UNDERSTANDING INDIAN INSURGENCIES: IMPLICATIONS FOR COUNTERINSURGENCY OPERATIONS IN THE THIRD WORLD

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FOREWORD

This monograph analyzes the susceptibility of Third World countries to insurgency and develops a theoretical perspective to illuminate some of the factors contributing to insurgency in these countries. The term insurgency has been used broadly to include all violent struggles against the state by any group or section of population of an area trying to establish its independent political control over that area and its population. A simple linear model for India, having both static as well as dynamic aspects, has been developed to demonstrate how the degree of inaccessibility of an area, the strength of separate social identity of its population, and the amount of external influence on the area determine the propensity of that area for insurgency. The details of empirical verification of the model has been left out for the sake of brevity. However, the author can be contacted for the methodological details. The author has discussed implications of the Indian model for various aspects of counterinsurgency strategy for the Third World, including economic development, the role of democracy, social and political autonomy, and counterinsurgency operations. He has made recommendations for effective counterinsurgency strategy and for long-term stability in these countries.

India is very complex and provides an ideal window for understanding Asian society. India has been containing Islamic terrorism for years, with the second largest Muslim population in the world, about 12 percent of India's total population.

This monograph, based on the author's thesis work at the Naval Post Graduate School, Monterey, California in 2005, has been written with the American

and Western audience in mind. The author has gone to some lengths in explaining many points that may look to an Indian reader like stating the obvious.

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SUMMARY

Resurgence of Maoist Insurgency in Asia.

The recent resurgence of indigenous Maoist insurgencies in the South/Southeast Asia region is a destabilizing development that, left unchecked, can have significant implications for the Global War on Terror. Researcher William Latimer suggests that the United States, in its global counterterrorism campaign, must draw on the experience of India, which has an extensive history of counterterrorism efforts.

About India and Its Insurgencies.

India is a union of states. The Constitution of India provides for a parliamentary form of government, federal in structure with certain unitary features. The Constitution of India distributes legislative powers between parliament (national level) and legislative assemblies (state level). Apart from the states, there are centrally administered territories, called Union Territories.

According to the Indian federal structure, the fighting of insurgency at home is the responsibility of the concerned state government. This accounts for the diversity and inconsistencies in the Indian approach to counterinsurgency. However, there also has been a broad evolution of counterinsurgency strategy over the years because of involvement of the central (federal) government, army, central (federal) police organizations, Indian Police Service, Indian Administrative Service, and the linkages between provincial and central politics in counterinsurgency by

state governments. A list of major insurgencies faced by India since independence in 1947 is shown in Table 1.

Place		J&K	Assam	Punjab	Nagaland	Tripura	Mizoram	Naxalism −1	Naxalism − 2
Period		1980-on	1979-on	1978-96	1947- on	1980- on	1966-1976	1967-70s	1980- on
Style		guerrilla, terrorism	Maoist guerrilla, terrorism	guerrilla, terrorism	Maoist guerrilla	Maoist guerrilla, terrorism	Maoist guerrilla	Maoist guerrilla	Maoist guerrilla
Nature of Insurgency	Religious	√		√					
	Ethnic		√		√	√	√		√
	Ideology				√		√	√	√
	Linguistic		√						

Table 1. Major Insurgencies.

Theoretical Perspectives on Revolutions in the Third World.

The objective of this paper is to develop a theoretical perspective for analyzing the Indian experience with insurgency, and to discuss its implications for counterinsurgency in Third World countries. Understanding the affected population is essential for understanding an insurgency or planning for counterinsurgency. The contested population is not only the end; it is also an important means for the insurgent. The insurgents and government of the day compete with one another to control the population, as well as to gain the populace's loyalty.

Skocpol holds that the probability of revolution against the state is determined by the degree of penetration of national territory by a state, the incorporation of socially mobilized groups, and the degree of bureaucratization of the state administration

and its armed forces. India, with a history of democratic governance for more than 50 years, ideally should score high on all three dimensions. True to the model, at the macro level, India has been able to handle the many insurgencies it has faced since independence from the British Empire in 1947. However, this does not explain the emergence of insurgencies in various areas within India. The reasons for these insurgencies can be traced to the many attributes of the country which, like many other Third World societies, affect all three dimensions of Skocpol's model. Based on these aspects, a slightly different model is developed.

Modeling Indian Insurgencies.

Based on scholarly works by many authors from various disciplines, I advance the following hypothesis: *In India, the degree of inaccessibility of an area, the strength of separate social identity of its population, and the amount of external unifying influence on it, determine the propensity of that area for insurgency.*

To test this hypothesis, I examine all the major insurgencies in India since independence. A simple model is developed to explain the emergence and strength of insurgencies in India. Secondary and tertiary sources are used for collating data to test two out of three dimensions of the model. The third dimension, the amount of external unifying force, is not tested quantitatively; instead, it is supported through empirical evidence.

Based on the above hypothesis, the relationship between the variables can be expressed by the following equation:

$$I = C_{xrel}X_{rel} + C_{xlang}X_{lang} + C_{xethn}X_{eth} + C_{yfor}Y_{for} + C_{yslope}Y_{slope} + C_zZ + I_0$$

I_0 is the value of I when all the other factors on the right-hand side are 0,

X_{rel} is the *SSI* due to religion.

X_{lang} is the *SSI* due to language.

X_{ethn} is the *SSI* due to ethnicity.

Y_{for} is the average forest coverage of an area.

Y_{slope} is the average slope of the terrain of an area.

$C_{xrel}, C_{xlang}, C_{xethn}, C_{yfor}, C_{yslope,}$ and C_z are the coefficients.

SSI (The Strength of Separate Social Identity): Can be defined as the sense of separation from the majority population through religion, language, ethnicity, and any other distinct social attributes of the population as a whole.

I (Propensity for Insurgency): This is the dependent variable. It is defined as the level of insurgency seen in the past.

Z (The Amount of External Unifying Influence): Is defined as the proportion of persons among the top leadership of the main insurgent groups who are of outside origin or who spend much of their time outside the affected area.

Because of unavailability of data, only the X and Y dimensions of the model have been empirically verified for the entire country—by comparing data from 528 parliamentary constituencies of India—while the Z dimension is supported by empirical evidence. For verification by correlation, both the graphical method as well as the analytical method is used. For this, ArcGIS software and statistical tools are used for analyzing geographic data and for finding the strength of correlation through regression analysis.

Conclusions and Recommendations.

Acceptance of the model has significant policy implications for the Third World countries regarding

the role of democracy, the desirability and extent of decentralization of political power, the desirability and type of economic development with respect to the ground situation, integration of the population, and the effect of forests on counterinsurgency. These discussions were the basis for the following recommendations.

1. Economic development of inaccessible and hitherto economically unviable areas should be fostered by the state. Careful considerations should be undertaken regarding the likely outcome of the governmental efforts, particularly in the areas already dominated by the insurgents, and in the areas inhabited by relatively isolated tribes.

2. Democratic decentralization, within the broad legal structure based on equality and human rights, should be adopted to politically mobilize the marginal population in the right direction.

3. Outside influences inciting the insurgency should be denied access to vulnerable areas by constructing physical barriers.

4. The structure of force and hardware for counterinsurgency operations should be appropriate, keeping in mind the terrain of an area and the presence of inhabitants.

CHAPTER 1

RELEVANCE OF INDIAN EXPERIENCE

THE SOUTH ASIAN CONTEXT

Resurgence of Maoist Insurgency in Asia.

In the recent past, Maoist insurgency in Nepal has caught international attention with spectacular, violent incidents in the Himalayan state. More and more areas of Nepal may fall into lawlessness, which, in turn, may offer safe haven for smugglers, poachers, drug traffickers, and terrorists. There has been a similar resurgence of Maoist insurgency in India and the Philippines without any apparent support from any communist country. What effect all these developments might have on the Global War on Terror should be a matter of great concern and immediate attention.

Researcher William Latimer suggests that "as the United States embarks on its global counter-terrorism campaign, it must draw on the experience of other countries. Specifically India, with an extensive history of counterterrorism efforts, can reveal important lessons applicable to America's endeavors."[1]

About India and Its Insurgencies.

India is a union of states. It is governed under the terms of the Constitution of India, which came into force on January 26, 1950. The Constitution provides for a parliamentary form of government, federal in structure, with certain unitary features. The constitutional head of the union is the President. The

parliament of the union consists of the President and two houses known as the Council of States and the House of the People. The real executive power of the union is vested in the Council of Ministers headed by the Prime Minister of India. The Council of Ministers is collectively responsible to the House of the People.[2]

Similarly, at the level of state government, the Council of the Ministers of a state, headed by a Chief Minister, is collectively responsible to the Legislative Assembly of that state. The Constitution of India distributes legislative powers between Parliament and the states. Apart from the states, there are centrally administered territories, called Union Territories.

It may be worthwhile to discuss briefly certain trends in the evolution of Indian society. The Indian subcontinent, until its colonization by the British, had witnessed many invasions. The conquerors either left, after sacking and looting the inhabitants, or made India their new home. If the conquering tribe decided to settle down, those who were defeated had two choices. They either accepted an inferior position in the conqueror's society, or they left their land and fled to more inaccessible and less economically viable areas within the subcontinent.

Sometimes, another invading tribe might again conquer the economically viable land and push the earlier conquerors to less viable areas. For example, the Bodo Cachhar tribes from the east settled in the fertile valley of the Brahmaputra river during the third or fourth century AD, pushing the original inhabitants into higher mountainous terrain. Then, after a few hundred years, the Ahom tribes came from the east and pushed the Bodo Cachhars into the southern hilly areas.

Areas with forest cover and hilly terrain generally provided inaccessible refuges for the vanquished.

However, over the ages, the relative inaccessibility of vast areas changed. With the adoption of iron implements, thick forests were cut down for conversion to agricultural land. Road construction also increased the accessibility of these areas. After colonization, the British constructed railroads for accessing new areas for mining and plantation agriculture.

Those who inhabited the inaccessible areas generally remained marginalized and were identified as tribesmen by the more complex societies that developed on the fertile irrigated lands. For example, the Bodos remained relatively isolated compared to the Ahoms, who developed economically and politically, and ultimately were integrated into the complex Hindu society of the Aryans, which had developed elsewhere on the subcontinent.

However, the situation has never been completely stable. Dynamic political, economic, and social interactions occurred among the greater civilizations and the "little traditions." Dynamism was introduced, sometimes through change in technology, sometimes through social and religious reforms, sometimes through change in economic activities and, at yet other times, through political conquest. Thus, the marginalized societies remained at various levels of isolation from, or integration with, the greater socio-political system.

Over the years and after independence, the position, as well as the ambitions, of these societies changed. After 50 years of democratic governance, it is difficult to identify some of them as separate from the mainstream, while others can still be called tribesmen in the real sense. The impact of democracy and modern economic development has been different for different populations. For example, because of the quality of

the land and its inaccessibility, a particular area may be less viable for modern economic development. However, the inhabitants of that area, with emotional attachments to the land of their ancestors, will not migrate to a more viable area. Therefore, many of them continue to remain on the fringes of the economic and political system.

The government of India has been trying to stimulate development in these areas. Since the actual governance of an area, as specified in the Indian Constitution, is left to the democratically elected provincial government, there is wide variation in the impact of democratic development on these societies.

