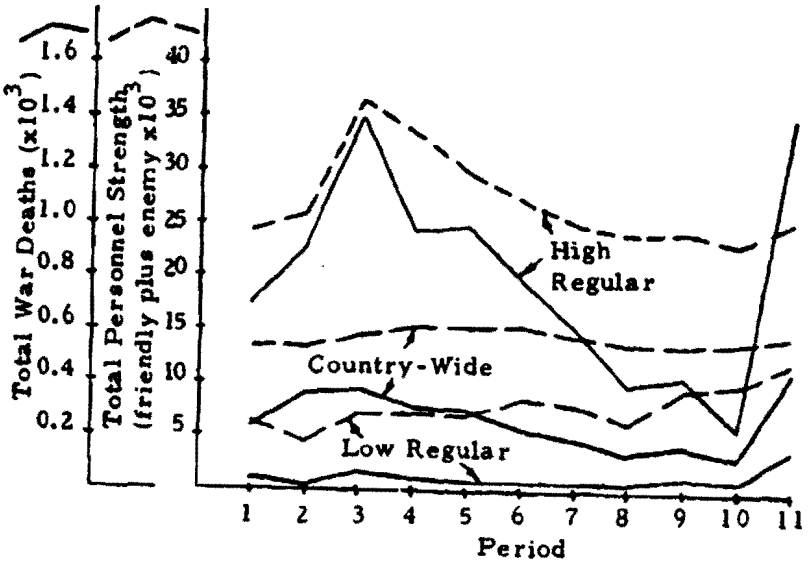


Figure II-2

Distinctive Characteristics of
High and Low Regular Province Clusters

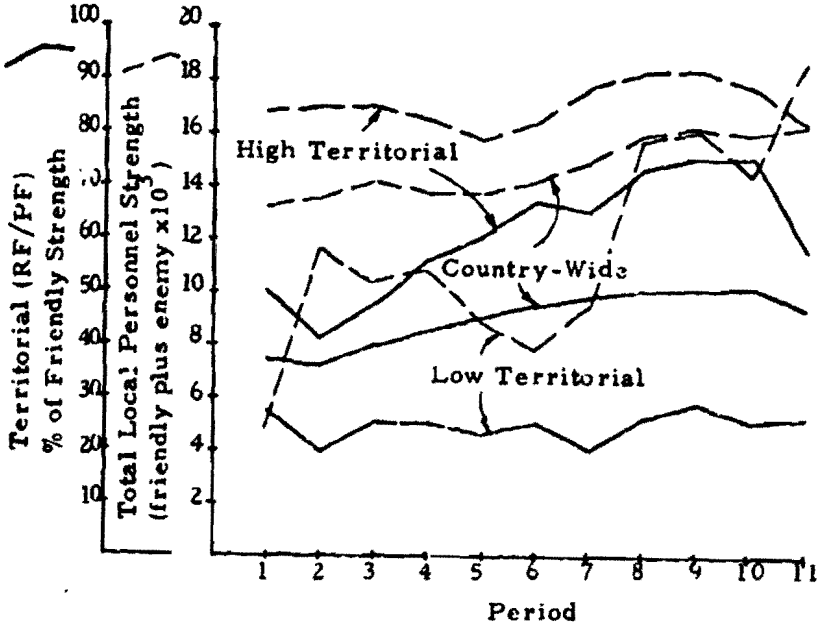


Figure II-3

Distinctive Characteristics of
High and Low Territorial Province Clusters

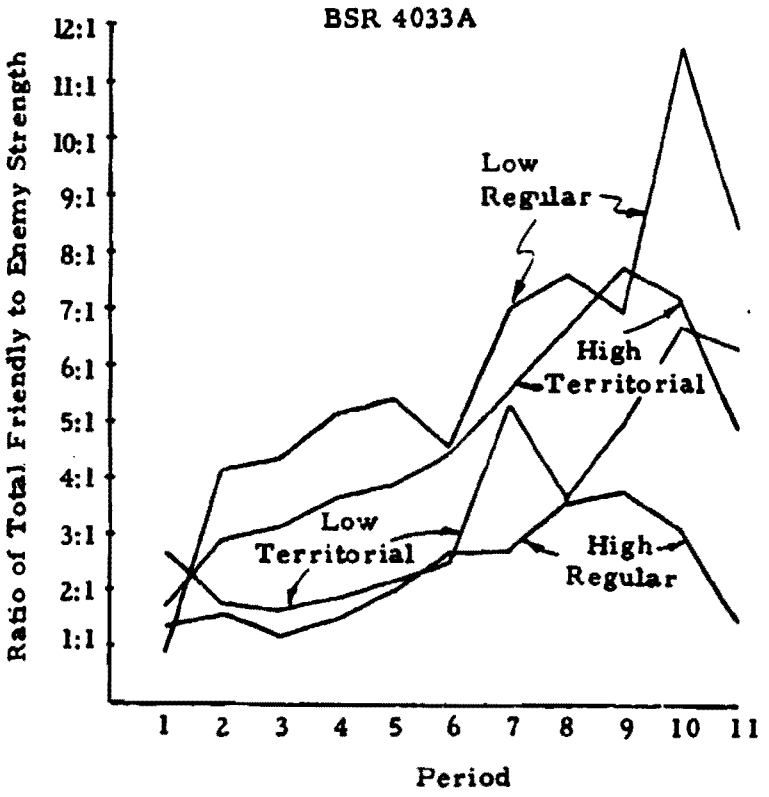


Figure II-4

Overall Force Ratio

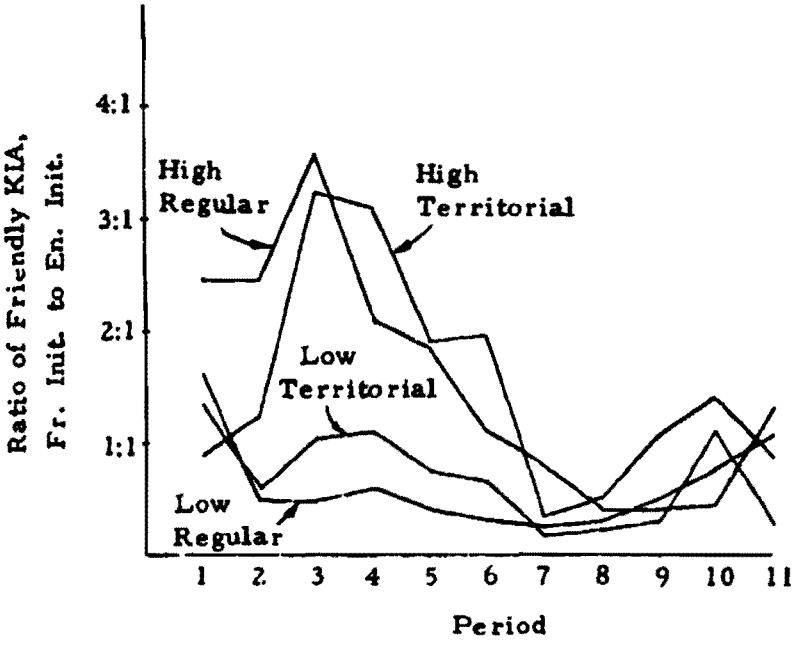


Figure II-5

Friendly to Enemy "Initiative" Ratio

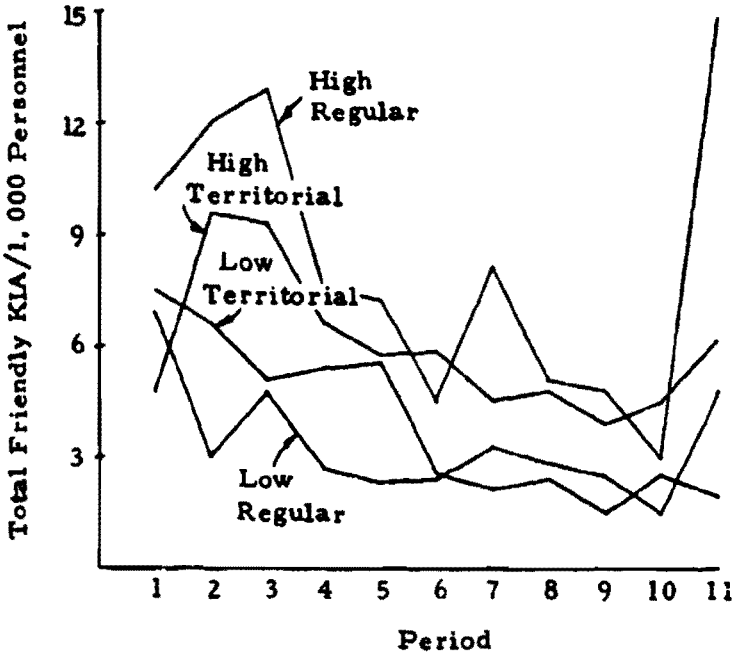


Figure II-6
Friendly KIA Rate

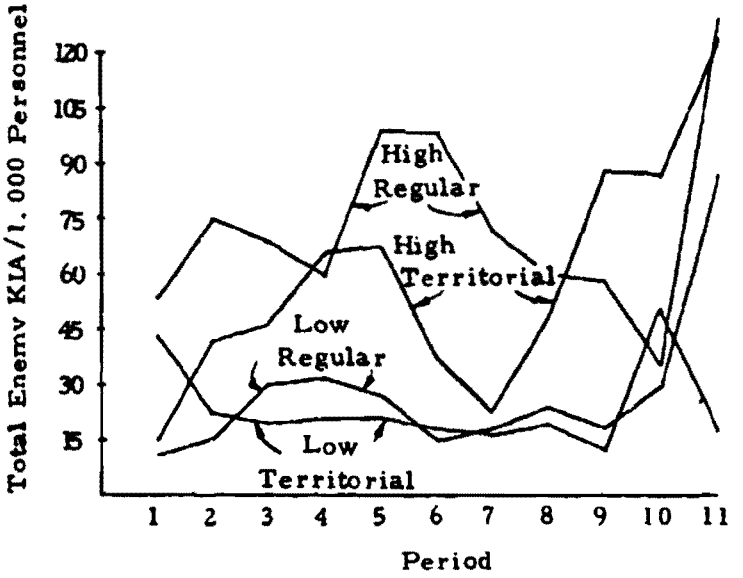


Figure II-7
Enemy KIA Rate

RVNAF Composition[26]

Problem – That the war is a mix of various levels of enemy threat and combat environments has been long understood and was clearly demonstrated in the descriptive work. Given the problem of building, deploying, and supporting several types of armed forces, it is desirable to have a size and mix of these forces appropriate to the various threats and environments. An appropriate force mix would be the one which gives a maximum for the expected population under GVN control.

Approach – Variation of enemy threat and combat environment was represented by the OASD (SA) categorization of provinces as main force, guerrilla, mixed, and other. By assuming that the interactions between ARVN, RF, and PF strength are multicative, it was possible to specify a multiple regression model in the form:

$$\text{Expected GVN Control} = C_0 + C_1\,\text{ARVN} + C_2\,\text{RF} + C_3\,\text{PF} + C_4\,\text{ARVN}\cdot\text{RF} + C_5\,\text{ARVN}\cdot\text{PF} + C_6\,\text{RF}\cdot\text{PF} + C_7\,\text{ARVN}^2 + C_8\,\text{RF}^2 + C_9\,\text{PF}^2$$

An optimum mix (if the point maximizes expected GVN control) is found where:

$$2C_7\,\text{ARVN} + C_4\,\text{RF} + C_5\,\text{PF} + C_1 = 0,$$
$$C_4\,\text{ARVN} + 2C_8\,\text{RF} + C_6\,\text{PF} + C_2 = 0,$$
$$\text{and} \quad C_5\,\text{ARVN} + C_6\,\text{RF} + 2C_9\,\text{PF} + C_3 = 0$$

Data – All data elements were obtained from the SEAPR file for 1969 and 1970. In addition to assigned strength for ARVN, RF, and PF, a fourth independent variable was created to represent the effect of Vietnamization. This Vietnamization "balance" was the sum of ARVN, RF, and PF strengths minus US assigned strength. The withdrawal of US forces would increase the balance. Therefore, it could be interpreted that Vietnamization was working if a strong positive relationship was found between the "balance" and GVN control.

Results – In general, the results showed strong positive relationships for only PF strength. While no strong adverse relationships came out of the analysis, neither did any optimum solutions for force mix. The effect of ARVN strength was difficult to interpret because the strongest pattern emerging with regard to ARVN strength was increases that follow declines of GVN control. Numerous sensitivity curves were plotted which, when applied to specific province situations, allow identification of problems and likely implication of force mix changes. A typical set of these curves is presented in Figure II-8.

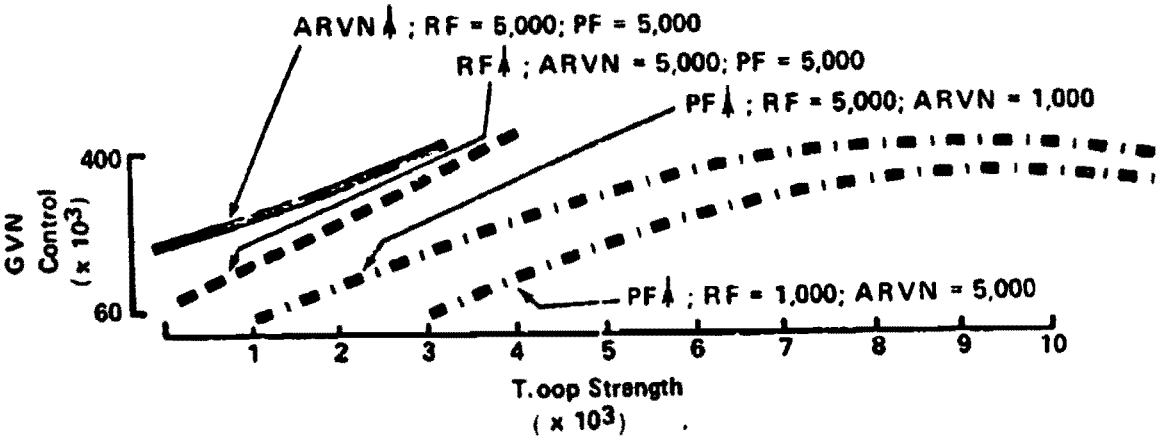


Figure II-8

Guerrilla War Sensitivity Curves

Additional research along this line was planned in which percent GVN control and measures of enemy activity were to be used as dependent variables. A shift of attention to the implications of the 1972 offensive along with data problems delayed this additional work until late in the program. As a consequence there is very little connection between either the problem addressed on the research strategies followed here and in the study of friendly initiated discussed at the end of this section.

