, based fundamentally on Confucian thought. Roman Catholic and Protestant beliefs were introduced in the 18th and 19th centuries, respectively. *Tonghak*, or Religion of the Heavenly Way, is an indigenous religion founded in 1860 as a combination of Confucian and Taoist beliefs. The government points to this religion, which has organized a political party, as proof that religious freedom exists in North Korea. Christians are permitted to meet in small groups under the direction of state-appointed ministers. Shamanism, a belief in household and natural spirits, gods, and demons, still has some influence in rural areas (Microsoft Encarta 2002).

PATTERNS AND DENSITY

North Korea's population distribution is linked to its physical geography. The country's population is concentrated in the coastal plain and lowlands of the country's broad river valleys. Seven of its twelve major cities are on the coast and nine of twelve are situated along a river. Five provinces have populations in excess of two million: P'yongan-namdo (South P'yongan Province), Hwangyong-namdo (South Hwangyong Province), P'yongan-butko (North P'yonggan Province), Pyongyang, and Hamgyong-butko (North Hamgyong Province) (Figure 9.1). Additionally, the climate and soils in these areas are conducive to agriculture and they are among the country's most productive rice growing areas. The least populated regions are the mountainous Chagang-do and Yanggang-do provinces adjacent to the Chinese border.

The majority of North Korea's people live in cities, with 62% of the population considered urban and 38% considered rural (Microsoft Encarta 2002). There are five cities with populations greater than 300,000 (Table 9.1). P'yongyang, the capital, is the largest city with a population of 2.7 million. It is the principal commercial, manufacturing, cultural, and administrative center in North Korea.

Another way to examine population is in terms of density, a numerical measure of the relationship between the number of people and some other unit of interest expressed as a ratio. Crude density, also called *arithmetic density*, is the total number of people divided by the total land area.

According to the CIA World Factbook, North Korea's population totaled 22,224,195 in 2002; inhabiting a land area of 46,540 square miles. Thus, North Korea's average population density equates to 406 persons per mile^2. This land area is the approximate size of the state of New York. For sake of comparison, South Korea has a population of 47 million people living in an area of 38,328 square miles. Thus, South Korea's density is 1,235 persons per mile^2 — or three times as dense.

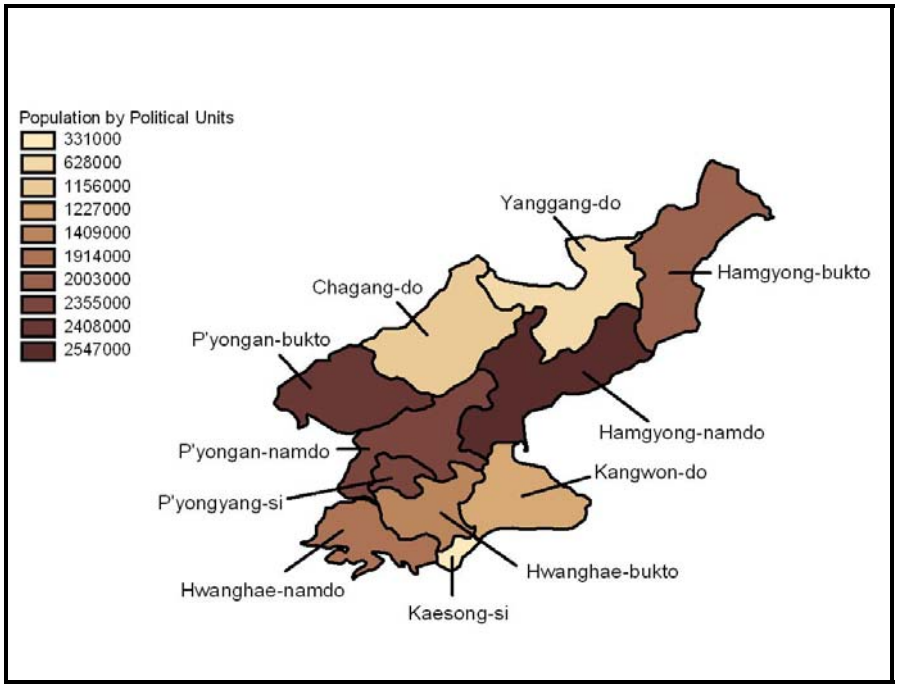

Figure 9.1. Population of North Korean Provinces, 2002.
Source: Microsoft Encarta.

Table 9.1. Population of North Korea's largest cities. Year of record is 2002. Source: Microsoft Encarta, 2002.

CITY	POPULATION
Pyongyang	2,741,260
Nampo	731,448
Chongjin	582,480
Kaesong	334,433
Sinuiju	326,011
Anju-up	205,000

Arithmetic density is crude because it does not take into consideration such factors as a country's arable land. According to the Central Intelligence Agency, only 14 percent of the land in North Korea is considered arable (CIA World Factbook 2002). Therefore, when we calculate the *physiologic density*, which measures a country's population per unit of arable land, North Korea has a population density of 3,427 persons per mi.^{2} compared to 7,214 per mi.^{2} in South Korea. This physiologic density suggests that there is tremendous stress on the country's farmland and the population has perhaps exceeded the land's carrying capacity. Furthermore, North Korea's farmland is declining in productivity owing to soil erosion and degradation (CIA World Factbook 2002). Finally, natural disasters and poor economic management have exacerbated stress on arable land. Aid agencies have estimated that up to two million people have died since the mid-1990s as a result of food shortages (BBC 2002).

POPULATION COMPOSITION

In addition to exploring distribution patterns and density, geographers also examine population in terms of its composition, that is, in terms of its constituent subgroups. Understanding population structure enables analysts to gather important information about population interactions. For example, knowledge of the composition of a population in terms of total number of males and females, size of age cohorts, and number and proportion of people active in the workforce, offers valuable insight into the dynamics of the population.

The most common way for demographers to represent graphically the composition of the population is to construct an *age-sex pyramid*, which is a representation of the population based on its composition according to age and sex. Usually, males are portrayed on the left side of the vertical axis and females to the right. Age categories are ordered sequentially from the

youngest, at the bottom of the pyramid, to the oldest, at the top. By moving up or down the pyramid, one can compare the opposing horizontal bars to assess differences in frequencies for each age group. A cohort is a group of individuals who share a common temporal demographic experience. A cohort is not necessarily based on age, however, and may be defined according to criteria such as time of marriage or time of graduation.

Age-sex pyramids can reveal the important demographic implications of war or other significant events. Moreover, age-sex pyramids can provide information necessary to assess the potential impacts that growing or declining populations might have. Now, let us take a look at the age-sex pyramid for North and South Korea (Figures 9.2 and 9.3) and the accompanying data (Tables 9.2 and 9.3) for both countries for the year 2000.

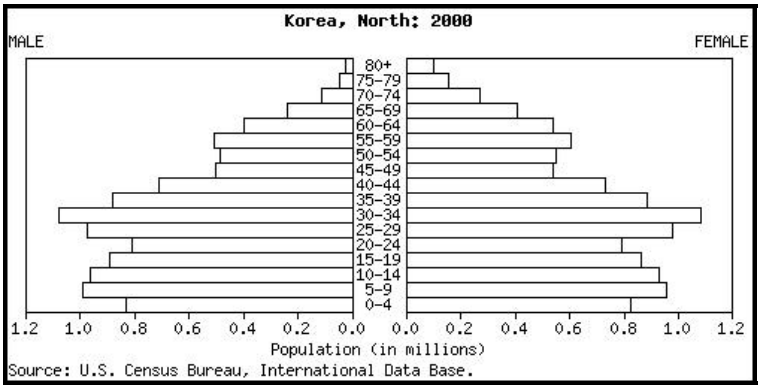

Figure 9.2. Population age-sex pyramid for North Korea, circa 2000.
Source: U.S. Census Bureau.

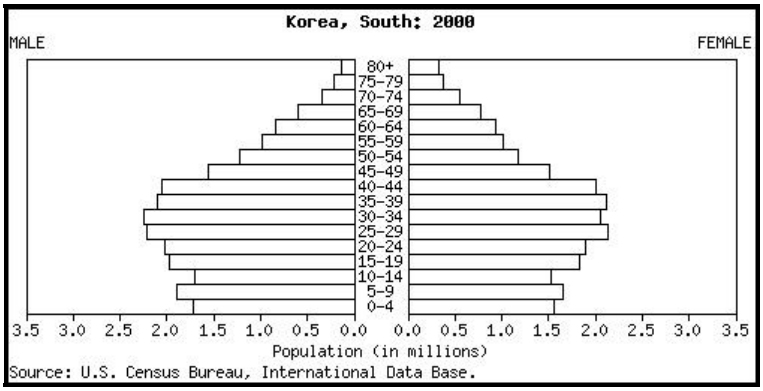

Figure 9.3. Population age-sex pyramid for South Korea, circa 2000.
Source: U.S. Census Bureau.

Many, developing countries have a broad base and steadily tapering higher levels, which reflects a large number of births and young children, but much smaller older-aged cohorts as a result of relatively short life expectancies. North Korea does not exactly fit this pattern; data reveal a "bulge" in the lower ranges of adulthood (Figure 9.3).

Table 9.2. Midyear population for North Korea (i.e., total and percentage), by age and sex (base year is 2000). Population in thousands. Source: U.S. Census Bureau.

AGE COHORT	COHORT TOTAL	% OF TOTAL	SEX RATIO	MALE	FEMALE
00-04	1,655	7.65%	1.01	831	824
05-09	1,943	8.98%	1.04	989	954
10-14	1,893	8.74%	1.04	964	929
subtotal	*5,491*	*25.36%*	1.03	*2,784*	*2,707*
15-19	1,756	8.11%	1.03	892	865
20-24	1,600	7.39%	1.02	807	793
25-29	1,955	9.03%	0.99	974	980
30-34	2,161	9.98%	1.00	1,079	1,082
35-39	1,762	8.14%	0.99	877	885
40-44	1,439	6.65%	0.97	708	732
45-49	1,042	4.81%	0.93	502	540
50-54	1,036	4.79%	0.88	484	552
55-59	1,111	5.13%	0.84	506	605
60-64	938	4.33%	0.74	400	538
subtotal	*14,800*	*68.37%*	0.95	*7,229*	*7,572*
65-69	648	2.99%	0.58	239	410
70-74	380	1.76%	0.41	111	269
75-79	207	0.96%	0.31	49	159
80+	122	0.56%	0.23	23	99
subtotal	*1,357*	*6.27%*	0.45	*422*	*937*
Total	21,648	100.00%	0.93	10,434	11,214

Table 9.3. Midyear population for South Korea (i.e., total and percentage), by age and sex (base year is 2000). Population in thousands. Source: U.S. Census Bureau.

Age Cohort	Cohort Total	Percent of Total	Sex Ratio	Male	Female
00-04	3,282	6.94%	1.10	1,720	1,562
05-09	3,556	7.52%	1.14	1,895	1,661
10-14	3,225	6.82%	1.12	1,702	1,524
subtotal	*10,063*	*21.29%*	1.12	*5317*	*4747*
15-19	3,798	8.04%	1.08	1,969	1,830
20-24	3,917	8.29%	1.06	2,017	1,900
25-29	4,356	9.22%	1.04	2,219	2,137
30-34	4,295	9.09%	1.09	2,238	2,057
35-39	4,219	8.93%	0.99	2,096	2,123
40-44	4,072	8.62%	1.02	2,060	2,012
45-49	3,066	6.49%	1.04	1,561	1,505
50-54	2,390	5.06%	1.03	1,215	1,175
55-59	2,000	4.23%	0.96	981	1,019
60-64	1,784	3.77%	0.89	843	942
subtotal	*33,897*	*71.72%*	1.03	*17,199*	*16,700*
65-69	1,366	2.89%	0.78	597	769
70-74	887	1.88%	0.62	339	548
75-79	586	1.24%	0.55	208	378
80+	461	0.98%	0.41	133	328
subtotal	*3,300*	*6.98%*	0.63	*1,277*	*2,023*
Total	*47,261*	*100.00%*	1.01	*23,792*	*23,469*

One aspect of North Korea's population data that immediately arouses the curiosity and suspicion of a trained population geographer has to do with the country's purported "sex ratio"—the ratio of men to women reported for the population. In the 2000, the U.S. Census Bureau estimated the North Korean population to be 21,648,000, including 10,434,000 males and 11,212,000 females. This is an overall sex ratio (males to females) of 0.93, which is well below South Korea's ratio of 1.01.

In 1953, at the end of the Korean War, North Korea's sex ratio was reported to be 0.88, and in 1956, a ratio of 0.92 was reported. While these are extremely low sex ratios for a national population, they are consistent with figures for other countries that have suffered severe losses in wartime.

Between 1956 and 1970, North Korea's sex ratio was reported to have risen from 0.92 to 0.95, a pattern consistent with postwar demographic recovery and influenced by the fact that slightly more boys than girls are born in a given year—providing a natural situation with no selective abortion. Between 1970 and 1975, however, North Korea's reported sex ratio dropped radically to 0.87, lower than the level reported at the end of the Korea War. Between 1975 and 1987, it was reported to have dropped still further to 0.84 (Table 9.4). Since 1987, the ratio has climbed to 0.93, which is still much lower than South Korea's 1.01.

The spatial differences in the sex ratio across the Korean Peninsula can be explained by two factors. First is the fact that "son preference" in South Korea is stronger than anywhere else in the world (Goodkind 1999). This phenomenon is clearly evident in the sex ratio for South Korea, which at birth is 1.11 males to females. Goodkind (1999) reviewed North Korean statistics including sex ratio at birth, sex ratios of infant and child mortality, and sex ratios of child malnutrition. He found that North Koreans do not evince prenatal discrimination against daughters, a finding that may indicate a lack of prenatal sex-testing technologies (Goodkind 1999). He concludes that the discrepancy in son preference across the Korean Peninsula seems due largely to the socialist agenda pursued by North Korea after World War II. An important aspect of that agenda challenged ancient Confucian ideology (Goodkind 1999).

A second factor attributable to the large differences in the sex ratio between North and South Korea is perhaps even more intriguing. Analysts have argued that the North Korean government, which is one of the most secretive in the world, has deliberately misled the world as to its true population demographics. Eberstadt and Banister (1991) argue that the North Korean government underreports males to make it more difficult for Western intelligence agencies to estimate the size of the North Korean military.