An easy way to describe today's India would be by comparison to the European Union (EU). If the EU is able to achieve greater integration through a single currency, similarity in legal and administrative structures, unified security and foreign affairs management, and a sense of patriotic loyalty to the Union among the citizens of member nations, then it will closely resemble India. The Indian constitution recognizes 23 official languages[3] while the EU has 20 official languages.[4] The official figure of "mother tongues" spoken in India is 1,683, of which an estimated 850 are in daily use. The SIL Ethnologue lists 387 living languages for India.[5] The social, cultural, religious and ethnic diversity of India surpasses that of the EU.

Another way to describe India is by contrast with the United States. If the U.S. society resembles a bag of multigrain rice in which diversity is visible but more or less uniformly dispersed, Indian diversity is visible like plums in a pudding.

Fighting insurgency has been a homeland problem for India. According to the Indian federal structure, the fighting of insurgency is a provincial responsibility.

Therefore, depending on the local political situation, fluctuating and divergent counterinsurgency strategies are adopted in India. This accounts for the diversity of approach and different levels of success in counterinsurgency since India's independence in 1947. However, in spite of this diversity and inconsistency, there also has been a broad evolution of counterinsurgency strategy over the years, because of involvement of the central (federal) government, army, central police organizations, Indian Police Service, Indian Administrative Service, and the linkages between provincial and central politics in counterinsurgency by state governments. A list of major insurgencies faced by India since independence in 1947 is shown below.

Place		J&K	Assam	Punjab	Nagaland	Tripura	Mizoram	Naxalism −1	Naxalism − 2
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Nature of Insurgency	Religious	√		√					
	Ethnic		√		√	√	√		√
	Ideology				√		√	√	√
	Linguistic		√						

NOTE: Author has included all violent struggles against the state by any group or section of population of an area trying to establish its independent political control over that area and its population.

Table 1. List of Major Indian Insurgencies.

THEORETICAL PERSPECTIVES ON REVOLUTIONS IN THE THIRD WORLD

The objective of this paper is to develop a theoretical perspective for analyzing the Indian experience with insurgency and to discuss its implications for

counterinsurgency in Third World countries. It postulates that the strength of an insurgency and the success of the counterinsurgency strategy depend on factors like the inaccessibility of an area, the strength of separate social identity, and external influences. The role of relevant causal factors in deciding successful counterinsurgency strategy is discussed in the section containing recommendations.

Insurgency and Affected Population.

Understanding the affected population is essential for understanding an insurgency or planning for counterinsurgency. The Marine Corps' *Small Wars/21st Century* cites Bernard Brodie's *War and Politics* as stating that "good strategy presumes good anthropology and good sociology," and "some of the greatest military blunders of all time have resulted from juvenile evaluations in this department."[6] The Marine Corps document goes on to note,[7]

> Fundamentally, war involves an iterative competition between peoples or societies. This combination of national history, myth, geography, beliefs, ethnic backgrounds and religion we know as culture. . . . The nature of Small Wars places a premium on an in-depth knowledge of a nation's or people's strategic culture— but more importantly, its societal culture.

Blind application of conventional military doctrine can be the best recipe for failure. According to Nathan Leites and Charles Wolfe, "the military measures, forces, and capabilities that are best suited for counterinsurgency are apt to differ from those that are best suited for other types of contingencies."[8] Application of conventional strategy in an insurgency

situation is bound to alienate the affected population and provide the insurgent the advantage of propaganda. Andrew Krepinevich describes how the absence of "an innovative counterinsurgency strategy alienated the population and provided the enemy with an excellent source of propaganda" in Vietnam.[9] In insurgency, the components of the Clausewitzian trinity[10] lose their distinction. Harry Eckstein points out that "[the] tripartite distinction between combatant, noncombatant, and support/supply system typically is blurred in guerrilla war, unlike conventional war."[11] According to Martin van Creveld, low intensity conflicts (LIC) very rarely "involve regular armies on both sides, though often it is a question of regulars on one side fighting guerrillas, terrorists, and even civilians, including women and children, on the other."[12] In guerrilla warfare, "in the classical sense, the 'people sea' forms a sanctuary of people support for the 'guerrilla fish'; in urban guerrilla warfare the anonymity of the city provides protection."[13]

Leites and Wolf describe insurgency as a system and population as one of its important sources of inputs.[14] The contested population is not only the end; it also is an important means for the insurgent. The insurgents and government of the day compete with one another to control the population as well as to gain their loyalty. Therefore, proper understanding of the contested population in a particular insurgency is absolutely necessary for deciding appropriate strategy for tackling it.

Susceptibility of Population to Insurgency.

Theda Skocpol holds that the probability of revolution against the state is determined by the

degree of penetration of national territory by a state, the incorporation of socially mobilized groups, and the degree of bureaucratization of the state administration and its armed forces.[15] This can be represented by the diagram below.
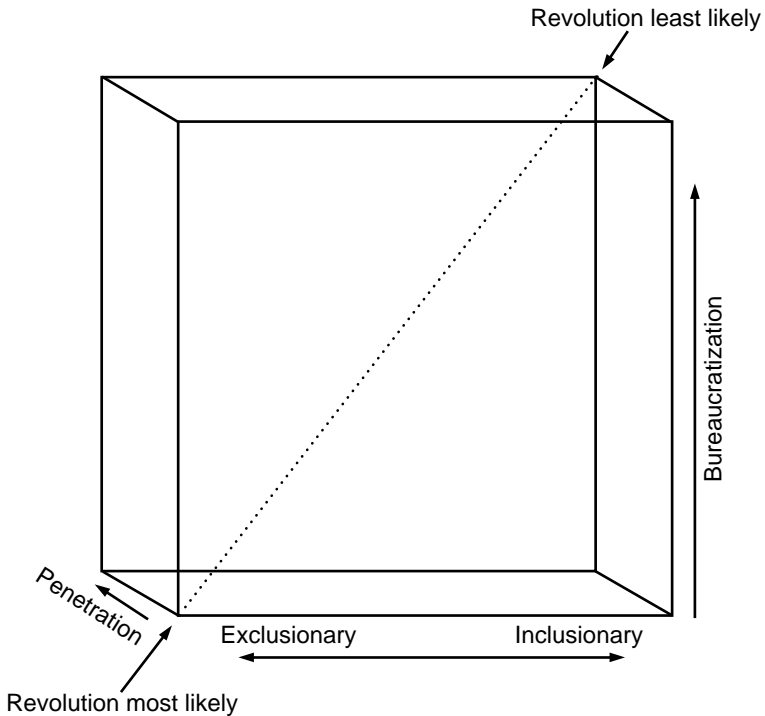
Figure 1. Skocpol's Model.

Adapting Skocpol's Model to India.

India, with a history of democratic governance for more than 50 years, ideally should score high on all three dimensions. True to the model, at the macro level, India has been able to handle the many insurgencies it has faced since independence from the British Empire in 1947. However, this does not explain the emergence of insurgencies in various areas within

India. The reasons for these insurgencies can be traced to the many attributes of the country which, like many other Third World societies, affect all three dimensions of Skocpol's model. Based on these aspects, a slightly different model is developed in the next chapter, which includes dimensions that are easier to estimate.

Social Control and Penetration.

The first consideration is the degree of penetration of national territory by the state, which depends on the reach of the administration, as well as the nature and quality of governance. Every population has mechanisms for social control. According to Chalmers Johnson, "Society, conceived as the successful adaptation of a collectivity of people to their environment through a division of labor, cannot succeed unless some people have power over other people."[16] Quoting Weber, he describes "[a] state as a human community that (successfully) claims the *monopoly of physical* force within a given territory."[17] He further adds, "Every society needs institutions authorized to exercise force [for social control], occasionally, in order to establish confidence. The most typical form of this institution is the state."[18] Therefore, penetration of a state into a population implies social control by the state over the individual members of that population.

Fragmented Social Control in the Third World.

Unlike the Western world, Third World countries, for the most part, have not evolved into modern nation states on their own. Western society slowly evolved from medieval to modern over hundreds of years. According to Charles Tilly, "looking back, one cannot help but be struck by the seemingly symbiotic relationship existing

between the state, military power, and the private economy's efficiency in the age of absolutism."[19] All the subsystems reinforced each others' transformation into modern industrialized societies. This did not happen in the case of the Third World countries. According to Joel Migdal, Third World states are weak and are not able to provide satisfactory enforcement of the laws they promulgate. Many Third World countries "have differed from those of both the West and the socialist bloc, not so much in the amount of social control in the society, but in its distribution and its centralization."[20] Third World countries, with web-like societies, have "[fragmented] social control dispersed among various social organizations having their own rules, rather than centralized in the state or organizations authorized by the state."[21] At the time of its independence, Indian society did not resemble a feudal society, nor did it have a modern state. According to B. Kuppuswamy,

> Conflicts at the cultural level and between social norms have been responsible for the large scale sense of frustration in the country [India]. Democracy, socialism and secularism are preached but hierarchy, inequality emotionalism and particularism are extensively practised at home and in all sectors of the society.[22]

The reasons for fragmented social control in the Third World can be traced to the colonial past. According to Migdal, land tenure laws, taxes, and new modes of transportation introduced by imperial rulers destroyed the old social and political arrangements within a very short period of colonization. Imperial powers preferred to rule through fragmented, indigenous leadership and local strongmen, rather than by establishing centralized social control in place of the old system. Thus, in these colonized societies, old social control was replaced by fragmented social

control. Establishment of the Zamindari system and permanent settlement of land by the British in India after 1858 are examples of fragmentation. Even in the societies that escaped former colonial rule, Migdal points out, "the alliance of European merchants and indigenous strongmen limited the ability of the state leaders to concentrate social control."[23]

Fragmented Social Control and Penetration by the State into a Population.

To review, "every society needs institutions authorized to exercise force [for social control], occasionally, in order to establish confidence. The most typical form of this institution is the state."[24] With Third World countries,where social control is fragmented, the weak state competes with "strong" societies for popular control. Therefore, the degree to which social control is fragmented is a measure of the lack of penetration by the state. The state has a better chance if a distinct society is divided, compared to the situation when that society is more homogeneous. Therefore, the greater the social homogeneity of a distinct population, the less is the penetration of the state into that population.

In India, the population can be divided along many dimensions, including religion, ethnicity, language, and caste. The existence of a strong unifying social identity on any one of these dimensions, however, can offset the divisive tendencies of multiplicity in other dimensions. A population can have a strong cohesiveness due to a minority religion. In such a situation, the state will face strong competition from religious institutions in exerting social control over this population. This religious cohesiveness will be stronger if the population is less divided along other

dimensions, like ethnicity, language, and caste. In other words, the relevant question is whether the particular population has a strong sense of separate social identity in contrast to the majority population. In view of the foregoing discussion, it can be assumed that the degree of the state's penetration into the population is inversely related to the strength of the separate social identity of that population, and the sense of separate social identity should be sought in factors including a homogenous minority religion, regional language, and ethnicity.

Multiplying Effect of Separate Social Identity for Insurgency.

