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# ANALYSIS OF VIETNAMIZATION: SUMMARY AND EVALUATION

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13 ABSTRACT

This report is the summary of a two and one-half year study seeking quantitative measures of ARVN performance, descriptions of the war in Vietnam over time and across provinces, guidance for force mix between regular and territorial forces, evaluations of village development efforts, evaluations of the 1972 offensive impacts, and optimum levels of friendly initiative. Also included are a self-critique, some general conclusions regarding the utility of the methods employed, a list of references, and a comprehensive glossary. Volumes II and III of the report provide a detailed description of the data sources and definitions used in this work and a data abstract of the forty-odd variables found to be most valuable for study.



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# ANALYSIS OF VIETNAMIZATION: SUMMARY AND EVALUATION

Final Report
Volume I

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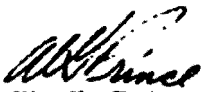
## ACKNOWLEDGEMENT

This final report is the condensation of a room full of formal reports, working papers, notes, and computer output produced during some 27 months of study. As principal investigator I accept the blame for any omission or misrepresentation and give credit for the day to day production to the members of the study team. Bendix employees John Adkins, Ron Bauer, Cris Candela, Phil Chase, Carol Hiroka, John MacDougal, Dave McCormick, Peggy Mobley, Mike Morris, and Bob Youngblood labored diligently on my notions and often found their own path of inquiry. Consultants Jeffrey Milstein and Raymond Tanter provided valuable assistance in planning and interpreting the work. Nguyen Thi Hien gave us all better insight into the Vietnamese nature. The active interest of Robert Komer has been especially useful and I apologize for not getting as far into the attitude data as he suggested. In the Office of the Assistant Secretary of Defense (Systems Analysis) I owe much to Thomas Thayer for helping to get the project started. Once under way much of the problem formulation was guided by the Vietnam operational and analytic experience offered by OASD/SA analysts Ltc. W. J. Eddins, Maj. Wayne Downing, Maj. Bill Hornagle, and James Boginis. The interest and patience of Deputy Assistant Secretary C. E. McManaway is appreciated and I share his reservations over the limitations of our findings. I can only add that in spite of the limitations outlined in this report, any systematic effort to identify and learn from the observed regularities is better than none as long as these limits are understood. Finally, we all thank the Defense Advanced Research Projects Agency for its support of this opportunity to practice our trade.



W. G. Prince
Principal Investigator

Trời đã cho đất nước Việt-Nam chúng ta nhiều tài nguyên phong phú. Người dân Việt-Nam chúng ta năng động, can-đảm và chuyên cần. Một tương lai sáng lạn đương đợi chờ toàn thể quốc dân ta, nếu cuộc binh đao giữa người Việt-Nam không còn tiếp diễn mãi.

"Our country is very richly endowed by nature. Our people are dynamic, courageous, and hard working. The brightest future awaits the whole Vietnamese nation if only this long fratricidal war could be brought to an end."

Nguyen Van Thieu
President of the Republic of Vietnam
Saigon, July 11, 1969

"It is a strange and it is almost an inexplicable situation, at least from our viewpoint."

Dwight D. Eisenhower
President of the United States
Washington, D. C., April 27, 1955

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# SECTION I

# SUMMARY

## Objectives

The basic objectives of the Analysis of Vietnamization project have been:

- Systematic analysis of routinely reported Vietnam data in search of models applicable to policy-relevant questions concerning the withdrawal of U.S. combat forces.
- Evaluation of the data and the use of various quantitative analysis methods as aids to decision making.

The specific questions addressed by the analyses cover a wide range of issues including:

- Unit effectiveness (ARVN performance)
- Measures of conditions ("progress") and activity (description of the war)
- South Vietnamese mix of regular and territorial forces (RVNAF composition)
- Impact of socio-economic conditions on popular behavior and attitudes (village programs)
- Allocation of post cease fire development effort
- Attrition processes and impacts of the 1972 offensive on development
- Results of various levels of friendly initiative.

## Approach

Evaluations of the situation in Vietnam and analyses seeking to explain the processes involved have been carried out from countless perspectives using every conceivable approach and source of information. The

scope of this work ranges from illustrating progress in terms of an upward trend in the percentage of population living in relatively secure and developed areas to first hand impressions of observed conditions and events in a single village. The amount of routine reports of numbers measuring these conditions and events is so great that a complete inventory of the available data may never be made. The approach followed in this project is based on a conviction that even though security, battles, and death are very personal matters to those involved:

- At least some of the aggregate numbers reported are valid measures of central elements in the processes at work.

- The different values represented by these numbers from time to time or place to place are not determined by chance alone, but also by various doctrines, conditions, and attributes of forces involved.

Nearly all doctrine and decisions taken in the war at every level are founded on such a belief that there are regularities in the occurrence of particular conditions and events. Most actions were taken with the expectation that in that situation the chances of a favorable outcome were greater for the action taken than for some other course of action. When unfavorable outcomes resulted it was likely that the situation had not really been what it was perceived as being so some random values will be present in the data, but there was probably even some regularity in misperception by either side. The basic approach followed in this project was to divide the observations into sets according to the situation and find those regularities in the data that could be translated into explicit decision rules or doctrines applicable to issues arising in the process of withdrawal of U.S. combat forces from the war.