Another important feature of the population pyramid is the *dependency ratio*, which is a measure of the economic impact of the young and old on the more economically productive members of the population. In order to assess this relationship in a particular population, demographers will typically divide the total population into three age cohorts. The youth cohort consists of those members of the population who are less than 15 years of age and generally considered to be too young to be fully active in the labor force. The middle cohort consists of those members of the population aged 15 to 64 who are considered economically active and productive. Finally, the old-age cohort consists of those members of the population aged 65 and older who are considered beyond their economically active and productive years. By dividing the population into these three groups, it is possible to

obtain a measure of the dependence of the young and old upon the economically active and the impact of the dependent population upon the independent.

Table 9.4. Reported total population by sex, 1946-2000 combined with U.S. Census Population Projections (in thousands). Source: Eberstadt and Banister, 1991 and US Census Bureau

YEAR	TOTAL	MALE	FEMALE	SEX RATIO
1946	9257	4629	4628	1.00
1949	9622	4782	4840	0.99
1953	8491	3982	4509	0.88
1956	9359	4474	4885	0.92
1960	10789	5222	5567	0.94
1965	12408	6067	6341	0.96
1970	14619	7127	7492	0.95
1975	15986	7433	8553	0.87
1980	17298	8009	9289	0.86
1982	17774	8194	9580	0.86
1985	18792	8607	10185	0.85
1986	19060	8710	10350	0.84
1987	19346	8841	10505	0.84
2000	21648	10434	11214	0.93
2001	*21940*	--	--	--
2002	*22215*	--	--	--
2003	*22466*	--	--	--
2004	*22698*	--	--	--
2010	*23802*	--	--	--
2020	*25210*	--	--	--

North Korea has a dependency ratio of 0.46. There are 5.4 million children under the age of 15, which is about one-fourth of the population. There are over 1.3 million people over the age of 65. When these dependent cohorts are added together, and then divided by the number of people who are of working age, we come up with the dependency ratio of 0.46. By contrast, South Korea's dependency ratio is 0.39. The difference can be explained by North Korea's higher birth rate and younger population, which we turn to next.

KEY DEMOGRAPHIC INDICATORS

The *crude birthrate* (CBR) is the total number of live births in a year for every thousand people in the population. The crude birthrate for North Korea in the year 2000 was 21 (Table 9.5). This CBR was over 60 percent higher than South Korea's CBR of 13. North Korea's higher CBR can be explained by two primary factors. First, North Korea is less urbanized than South Korea. Sixty-two percent of North Koreans live in urban areas, which is much lower than the 84 percent of South Koreans who live in cities. Generally, urban families will have smaller families than those living in the countryside. The second factor explaining higher birth rates is each country's general level of economic development. Gross Domestic Product (GDP) per capita is often used as a general indicator of economic development, which in turn is correlated to a country's CBR. South Korea has a GDP per capita of $18,000, whereas North Korea has a value of $1,000 (CIA World Factbook 2002).

Table 9.5. Demographic indicators for North Korea, South Korea, and the United States. Source: U.S. Census Bureau.

INDICATOR	NORTH KOREA	SOUTH KOREA	UNITED STATES
Births per 1,000 of population	21	13	14
Deaths per 1,000 of population	8	6	9
Rate of Natural Increase (%)	1.4	0.8	0.6
Annual Rate of Growth (%)	1.4	0.8	0.9
Life Expectancy at birth (years)	68	74.7	77.1
Infant deaths per 1,000 live births	34	8	7
Total fertility rate (per woman)	2.4	1.5	2.1
Doubling Time	50.00	87.50	116.67

The crude birthrate is only one of the indicators of fertility. Another indicator used by population experts is *total fertility rate* (TFR), which is a measure of the average number of children a woman will have throughout her childbearing years, approximately ages 15 through 49. Whereas the CBR indicates the number of births in a given year, the TFR is a more predictive measure that attempts to portray what birthrates will be among a particular cohort of women over time. A population with a TFR of slightly higher than two has achieved replacement level fertility. This means that birth and death rates are approximately balanced and there is stability in the population. The TFR for North Korea is 2.4, which is well above South Korea's TFR of 1.5

but below the world average of 2.8. North Korea's TFR indicates that the population will continue to grow only modestly in the future. The U.S. Census Bureau predicts that North Korea's present TFR of 2.4 will decline to 1.8, a figure below the level required to replace the population. With this drop in fertility, the current population of 22 million will only climb to 25 million by 2020 (Table 9.5).

Closely related to the TFR is the doubling time of the population. The *doubling time*, as the name suggests, is a measure of how long it will take the population of an area to grow to twice its current size. To compute a country's doubling time, we simply divide the number 70 by the rate of natural increase. In the case of North Korea, the rate of natural increase is 1.4 (Table 9.6), which is considerably higher than South Korea's 0.8. To calculate North Korea's doubling time, we divide 70 by 1.4, and we get a period of 50 years. It is troubling, given North Korea's current level of economic development and environmental concerns that the country's population will double to 44 million in the next five decades.

Countering birthrates and also shaping overall population numbers and composition is the *crude death rate* (CDR), the ratio between the total number of deaths in one year for every thousand people in the population. Crude death rates often reflect levels of economic development. North Korea's CDR is 8, which is slightly above South Korea's value of 6.

Death rates can be measured for both sex and age cohorts and one of the most common measures is the *infant mortality rate*. This figure is the annual number of deaths of infants less than one year of age compared to the total number of live births for that same year. The figure is usually expressed as number of deaths during the first year of life per 1,000 live births. The infant mortality rate has been used by researchers as an important indicator both of a country's health care system and the general population's access to health care. North Korea's infant mortality rate is 34 deaths per 1,000 live births, which is four times higher than South Korea's value of 8.

Related to infant mortality and the crude death rate is *life expectancy*, the average number of years an infant newborn can expect to live. Infants born in North Korea in the year 2000 can expect to live an average of 68 years, while infants born in the same year in neighboring South Korea could expect to live six years longer, to 74.7.

MOBILITY AND MIGRATION

In addition to the population dynamics of death and reproduction, the movement of people from place to place is a critical aspect of population geography. Like South Korea, North Korea has experienced significant urban migration since the end of the Korean War. In 1953, it was estimated that only 17 percent of the population was classified as urban (Goodkind

1999). In 2002, about 62% of the population was considered urban. The government restricts and monitors migration to cities and ensures a relatively balanced distribution of population in provincial centers in relation to P'yongyang.

Migration has two forms, emigration and immigration. Emigration is migration out from a location; immigration is migration into a location. A decision to migrate stems from a perception that somewhere else is a more desirable place to live. People may hold very negative perceptions of their current place of residence or very positive perceptions about the attractiveness of somewhere else. Negative perceptions that induce prompt to move away are *push factors*, whereas *pull factors* attract people to a new destination. Of course, these push and pull factors assume a free society where people can choose where to live and have a choice to migrate. According to the CIA, there is a net migration rate of 0 in North Korea. This reflects the closed nature of the North Korean government. There is no immigration or emigration in North Korea. Nobody is allowed in or out of this closed bastion of Communism.

CONCLUSION

The discipline of geography brings a unique spatial perspective to the scientific study of population. This chapter has used this perspective to examine the population distribution and characteristics of North Korea.

North Korea's demographic statistics paint a bleak picture of the future prospects for the country. The country's economy does not currently have the capacity to grow fast enough to provide opportunities for its growing population. North Korea will likely require international aid to avoid famine and human misery on a massive scale. The government is certainly part of the problem. The current regime spends about one-third of its national income on the military, rather than feeding its own people (CIA World Factbook 2002). These resources could provide infrastructure improvements, health care, quality food, and new irrigation schemes. ★

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Republic of Korea Army soldiers from the Joint Security Area Battalion stand guard at the Military Demarcation Line at Panmunjom, Republic of Korea. Source: U. S. Air Force photograph by TSgt(s) Renee' Sitler.

10 URBAN GEOGRAPHY

Brandon K. Herl

Key Points:

- North Korea's urbanized areas fall into one of three general categories based upon landscape type: Interior River Valley, East Coast, and West Coast.
- Most of North Korea's cities are located on or within five kilometers of a river, but the largest cities are coastal cites that have river access.
- West coast cities have a greater degree of connectivity and interdependence than Interior and east coast cities.
- Major urban problems revolve around a lack of resources, public utilities, and space for growth, since developable land is also needed for agriculture.

URBAN GEOGRAPHY FOCUSES ON the location, functions and growth of urban areas. Generally, the goals of urban geographic analysis are to understand the spatial structure and organization of population centers, to examine the spatial interaction and connectivity between cities, and to explain the processes that created the observed patterns (Palka 2002). Cities are centers of power and nodes of concentrated political and economic activity. As such, urban areas are just as vitally important to a rural, underdeveloped country as they are to a modern, highly urbanized, and developed country (Getis et al. 2001).

This chapter focuses on general population center trends and the universal characteristics of North Korean cities. This analysis considers the site (the characteristics of a city's physical location and local surroundings) and the situation (the relationship and function of a city in respect to other cities outside its local area) of selected cities. Special attention is directed to structural layouts and the resulting land-use problems.

RURAL AND URBAN SETTLEMENT STATISTICS

North Korea's physical landscape and unique history have, over time, contributed to its modern settlement and urban landscape patterns. The locations, as well as the internal characteristics of North Korea's major cities, have been largely defined by the lay of the land. Rugged mountains, narrow river valleys, and segmented coastal plains provide marginal space for large,

sprawling cities. Figure 10.1 illustrates the location of North Korea's largest and most important cities.

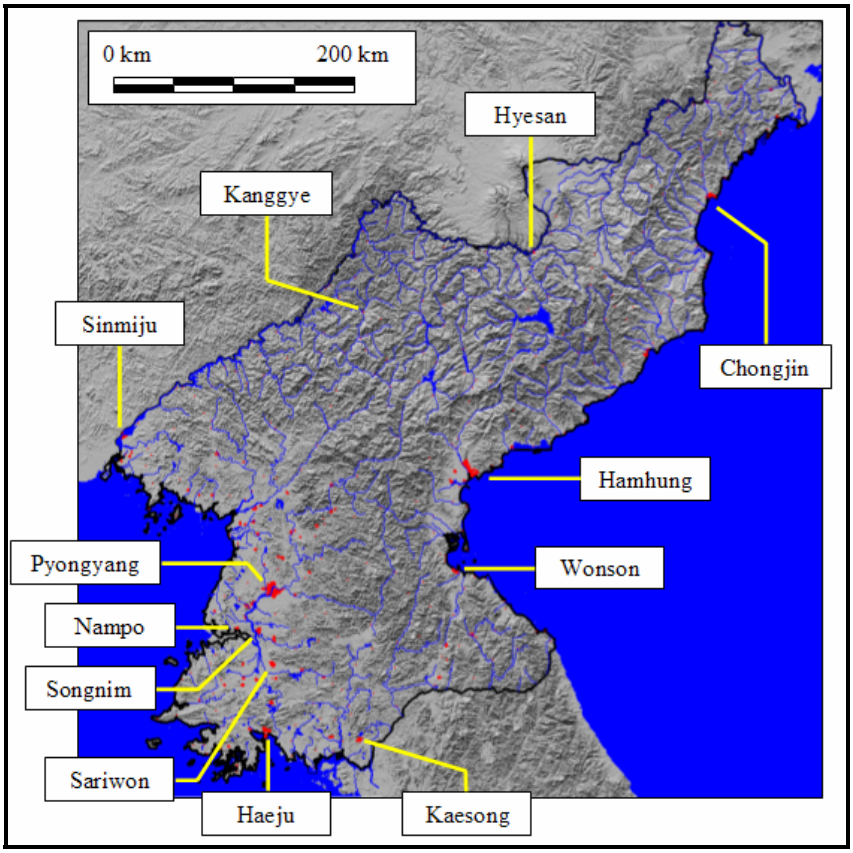

Fig 10.1. Physical map illustrating North Korea's major urban centers.
Source: Author.

If flat, developable land is considered a rare find throughout the Korean Peninsula; it is less prevalent in the north. Estimates state that only 14% of North Korea's entire land mass is considered to be arable land suitable for farming; yet this is also the most suitable land for expansive urban development (Countrywatch 2002; North Korea—A Country Study 2002; Encyclopedia Britannica Online 2002). The lack of reliable population and urban composition data complicates any detailed analysis of North Korea's urban landscape. Generally accepted population statistics are provided in the Table 10.1. Not accounted for in these data are an estimated four-hundred cities with populations of less than 20,000, scattered mostly in the coastal plains and along the interior river valleys.

Table 10.1. North Korea's fourteen largest population centers. Source: Webclocks.com/populations.

RANK	CITY NAME	EST. POP ca. 2000	RELATIVE LOCATION	ON COAST	ON RIVER
1.	P'yongyang	2,848,000	Western-Central	--	Yes
2.	Hamhung	848,000	Eastern-Central	East	Yes
3.	Chongjin	629,000	Eastern-North	East	Yes
4.	Nampo	447,000	Eastern-Central	West	Yes
5.	Sinmiju	349,000	Western-North	West	Yes
6.	Wonsan	331,000	Eastern-Central	East	Yes
7.	Kanggye	255,000	Central-North	--	Yes
8.	Haeju	236,000	Western-South	West	--
9.	Sariwon	165,000	Western-South	--	--
10.	Songnim	146,000	Western-Central	West	Yes
11.	Kaesong	145,000	Western-South	--	--
12.	Hyesan	110,000	Central-North	--	Yes
13.	Najin	91,000	Eastern-North	East	Yes
14.	Kimchaek	21,467	Eastern-North	East	Yes

GENERAL URBAN CATEGORIES

There are three general categories of low-relief land that facilitate urban and/or agricultural development in North Korea: the broad coastal lands along the western coast, the smaller and more fragmented coastal lands along the east coast, and the interior's extremely narrow and linear tracts of land along major rivers, dry valleys, or isolated mountain plateaus. Figure 10.2 demonstrates the correlation between urban places and river valleys in North Korea.