In an insurgency situation, the fragmentation of social control has a multiplying effect in favor of insurgents, which helps the insurgents by influencing choices made by the population. Leites and Wolf point out that as a rational decisionmaker, an individual or a group in a population assesses the opportunities and/or consequences of joining the insurgents or helping the government.[25] Therefore, an individual who is forced to choose one side or the other in an emerging situation naturally will be attracted to the one yielding higher social control.

This is even more apt because the social organizations that exercise social control over the individual also provide the person with the necessary trust networks. According to Piotr Sztompka, an individual who is forced to choose one side or the other in an emerging situation clearly is taking a risk. Sztompka quotes Niklas Luhmann that "trust becomes the solution for specific problems of risk."[26] If the insurgents are representing the perceived grievances of the local dominant social group, an individual belonging to the

social group is even more likely to cooperate with the insurgents. Moreover, it is clear that the state is not able to provide satisfactory enforcement of their laws. On the other hand, the population belonging to these areas is connected to the insurgency through the local social network and therefore forms the support base for the insurgency. Sikh and Kashmir insurgencies in India are obvious examples of these linkages.

Dependence of Insurgents on the Social Networks.

Insurgents also depend on the social networks for their security. J. Bowyer Bell describes how an insurgent organization, being an underground organization, is highly secretive and, consequently, inefficient.[27] Such an organization is forced to fragment into small local groups to avoid detection. It resembles A. L. Barabasi's description of loosely interconnected clusters inside a hierarchical network.[28] Its existence depends on the risky business of maintaining communication and coordination among its clusters with utmost secrecy. Therefore, the insurgents try to prevent entry of anybody who cannot be trusted into their in-group. According to Marc Sageman, the terrorist groups resist the temptation to expand through recruitment drives or brainwashing in order to ensure security. The preexisting social affiliations of an incumbent form the initial basis on which he or she is granted formal affiliation.[29] For the recruit, trust based on social networks also plays a big role, because he or she risks everything, including life, by joining the insurgency. Sztompka explains how social capital—like social networks, family, friendship, and religion—helps in taking risk.[30]

Therefore, the existence of a separate social identity in the target population is very helpful to the

insurgents. On the other hand, if the insurgents are not linked to the entire population, it can be their weakness. According to K. P. S. Gill, the Sikh insurgency, which ultimately could not sustain itself, was waged not by the entire Sikh community, but was "actually a rebellion of a privileged, quasi-feudal, caste-based orthodoxy that saw its privileges shrinking."[31] Gill also speaks of how "it was the Sikhs . . . that stood against the movement for Khalistan. Of the Punjab police, of course, 65 percent were Sikhs. But more significantly, there was increasing and organized resistance among [Sikh] civilians against terrorist violence."[32]

Bureaucracy and Separate Social Identity.

Finally, fragmentation of social control adversely affects the bureaucratic agencies of the state. The sense in which Skocpol uses the phrase "bureaucratization of state agencies and armed forces," refers to the impersonal and bureaucratic forms of the state and its agencies.[33] While many nondemocratic states have highly bureaucratized agencies and armed forces, it is difficult to imagine any reasonably large democratic state without bureaucratic agencies. At the time of their independence from colonial rule, bureaucracies in the Third World did not have the level of objectivity and rational organization that is the hallmark of modern democracies. According to Migdal, in a society with fragmented social control,

> The bureaus of the state may become little more than the arenas for accommodation [by the state] with other organizations [of social control]. Their tentacles may be captured by those with very different rules and principles from those expressed in the state's legal code, and state resources may be used to strengthen the very forces they aimed to eliminate.[34]

Thus, the strength of separate social identity of an area's population can adversely affect the bureaucratization of state administration and its police in that area.

Inaccessibility and Insurgency.

In the Third World, the inaccessibility of an area directly helps insurgency in many ways. Inaccessible areas provide excellent havens for insurgents. Andrew Mack discusses how "operating in uninhabited areas and supplied from without . . . the insurgents may simply rely on the mountains and forests to conceal and protect them."[35]

Inaccessibility and Penetration by the State.

The remoteness of an area inhibits penetration by the state into its population in a significant way. According to Leites and Wolf, less developed countries have units that are physically, functionally, and technologically remotely situated within the bigger political entity. The state and its agents are not part of the "life-world" of these remote people,[36] and hence, do not enjoy their confidence. On the other hand, the insurgents normally thrive in these remote areas and their social networks. The population belonging to these areas is connected to the insurgency through the local social network and forms the support base for the insurgency, as discussed above. More than the physical distance, remoteness can result from inaccessibility due to forests, rugged mountains, inhospitable terrain, or extreme climate. As mentioned in earlier sections, historical events dating back hundreds of years have resulted in populations living in inaccessible areas in the Third World. Members of the government machinery who do not belong to

these remote populations are reluctant to go to these places or to live there. The government may build schools, hospitals, police stations and other facilities, but the vast majority of these facilities may be defunct due to absenteeism by government employees. Thus, the inaccessibility of an area inhibits state penetration into the local population.

Inaccessibility and Social Change.

Inaccessibility of an area inhibits economic development that might have helped the state to penetrate the population better. Economic development is understood to have strengthened the state in medieval Europe at the expense of other competing agents of social control. According to Karl Marx, the developments and changes in human history basically are shaped by the economic, technological, and more broadly, material developments. The dynamism that is instigated by economic developments or cognitive changes resulting from exposure to science, technology, and democracy also has induced a slow social transformation in India. For example, economic developments have forced people to migrate from one area to another, or from rural areas to urban industrial areas, greatly reducing the hold of the pre-independence social controls by caste, village, religion, and tribe.

However, because this transformation is related to economic development, it bypasses the inaccessible areas within the country. In these areas, for geographical or historical reasons, very little economic development has taken place since India's independence. Hilly areas, due to their inaccessibility, and forest areas, due to environmental protection concerns, do not get their share of economic development. At the same time, large scale migration from these areas is impeded by

the people's attachment to their ancestral lands. Thus, the inaccessibility of an area insulates the area from social transformation.

Inaccessibility and Relative Deprivation.

The inhabitants of inaccessible areas feel an acute sense of relative deprivation because of all the points discussed above. Increases in the flow of information into these areas through radio, TV, long distance telephone, and the internet have contributed to this sense of deprivation. These communication channels bring information about what goodies are available to others in the country, what opportunities the society is supposed to provide, and the tall claims by national and regional politicians about what has been made available to every citizen. But because of economic underdevelopment, the inhabitants of inaccessible areas do not find any of these things available to them in sufficient quantity. This contributes to the sense of relative deprivation that, in turn, increases the disposition to collective violence. According to Robert Ted Gurr, "the capacity, but not the need, for violence appears to be biologically inherent in men. The disposition to collective violence depends on how badly societies violate socially derived expectations about the means and ends of human action."[37]

Inaccessibility and Exclusion from the State.

The inaccessibility of a population also affects the relative power position of its politicians in the state's politics. If its representatives are marginalized in national level politics, then the population can be expected to have less sense of inclusion in state governance. Thus, inaccessibility is a hindrance

to the state's inclusiveness. Clearly, inaccessibility of a population both determines and reflects the penetration by the state into the population, as well as the population's inclusion in the state's politics.

External Unifying Influence and Insurgency.

Finally, a short discussion about the internal social dynamics of the target population can provide insight into yet another aspect that has contributed to the growth of insurgency in India. How Third World societies are fragmented already has been discussed; even a small population may have many divisions. One of the basic divisive aspects of an otherwise homogenous population is kinship segmentation. Such segments usually remain divided, but can unite in certain circumstances. Lincoln Keiser brings out this segmentary opposition in his study of an isolated population in Pakistan. He, however, describes how "[sometimes] segmentary units mobilize [or unite] to protect their reputation and their rights to natural resources."[38] Therefore, it is suggested that a unifying external force can play a catalytic role in unifying and aligning the segments. The external unifying force is not necessarily from across the country's political boundary. It can be any influence external to the target population. Thus, the strength of the separate social identity of a population and its inaccessibility affect all three dimensions of Skocpol's model. At the same time, the presence of a unifying external force can help mobilize the segments of an isolated population.

CHAPTER 2

MODELING INDIAN INSURGENCY

THE NEED FOR A NEW MODEL

As discussed in the first chapter, according to Skocpol, the probability of revolution against the state is determined by the degree of the state's penetration of national territory, the extent of incorporation of socially mobilized groups, and the level of bureaucratization of the state administration and its armed forces. This is shown diagrammatically in Skocpol's model (Figure 1).

The previous chapter noted that, while this model explains India's stability and success in the face of all odds, it does not explain the insurgencies that India has experienced since its independence—insurgencies in various areas which require explanation. In the previous chapter, the explanation of Indian insurgencies was traced to certain aspects of the society and state inherited by Third World nations from their colonial past. These aspects, like the fragmentation of social control and the preponderance of relative deprivation in inaccessible areas, affect all three dimensions of Skocpol's model. However, it is difficult to empirically verify the explanation using this model, as the three dimensions it presents are difficult to measure quantitatively. Therefore, a slightly different model is developed in this chapter, with dimensions that are easier to estimate empirically.

A THEORETICAL PERSPECTIVE FOR INDIAN INSURGENCIES

Based on the foregoing discussions, I advance the following hypothesis: *In India, the degree of inaccessibility of an area, the strength of separate social identity of its population, and the amount of external unifying influence on it determine the propensity of that area for insurgency.*

To test this hypothesis, all the major insurgencies in India since independence are examined. A simple model is developed to explain the emergence and strength of insurgencies in India. Secondary and tertiary sources are used for collating data to test two out of three dimensions of the model quantitatively. The third dimension, the amount of external unifying force, is not tested quantitatively; instead it is supported through empirical evidence.

DESCRIPTION OF THE INDIAN MODEL

Variables.

There are four variables: (1) the degree of inaccessibility of an area, (2) the strength of separate social identity of its population, (3) the strength of external unifying influence on the population, and (4) the propensity towards insurgency shown by the area. The first three are independent variables, and the fourth is the dependent variable.

Relationship among the Variables.

The basis for this model is the hypothesis that, in India, the degree of inaccessibility of an area, the strength of separate social identity of its population, and the amount of external unifying influence upon it

determine the propensity of that area for insurgency. The relationship among the variables is presumed to be linear.

$I = C_xX + C_yY + C_zZ, + I_0$ where

I is the propensity towards insurgency shown by an area,

I_0 is the value of I when all the other factors on the right-hand side are 0,

X is the strength of separate social identity of its population,

Y is the degree of inaccessibility of the area, and

Z is the amount of external unifying influence on the population.

C_x, C_y, and C_z are coefficients or weights given to each variable. These are necessary because all the variables are of different types with different units. Basically, this takes care of the fact that tigers, dogs, and hyenas are added and compared with elephants.