Village Programs[27]

Problem – This study topic was an investigation of the side of Vietnam operations sometimes called the "other war". The original study problem was to determine the effectiveness of village programs in terms of GVN control, security, economic conditions, and local government viability. The village programs in Vietnam were carried out with the expectation that emphasis on local involvement in development efforts would have favorable impacts on the village socio-political-economic framework and the relationships between the village structure and the district, province, and national administrative

networks. The research problem was to identify programs that have been either a waste of resources or identified with substantial improvements. As the work progressed through various approaches and generally positive findings for all measures of village program effort, it became clear that the impacts of village programs varied widely across the country. Although no satisfactory generalized model was developed to account for the province to province differences, these differences themselves could be the basis for planning future village program efforts. So the final problem became one of applying the analysis findings to the development of a plan for the post cease-fire situation.

Approach – The first step was to review the current GVN Community Defense/Local Development (CDLD) Plan to obtain an understanding of what kinds of activities are included in village programs. It was found that the village program efforts are widely varied, ranging from rather large public works projects to assistance for individual families. The common aspect of these efforts is that the initiative and planning take place at the hamlet and village levels, hopefully with a high degree of public participation. This emphasis on local involvement in the development of the countryside was given the name Village Self Help (VSH) and was applied to all villages under GVN control as part of the 1969 Accelerated Pacification Campaign. While some highly detailed reporting systems are specified in the CDLD Plan, it was decided that there was sufficient information in the responses to individual HES questions to allow use of this more readily available and consistent data source.

The choice of the HES as a source of data representing village program efforts as well as socio-political-economic conditions was partly motivated by the fact that some relevant work using province level aggregations of the HES question responses had already been started. This analysis of some 53 HES questions, including 11 describing aspects of VSH effort, became the basis for a broader research design for the use of hamlet level data. It also indicated that for a country-wide model:

- Programs to provide education and health benefits are strongly related to social/economic conditions and popular compliance with the GVN in a favorable sense.

- Programs to improve the economy appeared to be associated with the presence or absence of local officials (GVN and VC) and their activity.

- Enemy military activity and measures of insecurity seemed to be independent of social, economic, and administrative conditions.

- Information activity by the GVN is favorably related to participation in GVN sponsored programs.

- No adverse impacts of village programs were apparent.

The analysis of hamlet level data began with tests using data from all hamlets in four sample provinces for the October 1969 - March 1970 period. The provinces Quang Tin, Phu Bon, Long Khanh, and Kien Hoa were selected to obtain an example from each province cluster for that period. The tests used both product-moment and rank-order correlation techniques with virtually identical findings. The data tested included 79 HES questions (39 measuring development efforts) and 8 indices combining several questions. These tests of relationships across hamlets were repeated on a country wide scale using a sample of the hamlets created by random selection of one hamlet out of 20 for the months March 1970, March 1972, and June 1972. Conceptually, there were two levels of dependent variables considered in this cross-sectional work. Popular behavior compliant with either the GVN or VC (political influence) was examined for its relationship to social, economic, administrative, security, and GVN control indices. Then the relationships between the social, economic and administrative conditions and measures of development activity were studied. In addition, GVN control, security, economic strength, social benefits, administration, hamlet age and accessibility as well as various popular attitudes were introduced as intervening variables. This work revealed that in the process of building or eroding political influence:

- Political influence of either side is only weakly related to that of the opponent. A loss for one party does not leave a void automatically filled by the other nor does a gain necessarily mean the other side loses.

- There is evidence of VC political influence being negatively related to economic conditions, but only under conditions of above average economic strength and administrative presence.

- The negative relationship does not vary with security conditions or level of effort to stimulate the economy.

- Political influence of the GVN also varies with economic conditions. The relationship is nonlinear and subject to saturation in individual hamlets.

- Economic stimulation efforts by the GVN (village self help programs) relate similarly to GVN influence and to economic conditions in that the relationship is positive and nonlinear.

- Social benefits are negatively related to VC political influence and this relationship is strongly influenced by the nature of the war, security, GVN control, and economic conditions.

- Relationships between social benefits and GVN political influence are positive, relatively stronger than those with VC influence, and vary less with other conditions.

- The availability of social benefits and GVN administrative presence both are positively related to economic conditions themselves. These relationships also appear subject to saturation effects at higher levels of economic strength.

- The availability of social benefits is related positively to GVN economic stimulation, both of which vary with economic conditions. In contrast to the previous finding there is no evidence of saturation at higher levels of economic strength.

- The relationship between economic stimulation effort and economic strength is strongly influenced by local security conditions. Economic stimulation effort itself has tended to go to areas of high security, but its relationship to economic strength is stronger in areas of low security.

- Hamlets in High Regular war provinces appear to benefit the most from the currently employed programs to improve the economic strength index.

- In Low Territorial provinces the hamlets seem to benefit from programs to improve social benefits more than the provinces in the other three war types.

- Administrative programs appear to improve administration in the hamlets of provinces of all war types except the High Territorial provinces.

- In High Territorial provinces the hamlets appear to benefit less from programs to improve the economic strength, social benefits, and administrative indices.

- The low correlations found in the hamlets of the High Territorial provinces are the reflection of the already high benefit level in these hamlets.

- The programs which generally contribute significantly to improving the economic strength index are: land reform and public works projects which upgrade land and water access routes.

- The programs which generally contribute significantly to improving the social benefits index are: provision of dispensaries and maternity clinics, frequent health worker visits, primary schools, and secondary schools.

- The programs which generally contribute significantly to improving the administration index are: trained information/Chieu Hoi cadre, presentation movies and cultural drama team performances, information cadre (mobile) visits, static visual displays, and the presence of active land reform committees.

All of the work on a cross-sectional basis lacked the ability to demonstrate cause and effect. It only indicated that if a hamlet had development programs underway, adequate administration and good social benefits and/or economic strength, the probability was high that GVN political influence would be high and VC political influence would be low. It did not indicate whether the people cooperate because the GVN is there providing benefits or the people obtain the benefits as a result of cooperation. For the latter circumstance the process would be one in which good hamlets get better and poor ones get worse. Since the comparison of parametric and non-parametric results showed that the product moment correlations were reliable if carefully interpreted, an effort was made to develop some multiple regression models from the cross-lagged correlations from province level quarterly time series data. A number of very strong ($R^2 \geq 0.8$) models were found for each war category, but there were problems. There were too many interactions and interdependencies between the independent variables to be able to sort out the unique contribution of each element to political influence. Also at this time the problem of post cease-fire planning became significant and the validity of war type categorizations to the post cease-fire situation could not be shown.

The revised approach was to deal with each province separately to obtain and interpret the cross-lagged correlations from monthly data. This interpretation took on two aspects. For a basic description of the process

at work in each province, the autocorrelations of the two measures of political influence and cross-lagged correlations between 28 pairs of the 8 measures involved in the process were interpreted to identify the valid causal relationships. For the post cease-fire recommendations, the correlations between political influence and economic strength, social benefits, and administrative presence were weighted to obtain an index of the relative predictive value of the three conditions in each province. These values were further modified to reflect the relative need for improvement, the past experience in being able to change the conditions, the impact of the 1972 offensive, the initial recovery from that impact, and province size. The results were then expressed in terms of what proportion of the country-wide post cease-fire effort was recommended for each province and the within province distribution of that effort to programs intended to improve the economy, social benefits, or local administration.

Data – The reasoning behind and extent of the choice of HES data for this research has already been discussed. All of the data came from the 1970 and 71 versions of the HES. A weighting system for the various responses was used which initially extended from 1 to 9 with a weight of one on this scale meaning the best situation from the GVN perspective, a weight of nine meaning the best situation from the VC perspective, and a weight of five signifying a neutral interpretation of the response. The reasoning behind this 1 to 9 scale assumed that the was was a zero sum proposition and that outcomes were essentially one dimensional. Subsequent analysis did not support such an assumption. A continuum does not exist to justify the 1 to 9 scale so eventually the data were recorded on a 0 to 4 scale where 0 was bad and 4 the best from the perspective implied by the definition or label (e.g., a score of 0 on the "security" index is bad and 4 is perfect security or no evidence of insecurity).

General definitions and some basic descriptive statistics for the ten variables employed in the province level time series analyses are:

- GVN Political Influence - An index based on average scores for 15 HES questions concerning degree of participation in GVN sponsored activity or organizations and other cooperative behavior. Scale: 0 to 4, Median = 2.5, Range: 1.7 to 3.1.

- VC Political Influence - An index based on average scores for 7 HES questions concerning degree of participation in VC sponsored organizations or activities and other cooperative behavior. Scale: 0 to 4, Median = 0.7, Range: 0 to 1.6.

- Economic Strength - An index based on average scores for 3 HES questions concerning existence of local markets and the quantity and variety of products available. Scale: 0 to 4, Median = 2.5, Range: 1.4 to 3.9.

- Social Benefits - An index based on average scores for 9 HES questions concerning availability of education and public health facilities. Scale: 0 to 4, Median = 2.7, Range: 1.4 to 3.7.

- Administrative Presence - An index based on average scores for 7 HES questions dealing with presence, status, activity, and range of local government structure. Scale: 0 to 4, Median = 3.0, Range: 1.7 to 4.0.

- Economic Stimulation - An index based on average scores for 4 HES questions concerning GVN efforts to aid local economic development. Scale: 0 to 4, Median = 2.0, Range: 1.0 to 2.9.

- Security - An index based on incidence of non-selective terrorism, the best indicator of a "security" dimension defined by 11 HES questions concerning terrorism, civilian casualties and damage from enemy action, and impairment of normal activity due to insecurity. Scale: 0 to 4, Median = 3.8, Range: 2.9 to 4.0.

- Standoff Attacks - Number of enemy attacks and harassments by fire, the best indicator of an enemy low intensity activity dimension defined by analysis of some 70 HES and operational data elements. Scale: Interval, Median = 20, Mean = 22, Range: 0 to 245.

- Friendly Defense - Number of friendly troops killed in enemy-initiated incidents, the best indicator of an enemy high intensity dimension defined by analysis of some 70 HES and operational data elements. Scale: Interval, Median = 25, Mean = 29, Range: 0 to 608.

- Friendly Offense - Number of friendly troops killed in friendly initiated incidents, the best indicator of friendly initiative and large scale military operations. Scale: Interval, Median = 8, Mean = 19, Range: 0 to 727.

Table II-2 presents the identification of HES questions used in the composite indices for province and hamlet level analyses and used as separate data elements in hamlet level analyses.

TABLE II-2*

HES QUESTIONS USED IN VILLAGE PROGRAM ANALYSES

Dependent Variables:

- **GVN Control**
  - VSSG GVN presence and control and VC control scores
  - Index constructed from all 10 VSSG scores
- **Security**
  - Security Index (HMB2, HMB5, HMB6, HMC4, HMD1, HMD2, HMD6, HMD7, VQD8, VQT6, HQC9, and HQR5)
  - Local Security Situation Dimension (HMD1 and HMB6)
- **Economic Development**
  - Economic Activity Index (VQL1, VQL2, VQL3, and HQL1)
  - Social Benefits Index (VQP1, VQP2, VQP3, VQP4, HQP1, HQR1, VQR1, VQR2, VQR3, HQR3, HQR4 and HQS1)
- **Local Government Viability**
  - Administrative Index (VQE1, VQE4, VQE5, VQF5, VQF6, VQF7, HQC5, HQD2, HQD3, HQE1, HQE2, HQE3, and HQE5)
  - Political Influence Index (HQE1, VQE2, VQE3, VQE7, VQF1, VQF2, VQF3, VQF4, VQF7, VQN1, VQT7, HQC6, HQC7, HQF2, HQF3, HQF6, HQN1, and HQN2)
  - VC Political Influence Index (HMB1, HQB1, VQB1, HMB8, HQE4, HQB2, HQF1, and HQB3)

Independent Variables:

- **Village Program Effort (aggregate measure)**
  - Economic Stimulation Index (VQL5, VQN2, VQN3, VQN4, VQN5, and VQV3)
- **Village Program Effort (individual questions)**
  - VQE6 - Village Official Training
  - VQG1 - Use of Info/Chieu Hoi Cadre
  - VQG2 - Movies, Cultural Drama, etc.
  - VQG3 - Info Cadre Visits
  - VQL5 - Skills Training
  - VQN1 - Self Development Projects
  - VQN2 - Technical Self-Development Retardation

TABLE II-2 (CONT.)

- . VQN3 - Resource Self-Development Retardation
- . VQN4 - Public Works Projects
- . VQP1 - Public Health Stations
- . VQP2 - Maternity Clinics
- . VQR1 - Secondary Schools
- . VQT5 - Land Redistribution Committee
- . VQT8 - Province Assistance with LTTT Program
- . VQT10 - LTTT Program Implementation
- . VQV3 - Agricultural Credit
- . VQT10 - Agricultural Credit
- . VQV7 - Irrigation Systems
- . VQV9 - Rural Organizations
- . VQV10 - Agriculture Cadre Visits
- . HQF4 - RD Cadre Activity
- . HQG2 - Static Information Displays
- . HQN3 - Self-Development Projects
- . HQP1 - Medical Services
- . HQP2 - Health Worker Visits
- . HQR1 - Primary Schools
- . HQS2 - Resettlement Allowances
- . HQS4 - Welfare Assistance
- . HQS5 - War Damage Assistance

Intervening Variables:

- GVN Control Measures
- Security Measures
- Economic Strength (economic development measures)
- Social Benefits
- Administrative Capabilities
- Hamlet Age
- Hamlet Accessibility
- Popular Attitudes
  - . Opinion of GVN Economic Programs
  - . Opinion of Local Government
  - . Opinion of GVN Military

* See Appendix A, BSR 4022, Analysis of Vietnamization: A Cross-Sectional Test of Village Program Effectiveness, Bendix Aerospace Systems Division, Ann Arbor, Michigan, April 1973;

Results – The essential findings from the province and hamlet level cross-sectional analyses have been listed during the discussion of the evolution of the research strategy. The time series analyses of both quarterly data organized in various subsets and monthly data by individual provinces generally confirmed the earlier findings. Overall, economic strength, social benefits, administrative presence, and economic stimulation were found to dominate the valid causal relationships found in most provinces or groupings of provinces. Table II-3 summarizes the number of provinces in which the various causal relationships were identified from the cross-lagged correlations.

The key to application of these findings to the problem of allocating future effort is the variation of the strength and direction of the relationships from province to province. Two examples of this variation are illustrated in Figures II-9 and II-10. Within province variation comparing hamlet scores for GVN political influence and economic strength in Kien Hoa in March, 1970, in the five maps of Figure II-9. The maps II-9(a) through II-9(c) show correspondence in ranking according to thirds in the country-wide distribution of scores. Maps II-9(d) and II-9(e) represent the other two possibilities. The rank order correlation (ρ) for this relationship was 0.51.