• *Interior River Valley Cities*

The narrow interior river valleys are generally marginal places for agricultural and urban development. Urban centers in these areas—mostly smaller towns and villages—are rectangular in shape with the long axis paralleling the river and a local road. Buildings tend to be smaller, single-story structures. Occasionally, multi-story structures appear, but these buildings are normally found only in larger towns and small cities (Bikkal 1997; Franken 1994). Due to the rugged terrain, limited public utilities (i.e., power, telecommunications, water treatment plants, etc.) are available in these regions (Gasiorek 1997; Young-Hwa 2002; Eilers 2002).

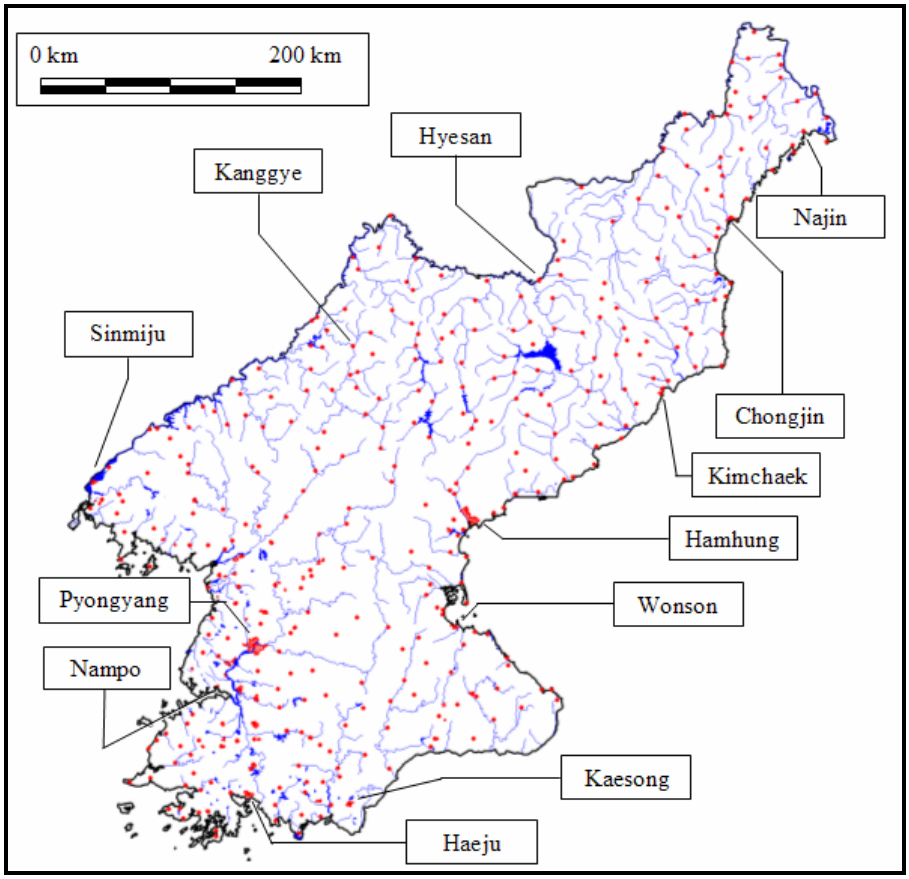

Fig 10.2. North Korea's urbanized areas and large rivers.
Source: Author.

In the places where the land is flat, but with insufficient acreage to support large settlements, family-sized farmsteads are the norm. While discouraged under official governmental laws and practices, these areas still exist in the north-central provinces due mostly to the cultural practices of the mountain peoples who have lived on these marginal lands for hundreds of years (North Korea—A Country Study 2002). Figure 10.3 illustrates settlement patterns in high mountain valleys in north-central North Korea.

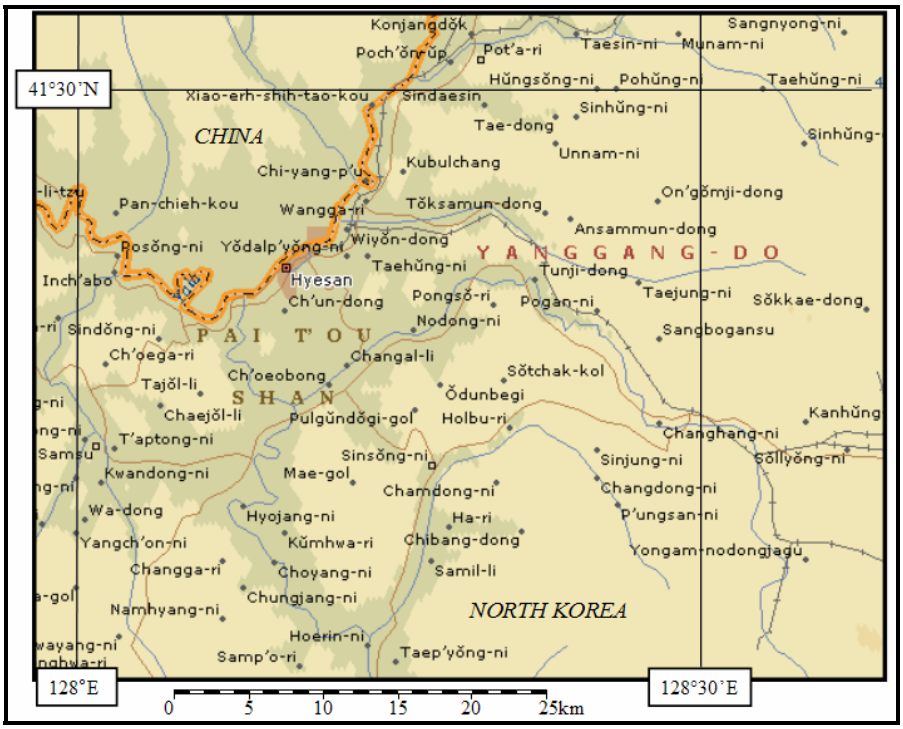

Figure 10.3. Hyesan and mountain valley city development patterns. Darker color represents lower elevations in river valleys. Source: Microsoft Encarta 2002.

Where larger tracts of open, flatter ground do exist, smaller villages and towns dot the valley floors at irregular intervals (Figure 10.3). These areas rely mostly upon subsistence agriculture for their livelihood, occasionally with a mining or the forestry component to the local economy (North Korea—A Country Study 2002; Encyclopedia Britannica Online 2002).

Because river valleys facilitate movement through the rugged interior of North Korea, the locations where navigable rivers intersect with large tracts of flat land are suitable places to find major towns and cities. Unfortunately, these places are also where flood-prone mountain rivers either join with a second river or sharply change their course along a major river bend (Johnson 1972; Northam 1975).

Accessibility, gentle relief, and resource availability provide ideal conditions for urban development. Kanggye and Hyesan, the seventh and twelfth largest cities in the country, benefit from these conditions. Figure 10.4 is a digital elevation model of Kanggye and the surrounding terrain, illustrating the relationship between terrain, rivers, and city location.

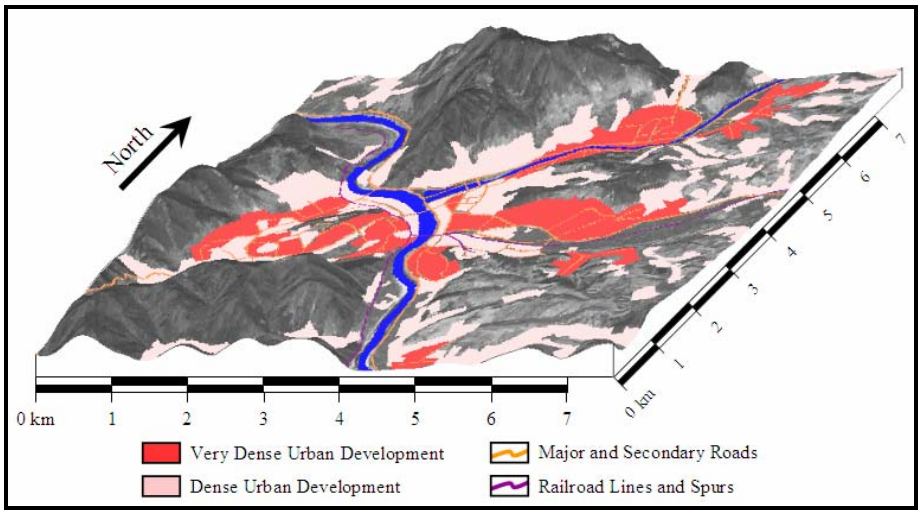

Figure 10.4. Kanggye's local development Patterns based upon terrain.
Source: Author.

Another factor in city development is its relationship or connectivity to other cities (Getis et al. 2001). Villages and towns tend to be focal places of trade and commerce for a general area. Larger city growth, however, occurs only if a population center can capitalize on a strong proximity influence and expand its functional importance to other cities outside of its immediate area (Abrams 1973).

Kanggye and Hyesan owe much of their status as major interior cities to fortunate physical location traits and to their proximity and connection to other North Korean cities. Additionally, both cities are either on or very near the international border with China. As such, they form a conduit of overland trade with China and North Korea. Both Kanggye and Hyesan may have been influenced by this situational advantage.

In the fragmented and extremely mountainous lands of North Korea's interior, however, it is doubtful that any type of large-scale interaction between these cities and the rest of the country will ever occur. As such, the size and national importance of the country's interior cities will likely remain limited.

Usually, North Korean cities are established in the coastal zone and, more often than not, astride a major river. North Korea's coastal cities have two advantages over the interior cities: 1) more available flat space for growth and development; and 2) easy and quick access to other cities via coastal shipping lanes.

Coastal cities form the industrial backbone of the country, but due to their location on farmland, their layouts and growth patterns are often

difficult to analyze unless they are further categorized by their location on the eastern or western coast. The major difference between east coast cities and west coast cities is the availability of developable land in and around the central city.

• *Eastern Coastal Cities*

East coast cities, even with excellent economic access to the Pacific Ocean region—especially Japan and Russia—have some major natural drawbacks, namely flooding (Countrywatch 2002; North Korea—A Country Study 2002; Young-Hwa 2002). The coastal plain along the east coast is small and limits development. They also tend to experience local flooding given their location to some of the highest mountains in the region and further compounded by the much shorter river lengths. Flash flooding is common and extremely devastating to structures and agricultural lands built along riverbanks. North Korea's two largest east coast cities, Hamhung and Chongjin, must deal with these matters regularly.

Hamhung (Figure 10.5) is North Korea's second largest city, with a population of nearly 850,000. While near the center of the eastern coastline, it cannot dominate this eastern half of North Korea in the same way that P'yongyang has for most of the western coastal areas.

Hamhung's influence is geographically confined to an area roughly 100 kilometers from its center, but mostly concentrated along the coastline. Hamhung is a vital port city that can easily extend its reach into the Sea of Japan and influence economic or military situations in this area. Hamhung's major limitation stems from its lack of overland connectivity and access to the western half of the country (North Korea—A Country Study 2002).

Chongjin is North Korea's third largest city and is also an east coast city that exerts strong regional influence, but is limited by both physical and international geographic barriers. Figure 10.6 illustrates the physical barriers to Chongjin's development. The city is encircled by significant relief to the north and west, and the ocean to the east. With a population of nearly 630,000 people and a major port city, Chongjin is another North Korean city that has a long reach into the Sea of Japan. During World War II, Japan used Chongjin as a major iron and steel production center (Microsoft Encarta 2002; North Korea—A Country Study 2002; VNC Travel 2002). Chongjin is situated in the tri-country border region where China, Russia, and North Korea meet at the coast and along the banks of the Tumen River about 225 kilometers from Vladivostok, Russia.

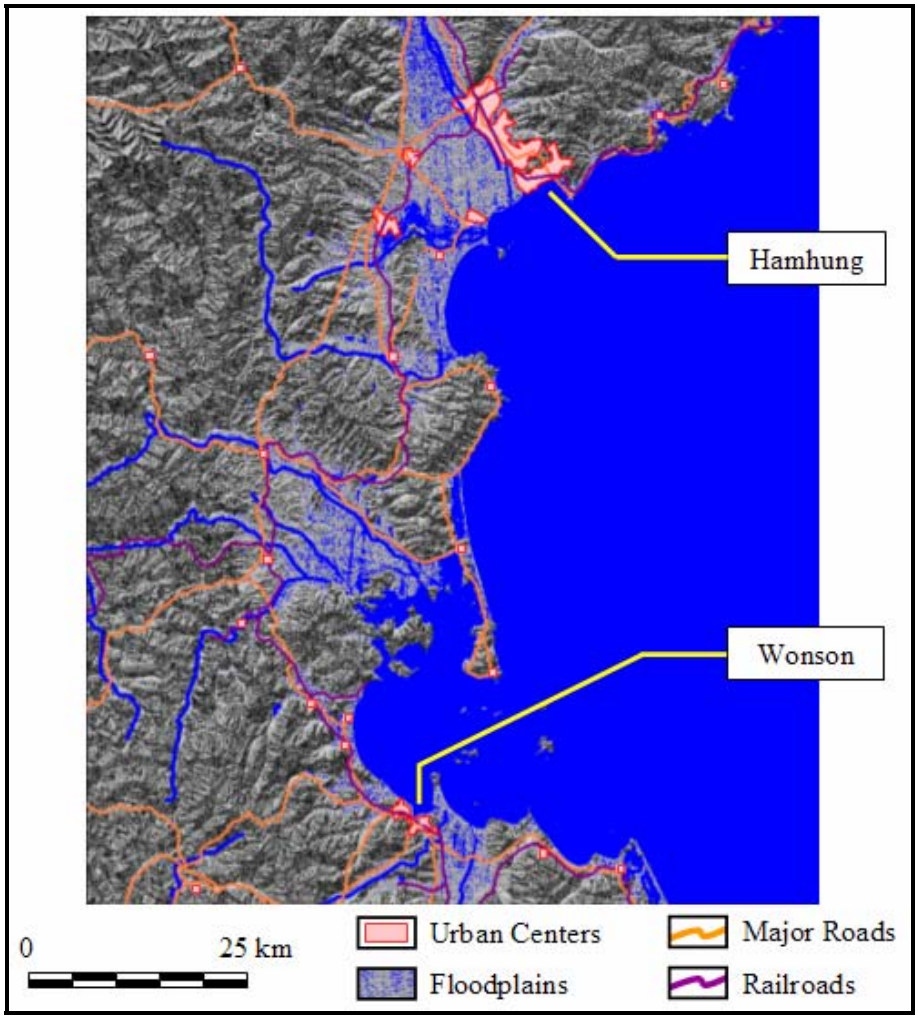

Figure 10.5. Hamhung, Wonson and Vicinity
Source: Author.