The Indian insurgency model looks like Figure 2.
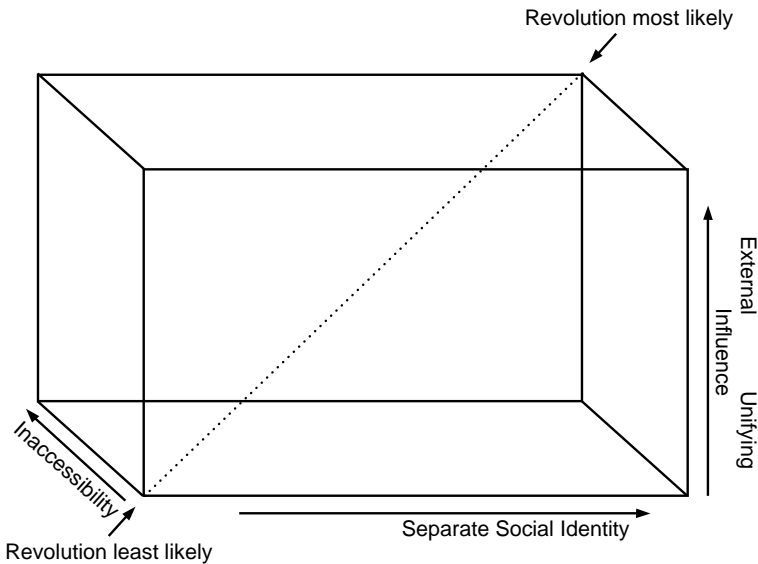
Figure 2. Indian Insurgency Model.

Definitions of the Terms Used in the Model.

*The Strength of Separate Social Identity (SSI)*can be defined as the sense of separation from the majority population through religion, language, ethnicity, and any other distinct social attribute of the population as a whole. In other words:

$X = C_{xrel}X_{rel} + C_{xlang}X_{lang} + C_{xethn}X_{eth} + C_{x?}X_{?}$, where

X_{rel} is the *SSI* due to religion. It is taken as 1 in case the population mostly belongs to a minority religion, otherwise it is 0.

X_{lang} is the *SSI* due to language. It is taken as 1 in case the population mostly speaks a minority language, otherwise it is 0.

X_{ethn} is the *SSI* due to ethnicity. It is taken as 1 in case the population mostly belongs to one ethnic group, otherwise it is 0.

$X_{?}$ is the *SSI* due to any other social attribute. It should be computed the same way as above. An example of such a social attribute is caste. This analysis, however, is limited to the first three attributes only.

C_{xrel}, C_{xlang}, C_{xethn}, and $C_{x?}$ are the coefficients.

*The Degree of Inaccessibility of an Area(Y)*can be defined as a combination of the average amount of forest coverage in that area and the average slope of the terrain of that area. In other words:

$Y = C_{yfor}Y_{for} + C_{yslope}Y_{slope}$, where

Y_{for} is the average forest coverage of an area. If 60 percent of an area is covered by forest, on a scale of 1 to 10, the area will get 6 as its Y_{for}.

Y_{slope} is the average slope of the terrain of an area. For example, a flat area situated on a plateau and a plain area at sea level may have average slope close to 0, while hilly areas have values close to 90 degrees

irrespective of their altitude. The average slope is a measure of hilliness or undulation of an area and not the elevation from sea level.

C_{yfor} and C_{yslope} are the coefficients.

*The Amount of External Unifying Influence (Z)*can be defined as the proportion of persons among the top leadership of the main insurgent groups who are of outside origin or who spend a lot of their time outside the affected area. For example, if two out of six top leaders of the main insurgent group either do not belong to the area or live outside the area, then on a scale of 1 to 10, the insurgency gets $Z = 3.33$.

Propensity for Insurgency: This is the dependent variable. It can be defined as the level of insurgency seen in the past.

METHODOLOGY FOR TESTING THE MODEL

Due to paucity of time and resources, attempts are made to verify the correlation only between the level of insurgency (dependant variable) and the following two dimensions (independent variables): Degree of Inaccessibility of an Area, and Strength of Separate Social Identity of its Population. The third dimension, External Unifying Influence, is dealt with less rigorously and supported through empirical observations.

Units for Comparison.

For the purpose of elections to parliament, the entire country and population of India are divided into parliamentary constituencies of more or less equal population size. These parliamentary constituencies have been taken as units for statistical comparison.

For each constituency, the values of dependent and independent variables are tabulated, and the correlation—whether the value of the dependent variable varies in accordance with change in the independent variable—is tested statistically.

The lower house of the Indian parliament is composed of representatives of the people chosen by direct election on the basis of adult suffrage. The maximum strength of the House envisaged by the Constitution is 552, with up to 530 members representing the states, up to 20 members representing the Union Territories, and not more than two members nominated by the President of India. This analysis uses 528 constituencies belonging to the states for the sake of comparison. Each unit has a population of about one million, which makes the population of each unit of comparison more or less equal in size.

Combining Variables.

The model presumes a linear additive relationship between the dependent variable and the independent variables. However, both the independent variables and each of their components are of different types and the units of measurements adopted also are arbitrary. Therefore, they cannot be added or compared directly. For combining or adding them, for quantitative comparison, coefficients are used. Regression analysis by Microsoft Excel is used to find the values of the coefficients that optimize the correlation of the dependent variable with the combination of independent variables. However, for more accurately identifying the relevance of individual independent variables, the correlation between each component of the independent variable also is compared with the dependent variable.

Correlation.

If the causal relationship hypothesized on the basis of the theoretical arguments is correct, then the values of dependent variable for different constituencies should vary, more or less, in the same way with the change in the values of independent variables. In other words, there should be high correlation between the dependent variable and the combination of independent variables. The reverse may not be true, i.e., a strong correlation does not necessarily mean a causal relation. However, a negligible or low correlation would show a lack of linear causal relationship. For establishing correlation, graphical as well as analytical methods are used. In the analytical method, Regression Analysis by Microsoft Excel is used for computing both the value of correlation as well as the values of the coefficients.

DATA USED FOR TESTING THE MODEL

Slope of the Terrain.

The data on elevation for India and nearby areas was downloaded from Geography Net, with the help of ArcGIS software. Using this data, ArcGIS software calculated the slope. A GIS map showing parliamentary constituencies of India was downloaded from *www.eci. gov.in/*—the official portal of the Election Commission of India. Combining this map with slope data, ArcGIS calculated the average slope for each constituency.

Average Forest Cover.

Average forest cover has been calculated by visual estimation of the amount of forest, as presented on the official site of the Environment Ministry of the

Government of India juxtaposed onto the parliamentary constituency maps. Maps of statewide forest coverage were downloaded from the State of Forest Report (2001) by the National Forest Commission of India at *envfor. nic.in/nfc/s-chap-6.pdf*. These maps were superimposed on the map of Indian Parliamentary Constituencies.

Separate Social Identity (SSI).

As previously noted, SSI is the sense of separation from the majority population through religion, language, and ethnicity. Therefore, data were collected separately for the three aspects of SSI.

SSI due to Religion. A map showing the demographic distribution of religion in India was downloaded from *www.mapsofindia.com/maps/india/religionsinindia. htm*. Only data regarding places where a minority religion was in the majority was tabulated. Except for a couple of small pockets, the areas where religious minorities are in the majority coincide with parts of state boundaries.

SSI due to Language. A map showing the demographic distribution of languages in India was downloaded from the above source. Hindi is the language spoken by the majority population. The major linguistic minorities' areas coincide with the state boundaries. In the introductory chapter of this paper, it was noted that the Indian constitution recognizes 23 official languages.[39] The official number of "mother tongues" spoken in India is 1,683, of which an estimated 850 are in daily use. The SIL Ethnologue lists 387 living languages for India.[40] For the purpose of this paper, data was confined to the main linguistic minorities.

SSI due to Ethnicity. The GIS map showing parliamentary constituencies of India was downloaded

from *www.eci.gov.in/*. Some constituencies are reserved for persons belonging to certain castes, and others are reserved for tribes. Provisions for Scheduled Castes and Scheduled Tribes in the Constitution of India were made to ensure political participation by those sectors of the population because they had inherited social and economic handicaps at the time of India's independence. The ethnic distinctiveness of the Scheduled Castes has been lost over the thousands of years of their assimilation into the mainstream of Indian society, but the majority of Scheduled Tribes have distinctive ethnicity due to their nonassimilation into the mainstream society. Members of Scheduled Tribes can be found nearly everywhere in India, but their population can be taken as concentrated in the constituencies reserved for them. Therefore, these data were tabulated for distinct ethnicity.

External Unifying Influence.

Collection of data regarding top leadership of different insurgent groups would require more intensive research. Therefore, the relevance of this variable could not be established through quantitative correlation. As an alternative, empirical evidence has been used to verify this dimension of the model as discussed later in this chapter.
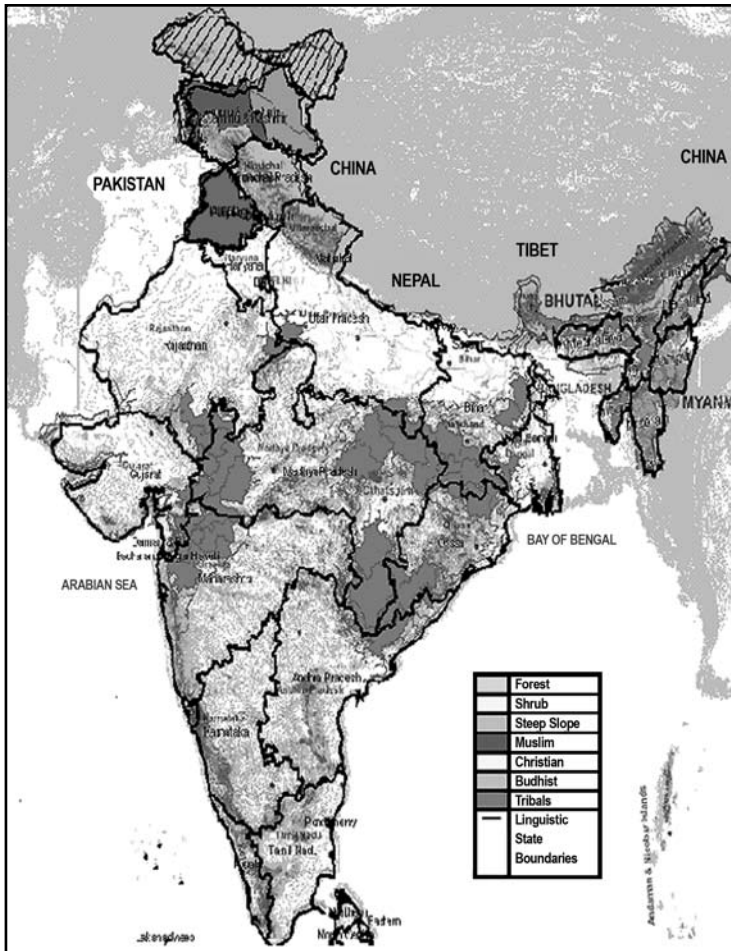
**Map 1. Slope, Forest, Religion, Language,
and Ethnicity**.

Level of Insurgency.

A rigorous definition of the level of insurgency
would be highly desirable, including both spatial and
temporal aspects. The level of insurgency can refer
to the duration of an insurgency, the peak level of
violence perpetrated by it, the total amount of violence,

the level of popular support, the strength of the cadre, the size of the affected population as a percentage of the total target population, the size of security forces deployed by the state to control it, the area over which the insurgents have real control, or the extent to which the insurgency achieves its objectives. In this paper, the measure of the level of insurgency is based on the author's considered but informal judgment of all the criteria, based on experience and a review of relevant literature.