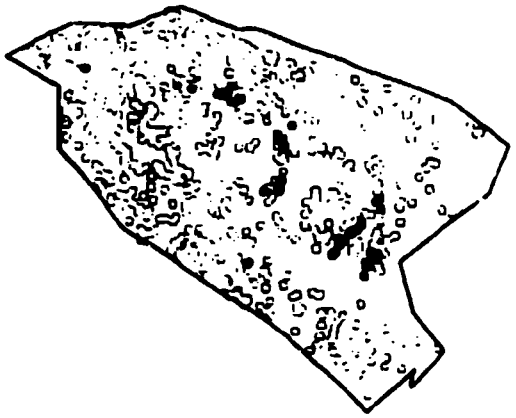
The accross province variation in causal relationships is illustrated by Figure II-10 for three relationships involving economic strength. The recommendations for post cease-fire allocation of development effort in hamlets and villages are summarized in two displays. Figure II-11 categorizes the percent of the country-wide total recommended for each province from very low (0.7 to 1.1%) to very high (5.1 to 5.3%).

Table II-4 summarizes the percent of total effort (left hand column) and the within province distribution of that percentage to programs intended to improve economic, social, or administrative conditions. Also shown for comparison are the percentages of the GVN Rural Development funding authorized for 1972.

TABLE II-3

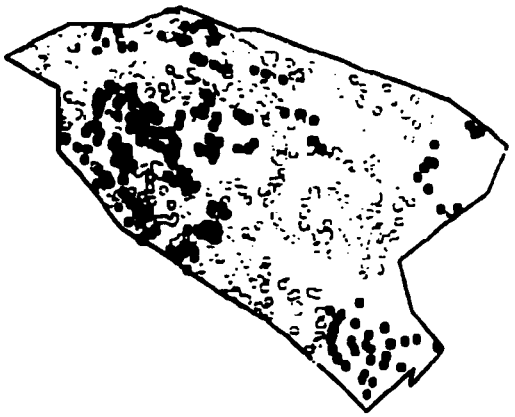
SUMMARY OF CAUSAL RELATIONSHIPS

	r is:	Number of Provinces in which r is: Expected — Strong					Expected — Moderate					Unexpected — Moderate					Unexpected — Strong				
	and:																				
	where n is:	0	1	2	3	6	0	1	2	3	6	0	1	2	3	6	0	1	2	3	6
$GVNPI(T_n) = f(ADMIN(T_o))$		4			10	12				5	3				2						
$VCPI(T_n) = f(ADMIN(T_o))$		5			9	8	1				2				1	1					
$ADMIN(T_n) = f(ECSTM(T_o))$		1			5	1				4	5				3	3					
$ADMIN(T_n) = f(SECUR(T_o))$				1	2				5	5	7			1		1					
$GVNPI(T_n) = f(ECSTR(T_o))$					0	10				3	6				2				1		
$VCPI(T_n) = f(ECSTR(T_o))$		1			0	9	1			5	5				2	5	1				
$ECSTR(T_n) = f(ECSTM(T_o))$		1			2	2	2			6	8				5	3				1	
$GVNPI(T_n) = f(SOCBN(T_o))$		2			9	9				2					1	1					
$VCPI(T_n) = f(SOCBN(T_o))$					7	11				1	1				4	3					
$SOCBN(T_n) = f(ECSTM(T_o))$		2			3	2				7	5				5					1	
$GVNPI(T_n) = f(ECSTM(T_o))$		2			4	2				3	7				2						
$VCPI(T_n) = f(ECSTM(T_o))$		1			5	5				3	6				5	3				1	
$GVNPI(T_n) = f(FROFF(T_o))$			1		2			1	1	3			4	1	4			1	1		
$VCPI(T_n) = f(FROFF(T_o))$								2	4				2	3	4		1	2			
$ECSTM(T_n) = f(SECUR(T_o))$			1		1			1	3	3				2	1						
$ECSTM(T_n) = f(STDOFF(T_o))$					3			1	5	3			1	1	2						
$ECSTM(T_n) = f(FRDEF(T_o))$								2		4				1	1						
$ECSTM(T_n) = f(FROFF(T_o))$								1		1			5	5	2			1	1		
$GVNPI(T_n) = f(SECUR(T_o))$			2		3			1	2	7			2		1						
$VCPI(T_n) = f(SECUR(T_o))$		1	1	1	1		2	6		7											
$SECUR(T_n) = f(FROFF(T_o))$								1	1						5						
$FROFF(T_n) = f(SECUR(T_o))$			2					4					2		1						
$GVNPI(T_n) = f(STDOFF(T_o))$			1	2			1	4	5	3					1						
$VCPI(T_n) = f(STDOFF(T_o))$	1	1	2					4	3	6											
$STDOFF(T_n) = f(FROFF(T_o))$									2	4			1	1	1			2		2	
$FROFF(T_n) = f(STDOFF(T_o))$								6	1												
$GVNPI(T_n) = f(FRDEF(T_o))$	1						5		2	3					3						
$VCPI(T_n) = f(FRDEF(T_o))$								4	5	3			1								
$FRDEF(T_n) = f(FROFF(T_o))$								1	2	4			1	3	3					1	
$FROFF(T_n) = f(FRDEF(T_o))$								4	1									1			

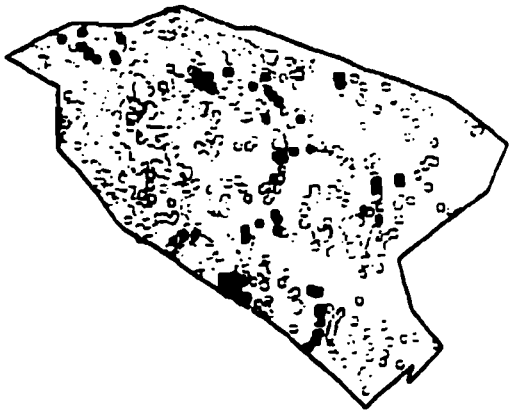


(a) GVN Political Influence and Economic Strength Both in Upper Third, March 1970

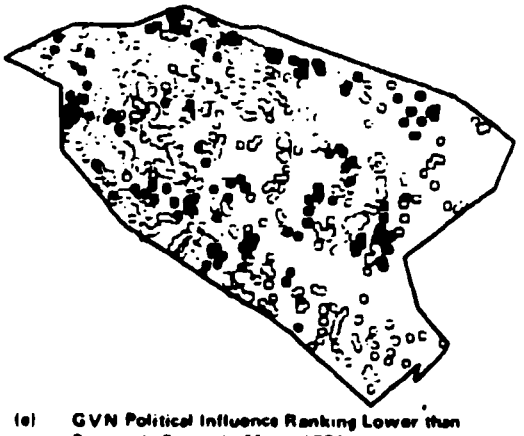
(b) GVN Political Influence and Economic Strength Both in Middle Third, March 1970



(c) GVN Political Influence and Economic Strength Both in Lower Third, March 1970



(d) GVN Political Influence Ranking Higher than Economic Strength, March 1970



(e) GVN Political Influence Ranking Lower than Economic Strength, March 1970

Figure II-9 GVN Political Influence and Economic Strength in Kien Hoa

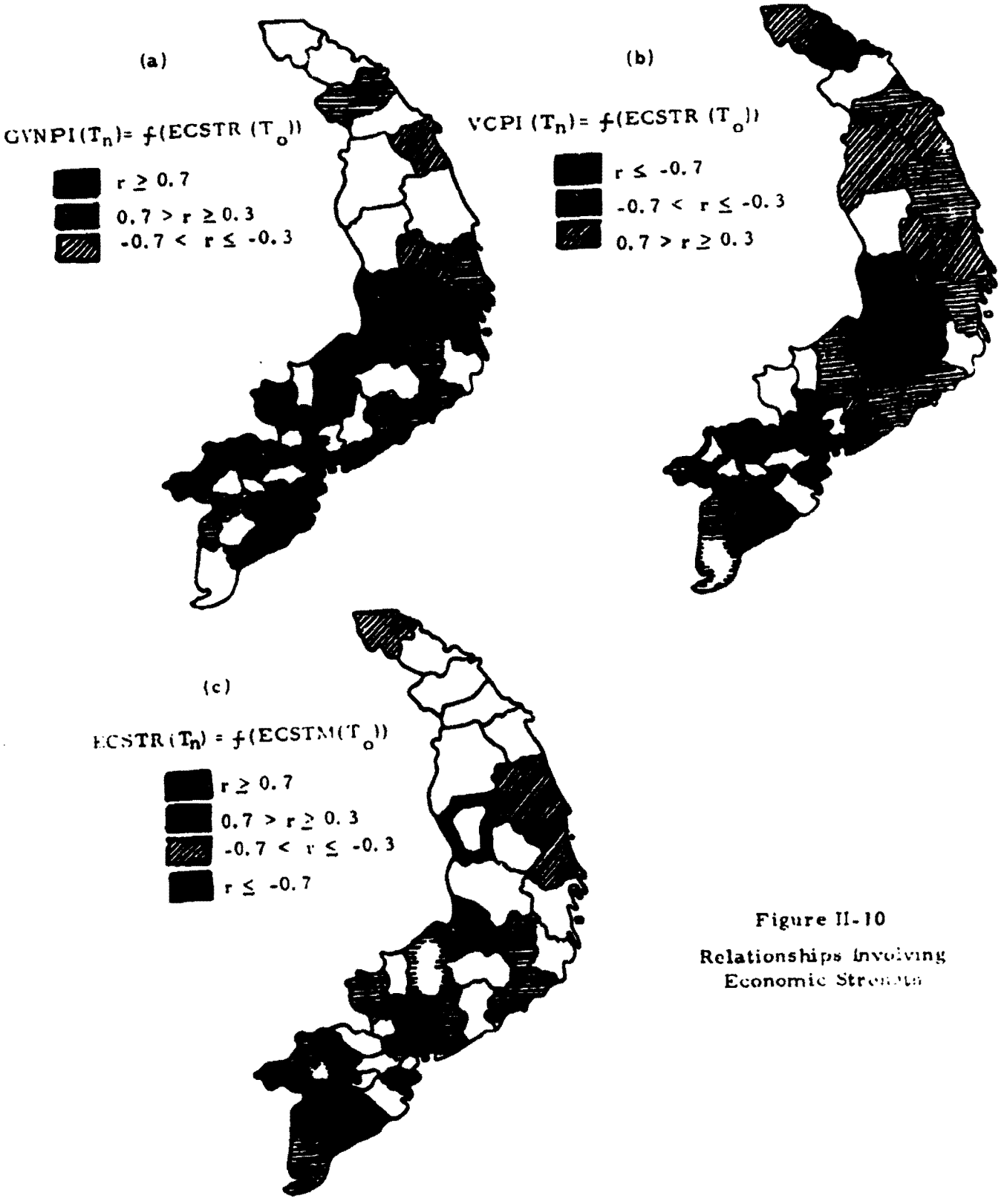


Figure II-10

Relationships Involving Economic Strength

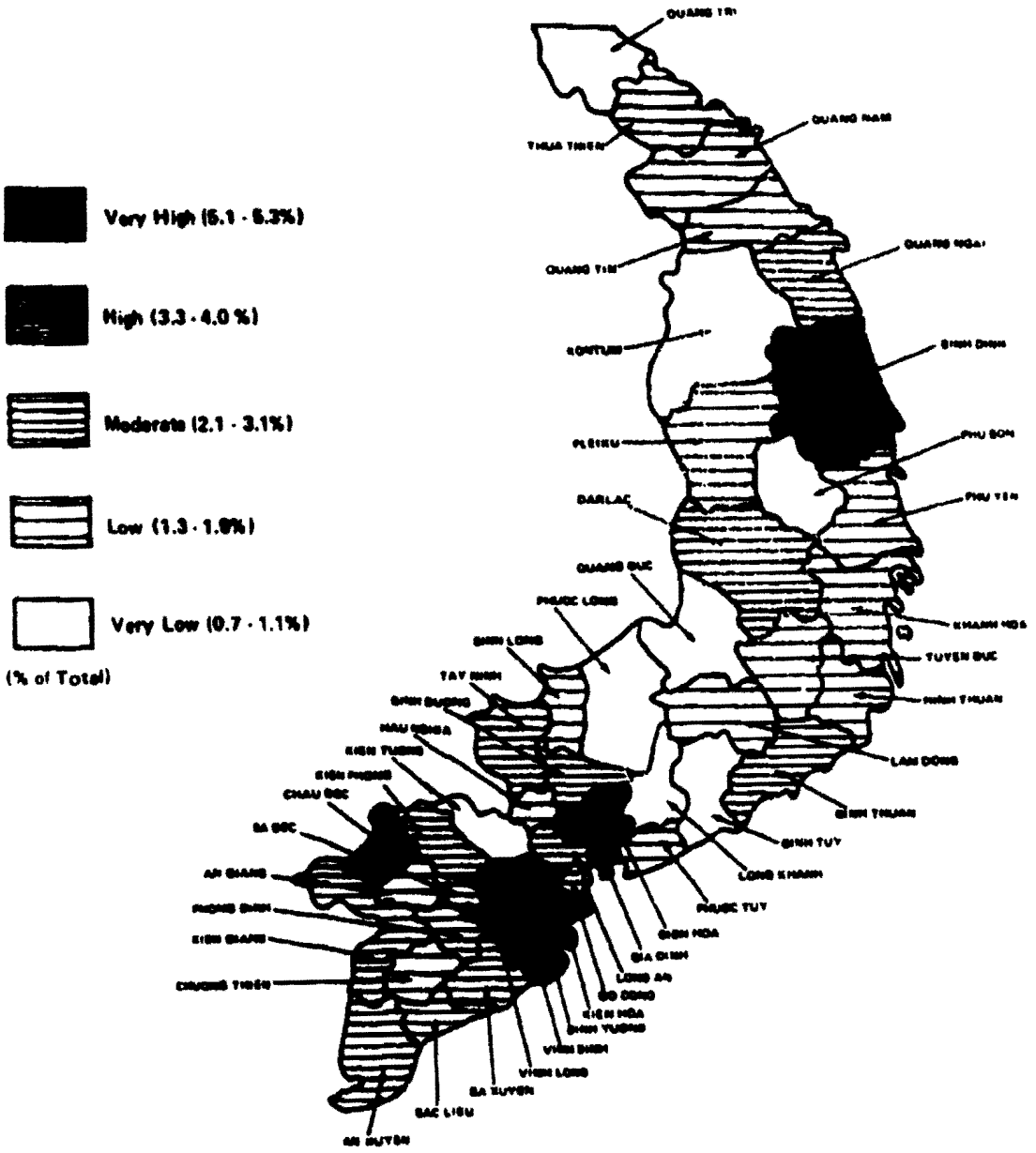


Figure II-11 Recommended Province Distribution of Past Cease-Fire Development Effort

TABLE II-4

SUMMARY RECOMMENDATIONS

Province	Percent of Total	1972* RD Tasks	Within Province Distribution (Percent) Economic	Social	Administrative
Quang Tri	1.0	3.0	47	17	37
Thua Thien	1.7	5.2	34	38	28
Quang Nam	1.6	4.4	33	25	42
Quang Tin	1.8	3.6	24	36	40
Quang Ngai	2.1	4.7	0	33	67
MR I	8.2	20.9	28	30	42
Kontum	1.0	1.0	53	0	47
Binh Dinh	5.3	3.6	31	40	29
Pleiku	1.7	1.3	30	26	44
Phu Bon	0.7	0.9	60	10	30
Phu Yen	1.4	4.6	41	12	46
Darlac	2.6	1.3	35	31	35
Khanh Hoa	1.9	2.5	57	43	0
Ninh Thuan	1.9	1.8	39	32	29
Tuyen Duc	1.4	1.2	45	24	31
Quang Duc	1.1	0.5	50	21	29
Lam Dong	1.4	0.9	49	24	27
Binh Thuan	2.1	1.7	35	32	32
MR II	22.5	21.3	44	25	32
Binh Tuy	1.0	2.1	48	19	32
Long Khanh	1.0	1.8	45	23	32
Phuoc Long	1.0	1.3	52	16	32
Binh Long	1.3	1.8	44	20	36
Binh Duong	2.2	3.6	36	35	29
Tay Ninh	2.7	3.1	39	29	32
Hau Nghia	1.6	2.5	37	27	37
Bien Hoa	3.3	2.9	35	28	37
Phuoc Tuy	1.5	3.0	39	28	33
Long An	2.7	13.6	37	36	27
Gia Dinh	5.1	6.6	32	37	31
MR III	23.4	42.3	40	27	33
Go Cong	2.1	-	39	34	27
Kien Tuong	1.1	-	50	22	28
Kien Phong	2.8	-	35	30	36
Dinh Tuong	4.0	-	31	34	35
Kien Hoa	5.1	-	29	36	35
Vinh Binh	3.6	-	32	38	30
Vinh Long	3.8	-	31	35	34
An Giang	1.5	5.1	5	68	27
Kien Giang	2.8	-	28	36	36
Chuong Thien	1.4	-	41	20	39
Phong Dinh	3.0	-	24	43	34
Ba Xuyen	3.1	3.3	33	34	33
An Xuyen	2.5	1.4	20	47	33
Bac Lieu	2.9	3.2	33	34	32
Chau Doc	3.8	2.5	24	38	37
Sa Dec	2.2	-	16	51	33
MR IV	45.7	15.5	29	38	33
Country-Wide	99.8		35.6	30.7	33.7

* Percent of the VN $1,687,000,000 authorization prior to the offensive. Allocations for DaNang, Cam Ranh, Dalat, and Vung Tau are not included. Source: Vietnam Bulletin, Vol. VII, No. 6, March 30, 1972, Page 5.