Two other areas of urban development on the east coast are in and around the cities of Najin and Kimchaek. These two cities are North Korea's thirteenth and fourteenth largest cities with populations of 91,000 and 22,000 respectively. While both form locally significant population centers, they are isolated and have limited regional importance, especially compared to the much larger Chongjin and the Hamhung-Wonson urban centers.

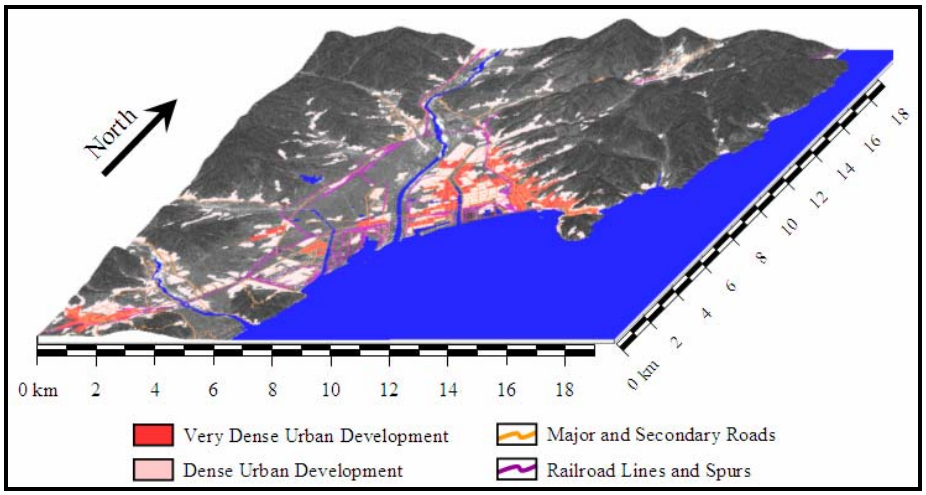

Figure 10.6. Digital elevation model of Chongjin and vicinity.
Source: Author.

• *Western Coastal and Coastal Plain Cities*

Western coastal and coastal plain cities have the largest amount of developable land and are generally far enough away from the mountains to make susceptibility to severe flash flooding less of a problem. As such, the cities tend to be larger in both areal extent and total population.

Western cities also tend to be more interconnected by road and rail lines, as well as by natural river systems. Their interdependence is also developed to a much greater degree, further facilitating their potential for future growth (Johnson 1972). These latter points have turned the western coastal cities into the manufacturing region of the country.

P'yongyang is North Korea's largest city as well as its national capital. With a population estimated to be 2,850,000, it is nearly three times larger than the country's second largest city, prompting geographers to classify P'yongyang as a primate city (Getis et al. 2001; Johnson et al. 2000). P'yongyang sits centrally located within the midst of the country's main agricultural, economic, and industrial activity.

Three of North Korea's top ten cities (Nampo, Songnim, and Sariwon) all are less than sixty kilometers away from P'yongyang, and the eighth-largest city, Haeju, is slightly more than one-hundred kilometers away. All of these cities are on comparatively flat ground and have either road or rail connectivity to P'yongyang. Furthermore, Nampo and Songnim both have direct access to P'yongyang via the Taedong River.

Although P'yongyang is not a true coastal city, its location along the banks of the Taedong-gang River give the city ocean access via the Korea Bay, while remaining somewhat protected from the ravages of coastal storms common to this part of the world. It sits in the center of the western coastal region and dominates all commerce moving north and south along the North Korea's western half of the peninsula.

P'yongyang is also the "showcase" city of North Korea. It rivals any modern city in the United States in regards to its numerous public parks, extreme cleanliness, wide streets, and a distinctive skyline. It is also the only city in North Korea that has an underground subway system. While this subway has only two lines, it is a major national accomplishment and point of pride that rivals the numerous shrines and monuments dedicated to the North Korea's political and cultural accomplishments and conspicuously placed prominently throughout the capital city (Franken 1994; Eilers 2002; Schmuland 1999; P'yongyang-Metro.com 2002).

Two large western cities of note that lie outside of P'yongyang's immediate area of influence are two border cities, Kaesong to the south and Sinmiju to the north. Kaesong, a landlocked city near the Demilitarized Zone separating North and South Korea, is North Korea's eleventh largest city with a population of roughly 146,000. A large city on its own merit, Kaesong is also the ancient capital city of the Korean Peninsula. Furthermore, both countries view control of Kaesong as a mark of national pride and significance (VNC Travel 2002; Encyclopedia Britannica Online 2002). In addition to its location near the Demilitarized Zone, Kaesong is situated along the traditional line of communication between the old kingdom's northern and southern provinces, which has served as the long-established invasion route along the Korean Peninsula (Microsoft Encarta 2002).

Sinmiju (Figure 10.7) is another border city that lies just outside of the reach of P'yongyang's immediate influence. With a population of 350,000, it is North Korea's fifth largest city. Sinmiju is on the mouth of the Yalu River, North Korea's navigable gateway to its northland interior. Sinmiju must share this access route with its larger and more prosperous Chinese sister-city, of Dandon (population 550,000).

Unfortunately for North Korea, the more favored site is occupied by Dandon, which is on slightly higher ground and outside of the Yalu's main floodplain. Furthermore, with some of the economic reforms that have been enacted over the years within the People's Republic of China, Dandon has blossomed and grown, placing greater strain on the relationships between the two cities and countries (Kwok 1981; Buck 1981; Cannon 2000).

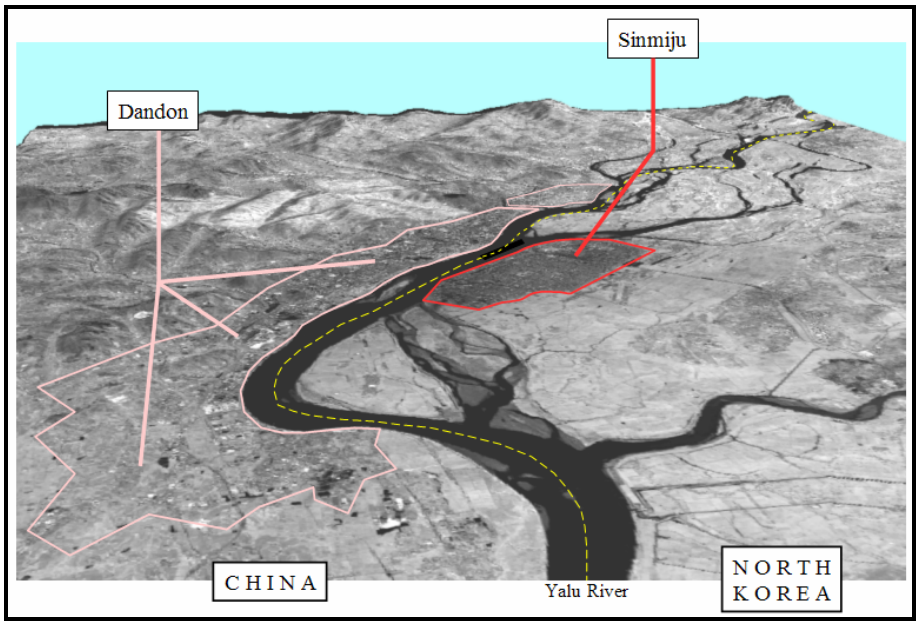

Figure 10.7. Sinmiju, North Korea and Dandon, China
Source: Author.

COMMON URBAN CENTER CHARACTERISTICS

One of the traits of nearly all of North Korea's cities is their proximity to water features. While seven of the top ten of North Korea's largest of cities are coastal, the vast majority of cities are on or near a large river. Many of these cities tend to have developed on both sides of the rivers and have numerous bridges connecting the halves.

In an unrefined, fundamental geographical analysis comparing the 350 largest North Korean cities nearness to rivers, Table 10.2 helps illustrate the relationship between North Korean cities and river systems. The analysis did not account for factors such as the varying width of the river valleys within the country.

The river valleys of North Korea that are able to sustain urban areas of 10,000 people or more generally have a width between one and five kilometers. Population centers on the order of 10,000 are situated every 20-30 kilometers (13-19 miles), even in the more rugged mountainous regions (i.e., north-central) between the Kanggye-Chongjin-Hamhung triangle.

Table 10.2. North Korean cities and river distance relationships. Source: Author.

DISTANCE FROM LARGE RIVER	CITIES WITHIN GIVEN DISTANCE	PERCENTAGE WITHIN GIVEN DISTANCE
≤ 1 km (~0.6 mi)	164 of 350	46.9%
≤ 5 km (~3.1 mi)	281 of 350	80.3%
≤ 10 km (~6.2 mi)	326[1] of 350	93.1%

[1.] Of the twenty-four cities not within ten kilometers of a river, twelve were coastal cities.

Structurally, most cities tend to be rather "flat," with towering high-rise buildings extremely uncommon in all but the capital of P'yongyang, which has most of the high-rise buildings in the country (Skyscrapers.com 2002). Multi-story buildings in the remainder of North Korea's cities are confined to industrial buildings and high-density, low-rise apartments (fewer than eleven floors) built to house the city's industrial workers.

In order to maximize land-use for urban development and agricultural use, inner-city space is focused on housing vice infrastructure (Abrams 1973). The net result is narrow, winding streets. However, in the aftermath of the Korean War many cities sought to remedy older, archaic street patterns in favor of modern grid patterns (Eilers 2002; Franken 1994). Still common to many cities are linear streets that converge on central city locations such as bridges, market areas, and large public gathering places.

One of the distinctive features of North Korea's urban areas is the absence of transition zones between rural/agricultural lands and city limits (Northam 1975; Bikkal 1997; Schmuland 1999). While a physical shortage of flat land helps to explain the lack of a transition zone, another explanation could lie within the North Korean national philosophy of juche becoming manifest at a regional or municipality level. Unlike many American and Western European cities, North Korea cannot afford the luxury of creating a transition zone from rural countryside to developed industrial area. With flat, developable land at a premium in this mountain-dominated country, productive cropland goes right up to and borders modern city infrastructure.

Occasionally this border is well defined, but in most places, it often has an interwoven, jagged appearance that gives the illusion of being a narrow strip of a green and grey patchwork quilt. The obvious effect is that when a city of any size is approached from any direction, the transition from open farmland to urban buildings is short-lived.

CONCLUSION

One overarching theme present in the urban geography of North Korea is the degree of influence the physical landscape on city development. The locations of most major population centers are sited on the few places with relatively flat terrain within the country's overwhelmingly rugged landscape. Access to the country's interior is extremely difficult and often confined to existing rivers and their associated valley systems. As such, interior city development and growth are extremely limited.

The largest of North Korea's cities are coastal. East coast cities are isolated and align themselves with the pockets of low-ground at river mouths, which present a host of flooding problems for the city's inhabitants. West coast cities are also vulnerable to flooding, but their primary struggle is in trying to find the delicate balance between allocating relatively flat ground for both agricultural development and urban growth. ★

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11 ECONOMIC GEOGRAPHY

Albert A. Lahood

Key Points:

- North Korea has continued to experience a policy-driven economic decline.
- Civil unrest due to scarcity of foodstuffs may be looming on the horizon.
- Kim Jong Il will likely continue to practice brinksmanship diplomacy.

THE DEMOCRATIC PEOPLE'S REPUBLIC of North Korea (DPRK) has an economy that ranks at the lower end of the world's economic spectrum (201st out of 228 countries), with a per capita GDP of $1,000 U.S. (*CIA* 2002). Many researchers agree that this is a result of a command economy that dictates state ownership of the means of production and centralizes planning for agricultural and industrial output, as well as the exchange value and distribution of commodities (Carter et al. 1995; Eberstadt 1997; Kim 1992; Kong and Kim 1997; Noland 2002; Oh and Hassig 2002; Young 2000). The motivation of laborers, however, also seems inextricably linked to the command economy's structure, in that labor's incentive to efficiently produce is removed as a result of the equivalent wage compensation structure. This exacerbates systemic production problems resulting in the inability to meet domestic consumption needs.

Economic Geography is ultimately the study of production that "forms the material basis of international relations and, at the same time, sets the local context for urban and regional development and social conflict/acquiescence/support which underpins development" (Scott and Storper 1986). In a developing economy, making a living is inextricably linked to the environment in which people reside, because each biome provides unique opportunities and limitations by virtue of its latitudinal position, topography, climate, vegetation and mineral deposits. Human uses of these endowments, however, are only limited by the possibilities conceived by and the decisions made by people; therefore, environment is not the determinant, policy is. In North Korea's version of a command economy, decision-making authority is centralized, thus limiting the possibilities of economic innovation and creativity by their *proletariat*. As a result, the country has been unable to sustain its initially rapid economic

growth and development during the 1950s and 60s, and since the 1970s, has been on a steady path of economic decline. This is evident in view of the current food crisis.

COMMAND ECONOMY

North Korea reorganized its economic space by collectivizing agriculture into state owned units that are permanently leased by the residents. These units are theoretically self-governing and self-sufficient. The collective is responsible for paying its members and purchasing tools, equipment, seeds and fertilizer from local producers. The collective is also accountable to the state for meeting production goals set by the state's published economic plan. This same structure is also applied to the industrial sector. The manufacturing facilities are owned by the state and by extension the workers. The workers are responsible for the plant's self-sufficiency and they are accountable for meeting production quotas. These two sectors are encouraged to cooperate and form local and regional complementary economic relationships, where each productive enterprise within the state's economy provides the consumption needs of the other. This self-reliant system, known as *juche*, is intended to produce an economically autonomous state that meets all the needs of its people without the need for imported goods (Kim 1992).

ECONOMIC STRUCTURE

The internal decision-making structure of each industrial plant and collective farm is theoretically democratic. The Taean Work System is comprised of two organic committees that run each enterprise. The Party Committee is comprised of representatives elected from the workers, managers, technicians and the party secretary. Its advisory role is to ensure that the national production goals are met and the loyalty of the workers is maintained. The Executive Committee is responsible for the day-to-day operation of the factory or collective. The government claims that this is a democratic system and all the managerial decisions are made based on consensus of the members of the Party Committee, but it is more likely that the party secretary has the final decision making authority (Library of Congress 1993). The Teaen System has endured since 1960 and Kim Il Sung touted the system's ability to enable "the producer masses to fulfill their responsibility and role as masters and to manage the economy in a scientific and rational manner' (Library of Congress 1993). In practice, however, juche has limited both production and market, and the goal of self-reliance has failed in the most profound way, starvation.