Naga Insurgency. This is the oldest and most mature insurgency in India, and is called Mother of Insurgency. The insurgents in northeast India have looked upon the Naga insurgents for inspiration. Naga insurgency has been able to hold its ground for more than 50 years and perpetrate violence at will. Recently, one of the two factions of Naga insurgents started talks with the government of India for a peaceful solution. All things considered, it is evaluated $I = 5$.

Kashmir Militancy. Though the insurgency has been active for only about 25 years, its consistently high level of violence and daring actions beyond its area of influence put it close to the level of the Naga insurgency. It is evaluated $I = 4$.

Mizo Insurgency: This was active for about 10 years, but during that time, the level was very high. It arrived at a peaceful solution with the government of India, and the insurgents achieved part of their demands. Its leaders went on to participate in state democratic politics and gained power off and on. Thus, they are evaluated $I = 4$.

Sikh Militancy of Punjab. Punjab militancy was very violent and daring. For about 18 years, it created terror in Punjab and nearby areas, including the national capital. It attracted international attention by its level

of violence. However, it could not hold its ground and was crushed. It is evaluated $I = 3$.

Tripura Tribal Militancy. The tiny state of Tripura has been ravaged by tribal militancy for nearly 25 years. The level of violence has been high, but it consists mostly of kidnapping. It is evaluated $I = 3$.

Insurgency in Assam. Though this insurgency has been active for about 25 years, its level of violence and activities have been decreasing over the years. It is evaluated $I = 2$.

Darjeeling Gorkha Agitation. This was not an insurgency in a true sense, since they did not demand separation from the union, but the level of violence and tactics puts them in the same category. They were successful in achieving parts of their objective. It is evaluated $I = 2$.

Left Wing Extremism. The left wing extremism is quite high in certain core areas, whereas in other areas they operate only once in a while. Though a large number of districts in the central part of India are affected by this insurgency, the average level in the entire area is low. Not having a resolution on the variation in the level of extremism within the affected area, it is taken as uniform and evaluated $I = 1$.

Other Minor Insurgencies. There are minor insurgencies in Manipur and Arunachal Pradesh that have been evaluated as $I = 1$. A map showing insurgency in India, expressed in terms of high and low intensity conflict, also was used for identifying boundaries (*www.satp.org/satporgtp/countries/india/images/indiaconflict.jpg*).

Tabulation of Data.

The above data were tabulated in an Excel work sheet. Except for the slope, forest, and insurgency,

all other values were entered 1 for presence and 0 for absence. The slope was entered as calculated by ArcGIS software from data taken from Geography Net, forest was entered on a scale of 1 to 10, and insurgency was entered on a scale of 1 to 5.

TESTING THE MODEL

If the causal relationship suggested by the hypothesis is correct, there should be a high correlation between the combination of independent variables and the dependent variable. In other words, a negligible or low correlation would show a lack of causal relationship. The following causal relationship was tested using available data.
$I = C_x X + C_y Y + C_z Z + I_0$, where
I is the propensity towards insurgency shown by an area,
I_0 is the value of I when all the other factors on the right-hand side are 0,
X is the strength of separate social identity of its population,
Y is the degree of inaccessibility of the area, and
Z is the amount of external unifying influence on the population.
C_x, C_y, and C_z are coefficients or weights given to each variable.

Because data have been collected only for X and Y, and because both the variables have been further broken into their components, the relationship to be tested can be expressed by the following equation.
$I = C_{xrel} X_{rel} + C_{xlang} X_{lang} + C_{xethn} X_{eth} + C_{yfor} Y_{for} + C_{yslope} Y_{slope} + I_0$
I_0 is the value of I when all the other factors on the right-hand side are 0,
X_{rel} is the *SSI* due to religion.
X_{lang} is the *SSI* due to language.

X$_{ethn}$ is the *SSI* due to ethnicity.
Y$_{for}$ is the average forest coverage of an area.
Y$_{slope}$ is the average slope of the terrain of an area.
C$_{xrel}$, C$_{xlang}$, C$_{xethn}$, C$_{yfor}$, and C$_{yslope}$ are the coefficients.

In the foregoing discussions, methodological details of how the data were collected using different methods, including the application of ArcGIS software, super-imposition, and graphical comparison, have not been given for the sake of brevity. For verification by correlation, both the graphical method and the analytical method are used.[41]

Testing by Graphical Comparison.

For graphical comparison, the maps of slope, forest, religion, language, and ethnicity were superimposed on each other and on Map 1 which is compared with with Map 2, showing insurgencies.
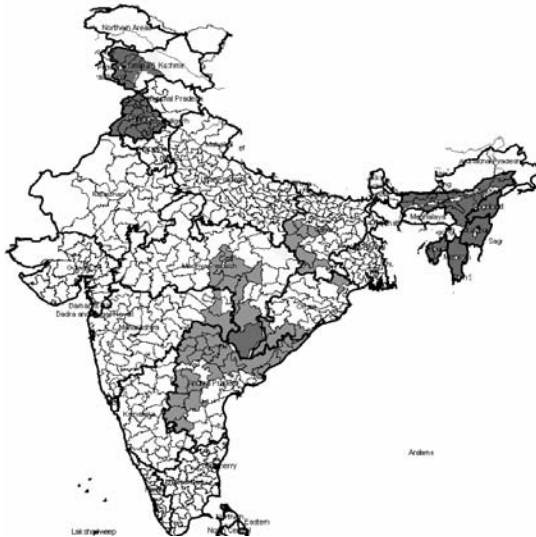
**Map 2. India Insurgencies
(Shown in various shades).**

Testing by Statistical Method.

Analysis of Data. Individual correlation of each of the independent variables with the dependent variable (insurgency) was calculated using the RSquare function of Microsoft Excel. See Table 2.

Independent Variable	Correlation with Dependent Variable
Average Slope	0.019
Forest Cover	0.128
Militant Minority Religion	0.476
Non-Militant Minority Religion	0.028
Minority Language	0.042
Distinct Ethnicity	0.041

Table 2. Correlation between Individual Independent Variables and the Dependent Variable.

Table 3 shows the results found when a regression analysis was done to find the covariance of all the independent variables with the dependent variable (insurgency).

Independent Variables	Distinct Ethnicity	Minority Language	Nonmilitant Minority Religion	Militant Minority Religion	Forest Cover	Average Slope of the Affected Area	Value of Insurgency when all the variables are 0
Value of Coefficients (weights)	0.433	0.162	0.714	3.015	0.116	-0.004	0.027
Value of Total R Square			0.644				

Table 3. Coefficients and Correlation through Regression Analysis.

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Therefore, the equation showing the relationship between the variables of the model becomes:

$$I = 3.015X_{rel} + 0.162X_{lang} + 0.433X_{eth} + 0.116Y_{for} - 0.004Y_{slope} + 0.027$$

Interpretation of the Results.

1. Relative relevance of different independent variables. Based on the RSquare values shown above, the following is the order of relative relevance of the independent variables tested for their influence on insurgency:

> 1. Militant Minority Religion;
>
> 2. Forest Cover;
>
> 3. Minority Language;
>
> 4. Distinct Ethnicity;
>
> 5. Nonmilitant Minority Religion;
>
> 6. Average Slope of the Affected Area.

2. Co-variation among the independent variables. Though the independent variables are independent with respect to the propensity of an area towards insurgency, which is the dependent variable, they are not totally independent of each other. For example, the RSquare value between "forest cover" and "slope" is 0.34. Similarly, 77 percent of forests lie in areas having an average slope of more than 45 degrees, which lie in about one-third of all the parliamentary constituencies. This can be explained by the fact that over thousands of years after the introduction of iron implements, most flat accessible forests have been converted to agricultural land. Forests in the relatively inaccessible areas have escaped this conversion. Therefore, the Rsquare value of the combined correlation, 0.644, is less than the sum of individual Rsquare values, which is 0.734. This interdependence also is the reason why one of the coefficients is negative.

3. The value I_0. Since I_0 is the value of I when all the other factors on the right hand side are absent, a small positive value indicates a propensity for insurgency in India, however small it may be, in any population—even without any of the enabling factors. In other words, a small niche is available for the extremists in any population in India. This appeals to common sense also, because occasional localized political violence has been seen in almost every part of the country after its independence. Moreover, this corroborates the McCormick and Giordano model for Bandwagon Effect on the growth of insurgency.
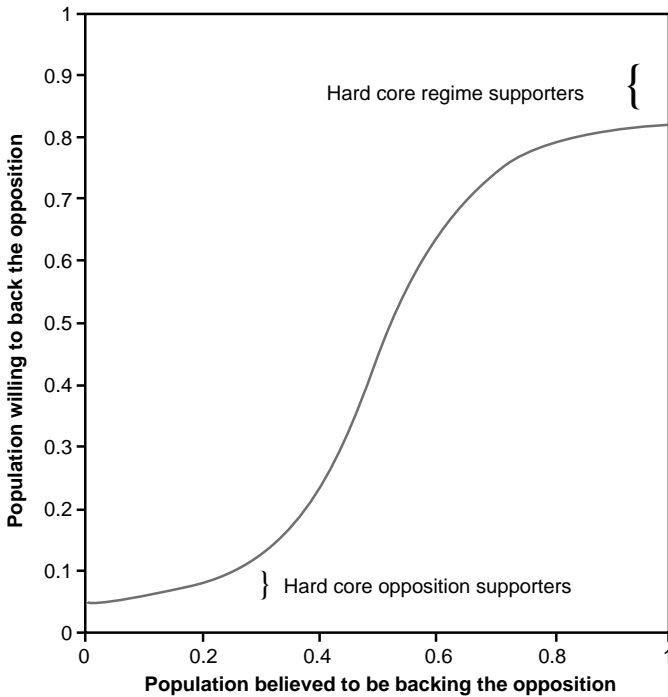
Hypothetical Mobilization Curve

Source: Paper presented by Professor Gordon McCormick and Professor Frank Giordano at Insurgency Board, Washington, DC, February 18, 2005.

**Figure 3. McCormick Giordano Model
of Support for Insurgency**.

According to this model, the willingness of a population to support insurgency depends on the perceived size of the support for that insurgency, as given in Figure 3. However, even when the insurgency is young and the insurgent organization is negligibly small, there will always be some people ready to support the insurgency.

4. The Value of RSquare. The relatively high value of RSquare indicates a high correlation, which is consistent with the relationship proposed in the model between the variables tested above, i.e., inaccessibility and separate social identity, with insurgency. To that extent, the model is verified statistically.

Verifying the Relevance of External Unifying Influence.