1972 Offensive [28]

Problem — The onset of the 1972 offensive by the NVA and VC raised a host of new questions, aside from making ongoing analysis oriented toward RVNAF reductions academic. During the battles in Quang Tri, Kontum, and Binh Long two important questions appeared to be suitable for the kind of systematic analysis of aggregate data being carried out in this project. One was the application of Lanchester attrition models to the main engagements for the purpose of assessing the situation and projecting outcomes for various levels of RVNAF and NVA commitment. The other question was more subjective and concerned NVA objectives and, therefore, the likely commitment ratios for use in the application of attrition models. One of the many theories to explain the scope and timing of the NVA offensive was based on the possibility of factional disputes in the North Vietnamese leadership. If a militant, hardline faction was in control, but perceived some danger of losing that control to a more moderate faction, not delaying a major attempt at overt military conquest of the South until the U.S. had completely disengaged could be explained. This hypothesis could be tested by a review of the open literature on policy and strategy statements of the North Vietnamese leadership.

Other questions gradually emerging as the offensive and counter-offensive reached a statemate stage concerned the impact of that activity on both pacification and the nature of the war. Substantial declines in pacification were obvious in the half dozen or so provinces in which the bulk of the action took place, but what about the others? The regular-territorial categorization of the war had been found to be very stable over the nine periods from April 1967 through September 1971. The events of 1972 could have significantly altered that structure signifying a new and possibly decisive phase. If the research reflected such changes and decisive levels of commitment by the NVA, the plans for U.S. assistance to the GVN should be quite different than if only limited objectives and NVA commitment were disclosed.

Approach — The study of the attrition observed over the early stages of the 1972 offensive sought to make use of Lanchesters Equations to explain the process and forecast likely outcomes. These deterministic models of the attrition process are well-known and have been applied to the analysis of military engagements and protracted war in general, and Vietnam in particular, with varying degrees of success. The success appears to be related to how well the data can be partitioned to represent a specific set of circumstances. In Shaffer's analysis of small unit action the partitioning is achieved

by selection of a large number of incidents where time is not an independent variable.[29] Time is included in Voevodsky's analysis of time series analysis of protracted wars in which variation in the circumstances is smoothed out by aggregation of data at annual intervals.[30] In Engel's analysis of the Iwo Jima battle, partitioning is the best of all because of the island's isolation.[31]

The regular-territorial categorization of the province level Vietnam data developed during the Analysis of Vietnam project and the relatively clear temporal boundaries offered by the 1972 offensive and other prolonged (weeks and months in contrast to isolated battles) surges in the intensity of the Vietnam conflict (Tet '68, May '68, the Cambodian incursions, and Lam Son 719) seemed to offer an opportunity for successful application of Lanchester models to aggregate Vietnam data. Several approaches offered answers to questions about RVNAF performance, allocation of resources, and projections of outcome. The most urgent application involved the derivation of estimates for the exchange and commitment ratios and computing projections of friendly and enemy KIA per week in the battles going on Quang Tri-Thua Thien, Kontum-Binh Dinh-Quang Ngai, and Phouc Long-Binh Long-Tay Ninh-Binh Duong using a version of the models along the line followed by Voevodsky as follows:

$$\frac{dD}{dt} = \frac{J_c}{7}\left[1 - \frac{S_{ta}}{S_\infty}\right] S_{ta}$$

where:

$$J_c = \frac{\text{Fr. KIA/month (Apr \& May '72) - Fr. KIA/month (High Regular 1967-71)}}{\text{En. KIA/month (Apr \& May '72) - En. KIA/month (High Regular 1967-71)}},$$

dt = unity (time interval of observations),
the constant 7 is derived from past observations of the Vietnam ratio of total casualties to deaths,

$S_{ta} = \frac{S_t + S_{t+1}}{2}$, is the average effective strength over dt, and S_t is effective strength at time "t" found from -

$$S_t = \left[1 - (1 - S_0)\, e^{\frac{-J_c t}{3\lambda}}\right] S_\infty$$

where:

S_0 is strength at the start of the invasion,

S_∞ is the total strength available or committed to invasion or defense, and

λ is the commitment ratio of level of acceptable casualties to the total strength available or committed. Past experience shows that λ varies from 0.4 to 1.0 for protracted wars. Assuming that both sides considered the outcome of the offensive would be decisive in terms of the war, values of 1.0 were used in the first attempt to fit estimated to observed deaths per week.

If the initial assumptions yielded fairly close approximations to observed KIA, the results could be used to make projections of the time at which that particular model reaches the boundary condition at which one side or both sides must elect to either raise their commitment or disengage. On the other hand, a poor fit to the observed attrition could lead to examining the sensitivity of the model to the values assumed for J_c and λ. Working back from observed attrition to calculate these exchange and commitment ratios would yield useful assessments of both friendly and enemy objectives and performance. If the NVA disengage with the data indicating a λ of, say 0.5 or less, the interpretation should be that a decisive outcome is not to be expected. The implication for GVN strategy of such a finding is that holding territory might be less important than holding down RVNAF losses. Comparison with these parameters for the other surges in intensity noted earlier would provide additional insight relative to assessing the situation.

Turning from the attrition aspects of the 1972 offensive where the focus is on selected major battle areas, a country-wide assessment of the offensive was also undertaken. The most serious immediate impacts of the offensive were limited to Quang Tri, Quang Ngai, Kontum, Phouc Long, and Binh Long where the March to April decline in GVN control was greater than 40 percentage points. Many more provinces showed much less of an immediate impact and some even continued to improve. Taking a longer view of what happened to both GVN control and pacification scores did not reveal much more in the way of such large declines, but when considered in terms of size (in contrast to percentages), the offensive appeared to have a more widespread and possibly serious impact than reflected in country-wide or military region aggregate statistics. Just as there was considerable variation in the style, intensity, and impact of the offensive, the observed and expected recovery from that impact also varied in terms of degree and

speed. Several approaches were taken in the study of this variation. Ranking the provinces according to the different changes of GVN control or pacification and comparison of the military, political, social, economic, and demographic characteristics of best and worst quartiles or other logical groupings was the first approach. This was expanded into multiple regression models seeking to explain and predict both decline and recovery. Failing here, the one and three month differences in scores for pacification, political mobilization, GVN presence and activity, social-economic conditions, friendly military initiative, and enemy presence and activity were studied to assess the changes of 1972 in terms of the long term trends and seasonal fluctuations since 1967. Finally, the regular-territorial categorization was updated to include 1972 and the months April-September examined in detail for significant changes in the structure of the war. Comparisons with the 1968 period were made in search of useful parallels.

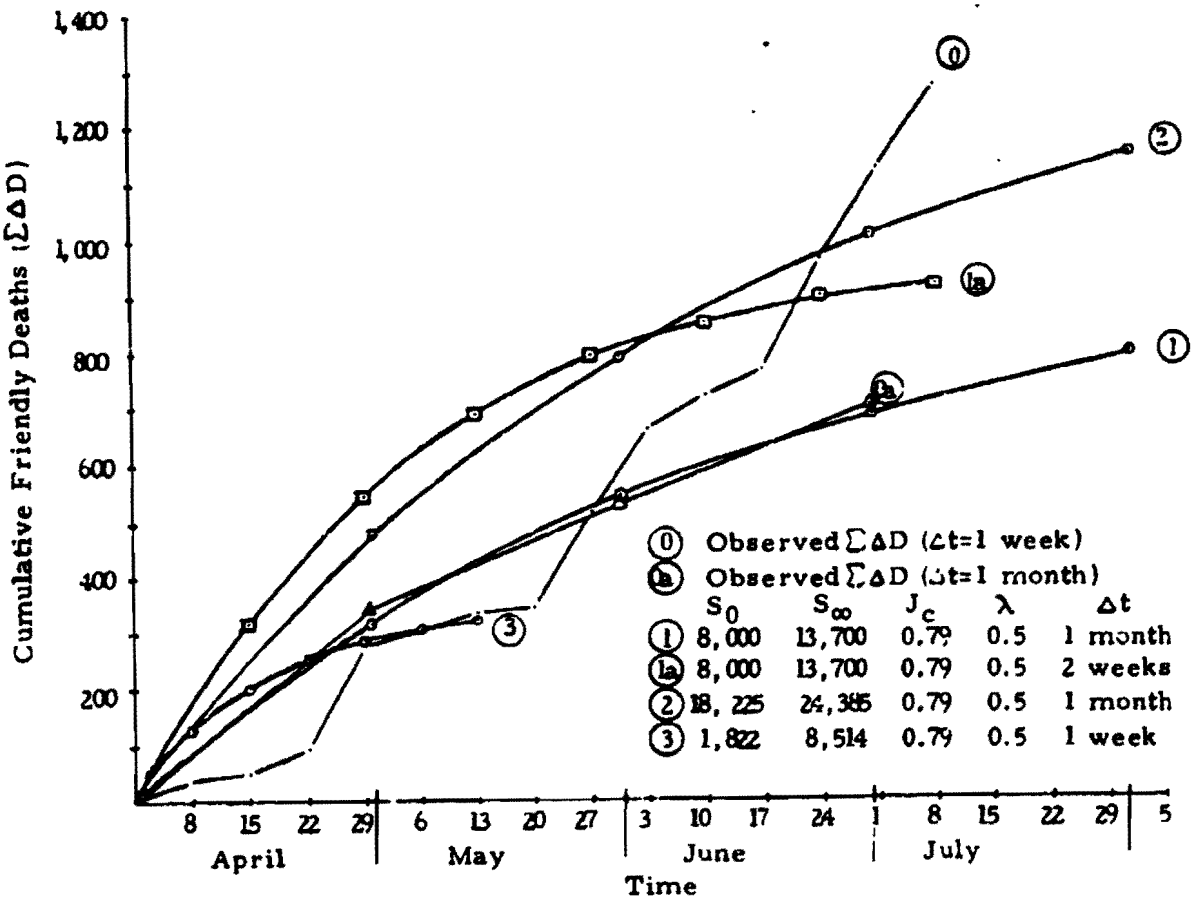
Data – Attrition Models – The strength and KIA data requirements for application of the attrition model to the 1972 offensive have already been noted. The first tests conducted in June, 1972 were based on data extracted from order of battle working notes and weekly listings of SEAPR data elements obtained from OASD(SA). Calculation of the constant J_c on the basis of the above average KIA ratio as planned yielded a unreasonably low figure in the 0.1 to 0.2 range depending on whether straight KIA or KIA per 1000 troops was used. This low figure led to consideration of what assumptions seemed logical about the proportions of friendly and enemy strength actually engaged in the attrition process at any given time. Because the friendly forces were defending essentially isolated base camps and fire bases which were being attacked one or two at a time, it was assumed that only one in ten friendly troops played a role in the attrition process. With enemy forces both concentrated for attack and subject to intensive aerial bombardment, the assumption that on the average one in two enemy troops were involved in the attrition process was made. These assumptions yielded a J_c of 0.79 when calculated from two rather different approaches using the following data:

	High Regular Province Cluster		
	1967-71 Mean	1967-71 Max	Apr-May '72 Max
Friendly KIA	153	----	389
Friendly KIA/1000 Troops	8.0	12.1	----
Enemy KIA	710	----	2193
Enemy KIA/1000 Troops	70	96	----

One other point should be made here concerning data needed to carry out the work with attrition models as well as updating the regular - territorial categorization of the provinces. Nearly all the study plans were based on working with monthly (some weekly) province level observations. Order of battle data for both sides were key elements needed at province level. This attempt to work at province level was a fatal flaw in a plan for work to produce timely and relevant outputs at three and six week intervals. Province level enemy strength data did not become available until February 1973. In the interim an effort was made to piece together a set of estimates based on selected intelligence estimates for "fronts" or military regions provided by OASD(SA), observed province level activity, and narrative reports of the "battles" found in open sources such as the New York Times, Washington Post, and Far Eastern Economic Review.

Results – Attrition Models – The initial testing of the attrition model approach was based on monthly, unverified friendly KIA data for Quang Tri, Kontum, and Binh Long provinces. This data included April, May, and most of June. Friendly strength was based on March numbers of ARVN/VNMC maneuver battalions for S_0 and narrative reports of force movement during April, May, and June for estimates of S_∞. The 0.79 for J_c appeared to be consistent with the strength estimates and observed attrition. The results for Quang Tri and Kontum were attractive because serious difficulty was indicated for Quang Tri while the cumulative friendly death curve for Kontum was still increasing sharply. The curves for cumulative strengths, casualties, and deaths all are similar and tend to indicate a "crisis" when the curve flattens. At this stage of the battle the side with the flat curve will either quit, disengage, or increase its S_∞, or commitment. There were two problems with these results, however. The strength estimates did not include RF and PF. Also when one follows the course of events in Quang Tri and compares the attrition estimates from the model with weekly observations, it is obvious that the GVN had come to at least two distinct crises during April and May. All this is illustrated in the curves plotted in Figure II-12.