The lack of external competition and the limited size of the domestic market results in production inefficiencies, poor quality control, underutilization of capacity and the inability to take advantage of economies

of scale (Australian Department of Foreign Affairs and Trade 2000). Thus, the system that is meant to free North Korea from economic dependence prevents the industrial and agricultural sectors from exploiting their regional strengths based on topography, climate and mineral deposits. This has led to under-production of inferior goods and economic isolation. The wound is self-inflicted, and is a systemic policy problem of a command economic structure, as seen in the cyclical economic crises in Russia (1933), China (1950-61) and Vietnam (1955-56) (Eberstadt 1997). Each of these aforementioned states has adjusted their internal market orientation through selective engagement with the global economy, whereas North Korea, to this point, has not made any significant structural adjustment (Kong and Kim 1997). North Korea has the mineral resources and a literate labor force that could enable it to become a productive economy, if economic reforms are initiated.

FUNCTIONAL ORGANIZATION

The economic space of the Korean Peninsula is a legacy inherited from Japanese colonialism. After the Japanese conquered the territory, like many other colonial powers, they reoriented the economic organization toward primary resource extraction and export. Integral to Japan's economic strategy was the concept of *areal functional specialization*. Under this concept specialization of economic activities are regionalized so that "particular peoples and particular places [are] concentrated on the production of particular goods' (deBlij and Muller, 2000, 48). Each region focuses on an activity so that it has a comparative advantage over others. In the Korean case, the Japanese colonizers evaluated terrain and climate and then implemented an economic development plan. The Northern portion of the peninsula was deemed too cold and mountainous to be agriculturally significant and therefore primary extractive industries (mining) were developed, as well as, heavy secondary industries, such as smelting iron ore and coking coal, two minerals, with which the north is well endowed (Figure 11.1). The northern P'yngan Province is estimated to have one of the world's largest high-quality anthracite coal deposits (Library of Congress 1993). Warmer climate and greater availability of arable land relegated the south to food production and limited light industries. The Korean Peninsula provided Japan with the resources needed for industrialization, just as Africa and the Americas fueled Europe's industrial drive. The internal infrastructure that Japan developed was oriented toward exploitation of the interior and the transportation of commodities to the ports for export. Therefore, the inter-urban transportation connections of the Korean landmass were limited by the export oriented system. This legacy is still visible in the early 21st century throughout the landscape of the north. Additionally, heavy industry represents over 40% of their GDP and is concentrated in the primary extractive and machinery (weapons) sectors (Country Watch 2003).

Although North Korea has attempted at various times to balance its productive sectors of agriculture and light manufacturing, it has always returned to a heavy industrial focus. This is evidenced by Kim Jong Il's 1998 renewal of the "heavy industry first policy" (Noland 2002; Young 2000).

The concept of juche applies to the local scale as well. Metropolitan areas are encouraged to become self-sufficient by establishing micro-economic complementarity. This equates to each metropolitan area having to produce most agricultural, light manufactured consumables, and heavy industrial commodities with little support from adjacent regions. Therefore, if one metropolitan area ceases to function, it has an insignificant impact on the others. North Korea's military industrial complex is thus nodal, and each metropolitan area can sustain military operations to some greater or lesser degree independently of the others.

ECONOMIC CRISIS

North Korea's economy has collapsed in the sense that its industrial and agricultural production cannot meet even the most basic consumptive requirements to sustain life (Noland 2002). This economic failure is rooted in some internal policy decisions as well as some external phenomena beyond the county's control.

The state's decision to favor the heavy industrial sector with the preponderance of government subsidies over the light manufacturing and agricultural sectors contributes to the systemic crisis. From the inception of this communist state, the government favored heavy industry, primarily defense related activities. "Industry's share of the combined total of gross agricultural and industrial output climbed from 28 percent in 1946 to well over 90 percent in 1980' (Library of Congress 1993). The tangible result of this policy has been more artillery and less rice (Noland 2002). Additionally, the CIA estimates that 31% of North Korea's GDP is spent on defense, and the per capita GDP of $1,000 U.S. is inflated. Kim Jung Il seemed to be addressing this unbalanced sectoral development in the 1994-6 three year economic plan that adopted the "Agriculture first, light industry first and trade first" slogan (Young 2000). Kim Jung Il, however, never committed sufficient resources because of resistance from his industrial constituency and the risk of alienating the military. Thus, "heavy industry first policy" was again in place, indicating that North Korea was resuming its arms build-up (Young 2000).

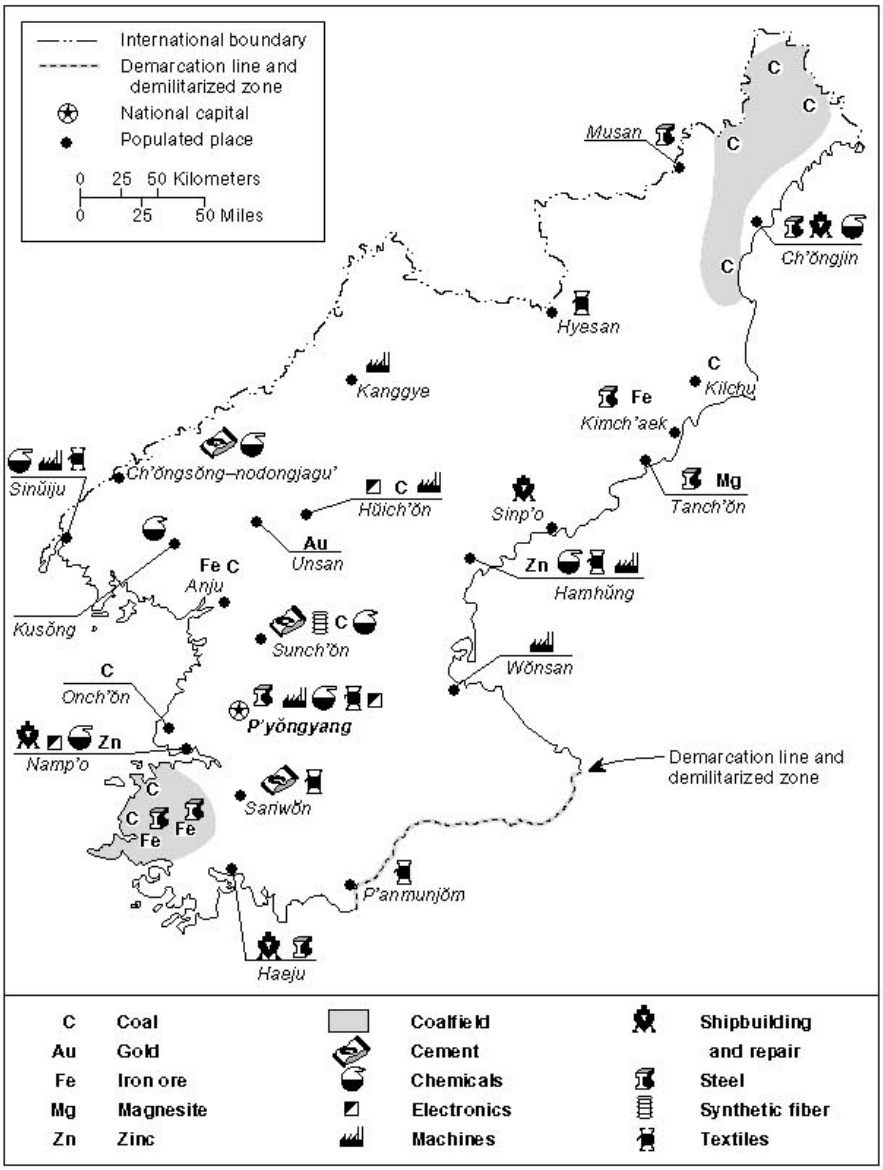

Figure 11.1. Locations of major industry in North Korea.
Source: Library of Congress, 1993

The transformation of the predominantly rural agrarian society into an urban industrial society has exacerbated the chronic food shortages do to the underdevelopment of agriculture production. During the Russian, Chinese, and Vietnamese food shortages, their respective populations were predominantly rural, about 70%. Therefore, individual households were able to subsist off the land. Unfortunately for the people of North Korea, the high

percentage of urban dwellers (64%) do not have this option (Ebert 1997). The later half of the 1990s has seen a series of floods, droughts and typhoons that have triggered famines of an unknown scale. The World Food Programme (WFP) estimates that 5.5 million people, a quarter of the total population, are at risk and the UN's Food and Agriculture Organization (FAO) has requested $4 million U.S. for the double-cropping and potato production programs for 2003 (FAO 2003; WFP 2001). The impending famine in the lean season of 2003 may trigger a renewed refugee migration across the northern boarder into China or lead to civil unrest. The precursor of this reality has been seen already with the breakdown of law and order, with roaming vagabonds searching for food, and cross border expeditions into China in search of food (Young 2000).

The economic blow that pushed North Korea to economic collapse was the fall of the Soviet state in 1989-90. The loss of the USSR as a trading partner has stressed the juche model and forced it to truly work as a stand-alone economic system. Prior to 1989, the Soviet Union represented 80% of North Korea's external trade.

CONCLUSION

There are three potential courses of action for P'yongyang. First, North Korea may remain isolated and attempt to reestablish its productive capacity while remaining dependent upon international aid during the interim. This seemed to be the default path that Kim Jong Il was following in the mid 1990s. Kim Jong Il has placated the international community by signing the Agreed Framework that exchanges the discontinuance of their plutonium based weapons research for heavy oil, as well as two light water nuclear power plants (U.S. Department of State 1994). North Korea has also secured emergency food assistance from the WFP, of which the United States has funded 67% (WFP 2002). Kim Jong Il, however, has engaged in illusionary discussions with South Korea and the United States. This has presented a false hope of economic reform and potential reunification of the Korean Peninsula. Kim Jong Il disclosed in 2002 that North Korea is continuing its research and potential development of uranium based weapons. He stated that this was in response to President Bush's labeling North Korea as being part of the "Axis of Evil" (Reuters 2002). This triggered a halt to United States oil aid shipments (Reuters 2002). The interruption of international aid, coupled with the seventh year of food scarcity and the onset of winter will trigger another famine in 2003. Potentially, a mass mobilization of the starving population could threaten the regime internally, precipitating a total collapse of the North Korean state. "The problem, of course, is that North Korea appears to lack the societal institutions to mobilize and channel mass discontent into effective political action' (Noland 2002, 9). It is more likely, however, that this is Kim Jong

Il's attempt to leverage a better negotiating position with the industrialized states in order to receive additional assistance without implementing structural reforms.

Second, and most likely, P'yongyang will follow Kim Jong Il as a practitioner of brinksmanship diplomacy. The declaration by Kim Jong Il in October 2002 to continue efforts to produce nuclear weapons is a political maneuver designed to gain a position of advantage in order to leverage economic concession from South Korea (Kong and Kim 1997); in particular, energy, light manufactured goods and investment capital. Economic relations with Japan will also be stressed given that the Taepo Dong-2 which has a longer range than the Taepo Dong-1 (1,500 kilometers) was launched in August 1998 (Federation of American Scientists 2002). The testing of this missile prompted the United States to engage in bilateral talks with North Korea, producing the Berlin Agreement and Agreed Framework, wherein Washington would lift economic sanctions, build two light water nuclear power plants and provide 3.3 million bbl. of heavy oil annually for North Korea's suspension of further missile testing (Kim 2002; U.S. Department of the Treasury 2002; Energy Information Administration 2002). This agreement, however, seems to be under suspension as of November 2002 (Reuters 2002). Kim Jong Il's missile brinksmanship also brought Japan to the eleventh round of normalization talks in Beijing with a $9-billion 'economic aid' package (i.e., 60 percent in grant aid and 40 percent in loans) as quid pro quo for North Korea's moderation of the missile threat, and precipitated the donation of 500,000 tons of rice through the WFP (Kim 2002).

Finally, P'yongyang may be forced to pursue a policy of engagement. Given the near total collapse of the economy and the potential for internal unrest, Kim Jong Il may have no other alternative but to implement some structural reforms in order to maintain his regime's existence. The scenario of P'yongyang opening its economy to free market forces, however, will continue to be avoided provided international economic and humanitarian aid continue to provide economic life support.

There have been some overt signals from P'yongyang that its isolation barriers may become permeable. Talks with Kim Dae Jong of the Republic of Korea (ROK) have started a dialog, but have produced little in the way of tangible results. ROK has encouraged private investment, the most significant being the Hyundai deal to develop a tourist resort in Mt. Geumgang region. However, this project has failed to sustain economic viability and is now heavily subsidized by ROK National Tourism Organization (Noland 2002). Additionally, there is an inter-Korean trans-Siberian railway project that is intended to connect both Koreas to Russia via a rail link through the DMZ, though this has yet to be accomplished.

Moscow has economic challenges of its own, and the estimated $9 billion for the project may prove an insurmountable barrier (Kim 2002). China has the proximity advantage over Russia, and is better situated to complete the railway through a link to Sinuiju.

Which of these potentialities becomes truth is dependent upon the continuance or stoppage of international humanitarian aid and economic concessions. Kim Jong Il will likely continue his attempts to renegotiate economic relations on his terms and he will try to win further concessions by capitalizing on the human tragedy of the Korean people and the threat of WMD; to what end and scale is yet unknown. ★

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A winter photograph of the Demilitarized Line in the central highlands. Source: U.S. Army photograph.

12 MEDICAL GEOGRAPHY

Major Patrick E. Mangin

Key Points:

- The overall health of North Koreans has deteriorated over the past several years owing to malnutrition and poor medical care.
- North Korea's economic woes and recent weather patterns have been detrimental to its staple crop production, causing famine.
- Sanitation is poor throughout the country, including major urban areas.
- From a health standpoint, protection against a wide range of insults is difficult given the widely varying geography of the Korean Peninsula.