Although I do not have the data to verify this dimension of the model statistically, it can be supported by empirical evidence. Sikh militancy provides a good example of the effect of external influence on insurgency. It is well-known that Pakistan heavily supported and guided Sikh terrorism during its heyday in Punjab. According to Gill, "Pakistan was strenuously and openly directing the terrorist campaign at this stage [1989], to the extent that terrorist training camps were being organised even within 75 metres of the international border (in the Ferozepur sector)." He further adds that "border crossings remained a continuous and daily occurrence along the 533 kilometre long international border Punjab shared with Pakistan, and could never really be checked effectively, despite 122 kilometres of fencing that had been erected by August 1989."[42] However, according to the Indian government's 2003–2004 Annual Report of the Ministry of Home Affairs, the India-Pakistan border fencing on the Punjab sector

was completed by 1993.[43] There was also a sharp decline in Sikh insurgency during and after 1993, as shown in Figure 4.
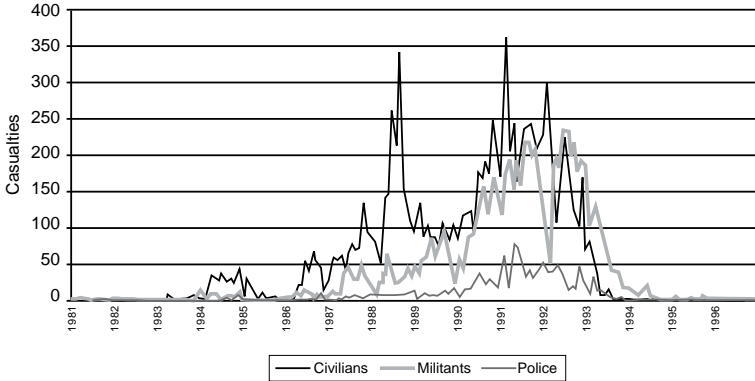
Source: K. P. S. Gill, 2001, p. 70.

Figure 4. Civilians, Police and Terrorist Casualties in Punjab: 1981–96.

Though the credit for quelling Sikh militancy cannot be given solely to border fencing, the coincidence in timing appears related. According to Singh,

> It [border fencing along the Indo-Pak border in Punjab] went a long way in controlling movement across the border. Infiltration of armed militants was reduced to a trickle and the inflow of weapons was substantially reduced. Intercepted documents mentioned that terrorists were finding it "very hazardous to cross the border." The Punjab Police, thereafter, decimated the diminishing ranks of the terrorists. The graph of violence came down sharply and, by 1994, terrorism in the state was contained. In fact, what was achieved by the internal security forces in Punjab has yet to be replicated anywhere else in the world.[44]

Thus, border fencing helped to cut off or minimize outside influence on the Sikh population in Punjab and decreased its propensity towards insurgency. It was easier to disrupt the extremist political mobilization after the border fencing was complete. This is an example of macro-level insulation from external influence. There also are examples of micro-level insulation. Professor Kalev Sepp describes the efficacy of "berming" in controlling insurgency in Iraq (See Annex I). Berming basically is insulating a town by building a mud wall around it and enforcing access control for vehicles. It is similar to border fencing at the micro level. It decreases external influence on the town population, since, in Iraq, insurgents use vehicles for their movements in and out of the towns. According to Professor Sepp, berming is "problematic for the insurgents and criminal gangs. It lengthens their time of travel, limits their choices of routes, and increases their risk of capture, especially if they're shipping weapons . . . Berming was considered successful enough in Mosul that Tall Afar was bermed before the major coalition and Iraqi military operation in September to clear out the Serai neighborhood. Samarra, long a contested town, will likely *be bermed* next" (see Annex I). Clearly, berming is used in Iraq to cut off external influence before enforcing political remobilization.

The role of physical barriers in decreasing the effect of external force also seems evident in the case of Israel. According to the government of Israel's official web document, "The Anti-Terrorist Fence—An Overview," comparing the number of suicide attacks before and after the construction of fencing leads to the unavoidable conclusion that

> Construction of the fence in Samaria was followed by a significant decrease in the number of suicide attacks originating from the area. Yet, in Judea, where no fence

was built, there was no reduction in the number of attacks.[45]

The process of magnetization of a ferromagnetic substance can elaborate this point metaphorically. The domains of a ferromagnetic substance become aligned in one direction under the influence of an external magnetic field. This property, which is used for magnetizing ferromagnetic substances, also can be used for demagnetizing. The magnetic lines of force that helped in magnetizing the substance can be cut off by keeping the substance in magnetic insulation. Thereafter, there are many ways the magnetic alignment can be disrupted or even realignment achieved in the desired direction.

It also can be explained in terms of Professor Gordon McCormick's model, shown in Figure 5.[46] According to this model, the state, the insurgents, and the foreign actors are all targeting the population. Therefore, the Indian model (Figure 2) can be seen as a sub-model of Professor McCormick's general model of insurgency.
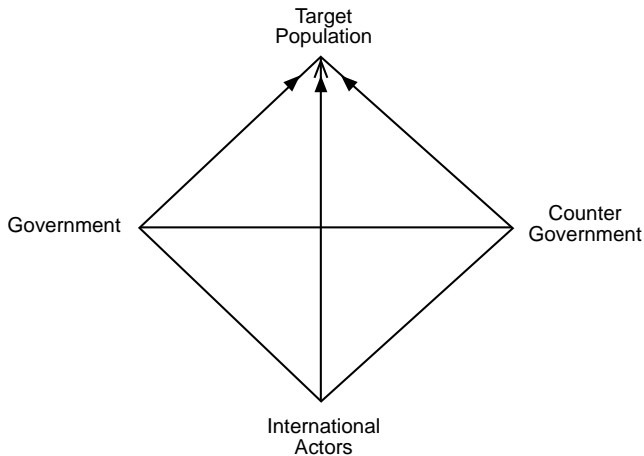

Figure 5. McCormick's Mystic Diamond Model of Insurgency and Counterinsurgency.

CHAPTER 3

DISCUSSIONS ON THE INDIAN MODEL

LIMITATIONS

Defining External Influence.

In this paper, the extent to which the top leadership of an insurgency comes from or resides outside the contested area is presented as the sole indicator of the amount of external unifying influence on the population living in that area. Admittedly, it ignores various other ways in which the population living in an area can be influenced from outside. Internet and other forms of communications, for example, can be used to reach the population and may provide unity. When required, physical contacts can be made through low-level go-betweens, making travel by top leaders unnecessary. Nevertheless, this definition is used because of the following considerations. Historically, almost every top leader of an armed rebellion, during its earliest stage, has taken refuge in territory outside the contested area (e.g., Lenin in France and Austria, Sun Yat-Sen in Japan, Fidel Castro in Mexico, Che Guevara in Mexico, Hekmatyar in Pakistan, and Ho Chi Minh in China). Almost all the top leaders of the Sikh, Kashmir, Naga, Tripura, and Mizo insurgencies of India have done the same. Second, the areas in the Third World with the maximum propensity for insurgency are relatively inaccessible and without much electronic connectivity. Thus, person-to-person connectivity is still critical. Third, unless an insurgency has succeeded in creating a liberated zone within the contested area, the contested area remains a dangerous war zone. An insurgency is

normally associated with its top leader(s), and their survival becomes very important for the unity and morale of the insurgents. The foreign sponsors and the insurgents, therefore, want to keep the top leaders safe and away from the war zone. This gives the sponsoring country greater capacity to more effectively influence the insurgency.

Similarly, in this paper, the sense of separate social identity is confined to three social factors: religion, language, and ethnicity, which are not exhaustive. Other aspects, like caste, subculture, and even strong class consciousness, can give a population a sense of separation from the majority population. However, it is presumed that the enabling factors behind Indian insurgencies have been limited to the three social aspects that were empirically tested.

Availability of Data.

The parliamentary constituencies were chosen as units for statistical correlation because data were available for them. Though the number of constituencies is large, each constituency is fairly big, with an average area of about 6,000 km^2 and more than a million voters. Due to their sizes, most of these constituencies do not have uniform distributions of the variables considered for correlation. Therefore, a finer resolution with more units of smaller sizes will throw more light on the way these factors influence the dependent variable, as well as each other. For example, a small part of a parliamentary constituency may be more undulated or forested, while the rest of the land may be flat plain or less forested, giving rise to low values for slope or forest. Because the average forest cover also is partially dependent on the slope, with the RSquare value between the two variables being 0.34, a portion of the

entire constituency may be highly inaccessible, despite the constituency's low average of inaccessibility as a whole. Therefore, a larger number of data units may reveal a higher or lower correlation between forest and slope as well as a higher or lower correlation between insurgency and inaccessibility.

Similarly, a more objective and quantitative definition of level of insurgency is desirable but could not be adopted because the necessary data are not available in the secondary and tertiary sources. Thus, the statistical analysis is limited by lack of data.

STATIC AND DYNAMIC ASPECTS OF THE MODEL

The model has both static as well as dynamic aspects. The geographic factors constitute the static aspect of the model, while historical and human factors belong to the dynamic aspect. The inability of Third World countries to develop strong states, as suggested by Migdal,[47] remains unchanged if the following dynamisms are not acknowledged or taken into consideration.

Inaccessibility.

The accessibility of an area is changeable. Deforestation for economic activities has opened up large tracts of land that were inaccessible earlier due to dense forest. The most densely populated fertile heartland of India, irrigated by the river Ganges and its branches, was covered by dense forest before the advent of iron axes. Similarly, roads and railroads cut through dense forests and highly undulated land and make them more accessible. Generally, the discovery of profitable economic opportunities in remote inacces-

sible areas has led to human activities that make the area more accessible. A tribe inhabiting an inaccessible area might have remained isolated from the larger political, social, and economic system for thousands of years until mineral deposits were discovered, or the area was deemed suitable for tea and coffee cultivation by British colonizers. Within a few years of such a discovery, the area becomes open to outsiders, sucking the local population into the larger political-economic system. This assimilation, over a number of generations, may integrate the tribesmen into the larger social system. Thus, in some areas, local tribes may get identified as castes of the more complex society while, elsewhere, the local tribes remain isolated communities and not integrated into the more complex social system.

Global Trends.

Macro trends or currents, seen all over the globe, may affect a population's sense of separate social identity at the micro level. Some trends, like religious fundamentalism and ethnic revivalism, have a tendency to increase the sense of separation, while others, like westernization and urbanization, tend to decrease the sense of separation.

Relative Deprivation.

Apart from roads and railroads, other forms of communication links increased at a faster rate with the advent of radio communication and developments in information technology. Irrespective of economic development in general and its effects on an area, communication links, like radio and television broadcasts, telephone connections, and internet

connections, have penetrated areas considered physically inaccessible. Although transport and communications infrastructure are important enabling factors for an area's economic development, when the standard of living does not improve, improved communication can engender a sense of relative deprivation. Through the flow of information, knowledge, propaganda, and physical contact, a population's general expectations may increase. But without the means to achieve their increased expectations, improved communications can create a greater sense of relative deprivation. Thus, an increase in communication may produce a greater sense of separation, due to an increase in the population's sense of relative deprivation.

Changes in the Enabling Factors.

Global trends and a sense of relative deprivation can increase a population's sense of separation, while increased accessibility through roads, railroads, and other means can decrease the sense of separation. As discussed below, democratic mobilization and economic development also can decrease the sense of separation. Similarly, physical barriers can cut off external influences on an insurgency. Thus, all the dimensions of the model have some aspects that change, making it more dynamic and time-specific. The situation in an area may have changed dramatically since India's independence. Some enabling factors may have increased while others have decreased.