Curves "0a" and "0" are plots based on the monthly, unverified reports and weekly, confirmed report data respectively. The initial test produced curves "1" and "1a". The fit between curves "0a" and "1" was very satisfying, but changing the time interval, "Δt", to two weeks, curve "1a", did not improve the fit with the weekly data, curve "0". The weekly observations and the flat curve for the first three weeks in April reflect the fact that in Quang Tri the GVN was in a crisis from the onset. With perfect hind sight this seems consistent with the logic behind the assumptions for proportion of forces present that are actually engaged. The J_c for those three weeks was probably



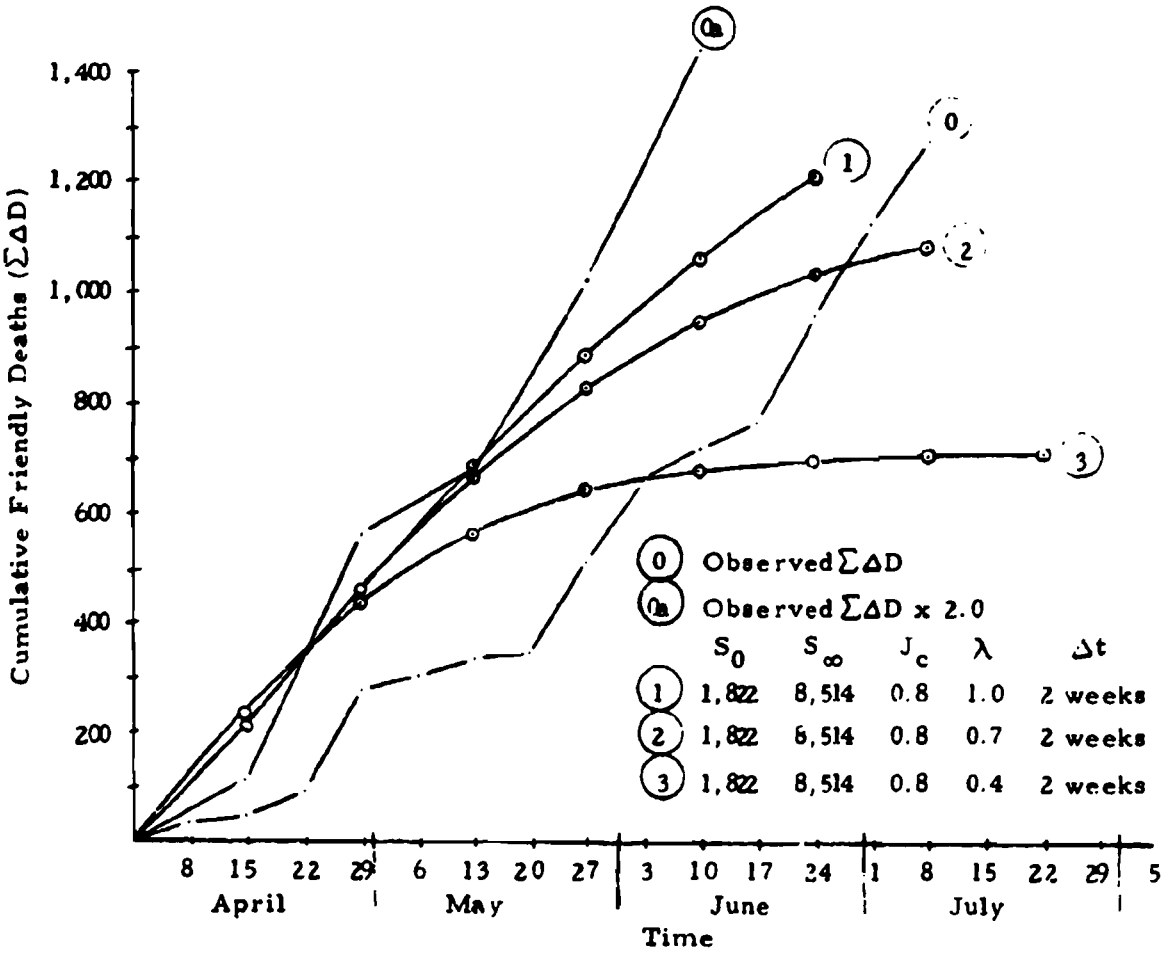
Attrition Curves for Quang Tri
Figure II-12

very low and so was S_∞ for the GVN. In the fourth week the GVN forces were mostly out of the remote bases and concentrated with the effect of increasing the S_∞ at least temporarily. The second flattening of the curve in May reflects the low GVN commitment ratio, probably less than 0.5. The increased S_∞ again in May and the start of the GVN counter-offensive is a second partition that needs to be applied to the modeling of attrition in Quang Tri. With the GVN on the offensive the

curve rises sharply as if the J_c has increased to 1.2 or more characteristic of a force on the offensive. In short, the weekly observations show that the time partitions for attrition curve fitting for Quang Tri need to be placed at 22 April, 20 May, and possibly 17 June in order to be accurate in detail even though a commitment ratio of 0.5 might be accurate for the three month period first tested.

Also illustrated in Figure II-12 are the results of later attempts to improve the data inputs for S_0 and S_∞. Curve "2" represents the best available data for total strength at the onset and at the end of June 1972. The 24,385 figure for S_∞ is the sum of end of June strength and total casualties estimated by 7 times total deaths to that point. This estimate shown by curve "2" also fails to fit the weekly data for the reasons already noted. Finding that the "accurate" S_0 and S_∞ provided estimates greatly in excess of anything observed or even expected on a weekly basis led to the same logic about strengths that was used in estimating J_c. For curve "3" the value of S_0 is one-tenth of the strength present at the onset (1,822) and that of S_∞ is one-tenth of the strength at the end of June plus 7 times total deaths to that point (the casualties all were involved in the attrition process). Curve "3" shows that increased λ or S_∞ were needed by the GVN in May. The same S_0 and S_∞ figures were used to explore the sensitivity of the model to variation in the commitment ratio. The results are illustrated in Figure II-13 where curve "0" is the same weekly observed data shown in Figure II-12. Curve "0a" reflects an effort at curve fitting that assumed only half the GVN deaths were being reported. If this were correct the fit for commitment ratios of 1.0 and 0.7 (curves "1" and "2") is fairly good through mid May. Although the degree of bias in reporting friendly KIA at this particular time and place is only a matter of conjecture, the finding from these curves is that understating the friendly KIA only makes it appear as if the forces in Quang Tri were less dedicated to holding than they actually were. Even comparing curve "0" with curve "3", λ =0.4, shows that on the average through June the GVN commitment may have been closer to 1.0 than 0.5. However, the shift to the counter-offensive complicates the question and more might be learned by study of the aggregates of Quang Tri and Thua Thien; Quang Ngai, Kontum, and Binh Dinh; and Phouc Long, Binh Long, Binh Duong, and Tay Ninh.

Although the data came too late for this work to be responsive in the manner planned last June, some brief testing of the approach for the battle areas mentioned above for the April through September 1972



Attrition Curves for Quang Tri
Figure II-13

period was carried out to at least evaluate the approach using attrition models. For this testing both friendly and enemy attrition were examined. The assumptions leading to the selection of S_0 and S_∞ were varied as were the values of J_c and λ . The objective was to observe the effect of varying these parameters and to find a set of curves that both fit the observed data and were logically consistent with regard to strength and J_c

estimates. In all situations the choice between using total strength present and the proportion of strength assumed to be engaged at any time was obvious. Total strengths yield estimates of attrition far in excess of actual values, even if "Δt" was taken to be several months. Changing the exchange ratio, J_c, changes the rate at which the "crisis" is reached. Increasing J_c increases this rate and anything above or below 0.8 will not allow the curves to fit with the same "Δt" for both the friendly and enemy calculations. Any variation in λ, commitment ratio, will change the level of cumulative deaths at which flattening of the curve takes place. These three sensitivities of the model are illustrated in Figure II-14.

Of the 12 curves shown in Figure II-14, curve 8 with "Δt" equal to one month seems most representative of the overall rise and September "statemate" contained in the observed data. This curve for a J_c of 0.8 and a λ of 0.7 is plotted with the observed data in Figure II-15 along with the corresponding curves for estimated and observed enemy deaths in Quang Tri and Thua Thien provinces. While both pairs of curves converge only in the final months, they probably do accurately represent the average engaged strengths, exchange ratio, and commitment ratios for the six month period. As previously noted, at least four sets of these parameter values are needed to give a close fit to the weekly variation. The interesting points about these curves are that neither side has behaved as if the outcome was expected to be decisive. Both seem to be holding back from an all or nothing type of commitment. Until the GVN counter-offensive (the d curve), the GVN commitment ratio, λ, must have been less than 0.4 in order for the curves to be so flat (the a, b, and c curves). In other words, for the data available and the assumptions used to fit the curves shown here, the friendly forces in Quang Tri and Thua Thien disengaged when less than four percent of the effective strength in the provices became casualties.

Figures II-16 and II-17 illustrate the same sets of estimated and observed curves for the Quang Ngai, Kontum, and Binh Dinh; and Phouc Long, Binh Long, Binh Duong, and Tay Ninh "offensives." In these cases the results are a much closer fit across all the six months. The weekly variation in the observed data does not show the changing GVN commitment ratio and shift to the offensive noted in the Quang Tri data. The estimates in Figure II-17 for friendly deaths are lower than observed values. Increasing J_c slightly and starting the estimates with May might have yielded a better fit and been more in line with the nature of the battles in Binh Long and Binh Duong during the siege and relief