THE MEDICAL GEOGRAPHY OF an area of operations is an important consideration when building and integrated geographic picture of a region. *Medical Geography* by definition is the application of geographical information, perspectives, and methods to the study of health, disease, and health care (Johnson 1996). Medical geography can provide a spatial understanding of a population's health, the distribution of disease in an area, and the environment's effect on health and disease. This chapter assesses the overall health of the North Korean people by examining the distribution of disease and influence of nutrition on health. This chapter also analyzes North Korea's environmental hazards and potential risks to visitors. This information can be used to identify force protection measures needed to mitigate specific environmental health hazards in the country's various physiographic regions.

THE TRIANGLE OF HUMAN ECOLOGY

The Triangle of Human Ecology provides a useful framework for analyzing the impact of health related issues at a particular location (Figure 12.1). Three vertices form the triangle: population, behavior, and habitat and they enclose the state of health (Meade et al. 1988).

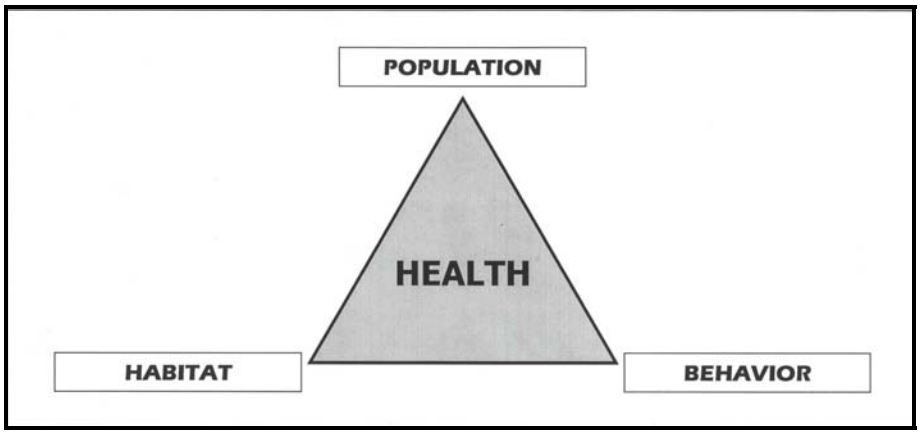

Figure 12.1. The Triangle of Human Ecology.
Source: Palka, 2002.

Habitat is the environment within which people live and work. The human habitat commonly includes houses, workplaces, settlement patterns, recreation areas, and transportation systems. *Population* is the pool of humans that serve as potential hosts of various diseases. Factors that characterize and affect the population include nutritional status, genetic resistance, immunological status, age structure, and psychological and social concerns.

Behavior consists of the observable aspects of the population and is typically a manifestation of cultural norms. It also impacts on people who come into contact with disease hazards and whether or not the population decides on other alternatives. *Health* is not limited to the absence of disease, but also assumes a state of total physical, mental, and social well-being. Health is a continuing state that can be measured by an individual's ability to rally from a wide range of *insults* (Palka 2002). Key indicators of health include mortality rates and life expectancies.

Physical insults can refer to air quality, temperature, humidity, light, sound, atmospheric pressure, and trauma. Physical insults pertinent to North Korea also include the stress of extreme annual and diurnal temperatures and high altitudes. *Chemical insults* include pollen, asbestos, various pollutants, smoke, or even food (Palka 2002). North Korea's urban air pollution and use of United States-banned pesticides and fertilizers are examples of chemical insults (AFMIC 2002). Infectious insults include virus, bacteria, fungi, and protozoa. Infectious insults cause debilitating *endemic* and *epidemic diseases* in North Korea.

THE HABITAT FOR DISEASE

The physical and cultural environment of North Korea includes a diverse range of physical and chemical insults that influence the state of health. The physical environment provides the conditions for certain maladies to exist, while the cultural component provides a host reservoir and the potential for diffusion of those maladies.

North Korea's geography provides an excellent habitat for diseases. Those of greatest concern include:

- Malaria
- Korean Hemorrhagic Fever
- Japanese Encephalitis
- Scrub Typhus
- Leptospirosis
- Tuberculosis
- Hepatitis A, B, C
- Sexually Transmitted Diseases
- HIV
- Typhoid
- Anthrax
- Cholera

North Korea's health data (necessary to confirm disease distribution) is difficult to gather or otherwise access. However, if we consider factors such as disease transmission categories; food-borne and water-borne, vector-borne, and soil contact, planners can make reliable estimates as to where certain diseases might exist, given an area's physical and cultural characteristics.

FOOD-BORNE AND WATER-BORNE DISEASES

Food-borne and water-borne diseases are generally spread by contact with an infected human's fecal matter. Human waste is not treated in many rural areas or on the outskirts of large urban areas. In places where water treatment systems are available, the poor economy has reduced repair part availability to fix sewer and water-treatment systems (Tse 2001). Therefore, if local food, water, or ice is consumed, *diarrhea, cholera, Hepatitis A,* or *typhus* can be expected to incapacitate personnel within days (AFMIC 2002).

The agricultural sector of the economy is unquestionably tied to food-borne and water-borne disease diffusion. Fertilizers are needed to sustain adequate crop yields. Successive planting seasons require extensive

use of fertilizer, otherwise soil minerals are exhausted. Consequently, North Korea has thirteen fertilizer plants including the large Heungnam Fertilizer Factory and Namheung Youth Chemical Plant. However, fertilizer supplies are typically unreliable and in short supply because of two important factors. First, most facilities are obsolete—most were built before 1960—and are very inefficient. Second, facilities are seriously under-utilized because of the shortage of electricity, energy, and raw materials. Most plants produce nitrogen and phosphorous fertilizers (about 500,000 tons a year). Furthermore, the country is entirely dependent on Russian and Chinese imports of ammonium phosphate sulfate or combination fertilizers since North Korean plants are incapable of producing these types of fertilizers (Republic of Korea, National Intelligence Service 2002).

The agricultural sector requires about two million tons of fertilizer annually to support grain production. Current supplies cover a meager 40 percent of the demand, generating a major bottleneck in agricultural production. Hence, in its struggle to manage the fertilizer shortage, North Korea has increased the use of human and livestock waste (Republic of Korea, National Intelligence Service 2002). Diseases associated with the use of human and animal waste occur year-round, but the incidence rate is vastly higher during the growing seasons, especially for maize (corn) and rice from April through September (Table 12.1).

Table 12.1. North Korea's typical cropping calendar in the cereal bowl region (i.e., North and South P'yongan, Pyongyang, North and South Hwanghae). Source: Republic of Korea, National Intelligence Service, 2002.

CROP	O	N	D	J	F	M	A	M	J	J	A	S
Winter Wheat	S	G	G	G	G	G	G	G	H	H		
Spring Wheat					S	G	G	G	H	H		
Spring Potato						P	G	G	H	H		
Rice						S	G	T	T	G	G	H
Maize						S	G	T	T	G	G	H
Sweet Potato	H							P	G	G	G	H
Soya Bean									S	G	G	H
Main Season Potato	H							P	P	G	G	G

KEY:
S = Sowing P = Planting T = Transplanting G = Growth Period H = Harvest

Chronic fertilizer shortages contribute to water-borne illness as well. On many farms human and livestock waste is frequently used as fertilizer for

staple crops such as rice and corn. Consequently, these areas are breeding grounds for a host of water-borne diseases. To prevent ingesting the bacteria that cause these diseases, one should avoid ice and tap water. Additionally, and if it is necessary to travel through rice paddy areas, one should wash their hands before eating and preparing food.

VECTOR-BORNE DISEASES

Vector-borne diseases are those which are transmitted by a biological agent (often an insect). Many of the most important vector-borne diseases are water-related, in that some insect vectors breed or pass part of their lifecycle in or close to water. Vector-borne diseases have been exacerbated in many cases by inappropriate water engineering (e.g., irrigation) or poor management of water resources and wastes (e.g., poor sanitation). Some vector-borne diseases are also animal-related (e.g., Lymes Disease), in that the insect vectors are associated with specific animal hosts. In these cases, land use and land cover are important factors in their distribution and prevalence.

Japanese encephalitis is the most important vector-borne (mosquito transmission) disease threat in the country and occurs in both urban and rural areas. The greatest number of cases occurs in the southern coastal provinces. Larvae are found in flooded rice fields, marshes, and small stable collections of water around cultivated fields. The Japanese encephalitis virus has a complex life cycle involving domestic pigs and a specific type of mosquito (*Culex tritaeniorhynchus*) which lives in rural rice-growing and pig-farming regions. The mosquito breeds in flooded rice fields, marshes, and standing water around planted fields. After infection, the virus invades the central nervous system, including the brain and spinal cord. In temperate zones, the vectors are present in greatest numbers from June through September and are inactive during winter months (World Health Organization 2002).

Mite-borne Typhus (Scrub Typhus) is a rickettsial infection widespread in North Korea. The bacteria are carried by mites or chiggers. As the mites feed on humans, they deposit the bacteria. Outbreaks are typically sporadic and scattered. The disease is usually limited to rural areas associated with disturbed environments and secondary vegetation as a result of clearings, overgrown terrain, or new encampments. The actual incidence of scrub typhus is difficult to ascertain because it is not a reportable disease. This disease can severely impair combat readiness (AFMIC 2002).

The past decade has witnessed a return of *malaria* to South Korea. Korean malaria is of the form *Plasmodium vivax* which—although rarely fatal to healthy adults—can be incapacitating. It is also delivered by the female *Anopheles* mosquito. Fortunately it is easily cured with a course of chloroquine and primaquine (Preventive Medicine Update 2000). American

soldiers fell victim to malaria along the Demilitarized Zone (DMZ) in August of 2000, so it is likely that small numbers of people in the southern and western areas of North Korea are also infected. In total, there were 4,000 reported cases in the Republic of Korea in the year 2000 (World Health Organization 2002).

SOIL CONTACT DISEASES

Hantavirus hemorrhagic fever with renal syndrome (HFRS) is a disease that can be contracted by personnel who are exposed to dust or aerosols in rodent-infested areas. Rates can be high in small groups exposed to areas with heavy rodent infestation. It occurs year-round (peak transmission period October through December) and is associated with peak human activity in rodent-infested areas during harvest, particularly in the fall.

HUMAN-INDUCED ENVIRONMENTAL CONTAMINATION

Industrial activities contributing to environmental contamination in North Korea include power generation, mining, petroleum refining, and the production of cement, chemicals, fertilizer, machinery, military products, steel, and textiles. Many of these industries use obsolete technology without effective pollution controls. Much of North Korea's heavy industry is concentrated around the cities of Haeju, Hamhong, Kanggye, Kimchaek, and Wonsan. Three of the countries largest industrial centers are: the Sungni Chemical Factory in Sonbong, North Hamgyong Province, which is adjacent to the Tumen River; the Ponghwa Chemical Factory in Huich'on-kun, North P'yongan Province, near the port of Sinuiju on the Yalu River; and the Namhung Youth Complex, which includes a petrochemical complex, ethylene, ammonia, and urea fertilizer plants (AFMIC 2002).

• *Air Contamination*

North Korea depends heavily on coal for energy. Unfortunately, the most plentiful coal is of poor quality and burning it generates large amounts of air pollution, including particulates, sulfuric acid, and nitrogen oxides. The lack of effective emission controls from industrial facilities results in extensive air pollution (Tse 2001). North Korea allegedly generates twice as much air pollution as South Korea because of its reliance on low-grade coal. Cities of greatest concern include Hamhung (fertilizer factory); Wonsan (chemical factory); and Chongjin (iron and steel factory). Chongjin reportedly experiences air pollution from the Kimchaek Iron and Steel Complex and the Chongjin Chemical Fiber Mill. The Wonsan area has an air pollution problem from sulfur oxides and mercury vapor from the Munpyong Smelter and the Wonsan Chemical Plant (AFMIC 2002).

• *Food Contamination*

In general, chemical contamination of food may result from deposition of particulates from industrial activities, uptake of persistent chemicals in soil, pesticide and fertilizer misuse in agricultural production, and improper processing or storage. Contamination of food with fecal pathogens may result from use of fertilizers derived from human or animal waste, unsanitary food preparation techniques, and improper handling of prepared foodstuffs. Even one-time exposure to fecal contamination in rations may cause a variety of food-borne illnesses previously mentioned. Red tides appear off the coasts of Nampo and Wonsan between April and October. The occurrence of red tides, also known as harmful algal blooms, appears to be increasing. Red tides cause paralytic shellfish poisoning and sometimes other types of poisoning.

• *Soil Contamination*

Specific information regarding soil contamination is unavailable for North Korea. In general, soil contamination is localized to specific areas surrounding industrial facilities and waste disposal sites. Even in such areas, significant exposure to contaminants in soil is unlikely in the absence of wind-blown dust or active digging. As a result, soil contamination usually presents a low risk to human health, although contaminated areas should be avoided when feasible (AFMIC 2002). From the levels of industrial metals processing, coal burning, and other dirty industries that discharge unabated, it is certain that chemical contamination of soil is a major health issue in many areas.

• *Water Contamination*

Municipal and industrial wastes are commonly released untreated near population and industrial centers, causing chemical and microbial contamination of surface water. Municipal water supplies may be contaminated because of the use of contaminated water sources and a shortage of electrical power needed to treat completely available supplies. In recent years, the percentage of North Koreans with access to potable water has declined. Consumption of water contaminated with raw sewage or runoff containing fecal pathogens may cause a variety of acute enteric infections (AFMIC 2002).

• *Rivers*

The Taedong River is reportedly contaminated with pollutants such as nitric acid and arsenic from textile mills and wastewater from lead and zinc mines. The Yalu River is reportedly polluted with untreated residential and industrial waste from coal mines and cement factories. The release of industrial sludge and waste by industrial complexes in the major waterways

such as the Taedong, Chongchon, and Tuman has turned them into rivers of death. Despite the fact that the Taedong is the primary source of drinking water for the people of P'yongyang, its biological contamination levels were measured at a dangerously high levels (AFMIC 2002).

The Tuman River is polluted by waste from North Korea and China. North Korea's Musan mine and the Hoeryong paper factory, along with China's Kaishantun pulp processing plant and the Shixian paper factory, have dumped enough pollutants into the river to bring the percentage of phenol in the Tuman to ten to forty times beyond levels considered safe. This pollution has become a major factor in the spread of water-borne diseases (i.e., dysentery/cholera), and has had a severe impact on fish populations in the river (Republic of Korea, National Intelligence Service 2002).