ROLE OF DEMOCRACY

Democracy's detractors point to the many instabilities in democratic countries in the Third World,

arguing the unsuitability of democratic governance for Third World countries. Ausuf Ali, at the online website *beliefnet.com,* describes how "Pakistanis have developed a sad conviction that democracy as we know it is not a workable form of government for their country, because Pakistanis do not have the social psychology, the political culture, the social ethics, or the common decency for making democracy work."[48] These types of arguments are not limited to Pakistan. One can hear them in Thailand, Nepal, Nigeria, Bangladesh, and even in India; indeed, in almost all the Third World countries. However, the reason for this instability is that Third World states, at the time of their independence from colonial rule, were weak due to the fragmentation of social control, which was "dispersed among various social organizations having their own rules rather than centralized in the state or organizations authorized by the state."[49]

Democratic governance is like walking, cycling, or swimming. One learns these activities over long periods of time during which one's performance remains clumsy. Western democracies took hundreds of years to reach the level of perfection they have today. One thing is sure: one cannot learn to swim without entering the water. In his 1999 keynote address to the World Movement for Democracy, Amartya Sen pointed out how "a country does not have to be judged to be fit for democracy, rather it has to become fit through democracy."[50] Therefore, imperfections in the Third World democracies, and their initial inefficiency in handling centrifugal tendencies, should not be taken as evidence that democracy is undesirable in the Third World.

Democracy helps to integrate a population into the state through political mobilization, decreasing the population's sense of separate social identity. On one

hand, political mobilization and access to information through an independent press in a democratic country can increase a population's sense of relative deprivation. On the other hand, democracy also provides the channels for expressing perceived grievances that might otherwise accumulate and create an explosive situation. Democracy also helps to bring these grievances onto the government's radar, and eventually leads to mitigation of some of the grievances. Free and fair elections give legitimacy to the state, thereby decreasing the scope for insurgency. In Third World democracies, religious, caste, linguistic, and ethnic identities often are used for political mobilization; instead of creating a sense of separation, however, these mobilizations ultimately help to integrate the population into the national polity. Initially, such mobilization helps the social group to bargain and lobby for its share of political power at both the regional and national levels. Democratic India's history is full of examples of linguistic, caste, religious, and ethnic separatist movements that eventually transformed themselves into mainstream political parties, contributing to the strength of the country's democratic fabric. Thus, in the long run, democracy helps to mitigate and neutralize the enabling factors of insurgency.

POLITICAL MOBILIZATION BY DECENTRALIZATION

As discussed above, political mobilization is democracy's main process for integrating a population into national polity and strengthening it. Coupled with decentralization, democratic political mobilization can reach a country's remotest and most inaccessible areas. Decentralization does not mean total autonomy

because, without a national legal system based on democratic governance, equality, and respect for human rights to tie the entire country together, such autonomy can reinforce an autonomous area's sense of separate identity. Rather than mitigating its centrifugal tendencies, such autonomy can strengthen them. Autonomous tribal areas of Pakistan and Revolutionary Armed Forces of Colombia (FARC) autonomous areas (1999–2002) exemplify how such autonomy can lead to islands of chaos and lawlessness. In proper decentralization in a democracy, on the other hand, the state partially distributes its power to its local units. It does not create a state within, but rather the local unit becomes a more empowered part of the state itself. This helps the state to exercise social control more effectively and decreases the fragmentation of social control by the local social organizations.

ECONOMIC DEVELOPMENT

Desirability of Economic Development.

The role of economic development in integrating an area into the larger political-economic system of the country is discussed in the first chapter. The adverse impact of partial development, without overall economic development, on the sense of separation already has been discussed. Economic development increases accessibility. Availability of modern economic activities decreases individuals' dependence on a social network (typical of subsistence and feudal economies) for economic activities. Economic development encourages demographic mobility, which blurs the geographic separation of the population from others. Economic development encourages education, which

empowers individuals and the population to participate better in the larger political-economic system, and decreases their sense of separation. Balanced economic development decreases the population's sense of relative deprivation and resultant sense of separation.

Type of Economic Development.

However, in areas of relative inaccessibility, spontaneous economic development is unexpected and out of the ordinary. Obviously, Adam Smith's "invisible hand" has not helped the area to develop. Therefore, the state cannot depend on *laissez-faire* economic policy to stimulate economic development in inaccessible and hitherto economically unviable areas. The state must create infrastructure and incentives to stimulate development. The state's long-term political objectives have to override immediate economic considerations. After all, by preventing insurgency, the state can avoid future expenditures on counterinsurgency.

Economic Development in Areas Dominated by Insurgents.

However, the state should be cautious in dealing with an area already dominated by insurgents. Keeping in mind a Third World country's severe constraints on resources, careful consideration should be given to the distribution of resources between counterinsurgency operations and developmental activities. An insurgent group would prefer that the state divert a part of its resources from counterinsurgency to developmental activities. This helps the insurgents by decreasing the pressure on them. Moreover, if insurgents have good control over the population, they can divert some of

the developmental resources to themselves. However, if the developmental activities give greater advantage to the state, the insurgents will find excuses to oppose such activities. (See Annex II for detailed discussions of this topic.)

Economic Development in Tribal Areas.

Caution also should be taken while dealing with areas inhabited by tribesmen. The vulnerability of tribes to outside influence has been highlighted by the Yanomami controversy of Brazil. On one hand, there is a need to avoid exposing the tribes to outside influence detrimental to their well-being. On the other hand, it is not desirable to let them live with Stone Age technology, because once they are aware of the many conveniences of the modern age, they do not want to remain in the Stone Age.[51] If the relative deprivation felt by the tribes is not addressed properly by the state, the insurgents can take advantage of them. Referring back to the ferromagnetic metaphor (see last section of Chapter II on verifying external influence), if the state does not mobilize the isolated segmented populations in the desired direction, outsiders can mobilize them against the state.

INTEGRATION AND HORIZONTAL/VERTICAL LINKAGES

A marginal population develops linkages outside its geographic limits as it mainstreams into the politico-legal structure of the country, integrates into the national economy, and becomes more and more integrated into the larger society. The linkages can be both vertical and horizontal. For example, an individual belonging to an

inaccessible area in an Indian state like Assam develops vertical networks through his or her social affiliations (like caste, ethnicity, or religion). Such networks extend beyond the provincial boundaries, because these social affiliations are pan-Indian. Similarly, through profession, trade, political involvement, or education, the individual develops vertical economic and political linkages with the national economy and polity. In India, most of the senior jobs are all-India in scope. Moreover, even the lowest-level government employee likely belongs to a provincial or federal service. The more linkages a population develops outside the hitherto limited area, the weaker grows the hold of local networks on that population. The flip side to this development is the acquisition of multiple mutually-incongruent roles by the individual. This is desirable from a counterinsurgency point of view, since expectations based on the country's rational legal system tend to gain at the expense of local social affiliations. Influenced by the legal expectation of objectivity, a person is forced to sacrifice parochial considerations based on ascribed characteristics. Thus, the person becomes integrated into the national polity and economy and loses the sense of separate social identity.

COUNTERINSURGENCY OPERATIONS IN FOREST AREAS

Analysis of data in Chapter 2 showed that most Indian forests lie in relatively inaccessible areas. Forests play an important role in insurgency in these areas. First, the state, concerned about environment, is committed to preserving the forests. The state, therefore, is not able to allow the tribes to carry on destructive practices

like shifting cultivation,[52] whereas the insurgents, by keeping the forest employees away, help the tribes to carry on the destructive practice. Since the tribes had no role in the massive deforestation of the past couple of centuries in other areas for commercial purposes, and since they do not fully understand the critical importance of forests today, they find the government actions unjust and the insurgents are considered their friends. This makes counterinsurgency both difficult as well as important. Second, these areas have features that demand appropriate force structure and hardware. For example, the size of fighting units depends on the thickness of the forest. The denser a forest, the smaller should be the size of the units, i.e., force should be divided into smaller units. (See Annex III for detailed discussions of this topic.)

CHAPTER 4

RECOMMENDATIONS FOR COUNTERINSURGENCY STRATEGY

The following recommendations are made, based on the discussions above.

1. Economic development of inaccessible and hitherto economically unviable areas should be fostered by the state. Careful consideration should be given to the likely outcome of governmental efforts, particularly in the areas already dominated by insurgents and in the areas inhabited by relatively isolated tribes.

2. Democratic decentralization, within the broad legal structure based on equality and human rights, should be adopted to politically mobilize the marginal population in the right direction.

3. Outside influences inciting the insurgency should be denied access to vulnerable areas by construction of physical barriers.

4. The structure of force and hardware for counterinsurgency operations should be appropriate, keeping in mind the area's terrain and inhabitants.

ANNEX I

BERMING

Kalev Sepp, Naval Postgraduate School, Monterey, CA, October 28, 2005.

For the first time in centuries, Mosul became a "walled city" again when U.S. forces pushed up an earthen berm extending completely around the town of 1.5 million people. The berm is a wall of dirt six to eight feet high, scraped up from the barren hardpan desert beyond the inhabited areas, and extending continuously for dozens of miles. The purpose of the berm is to force all vehicle traffic to pass into and out of Mosul on paved roads, with traffic checkpoints set up at the gaps in the berm where the roads pass through it. Since the insurgents and criminals use vehicles to travel, transport weapons and explosives, and communicate via courier (to avoid using cell phones, which can be monitored), they must go through the checkpoints. While the Iraqi police manning the checkpoints can be bribed to let a vehicle go uninspected—for as little as a pack of cigarettes, but not more than $500—berming is problematic for the insurgents and criminal gangs. It lengthens their time of travel, limits their choices of routes, and increases their risk of capture, especially if they are shipping weapons. While the berm can be breached, it is not easy to do so, and it is obvious when it occurs. Even if the infiltrators are not caught in the act of breaching by a mounted patrol or by aerial surveillance, their tracks are followed readily. Berming was considered successful enough in Mosul that Tall Afar was bermed before the major coalition and Iraqi military operation in September to clear out the Serai neighborhood. Samarra, long a contested town, likely will be bermed next.

ANNEX II

APPLICATION OF GAMES THEORY TO GUESS THE PAYOFFS FOR INSURGENTS

DIFFICULTY IN GUESSING INSURGENTS' PAYOFFS

The most elusive problem in developing games between insurgent organizations and governments is that of assigning values for payoffs to the insurgents. Payoffs to the government are relatively easy to guess. Governmental reactions to various incidents, disclosures before legislative houses and courts, and political debates throw enough light on the possible payoffs for a government in any outcome. However, in the case of insurgents, less information is available. Whatever the insurgents may declare publicly might be aimed at deceiving and misinforming the government or convincing the target population of the insurgency's inevitable victory. Therefore, the payoffs can sometimes be just opposite to what the insurgents claim.

ASSUMPTIONS THAT ARE EASY TO GUESS

Assumption 1: Rationality.

The insurgents are rational actors. If they are found acting in an unexpected way, it is because their payoffs have been misunderstood. They remain rational in their actions.

Assumption 2: The Real Actors.

The real actors in the insurgency situation are the government, the government forces, the insurgents, and the

insurgents' leadership. For the most part, the behavior of the government forces will reflect the government's choices. Similarly, the insurgents' behavior will reflect their leaders' choices. However, care should be taken not to take this for granted. The more important point is to distinguish between the state and the government, and between the target population and the insurgent organization. The government (more appropriately, the incumbent regime) may not always be driven by the motives that maximize the state's interests. More often, it would give first priority to its own survival at the helm of the state. For example, the president or the prime minister of a country may take decisions with an impending election in mind rather than the benefit to the state. A state's interests normally are long term, as it is expected to survive many regimes and generations. Similarly, the insurgents may like to stop construction of roads into their area, which actually would benefit the population. Because the credit for the benefit will go to the state and not to the insurgents, and the roads will help the government forces in patrolling the area, the insurgents might want to stop the construction. Therefore, calculating payoffs for insurgents based on the benefits to the population, or taking the state's interests as equivalent to the interests of the government of the day, can be misleading.