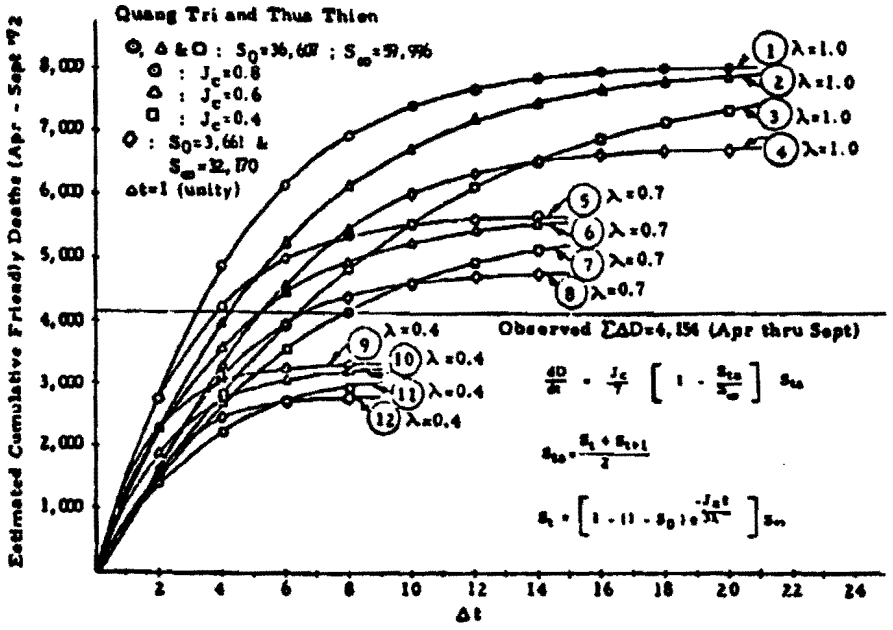


Figure II-14
Attrition Model Sensitivity Curves

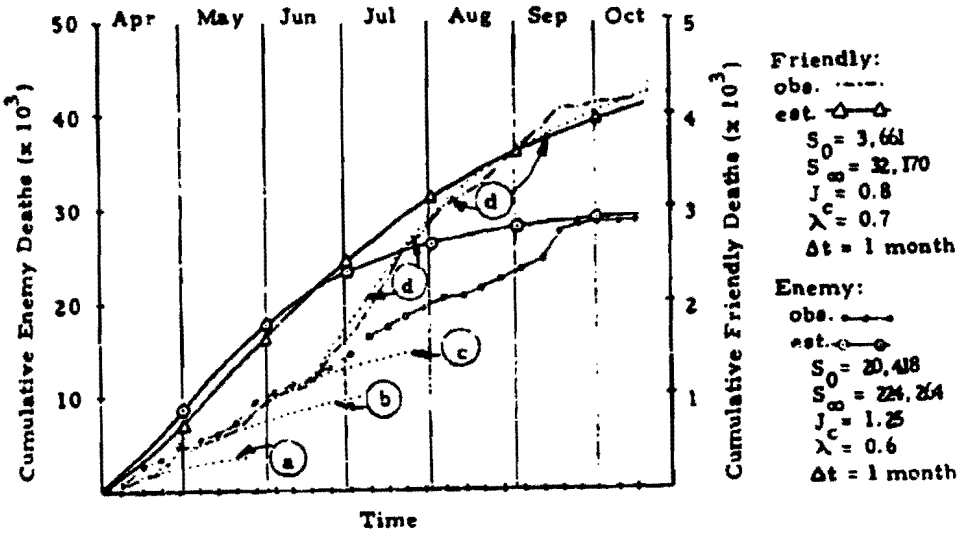


Figure II-15
April - September Attrition in Quang Tri and Thua Thien

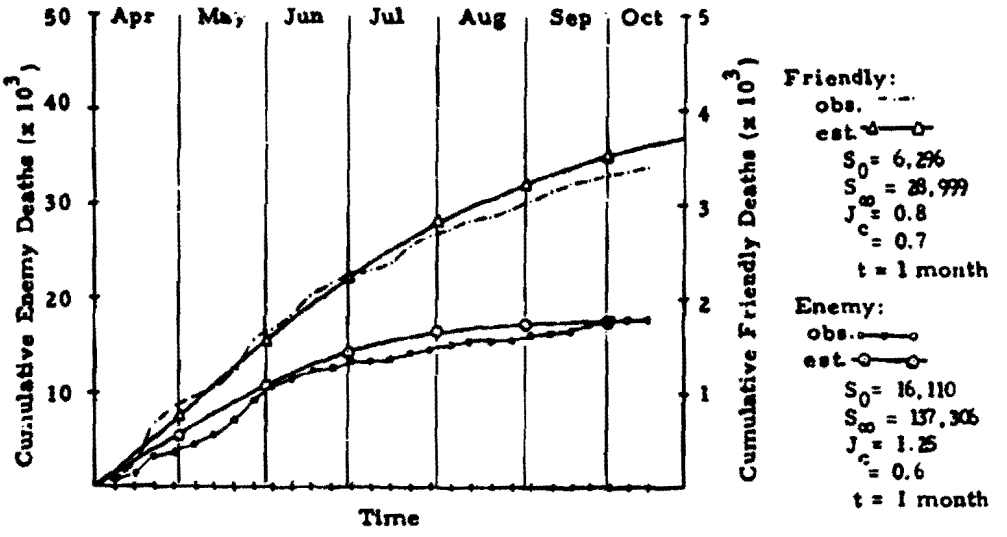


Figure II-16

April - September Attrition in Quang Ngai, Kontum and Binh Dinh

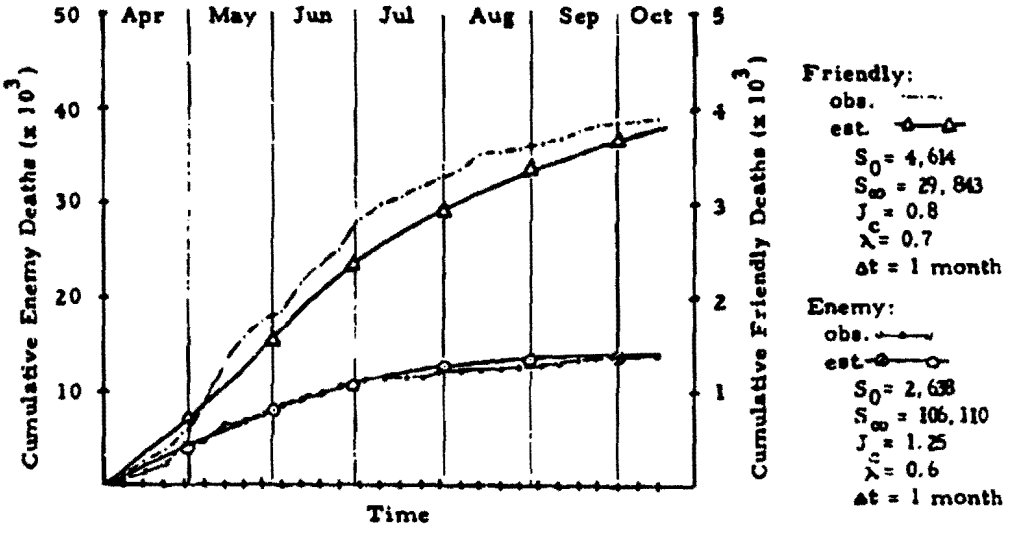


Figure II-17

April - September Attrition in Phouc Long, Binh Long, Binh Duong and Tay Ninh

of An Loc. Overall,a "Δt" of one month, J_c (friendly/enemy)of 0.8 and 1.25 (enemy/friendly), and the 0.1 and 0.5 factors to adust strength present to strength involved have produced some surprisingly good fits between observed and estimated curves.

Data – Country-Wide Assessments – The assessment of the country-wide impact of the offensive consisted of examining changes in the following dependent variables and seeking to explain them in terms of past change patterns as well as the independent variables listed below:

- Dependent Variables
  - Population living in hamlets rated AB for the HES PACIFICATION and SECURITY model scores.
  - Population living under GVN control according to the VSSG model (Dec '71 to June '72 and Apr '72 to June '72 changes).
  - Percent of population under GVN control (Mar '72 to Apr '72 change)
  - Province scores on the Bendix HES indices for -
    PACIFICATION
    POLITICAL MOBILIZATION
    SOCIAL/ECONOMIC
    GVN PRESENCE AND ACTIVITY

- Independent Variables
  - Province scores on the Bendix HES index for -
    ENEMY PRESENCE AND ACTIVITY
    ENEMY MILITARY ACTIVITY
    ENEMY POLITICAL PRESENCE
    ENEMY POLITICAL ACTIVITY
    SOCIAL BENEFITS
      Dispensaries Available
      Maternity Clinics Available
      Hospital or MD Available
      Secondary School Available
      Primary School Nearby
    ECONOMIC STRENGTH
      Surplus Goods in Market
      Manufactured Goods in Market
    ECONOMIC STIMULATION
      Public Works Projects
      Self Development Projects

GVN and VC POLITICAL INFLUENCE
SECURITY
Non-Selective Terrorism
- Numbers of incidents, operations, and results -
Enemy Ground Assaults
Enemy Stand off Attacks
Enemy Harassment
Enemy Coercion
Friendly KIA in Enemy Initiated Action
Friendly Large Unit Operations
Total Enemy KIA
Friendly KIA in Friendly Initiated Action

Results — Country-Wide Assessment — The immediate impact of the offensive and its extent was examined in terms of the percent of population under GVN control lost between March and April 1972. Five provinces lost more than 40 percentage points in this period and another seven lost between 20 and 39 percentage points. These 12 provinces are:

- March to April decline greater than 40%
  - Quang Tri
  - Quang Ngai
  - Kontum
  - Phouc Long
  - Binh Long

- March to April decline between 20% and 39%
  - Thua Thien
  - Binh Dinh
  - Quang Duc
  - Long Khanh
  - Tay Ninh
  - Kien Tuong
  - Chuong Thien

As should be expected the declines in both groups can be explained by the numbers of enemy ground assaults and standoff attacks. Less intense enemy activity such as harassment and coercion also were important in explaining the declines of the second group representing a higher proportion of enemy local unit involvement than in the first group

where the enemy forces were largely NVA units. Two important factors became apparent from examination of the patterns of change in GVN control. Of the 12 worst cases noted above only six had populations greater than 50,000 and only two of these had more than 500,000 in population. Therefore, it would be important to also examine the absolute changes as well as percentage data. Secondly, all but 8 of the 44 provinces did decline in GVN controlled population between December 1971 and June 1972, and many of these declines had started in late 1971 and were steady even if they were small in percentage terms. Explanation for these declines seemed as important as the more serious cases, even though more difficult to find.

The work continued by dividing the 44 provinces into quartiles of 11 according to their ranks on change in GVN controlled population between December 1971 and June 1972 (for long term impact) and between April 1972 and June 1972 (for initial recovery). The worst and best quartiles in terms of the December to June changes were:

- Worst Quartile: GVN Controlled Population Decline

Quang Ngai	-210,278
Dinh Tuong	-108,254
Binh Dinh	-101,918
Quang Tri	-88,057
An Xuyen	-84,878
Kien Hoa	-79,289
Kien Phong	-75,940
Quang Tin	-74,187
Ba Xuyen	-73,970
Chau Doc	-70,237
Chuong Thien	-69,206

- Best Quartile: GVN Controlled Population Decline or Gain

Lam Dong	-2,769
Bien Hoa	-2,158
Go Cong	0
An Giang	+555
Quang Duc	+617
Darlac	+2,390
Long An	+3,261
Binh Tuy	+3,313
Khanh Hoa	+4,414
Ninh Thuan	+9,701
Tuyen Duc	+18,057

Enemy action (the "offensive") in terms of ground assaults, stand-off attacks and harassment again accounts for much of the differences between the two groups of provinces. Only non-selective terrorism and coercion were above average in the best quartile and below average in the worst. Another striking difference between the two quartiles was found in the social/economic and development measures. Provinces in the worst quartile generally ranked very low on these measures while the best quartile provinces were consistently above average if not very high. Even though economic strength and GVN sponsored development could not possibly have prevented large scale NVA attacks[32], these factors are also stand out in the differences between the best and worst quartiles ranked on April to June 1972 recovery.[33] These quartiles were:

- Best Quartile: Percent Recovered

Quang Duc	+114.6
Lam Dong	+ 90.8
Phouc Long	+ 80.8
Kien Hoa	+ 69.8
Kien Giang	+ 67.3
Vinh Long	+ 65.1
Long Khanh	+ 60.6
Binh Thuan	+ 60.0

- Worst Quartile: Percent Additional Decline

Dinh Tuong	-103.3
Kien Tuong	- 93.7
Ba Xuyen	- 82.8
Binh Duong	- 35.6
An Xuyen	- 33.4
Kien Phong	- 24.6
Chuong Thien	- 2.9
Phong Dinh	0

Binh Long and Quang Tri were excluded from the latter group because they had declined as far as possible and recovery had not yet started. Phong Dinh was included even though no single monthly decline was as much as ten percent because it had one major characteristic in common with the others. The GVN control score had been steadily declining since late 1971. The others simply had a major drop in April as well. One logical difference between the two groups was relatively fewer enemy ground assaults, standoff attacks, and harassment incidents in the best quartile. In these provinces the enemy activity concentrated on terrorism and coercion while these activities were below average in the worst quartile. Economic conditions measured by the availability of manufactured goods and surplus commodities in local markets also stand out as being above average in the provinces recovering most and below average in those continuing to decline (Phong Dinh was an exception).

Additional effort was carried out on the problem of explaining and forecasting recovery rates using the post-Tet '68 experience as a data base. No strong, reliable regression models were found, however. Another overall assessment was sought in terms of the normal annual variation and the relatively long term 1967 through 1972 trend. Quarterly changes in province pacification scores were useful in placing the offensive and its impacts in a better perspective. For example, consider the following tabulation of significant changes:[34]

	Dec - Mar		Mar - Jun		Jun - Sept		Sept - Dec	
Year	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)
1967	x	x	1	9	0	5	2	14
1968	0	26(max)	1	6	2	6	9	1
1969	3	6	6	3	24(max)	1	6	4
1970	6	7	13	2	15	1	4	2
1971	5	15	9	3	4	5	7	3
67-71 Ave.	3.5	13.5	6	4.6	9	3.6	5.6	4.8
1972	1	17	0	23	7	5	x	x

One of the many possible interpretations of this change data is that the impact of the offensive in 1972 was severe, but still less severe than the pacification declines following Tet '68. However, recall the fact that several provinces had started a pattern of steady, gradual decline in late

1971 with 17 of these being significant by the end of March. Adding the 15 provinces that did not start downward until April gives a total of 32 significant declines in pacification between December 1971 and June 1972. Thus, the set-backs of 1972 were significant in nearly three-quarters of the provinces, but how far back had pacification really gone? The answer can be found by comparing the situation in September 1971 with September 1972 as shown in Figure II-18.

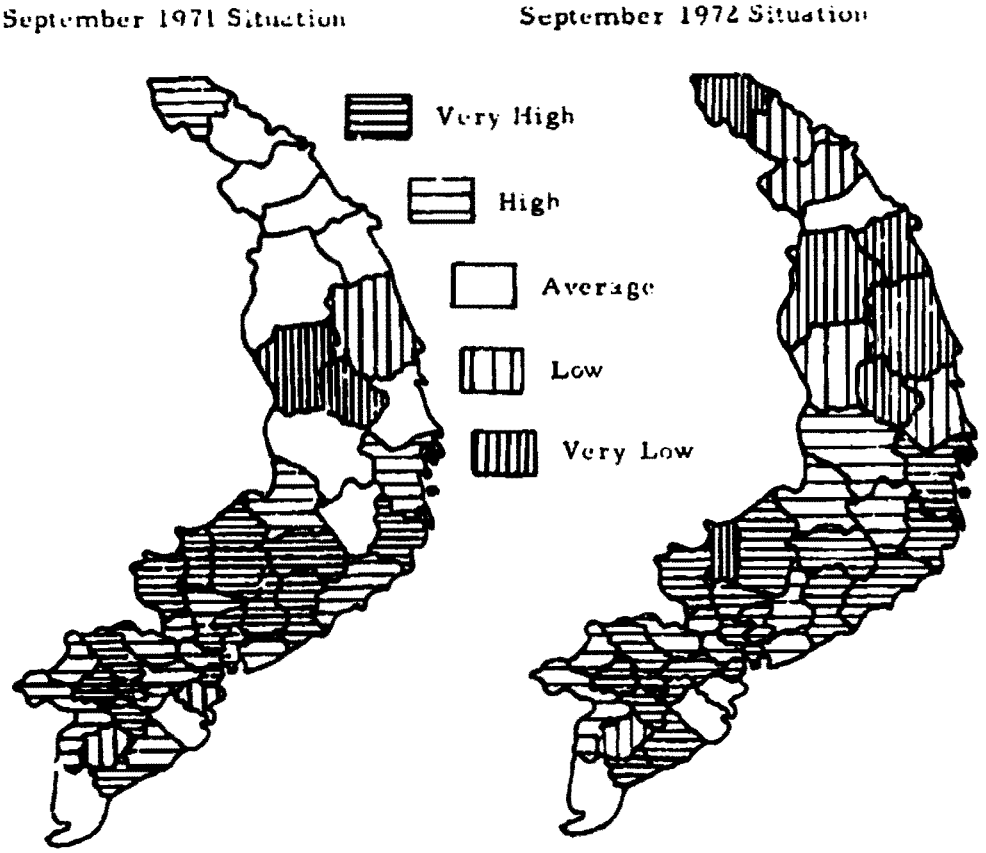


Figure II-18

Pacification Situations

The categorization of the situations from "Very High" to "Very Low" is based on the July 1969 to October 1972 distribution of the scores with one-fifth of the cases being placed in each category. The number of provinces in each category in the two months illustrated is:

	September 1971	September 1972
Very High	15	19
High	14	10
Average	10	4
Low	3	5
Very Low	2	6

Of the 29 provinces "High" or "Very High" in September 1971 all but 2 were still in one of these categories in September 1972, Quang Tri and Binh Long. The last time these two provinces had been categorized as "Very Low" was in December 1969 and it had taken until June 1971 for them to reach their pre 1972 levels. It could be said then, that the most severe declines involved setting pacification back about 28 months in calendar time and 18 months in recovery time. However, the improvement in these provinces through 1970 and 71 did not contend with quite so much NVA presence. Between September 1971 and September 1972 the changes in the "Average" category were 2 up to "High", 3 down to "Low", 2 down to "Very Low", and 1 up from "Low" to "Average". In short, most of the impact was confined to provinces categorized as average or below, and the overall effect could be summarized as pacification having been set back about a year.

Another approach to examining the offensive makes use of tabulations of the correspondence (or lack of it) between the significant changes of the dependent and independent concepts for the February to March, April to May, May to June, and August to September intervals. The dependent concepts were the aggregate Pacification model score and the GVN Presence and Activity, Political Mobilization, and Social/Economic sub-model scores. Tables II-5 through 8 present the number of provinces in which increased, unchanged, or decreased scores were observed for these four dependent concepts when the scores for Enemy Presence and Activity, GVN Presence and Activity (administrative, information, and rural development), and GVN Military Initiative (friendly KIA in friendly initiated action) either increased or decreased.