- *Marine Pollution*

Heavy metals and waste oil dumped directly into the sea by factories in Wonsan, Hamhung, and Chongjin have driven marine organisms in the surrounding areas into extinction, and the situation in the Yellow Sea is scarcely better. Sludge from mines near Anju flows unimpeded into the ocean, and the construction of the Seohae Lockgate has reduced considerably the ability of the Taedong River to disperse pollutants on its own. Furthermore, the locks trap waste and sludge from P'yongyang and Nampo and concentrate it before they flow into the estuary. The pollution is reportedly most severe near the Taedong estuary and the ocean near Nampo.

Massive reclamation projects at Kumsong (South P'yongan), Seoho (North P'yongan), and Ungdo (South Hwanghae) have destroyed vast areas of tidal flats, vital for the purification of seawater. These projects are accelerating the pollution of the surrounding marine environment (Republic of Korea, National Intelligence Service 2002).

- *Air and Soil Pollution*

Pollution from traffic is not a major concern because of the absence of large numbers of automobiles, which are the primary cause of traffic congestion and resultant urban air pollution. Areas with the most severe air pollution are cities with major industrial complexes. North Korean factories are not equipped with filters or other facilities which prevent pollution, and contaminants such as sulphur and carbon monoxide from being released into the air (Republic of Korea, National Intelligence Service 2002).

A total of 10.8 million tons of sulfides, nitrogen oxides, and other pollutants are released from North Korea annually—about 2.4 times the volume generated by South Korea. Acid rain (pH < 4.7) was confirmed falling near the Chongjin Thermoelectric Power Plant. Dust and toxic gases from extensive mining areas (like Musan) and industrial facilities adversely

affect agricultural production in the surrounding areas, not to mention creating health hazards for workers and residents, many of whom suffer from respiratory ailments. Additionally, unrestricted disposal of domestic and industrial wastes in manufacturing regions and remote mountain areas have led to accumulation of toxic pollutants in the soil, and contaminated groundwater and aquifers, and in turn agricultural products that depend on such water for growth (Republic of Korea, National Intelligence Service 2002).

FOOD, NUTRITION AND NORTH KOREAN HEALTH

Nutrition has a direct link to the overall health of a population and this is particularly germane to the people of North Korea. The relationship between food and its availability to an individual depends on a range of factors. Among these factors are family income, gender, age, season of the year, climate, weather, government regulations, transportation technology, and cultural factors such as dietary restrictions, taboos, and preferences. Since intense flooding in 1995, North Korea has experienced famine. The rise in mortality in North Korea is a controversial subject. The government in P'yongyang claims that 22,000 people died of hunger or hunger related diseases between 1995 and 1998. Nevertheless, a United States congressional team that visited the country estimates that the figure is closer to two million (CDC 2002).

Over the past decade, natural disasters such as droughts, tidal surges, floods, hailstorms, typhoons, and extremely cold winters have affected agricultural productivity every year with varying degrees of severity. The combined effect of these natural hazards has been a decline in food production. In addition, the precarious foreign exchange situation has not allowed for sufficient imports of much needed agricultural inputs such as fertilizer, pesticides, plastic sheeting, spare parts for machinery, tires for tractors and trucks, and fuel. Over the years, domestic production of fertilizer has declined to a level of about ten percent of the total requirement, increasing reliance on donations. Formerly, crop yields approached seven to eight tons per hectare during the 1980s. Now, however, they are about half that amount because of shortages in agricultural supplies and equipment. In order to increase food production, every possible piece of land is being brought into production, but cultivation of marginal land has the unintended consequences of soil erosion and further reduction in overall land productivity. The total food gap in the past eight years has ranged from 1.04 million tons in 1998/99 to 2.2 million tons in 2000/01 (Figure 12.2 and Figure 12.3).

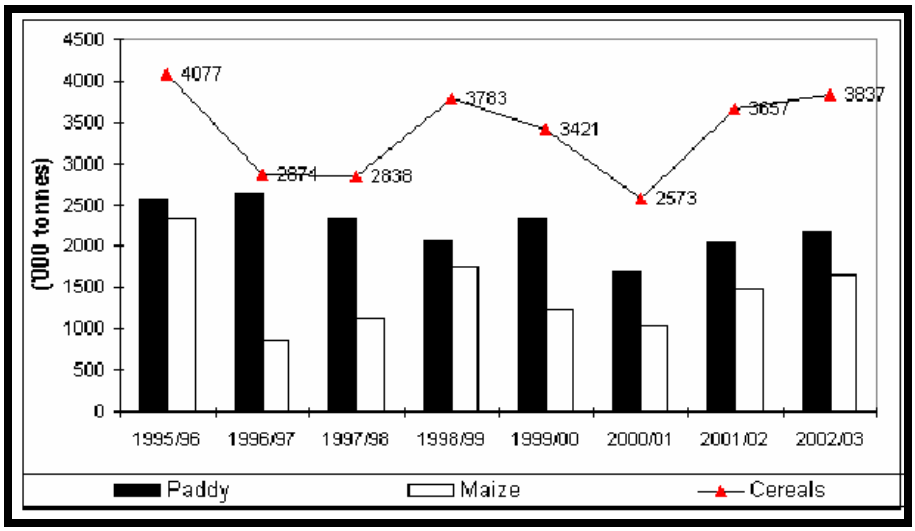

Figure 12.2. North Korea cereal production, 1995-2002
Source: FAO 2002.

What is very noticeable in Figure 12.3 is the urban/rural contrast in food shortage. The urban areas have a distinct lack of food, owing to the absence of family-owned plots that contribute to sustenance. The North Korean Public Distribution System (PDS) has proven incapable of adequately distributing international grain donations. This stems from the general lack of transportation networks. Certain portions of the country require six to seven days access from major port cities (Figure 12.4).

Approximately 50 percent of tractors are not operational due to the lack of spare parts, tires, and fuel (FAO 2002). Obsolete and decaying farm machinery and irrigation facilities need systematic rehabilitation or replacement. Irrigation facilities require streamlining, preferably linked to large gravity-fed networks. Fertilizer alone is not likely to provide sustainable enhancement in agricultural productivity; other innovative, environmentally safe agricultural techniques (such as soil fertility improvement, alternatives to chemical fertilizer, crop rotations, integrated pest management, landuse policy reforms, etc.) need to be put into practice. Double cropping of wheat and barley after rice and maize (cereal after cereal) on already exhausted soils is non-sustainable. Thus, increased assistance from the international community is necessary for rehabilitation of industries, infrastructure, and the agricultural sector (FAO 2002).

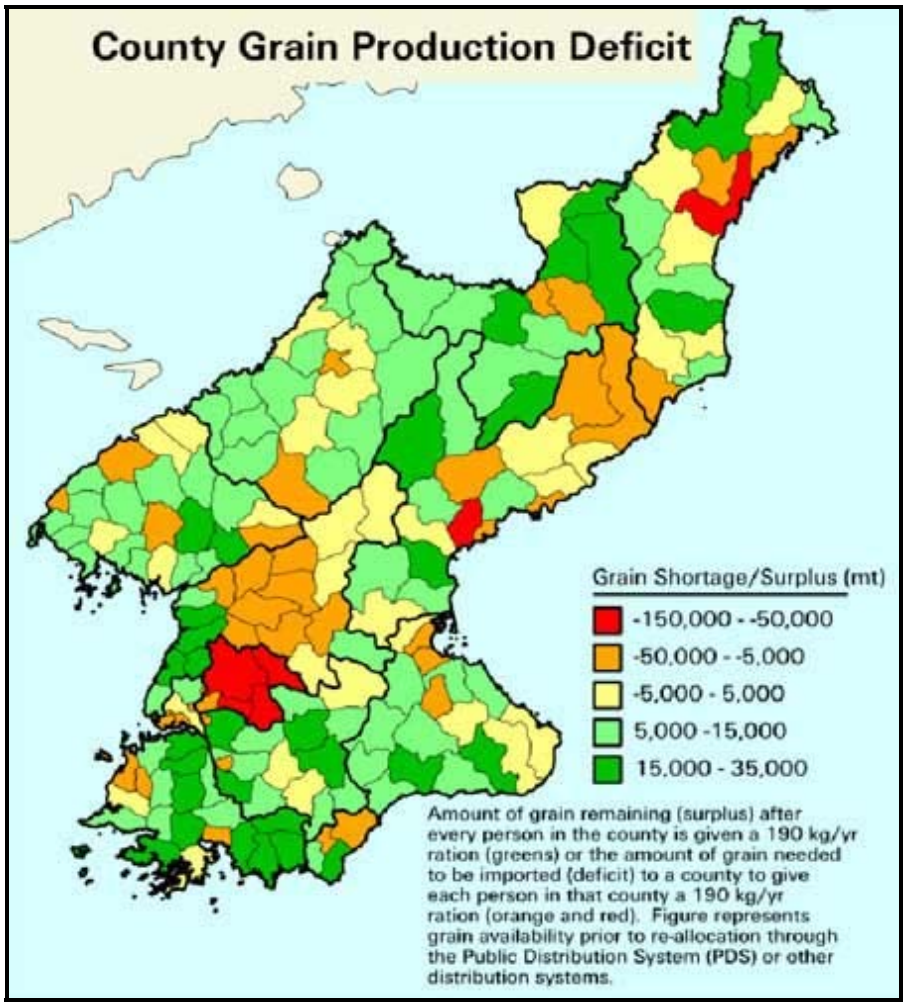

Figure 12.3. North Korea county grain production deficit.
Source: FAO 2002.

THE POLITICS OF NORTH KOREA'S FOOD SITUATION

In July 2002 the North Korean government announced substantial increases in wages, prices, and the currency exchange rate from highly subsidized and artificially low levels. Agricultural commodities were also affected by this adjustment to standing economic policy. Consequently, rice and maize prices in the public distribution centers are now 44-46 Won (depending on quality) and 24 Won per kg, respectively, compared to about 0.9 and 0.68 Won/kg respectively, before July. The farm gate prices are supposed to be about 40 won/kg for rice and 20 won/kg for maize. Many farmers, however, do not seem to understand exactly what prices they will

receive for their produce. It is also not certain at this time what will happen to the prices of various inputs such as seed, fertilizer, pesticides, fuel, and electricity. Thus, the farmers' response to this price adjustment will be formulated on the basis of the profitability of various crops. Many farmers would like to increase their farm output via double cropping. However, double cropping is constrained by many other conditions. Price reforms, in principle, should provide improved incentives and along with periodic price adjustments, they should result in a positive impact on agricultural production in the medium term. If allowed, farmers' markets throughout the country could play an important role in this new incentive-based system (FAO 2002).

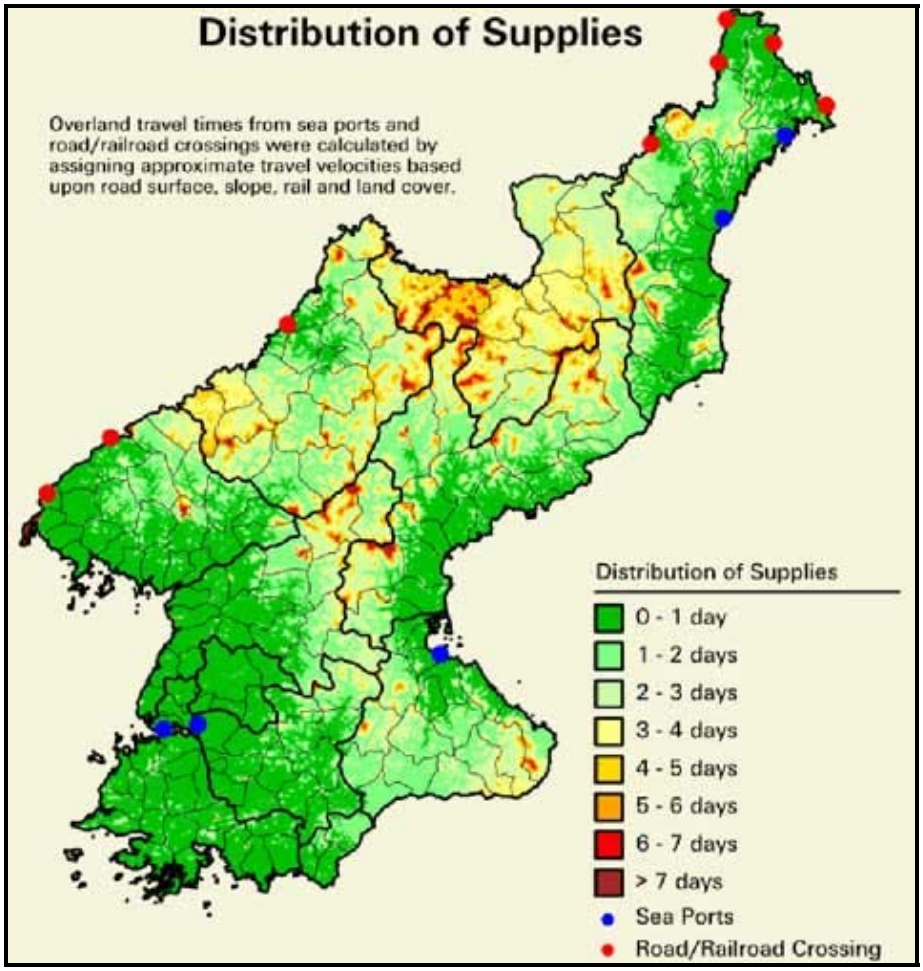

Figure 12.4. Typical food delivery time in days.
Source: FAO 2000.

In the wake of the serious food shortages, government policy for the livestock sector discourages mono-gastric animals, which require grains for feed and encourages increased ruminant herds, particularly goats and rabbits. Official estimates indicate that following a significant decrease in livestock numbers in 1997 in the aftermath of disastrous floods, there has been a positive turnaround in the number of all livestock species, except oxen and sheep (Table 12.2).

Table 12.2. North Korea livestock population, 1996-2002. Source: FAO, 2002.