Assumption 3: Short Term and Long Term Payoffs.

There are short-term payoffs and long-term payoffs. As discussed, in general, the long-term payoffs are applicable to the state and the particular insurgency. However, with a few exceptions, the government and the insurgents are concerned with the short-term payoffs. Therefore, the payoff matrix developed here analyzes the short-term payoffs to the government and the insurgents.

Assumption 4: Factors Influencing the Target Population.

The target population is influenced by (1) the preferences, or "hearts and minds," of the target population, (2) control of the ground or relative tactical advantage, and (3) the "bandwagon effect" of existing support. This paper considers only the impact on the "hearts and minds" of the population and the ground tactical situation for estimating the payoffs for the insurgency as well as the government. The bandwagon effect is used for variation in the payoff matrix.

Assumption 5: The Bandwagon Effect and Stages of an Insurgency.

This paper assumes the McCormick and Giordano model for the bandwagon effect on the growth of insurgency, as shown in Figure 6. (Also see Figure 5).

M&G Model
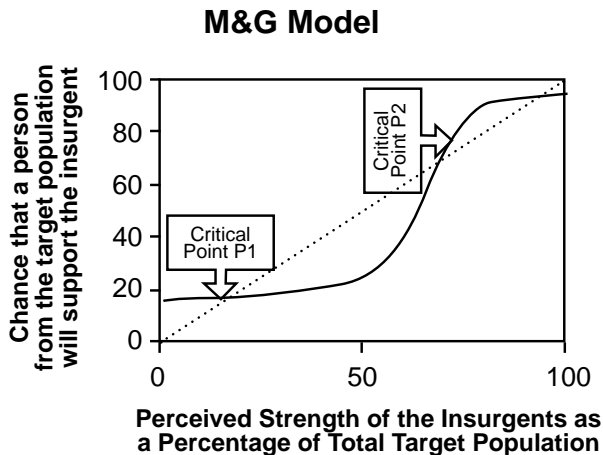
Based on a paper presented by Gordon McCormick and Frank Giordano to the Insurgency Board, Washington, DC, February 18, 2005.

Figure 6. Stages of Insurgency.

According to this model, when the insurgency is young and the insurgent organization is small, there always will be more people ready to support the insurgency (see also Chapter 2). However, as the insurgency grows, after a critical point, P_1, the willingness will lag the growth of the insurgency. After another critical point, P_2, the willingness will be greater than the perceived strength of the insurgents. Thus, *the willingness to support the insurgency depends on the perceived size of the support for the insurgency.* Though the perceived size of support is influenced by both the population's preference and the insurgents' relative success against the government forces, for the purpose of this project, variation in willingness due to size of the insurgency is treated as distinct from both preference and tactical success. Accordingly, this bandwagon model is interpreted in terms of size alone. The earliest stage is designated as "emerging insurgency," the middle stage as "matured insurgency," and the final stage as "challenging insurgency."

Assumption 6: Choices for the Government and the Insurgents.

We start with two choices for the insurgents: namely, to indulge in violent activities or to refrain from violence for the time being. Similarly, the government has two choices: to spend its resources on counterinsurgency operations or to undertake developmental activities in the affected areas. Insurgents play the rows, and the government plays the columns. The row player's payoff is shown first, and the column player's payoff is shown second. To start with, all payoffs are shown as unknown.

THE GUIDING PRINCIPLE
FOR A PAYOFF MATRIX

Insurgents are rational actors and their payoffs can be guessed from the choices they make, rather than predicting their choices based on our best guess.

CONSTRUCTING THE PAYOFF MATRIX

For the sake of brevity, the mathematical calculations and analysis are not included here.[53] In view of the foregoing guiding principle, it is preferred to start with a matrix having no predetermined payoff values. Thereafter, the observed behavior of the insurgents can be used for guessing their relative preferences. By this method, to start with, ordinal values can be assigned to the payoffs for insurgents, which will indicate the direction of preferences. With further analysis of insurgent behavior, it is possible to assign cardinal numbers to their payoffs, which will indicate quantitatively their relative or comparative preferences. By using simple mathematical tools like linear transformation, it is possible to arrive at a set of values that will be easy to use for further application of game theory. As previously discussed, it is relatively easy to construct the payoff values for the government. A payoff matrix constructed in the above manner for a typical matured insurgency in India is given in Figure 7.

		Government	
		Security Operations (C)	Developmental Activities (D)
Insurgents	Violence (A)	(-1,-2)	(3,-4)
	No Violence (B)	(-½,-1)	(0,4)

Figure 7. Final Payoff Matrix
for a Typical Matured Insurgency.

APPLICATION OF GAME THEORY

By applying game theory and concepts like Nash Equilibrium, it can be shown that the above matrix has an equilibrium state. In such a state, both sides try to minimize the payoffs of the opponent. The value of the equilibrium shows that both sides have zero or negative payoffs. However, whether the equilibrium will be maintained depends on the stage or strength of the insurgency. In the emerging stage and challenging stage, as per the bandwagon model, the insurgents receive more willing support than their strength; therefore, they can carry on with zero or negative payoffs. For example, if the insurgency remains nascent as long as the willingness is greater than the perceived strength, *the nascent insurgency will prefer to grow with 0 payoff at quadrangle BD of the above matrix*, irrespective of the high payoff it gives to the government. Similarly, when insurgency is in the challenging stage, it will prefer to inflict maximum negative payoff on the government. It can ensure this by equalizing the government's payoff as discussed above. Therefore, *a challenging insurgency will prefer the equilibrium state.*

However, a matured insurgency is handicapped by a negative bandwagon effect, as shown in the bandwagon model. Therefore, it is not in a position to take negative payoffs. Thus, it cannot play a game in which it is happy minimizing the government's payoff. It must play its own game and try to get a positive payoff, or at least minimize its negative payoff. Therefore, *the equilibrium payoff, being negative, is not acceptable to the matured insurgency.*

STRATEGY BY MATURED INSURGENCIES

The matured insurgencies are aware that the government normally is confused about the actual strength of the insurgents, as well as the payoffs to the insurgents in different quadrangles. The insurgents, therefore, try to give the impression to the government that they receive a slightly higher payoff when they are in the low-profile mode. Then the payoff matrix will look different to the government.

Now the government strategy to minimize payoff to insurgents actually will give a positive payoff to the insurgents in the violent mode and a negative payoff to them in the nonviolent mode. Thus, if the insurgents adopt a mixed strategy of more than one-half violence and less than one-half nonviolence, it will keep the government convinced that the insurgents get higher payoffs in the nonviolent mode, while the insurgents can maintain a small but significant positive payoff.

APPLICATION OF THE MODEL

The choices made by the insurgents can be used to determine the insurgency's position in the bandwagon model, which thereby reveals their strengths and predicaments. The model also can be used to help the government to decide on a correct strategy mix between security operations and economic development, irrespective of the popular theories in this connection.

ANNEX III

MODELING THE "FIND AND SEEK" STRUGGLE BETWEEN INSURGENTS AND GOVERNMENT FORCES IN FORESTED TERRAIN

OPERATIONAL DIFFICULTIES AND THE NEED FOR A SUITABLE MODEL

Government forces in countries like the Philippines, Sri Lanka, Nepal, and India are locked in a "find and seek" type of struggle with insurgents. As shown in the Indian model, inaccessibility plays an important role in insurgency. The insurgents typically make forested and, if available, undulated areas their refuge or haven. Mack describes how forests and mountains help to conceal and protect guerrillas.[54]

The government forces, far outnumbering the insurgents, try to find the insurgents in their refuge and engage them. Ironically, the insurgents, taking advantage of the terrain, not only manage to elude the government forces, they occasionally ambush a vulnerable part of the government forces, making the task of the government forces even more painful and frustrating. The forest and undulated land affect visibility of the opposing parties, giving an asymmetric advantage to the guerillas. Therefore, there is a need to create a suitable mathematical model that can demonstrate logically and quantitatively the constraints on visibility, while doing counterinsurgency operations in forested area. It then should be possible to analyze the suitability of certain structural and technological aspects of any strategy for counterinsurgency operations in such areas.

DIAGRAMMATIC REPRESENTATION OF THE PROBLEM

The trees in a natural forest are randomly placed, as is shown in Figure 8. The circles represent the tree trunks. Suppose a person stands somewhere in a forest, where his or her vision is limited by tree trunks. The areas that the person can see are shown by the spread of the arrows.
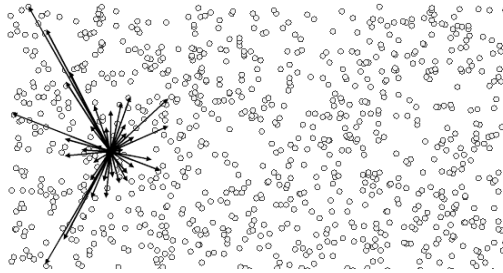

Figure 8. Visibility Diagram.

ASSUMPTIONS ON CAUSAL RELATIONS

Forested and undulated terrain makes it difficult for the government forces to find and engage the insurgents hiding in these areas. The following variables play an important role in this situation.

1. Capacity to see/Line of sight   Dependent
2. Chances of being seen   Dependent
3. Width of tree trunks   Independent
4. Observer's elevation   Independent
5. Percentage of forest coverage   Independent
   by tree trunks
6. The size of a force unit   Independent

It can be mathematically shown that the average visible area from a point is inversely proportional to the square of the density of the trees and the square of the average radius of the trees.[55]

$$A = \frac{\pi}{4K^2 n^2 r^2} = \frac{K_v}{n^2 r^2} \quad \ldots \ldots \ldots \ldots \ldots (5)$$

Here, K_v is a proportionality constant = $\dfrac{\pi}{4k^2}$

The model easily satisfies the test of common sense. If we have a greater number of trees in a forest, there will be less open area. Similarly, if for the same number of trees, we have thicker trees, again we expect the available open area to be smaller.

UTILITY OR APPLICATION OF THE MODEL

The model shows that in forested areas the visibility is limited. From any point in the forest, on average, a limited area can be visible. Therefore, when a group enters a forest, its capacity to see and detect the enemy is optimum when all, except the leader, are spread on the outer limit of a visible area. If they are spread beyond that limit, the members of a group lose visual contact with each other. If they are not spread to the optimum limit, many cannot contribute to the group's capacity to see and act. Thus, the size of a group should be decided according to the area of visibility, which is determined by the type of forest.

Similarly, it can be shown that the bigger the group, the greater its chance of detection by the enemy. Insurgents seem to know this intuitively, because most of the insurgent squads are typically small in number.

For the same reasons, long distance artillery units are not effective in such terrain. As the land often is also highly undulated, armored vehicles and heavy machine guns can become more of a liability. Besides, in India, the target population is scattered among the forest, making aerial and other attrition-based approaches counterproductive. This, by analogy, will also be applicable to densely populated urban areas.

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