TABLE II-5

PACIFICATION MODEL

		Increased (20)	Unchanged (82)	Decreased (74)
Enemy Presence & Activity	Inc. (63)	1	9	53
	Dec. (29)	9	18	2
GVN Presence & Activity	Inc. (32)	10	21	1
	Dec. (80)	1	34	45
GVN Military Initiative	Inc. (37)	3	10	24
	Dec. (24)	1	14	9

TABLE II-6

GVN PRESENCE & ACTIVITY SUB-MODEL

		Increased (12)	Unchanged (64)	Decreased (80)
Enemy Presence & Activity	Inc. (63)	4	28	31
	Dec. (29)	11	6	12
GVN Military Initiative	Inc. (37)	3	17	17
	Dec. (24)	3	6	15

TABLE II-7

POLITICAL MOBILIZATION SUB-MODEL

		Increased (36)	Unchanged (85)	Decreased (55)
Enemy Presence & Activity	Inc. (63)	6	30	27
	Dec. (29)	10	10	9
GVN Presence & Activity	Inc. (32)	12	14	6
	Dec. (80)	16	20	36
GVN Military Initiative	Inc. (37)	4	21	12
	Dec. (24)	4	11	9

TABLE II-8

SOCIAL / ECONOMIC SUB-MODEL

		Increased (30)	Unchanged (102)	Decreased (44)
Enemy Presence & Activity	Inc. (63)	9	30	25
	Dec. (29)	8	15	5
GVN Presence & Activity	Inc. (32)	9	22	1
	Dec. (80)	12	36	32
GVN Military Initiative	Inc. (37)	5	19	13
	Dec. (24)	4	12	8

Enemy Presence and Activity increases and decreases in GVN Presence and Activity are the most frequent (63 and 80 observations respectively out of a possible 176) significant changes observed. It can also be seen in Table II-6 that nearly half the declines in GVN Presence and Activity correspond to increases in Enemy Presence and Activity. The dominant feature of the data is thus increased Enemy Presence and Activity, but this simply confirms the fact than an enemy offensive is being observed in the data for these four time periods. That the aggregate Pacification score decreases are best explained by this dominant feature is not as interesting as the fact that half the increases (recovery) correspond to the GVN (civil) Presence and Activity being reestablished. GVN Military Initiative should be viewed as reaction to the enemy offensive. Thus, any correspondence between its increases and decreases of GVN Presence and Activity, Political Mobilization, and Social/Economic scores should be rejected as spurious. Tables II-7 and 8 show that Political Mobilization and Social/Economic scores were less disturbed by the offensive than were GVN Presence and Activity scores (48 and 58 percent unchanged versus 36 percent). The apparent impact of the offensive (Enemy Presence and Activity sub-model score increases) on the other three sub-models comprising Pacification shows that the first casualty of increased enemy action is probably local government. Any changes to enemy or GVN presence and activity (civil and military) measures were most likely to correspond to no change of Social/Economic conditions. Only decreases of GVN Presence and Activity show the expected impact on Political Mobilization. Finally, it is necessary to note that the positive aspects of Pacification tend to show immediate response to adverse conditions. Changes in the other direction are not associated with reductions in military activity at the same time. To explain these changes time lags need to be considered using an approach such as that employed in the time series analysis on the village programs topic.

The last area of concern with the offensive was the way in which the "regular-territorial" dimensional structure may have been altered. Analyzing the period April 1972 through September 1972 as a six month aggregate found very little change in this structure. The number of provinces falling into the four subsets for this period may be compared with the April 1967 through September 1971 partitioning by examining the following summary tabulation:

Province Sub-Set Categorizations

	Regular Dimension		Territorial Dimension		Ambiguous
	Low	High	High	Low	Cases
4/67-9/71	14	8	11	9	2
4/72-9/72	15	10	6	10	3
Unchanged	6	5	5	3	0
	Binh Tuy	Quang Tri	Kien Phong	Darlac	
	Phouc Tuy	Thua Thien	Dinh Tuong	Quang Duc	
	Haw Nghia	Quang Nam	Kien Giang	Phouc Long	
	Bien Hoa	Kontum	Chuong Thien		
	Go Cong	Binh Dinh	An Xuyen		
	Bac Lieu				
Changed	9	5	1	7	3
	Kien Hoa (HT)	Pleiku (LT)	Tay Ninh (HR)	Phu Bon (LR)	Quang Tin (HR)
	Vinh Binh (HT)	Phu Yen (LT)		Tuyen Duc (LR)	Quang Ngai (HR)
	Vinh Long (HT)	Khanh Hoa (LT)		Ninh Thuan (LR)	Binh Duong (LT)
	Phong Dinh (HT)	Binh Long (LT)		Binh Thuan (LR)	
	Ba Xuyen (HT)	Kien Tuong (LR)		Lam Dong (LR)	
	Chau Doc (HT)			An Giang (LR)	
	Long An (AC)			Sa Dec (LR)	
	Gia Dinh (AC)				
	Long Khanh (LT)				

More than half the provinces shifted to another category from where they usually tended to be. While such shifts often took place from period to period, the shifts observed here are unique in that they involved blocks of often geographically contiguous provinces of one category moving to another. There were seven low regulars moving to low territorial (the presence of NVA units may be responsible), four low territorials moving to high regular (clearly due to NVA presence), and high territorials moving to low regular (possibly because of relatively low levels on all measures except the RF/PF proportion of friendly deaths). Even though these changes were numerous, the unique characteristics of each sub-set were unchanged. The war intensified substantially and its focus shifted, but the basic nature continued much as before. The correlation between the April 1967 through September 1971 and the April 1972 through September 1972 two dimensional factor structures is 0.79.

In contrast to the stability of the six month aggregate structure, analysis of the individual months from April through September 1972 disclosed several substantial variations. The province to province variation could be well explained by a two dimensional solution, but the two dimensions were not the same regular-territorial dichotomy used as a reference in all the work with six month aggregates. The difference was most pronounced for the months May, August, and September. For example, observe the contrast shown in Figure II-19 between a straight two factor, orthogonal solution for August and the same structure rotated to the average (4/67-9/71) solution used as the reference for the regular-territorial dichotomy throughout the study.

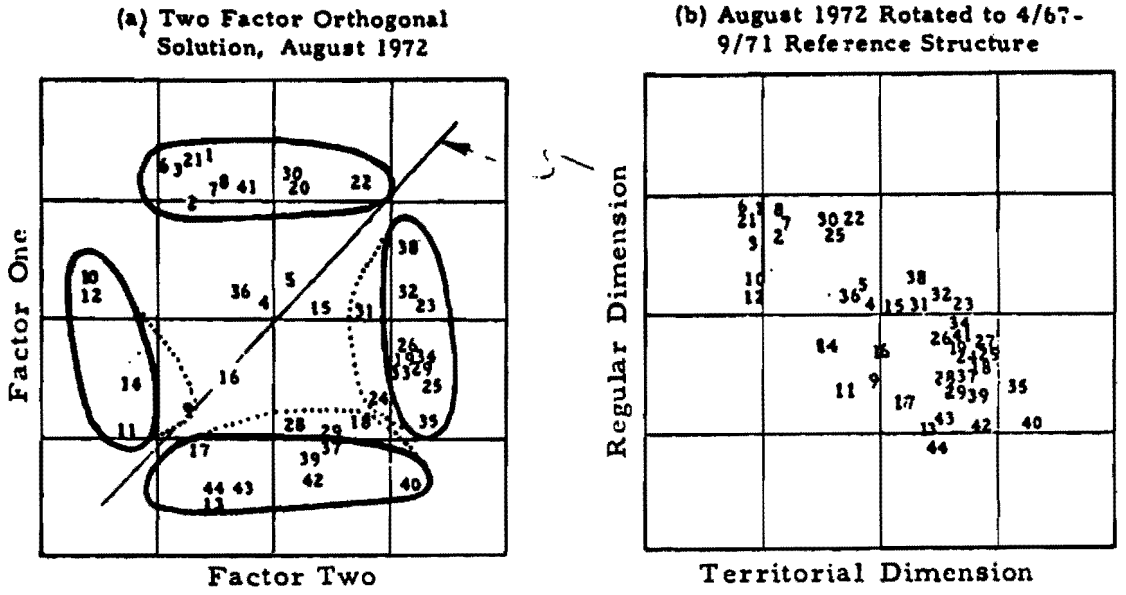


Figure II-19

Analysis Across Provinces, August 1972

The territorial dimension appears to have retained its orientation, but did lose its meaning as the low provinces moved toward high regular. The regular dimension was replaced by a stronger "factor one", which when its location relative to the reference solution is examined appears to deserve the label "1972 offensive." Quang Tri, Kontum, Binh Long, Pleiku, Quang Nam, Binh Dinh, and Thua Thien are at the "high" end and Ba Xuyen, Vinh Long, BacLieu, and Sa Dec are at the other extreme. This change in the structure describing across province variance has the effect of making the old regular-territorial approach of little value as a partitioning device for studying the offensive. In fact using the criteria for partitioning at ± 0.5 does not place any provinces in the high and low regular sub-sets for the quarter ending in August 1972. On the other hand averaging over a six-month period indicates that the basic nature of the war was only briefly altered.

Friendly Initiative[35]

Problem — This work was the continuation of the basic line of inquiry that sought to optimize the mix of ARVN, RF, and PF strengths in terms of expected GVN control. The research strategy was expanded to include activity as well as strength as independent concepts, and used several alternative outcome measures as the dependent concept. The basic assumption behind this work was that future enemy action is suppressed by current friendly initiative. Since both very high levels of friendly initiative and the high levels of enemy initiative that might be a consequence of low friendly initiative would produce high friendly casualties, the first research problem considered was to find an optimum level of friendly initiative that would be associated with a minimum level of friendly casualties. This hypothesis is illustrated in Figure II-20 in which the relationship might be expressed as friendly casualties being a function of friendly initiative and the square (or some other exponent) of friendly initiative as shown. Constant $_1$ is the expected friendly casualties for zero friendly initiative. An optimum will exist if the data reveal constant $_2$ as negative and constant $_3$ as positive. Once the appropriate levels of activity could be identified for various conditions (defined by the regular-territorial sub-sets), the sensitivity to changing the mix of RVNAF components was the next part of the problem.

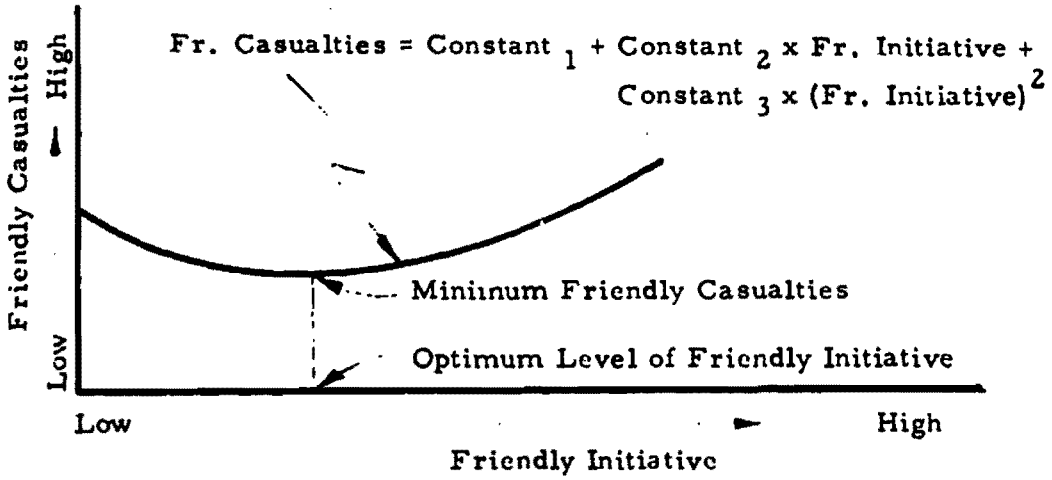


Figure II-20

Optimizing Friendly Initiative

Approach — Multiple regression with the data partitioned into the four war category sub-sets was carried out to find the values for the three constants. Data from the 1969-70 SEER file was used with the variables defined as follows:

- Friendly Casualties - ARVN/VNMC KIA on friendly initiated operations at time one plus ARVN/VNMC KIA in enemy initiated action at times two, three, and four.

- Friendly Initiative - An index constructed by summing the standardized scores (at time one) for number of ARVN/VNMC small unit operations and the percentage of available ARVN/VNMC battalion days spent on large unit offensive operations.

The regressions were all so weak (maximum $R^2 < 0.1$) that it was decided the other friendly forces (US and third country) could not be left out. The regressions were repeated on data substituting friendly totals in place of just ARVN/VNMC. This did not change much in the results which can be summarized by the plots shown in Figure II-21 where the time lag for costs due to enemy initiative is three months. The best R^2 was only 0.15 and

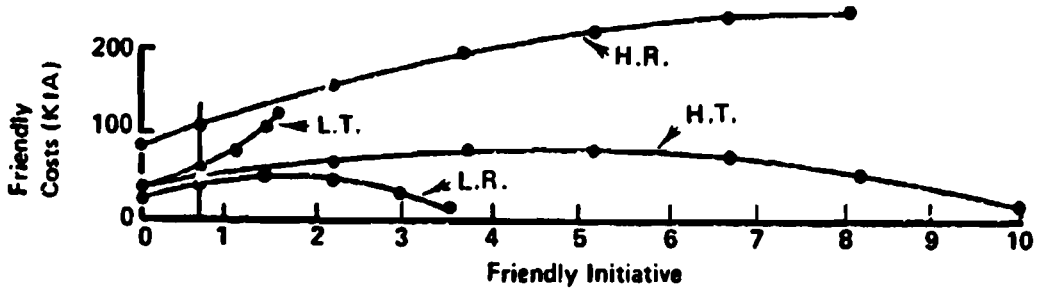


Figure II-21

Friendly Costs versus Friendly Initiative

there was hardly an optimum solution. This approach was abandoned in favor of a "shot-gun" strategy of looking at various bivariate scatter plots in search of a better way to define the dependent and independent measures.

A definition of friendly initiative better than the abstract sum of standard scores was needed in order to translate the results into operational terms anyway. In this "shot-gun" strategy the abstraction was shifted to the dependent variable by construction of a composite index incorporating future numbers of enemy incidents, friendly KIA per enemy incident, the rate per 1000 assigned friendly strength killed in enemy incidents, and the change in GVN control. These "outcomes" were categorized as favorable or unfavorable on the basis of the history in each province. In addition to partitioning by war category, enemy density and force ratios were used as intervening factors to define a variety of possible "threat" situations in which some future force strength and activity decisions would be needed. The results were to be expressed in operationally useful tables or charts such as those illustrated in Figure II-22 and Table II-9. The data was partitioned into more than 1200 sub-sets in search of the kind of regularity between threat, friendly strength or action, and measures of outcome that would yield such outputs.