PRODUCT	1996	1997	1998	1999	2000	2001	2002	Percent Change 1996-2002
Oxen	615	545	565	577	579	570	575	-6.5
Dairy Cattle	n.a.	n.a.	n.a.	n.a.	n.a.	9	9	--
Pigs	2,674	1,859	2,475	2,970	3,120	3,137	3,152	17.9
Sheep	248	160	165	185	185	189	170	-31.5
Goats	712	1,077	1,508	1,900	2,276	2,566	2,693	278.2
Rabbits	3,056	2,740	2,795	5,202	11,475	19,455	19,428	537.5
Chicken	8,871	7,547	8,965	10,371	14,844	15,804	17,259	94.6
Duck	1,098	822	1,372	1,624	2,078	3,158	4,189	281.5
Geese	554	357	462	829	889	1,090	1,247	125.1

A MEDIC'S EXPERIENCE IN THE KOREAN WAR

In his book, *"Medic": The Mission of an American Military Doctor in Occupied Japan and Wartorn Korea*, Dr. Crawford F. Sams provides a remarkable insight into particular problems encountered by the American medical community during the Korean War. The war presented problems such as cold weather injuries, and evacuation of injured soldiers in cold weather and high altitudes. These are similar problems that the American military has encountered recently in Afghanistan. The lessons learned from Dr. Sams' medical experiences fifty years ago are worth reviewing. The book examines unique experiences not just of American soldiers, but also of the problems associated with war-torn Korea and our responsibilities for refugee care. As evidence in Korea, Dr. Sams writes,

> *"By controlling the epidemics of disease among the civilian population we could lessen the hazard of the spread of disease to our own troops and those of our United Nations allies. On the other hand, if the communists could not lessen the spread of disease among the civilian population, then they might well have their own troops, who were also in contact, of course, with the civilian population, immobilized or decimated by these same epidemic diseases* (Sams 1998)."

During the Korean War, approximately 100,000 North Korean refugees were taken by landing craft to safe-zones created by United Nations forces. Another several hundred thousand followed the United States military withdrawal from P'yongyang in December of 1950. The medical community in Korea had anticipated the medical care that would be required in the event of mass refugee movements to Allied territory and stockpiled medicines and equipment to handle this situation. Had the proper and sufficient quantities of immunizations and inoculations not been available, diseases such as typhoid, cholera and diphtheria would surely have spread like wildfire throughout southern Korea (Sams 1998).

Disease-related casualties have been reduced tremendously since World War I. The United States military has paid attention to history in this regard after learning lessons from our own Korean experience and from those of the Soviets in Afghanistan in the 1980s, where as much as 88 percent of their casualties came as a result of exposure to disease and not direct combat (Grau 97).

WEATHER-RELATED INJURIES IN NORTH KOREA

North Korea's climate, especially the cold, provides ample opportunity for weather-related injury to soldiers. In his book, *The Coldest War*, James Brady recounts his first winter in North Korea;

> "*There were other things we heard about that first winter, that march south from the Chosin, how the mortar tubes shrank in the cold so the shells wouldn't fit, how men's skin stuck to metal when bare flesh was exposed and the whole palm of a hand tore away like a bloody glove, how you couldn't pull the pin on a frozen grenade, how men [urinated] on rifles to thaw them for firing* (Brady 1990)."

Cold weather injury prevention is a common problem in cold climates. Certain diseases and maladies are more prevalent in cold weather. Typically, contact between people increases, as does contact between people and rodents, which host disease-carrying organisms. Cold weather causes people to concentrate around areas where there is heat. The same applies for animals, especially for rats seeking shelter from the cold. The most common diseases that spread rapidly in cold weather are colds and flu. Dietary supplements, vaccinations, and proper sanitation help combat common colds and flu. Additionally, chemical irritants produced by heaters using open flame or diesel gas attack the lungs and eyes and can make soldiers sick and combat ineffective. Conversely, heat injuries can also happen in North Korea. The country generally has cooler summers than South Korea, but temperatures in the coastal lowlands can reach one-hundred degrees.

CONCLUSION

Medical Geography plays a key role in understanding the nexus between weather, climates, landscape, and culture in North Korea. Any medical geographic analysis requires a synthesis of information gathered from nearly every subfield of geography. The health of the North Korean people can be attributed, but not limited to, the subject matter contained in every chapter of this booklet. Political and economic progress is essential if the country hopes to overcome the nutritional deficiency that plagues its people.

Lastly, there are two excellent resources that can aid in analyses of the geography of health and disease in North Korea. The Armed Forces Medical Intelligence Center (AFMIC) and the United States Army Center for Health Promotion and Preventative Medicine (USACHPPM) provide resources and web links for force protection against the types of insults that will be found in North Korea. ★

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13 CONCLUSION

Francis A. Galgano Jr.

THIS REGIONAL GEOGRAPHY EMBODIES our attempt to put forward a reasonably uncomplicated introduction to, and analysis of the complex geography of this strategically important country. The systematic presentation of information by geographic subfield, coupled with multiple maps, data tables and a comprehensive bibliography is intended to present academic, students, and government officials with an integrated geographic profile of North Korea. Our objective in doing so is to make clear the nexus linking geography, culture, the physical landscape, and contemporary events.

Korea was thrust into our collective national consciousness on 25 June 1950 when the *Inmun Gun* (North Korean People's Army) attacked across the 38th Parallel, capturing nearly the entire peninsula and almost driving the United Nations' forces in to the sea. Before that time Korea was an isolated, faraway country that was perhaps unknown to most Americans. Since that time, however, the Korean Peninsula, and specifically the actions of North Korea's communist regime has been a fundamental variable in our national strategic calculus. Yet, unlike other smoldering Cold War zones of conflict, the strategic importance of this region has conceivably grown (Toffler and Toffler 1993).

Since the end of the Second World War, the seminal issue on peninsula has been the rivalry between North and South Korea. This rivalry is most clearly evident in the military sphere, manifested in the confrontation of a vast concentration of military force along the Demilitarized Zone. Much like its early history, when Korea's unique geographic location placed it in the middle of more powerful neighbors, modern tensions have been fueled by linkages between Korea and three major world powers—China, the Soviet Union (now Russia), and the United States. Thus, Korea has remained one of the most heavily armed, volatile regions on the globe notwithstanding the end of the Cold War. Unquestionably, this confrontation is the overriding issue in the political, economic, geo-strategic and military decision-making process in North Korea (Bunge 1991; Oh and Hassig 2000).

North Korea is clearly a regional threat—important to the United States because of its geographic proximity to essential American allies, military bases, and other economic/strategic interests. It has an unusually large standing army with a highly developed offensive capability, a well-established ballistic missile program, and it continues to develop nuclear weapons technology to complement its already robust weapons of mass destruction arsenal (White House 1997; CIA 2002). Perhaps more significantly, North Korea is now increasingly regarded as a global threat given its suspected role in supporting international terrorism and other activities that tend to subvert stability, such as exporting missile technology to unstable and radical states (White House 1997; Stout 2002). Furthermore, North Korea is suspected of employing an increasingly sophisticated information warfare capability (so called "cyberwar"), which is in many ways more dangerous and insidious (Cimbala 1999; Arquilla and Ronfeldt 1997).

Therefore, to understand North Korea and place its policies and national objectives into sharper focus, we must develop an understanding of the immutable role of geography in its historical development and contemporary world-view as a nation-state. Historically, North Korea's location and strategic position made it vulnerable to the vicissitudes of much stronger neighboring kingdoms and states. However, notwithstanding their adoption of many components of Chinese and Japanese culture, indigenous Koreans maintained their singular cultural identity. In fact they stubbornly resisted Chinese attempts to turn Korea into a colony and later Japanese attempts to assimilate their culture. Thus, the Korean people have developed over time a philosophy of juche—self-reliance—driven by the painful recognition of their vulnerability to powerful neighbors and the rugged, remote nature of the physical landscape (Bunge 1991). Kim Il Sung, and now Kim Jong Il blended this philosophy with Marxism-Leninism, the ever-present confrontation with South Korea (and by extension the West), and physical/political isolation to form a distinctive communist-societal dogma that essentially frames their world-view and geo-political policy (Snyder 2001).

Kim Il Song employed a broad and pervasive application of the juche philosophy to foster a strong sense of national assertiveness, self-identify, and self-reliance among the North Korean people. This has essentially set apart his brand of ideology from other communist states, driven in part by North Korea's unique geography (Oh and Hassig 2000). The regime has successfully used this distinctive ideology to promote social cohesion and popular confidence and establish the foundation of the struggle against their enemies for the general population. Thus, in the face of isolation, austerity and adversity, juche coupled with communism has been strongly identified with North Korean nationalism and is a crucial resource in the maintenance

of popular support and internal security and solidarity (Bunge 1991 and Snyder 2001).

Political and social stability are based on a highly centralized ruling structure reflecting the permanence of leadership in Kim Il Song's lengthy tenure and now his son's (Kim Jong Il) seemingly open-ended regime. What we see then in North Korea is a closed, parochial environment isolated from the outside world. It is in essence a monolithic party-state in which social, political and cultural solidarity, and discipline are valued above all else. Furthermore, loyalty to the Party and the leader has been merged indistinguishably. In effect, North Korea is a state within which national leadership—Kim Il Song and now Kim Jong Il—has been practically ordained as national idols and depicted as the visual embodiment of the interests and aspirations of the party and people (Oh and Hassig 2000).

Fundamentally then, we must come to grips with a state within which the most conspicuous aspects of society are the subordination of individual desires and interests to the principle of communal well-being and its emphasis on domestic harmony and national consciousness (Bunge 1991). This national persona is a manifestation of North Korea's long history, unique geography and the blending of culture (i.e., juche) with communist ideology. In the context of a state that faces continued international isolation coupled with internal economic stagnation and a famine, we must also consider that national leadership is venerated and assumes the identity and collective aspirations of the people. Therefore, the will of leadership truly represents the will of the people; and they believe that respect for authority, loyalty to the party-state and leader, and obedience are paramount values (Snyder 2001). Thus in the face of fracturing internal solidarity, or a perceived—perhaps fabricated—external threat, it is indeed possible that the party/leader will act unilaterally (rationally or irrationally) with the unfettered support of the people to preserve the *status quo* (Oh and Hassig 2000).

A geographic analysis such as this one is essentially a snapshot in time. North Korea has developed as a nation and state since the amalgamation of nomadic tribes into the peninsula's early kingdoms; and the country and people will continue to change. Therefore, the true strength in understanding the geography of a region is the recognition of how change has given us present conditions, the spatial and temporal interconnectivity of society, landscape, and culture, and how it will be manifested in the future. To that end we used a regional approach to define North Korea's location, physical landscape, and climate; and delineate the geographic components of its human landscape (i.e., history, culture, political and economic structure, urban space). By linking the sub-components of North Korea's geography in

time and space, we endeavored to communicate an integrated vision of many complex parts as a less-complicated geographic whole.

Clearly, in this short booklet we cannot fully evaluate North Korea in the context of the larger region it occupies with important neighboring states. North Korea's regional and geo-political strategy is driven by its isolation, environmental challenges and need to focus the population on a clear and visible threat. North Korea's ballistic missile program represents a significant threat to neighboring countries such as Japan and South Korea. The ballistic missile capability has grown out of the larger confrontation with South Korea, which remains the seminal issue on the Korean Peninsula. In that regard, diplomatic initiatives in the summer of 2002 broached the sensitive issue of normalization and unification—which was at the outset viewed as a promising signal of reduced tension. What is difficult to decipher is if this initiative by Kim Jong Il is simply part of a larger carrot-and-stick strategy to garner economic aid from his neighbors (most notably Japan) and the West. Nonetheless, it underscores his adroit use of brinksmanship and diplomatic slight-of-hand to keep enemies off-balance. Consequently, any military or diplomatic decisions that we make regarding North Korea will certainly influence the larger region, and must take into account the single-mindedness of its leadership to sustain the regime at all costs (Snyder 2001).

The chapters of this book generally indicate that North Korea is essentially a monolithic party-state within which venerated leadership symbolizes the goals and will of the people. Furthermore, society in contemporary North Korea, like that of traditional Korea has been defined by its leaders in terms of a universal ideological world-view in which society is not an aggregate of people pursuing private goals, but as a harmonious and organic whole. However, the other lesson of this book is that notwithstanding collectivized society, economy, and agriculture, this country does face significant geographic disparities and challenges, especially as segments of this system begin to crumble. With this understanding and the geographic profile given in this book, we trust that government professionals, instructors, and students will now have additional tools available to interpret effectively the actions of this country within the context of its geographic framework and develop better-informed courses of action. ★

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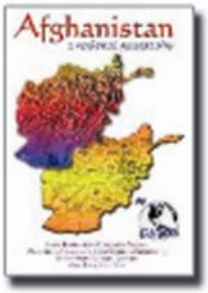

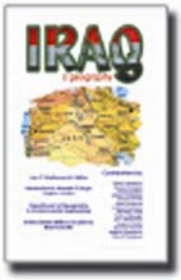
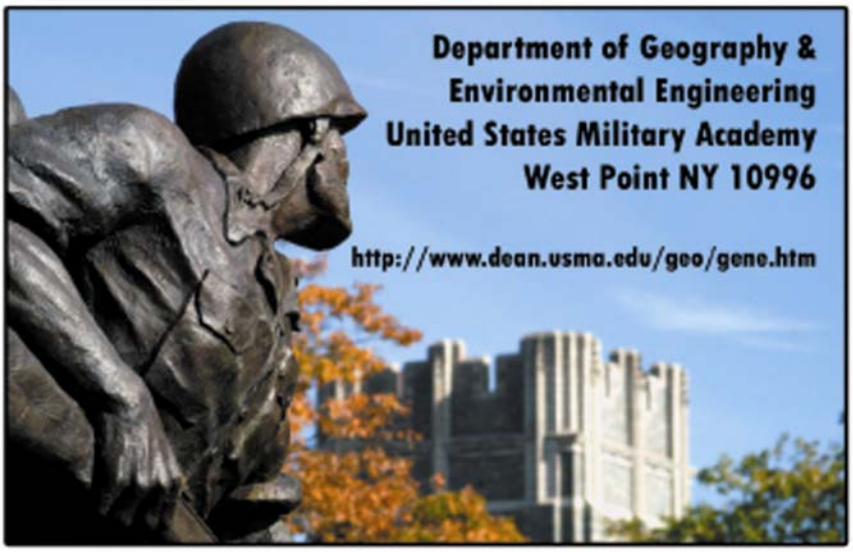
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