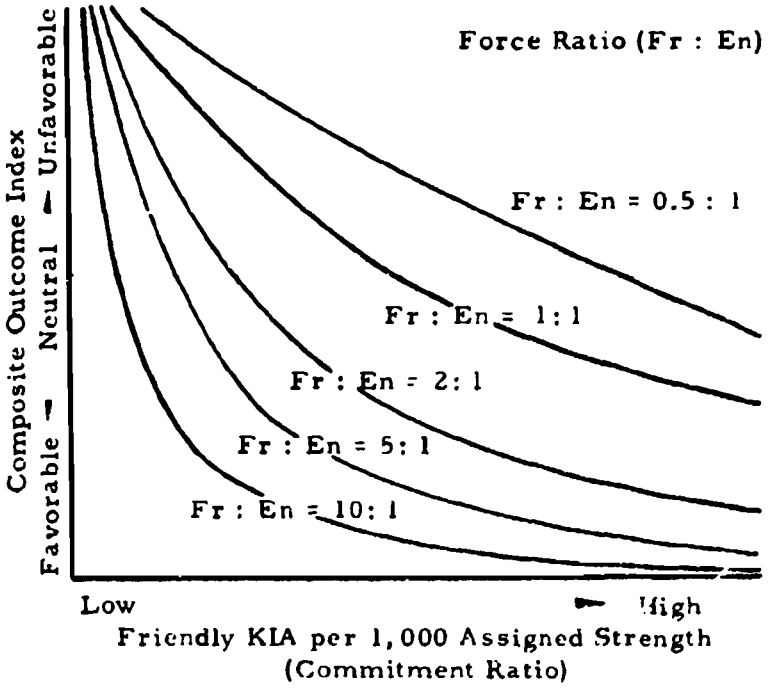


Figure II-22

Planned Graphic Display of Analysis Output

TABLE II-9

PLANNED TABULAR DISPLAY OF ANALYSIS OUTPUT

Probability of Favorable Outcome - p(F)

Enemy Regular Force Density (Troops/sq. km.)	1	2	3	4	5	6	7	8	9	10
0.0-0.1	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
0.1-0.2	0.6	0.7	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0
0.2-0.5	0.4	0.5	0.5	0.6	0.7	0.8	0.9	1.0	1.0	1.0
0.5-1.0	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.7
1.0-5.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4

Friendly Maneuver Battalions

Unfortunately, either the data or the approach or both missed the mark because the relationships found were general y very weak and often indicated adverse results for friendly military operations.

Data — The selection of variables used in the final series of analyses to derive some useful information about the utility of military force in Vietnar included:

- Friendly Strength and Activity Measures
  - Friendly Regular Strength (SEAPR)
  - ARVN/VNMC Strength (SEAPR)
  - RF Strength (SEAPR)
  - Total National Police Strength (SEAPR)
  - PSDF Participation (QHES)
  - Total Friendly Strength (SEAPR)
  - Friendly KIA or Friendly Initiated Action (SEAPR)
  - Friendly KIA, Fr. Init. per 1000 Total Assigned Strength (SEAPR)
  - Function 1 Air Support (Interdiction) Sorties (AIRSUM)
  - Function 2 Air Support (Close Air Support) Sorties (AIRSUM)
  - Tactical Air/Gunship Sorties Supporting ARVN/VNMC (SEER)
  - Air Lift/Medevac Sorties Supporting ARVN/VNMC (SEER)
  - Rounds of Artillery and Naval Gun Fire Supporting ARVN/VNMC (SEER)

- Friendly Regular Density (Troops/sq. km.) (SEAPR)
- Friendly Regular Strength per 1000 Contested Population (SEAPR)
- Friendly Territorial Strength per 1000 GVN Controlled Population (SEAPR)

- Intervening/"Threat" Measures
  - Overall Force Ratio (Friendly/Enemy) (SEAPR)
  - Regular Force Ratio (SEAPR)
  - Territorial Force Ratio (SEAPR)
  - Enemy Regular Density (Troops/sq. km.) (SEAPR)
  - (Measures of combat support were also treated as intervening parameters)

- Outcome Measures
  - Total Enemy Incidents per Month (averaged over one, two, three, and four months) (SEAPR)
  - Friendly KIA in Enemy Initiated Incidents (for current month and one, two, and three months ahead) (SEAPR)
  - Friendly KIA per Enemy Incident (for current month and one, two, and three months ahead) (SEAPR)
  - Friendly KIA in Enemy Incidents per 1000 Total Friendly Assigned Strength (averaged over one, two, three, and four months) (SEAPR)
  - Change in Percent GVN Control (over one, two, and three months) (SEAPR)
  - Composite Outcome Index - Sum of scores standardized by province for:
    Four Month Average Number of Enemy Incidents
    Four Month Average of Friendly KIA per Incident
    Four Month Average of Friendly KIA per 1000 Strength
    Three Month Change in Percent GVN Control

The rationale behind the choice of some variables should be noted. The strength data is straightforward except for PSDF participation. A consistent time series of PSDF strength data could not be found. Tests of the relationships between the HES questions on PSDF participation (percent of households with a member in PSDF) and activity and several months of data for number of armed PSDF and number of key inter-teams were carried out to see how well the HES data reflected across province variation. A rank order correlation (ρ) of 0.32 for PSDF participation and armed PSDF seemed

good enough to warrant using the HES data rather than drop PSDF from the research design. The measures of friendly regular strength per square kilometer and per 1000 contested population (difference between total and GVN or VC controlled population) were selected to reflect the responsibility of regular units to clear areas and advance GVN control. The population protection responsibility of the RF and PF was to be measured by the ratio of their strength to GVN controlled population. The composite outcome index says that several factors determine the favorability of how the situation looks in any given month. It also says that one should look ahead three months to judge the results of current activity and deployment, but time lags of two, one, and zero months were also examined in other iterations of this work. The distribution of scores on this index is shown in Figure II-23. The most favorable outcome is negative (-6.3 for Binh Duong in December 1971) and most unfavorable outcome is positive (12.24 for Binh Long in May 1972) on this scale. The mean score for each province is zero because of the

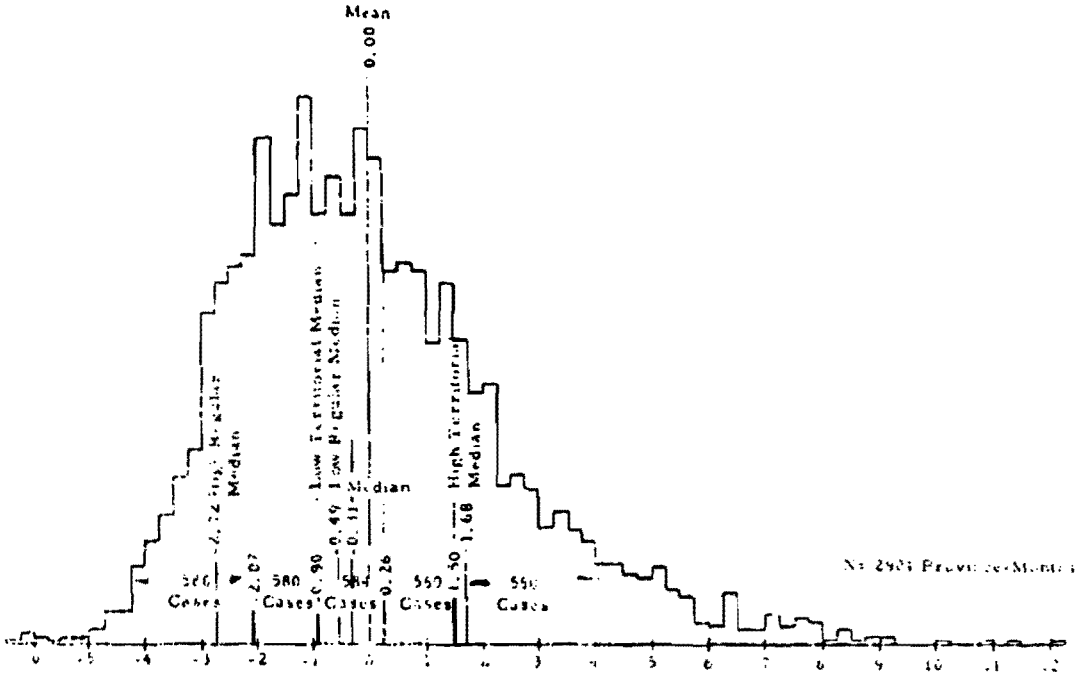


Figure II-23

Distribution of Composite Outcome Index Scores

standardization by province. The four elements of the index were standardized by province to compensate for the fact that a rather good outcome for Quang Tri would be considered a disaster for Go Cong. This also explains why Binh Long is the worst case and not Quang Tri. The intense combat of 1972 was unusual for Binh Long while it had been almost common for Quang Tri. It was surprising to find that the median value for the high territorial data sub-set was less favorable than the median value for the high regular sub-set. Table II-10 gives discriptive statistics for the four elements of the index and the correlation between each element and the composite index for the total and four war type data sets. The differences in

TABLE II-10

ELEMENTS OF COMPOSITE OUTCOME INDEX

Outcome Index Element	Mean Value	Standard Deviation	Correlation With Index	No. of Cases
Enemy Incidents per Month (T_0 to T_3)	51.2	53.2	0.283	2904
Low Regular	25.0	24.8	0.266	643
High Regular	110.6	74.7	0.300	552
High Territorial	42.9	30.3	0.408	696
Low Territorial	50.4	43.6	0.382	465
Friendly KIA, En. Init. per Month (T_0 to T_3)	28.1	29.3	0.498	2904
Low Regular	14.4	16.9	0.487	643
High Regular	57.9	37.0	0.604	552
High Territorial	26.0	19.1	0.524	696
Low Territorial	28.3	33.1	0.623	465
Friendly KIA per 1000 Fr. Strength (T_0 to T_3)	2.46	2.92	0.399	2904
Low Regular	2.27	3.45	0.356	643
High Regular	2.98	2.60	0.487	552
High Territorial	2.34	2.21	0.382	696
Low Territorial	3.04	4.08	0.406	465
Change in GVN Control (T_0 to T_3)	1.95	12.48	0.416	2904
Low Regular	1.72	13.56	0.505	643
High Regular	2.11	11.32	0.372	552
High Territorial	2.56	7.80	0.544	696
Low Territorial	1.47	16.66	0.473	465

the means and standard deviations cause a high regular province-month with zero or very low enemy activity to appear more favorable (or lower) on the composite index scale than the same outcome in a high territorial province-month (minus 4.38 versus minus 4.09). Thus this difference in median scores is an artifact of the index construction which gives greater weight to inactivity in areas that normally have rather high levels of activity than is given to normally quiet areas.

Before discussing the analysis results and presenting some detailed examples one more display based on the composite outcome index is appropriate. Figure II-24 illustrates the temporal and geographic distribution of the 580 most favorable and 580 most unfavorable outcomes. This is a useful presentation because it not only gives an overall perspective for evaluating the situation at any point in the January 1967 through June 1972 time frame, but also gives some credibility to the index in the way major extremes and general trends in the war stand out.

Results - Relationships between the outcome index and the independent variables (factors subject to change at US/GVN initiative) were found to be very weak, even when controlling for intervening parameters such as war type and enemy regular density. If anything, the higher levels of friendly strength and activity seem to be associated with unfavorable outcomes. Table II-11 is an abstract of the descriptive statistics by quartile of outcome for each war type. Comparison of these mean values across levels of outcome shows only that there is very little regularity between the factors subject to friendly initiative and GVN control and enemy initiative three months later. The same general impressions are found if outcome is examined versus varying levels of friendly strength and activity. Figures II-25, 26, and 27 are plots of curves fitted through the mean outcome index values for various ranges of friendly loss rates on friendly initiated action, friendly territorial strength per GVN controlled population, and enemy regular density for each war type category. Only enemy regular density has curves that show a non-zero relationship, but the effect is mixed and apparent at only high levels of enemy density. High enemy density has the expected result of driving the outcome more unfavorable in the high territorial and low regular cases, but the opposite seems to occur in the other two war type categories. To explain this difference and also to study the other relationships in greater detail these subsets partioned according to both war type and enemy density were examined for a number bivariate relationships.

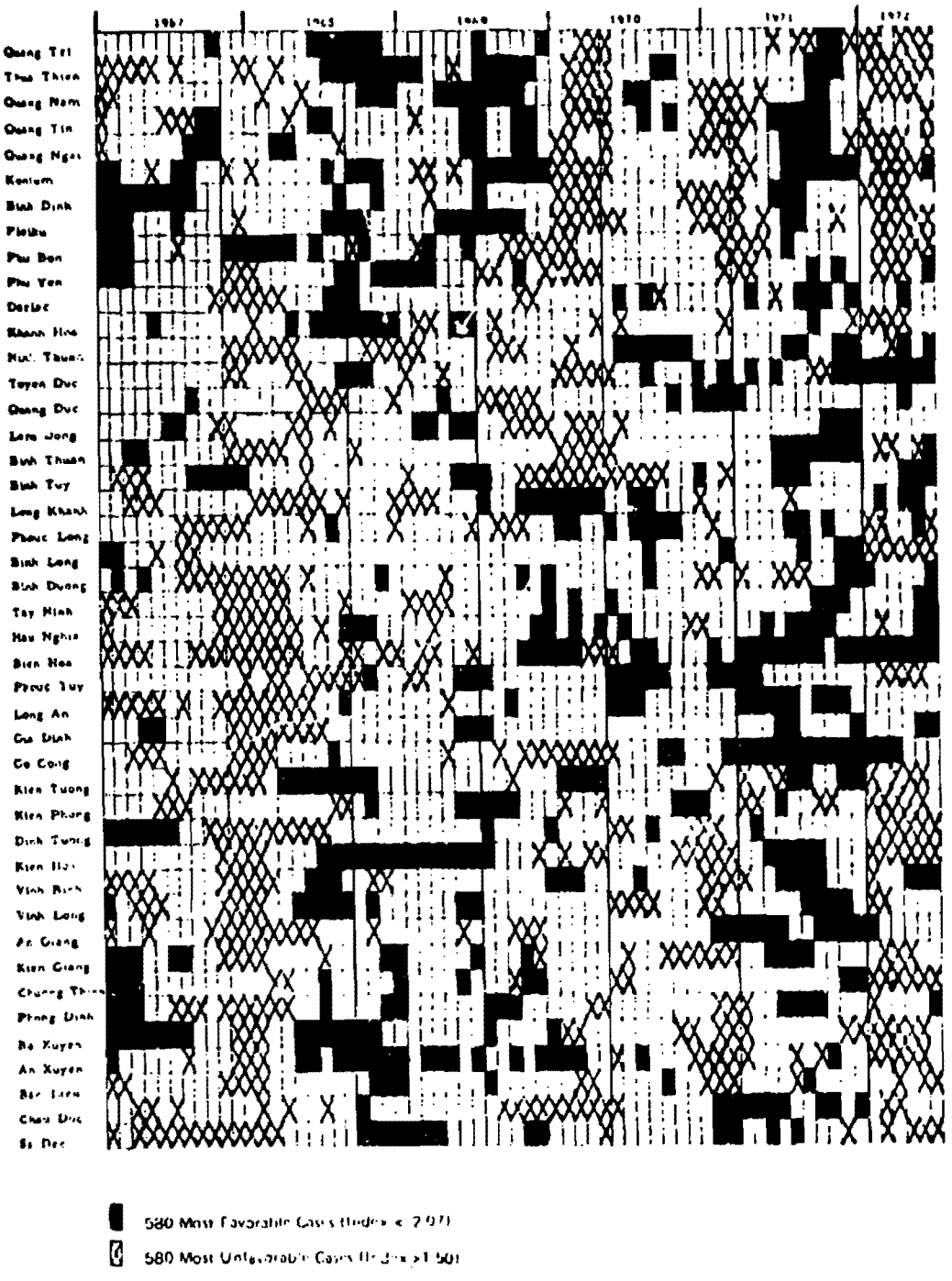


Figure II-24

Temporal and Geographic Distribution of Extreme Outcomes