## Findings

ARVN Performance – The measures of effectiveness applied to divisions and independent regiments were in the form of a ratio of observed performance to expected performance. The expected performance was based on multiple regression models incorporating past performance, the combat environment, and unit employment to provide an empirical basis for rating units on a number of performance measures including:

- Enemy eliminated on offensive operations
- ARVN offensive kill ratio
- Enemy offensive kill ratio
- Enemy initiated incidents

The results tended to show much less difference between units and less change over time than was indicated in the basic quarterly evaluations. The work also found that units which produce the highest body counts and best kill ratios did not rank highest according to what might be expected in each situation. This emphasized the importance of the means used to categorize the data into subsets according to some measure of the combat environment or nature of the war.

Description of the War — A series of descriptive analyses were conducted to find what data elements or combinations thereof best measure conditions and events as they vary from time to time and place to place. Even though thousands of data elements are reported, many of them may be indicative of variation in the same fundamental concept. For example, friendly battalion-days, contacts, contact-hours, friendly killed or wounded, weapons lost or captured, etc. are all strongly related to one another and can be said to measure the fundamental concept "friendly military initiative." It was found that approximately 75 percent of the variation over time present in some 300 data elements could be explained by less than 20 key indicators or composite indices of the following concepts or dimensions of the war:

- Military Dimensions
  - Friendly Presence - measured by regular maneuver battalion and territorial/para-military unit strengths.
  - Enemy Presence - measured by main force maneuver battalion and local unit strengths.
  - Friendly Activity (initiated) - measured by friendly killed on large unit operations and number of contacts on small unit operations.
  - Enemy Activity - measured by friendly killed in enemy initiated incidents and number of standoff attacks.

- Socio-Economic Dimensions
  - Social Benefits - measured by an index derived from Hamlet Evaluation System (HES) question responses concerning availability of facilities and services.
  - Economic Strength - measured by an index derived from HES question responses concerning local market conditions.
- Political Dimensions
  - Political Influence - measured by indices derived from HES questions concerning cooperation with or participation in either GVN or VC programs.
  - GVN Presence and Activity - measured by indices derived from HES questions concerning the status of local administration, development programs, and information/psyops programs.
  - Enemy Presence and Activity - measured by the size of the VC infrastructure (VCI), number of political or coercive incidents, and an index derived from the HES question responses on the incidence of non-selective terrorism.

These were the basic measures used in the search for regularities between various conditions alternative military and development initiatives and measures of the battle outcomes and popular behavior. A by-product of this study of the variation over time was a recommendation for simplification of the HES from more than 100 questions to 34 questions organized into ten submodels.

In the same manner the descriptive work examined similarities between provinces to determine if the cases (province-months) are 44 (or more) different situations or if there is some underlying structure that justifies categorization of the cases according to some criteria better than time or administrative divisions (military regions as is most commonly done). It was found that a two dimensional structure portraying the regular force and territorial force character of the war provides a strong basis for categorizing nearly all cases into one of four distinctive groups.

RVNAF Composition – This analysis was conducted in search of optimum levels for ARVN, RF, and PF strengths in order to maximize expected GVN control in each of four categories of cases. The categorization of cases was based on an earlier OASD ( ) identification of main force,

guerrilla, mixed and "other" provinces. The models obtained from the data analysis were generally weak and indicated that the optimum force mix did not exist within the range of the observed data.

Village Programs – A large portion of the project effort was devoted to tests of the hypotheses underlying "revolutionary development" or pacification which generally state that:

- Village programs for social, economic, and administrative development have a positive impact on these three conditions.
- The resulting social/economic/administrative conditions are reflected in subsequent levels of cooperative behavior with the GVN and VC, e.g., political influence.
- The degree of impact is conditioned by security, military operations, and initial social/economic/administrative conditions.

Tests using both province and hamlet level data in both cross-sectional and time series analyses confirmed all three basic expectations. However, neither security nor measures of military activity emerged as strong components of the process in more than just a few provinces. For example, the effect of economic strength upon political influence was strongest in areas of relatively low security, but this could be an artifact of low economic strength being associated with low security and diminishing returns at high levels of economic strength. In any event, the conclusion to be drawn is not that security in itself is unimportant to political influence, but rather that in hamlets where security was good enough to allow reporting under the HES, the payoff of economic strength in terms of popular behavior was largely independent of security.

The relationships varied greatly from province to province in such a way that no single measure or combination of measures of the nature of the war; military presence and activity; or other social, economic, political, demographic, geographic, and temporal factors could explain in terms of a generally useful model. Even though these province to province differences could not be easily explained, they do offer a basis for distributing future development program efforts between the provinces. A set of recommendations for post cease-fire allocations was derived from 1972 conditions, trends, and the expected returns in GVN political influence.

Impacts of the 1972 Offensive – A number of elements of the 1972 data were incorporated in the descriptive analyses as well as other efforts seeking to account for significant changes observed in pacification and security scores. Comparison of the variations in the style and intensity of the offensive with economic, social, and administrative conditions revealed that except for the extreme cases of Quang Tri and Binh Long, the only significant gains by the enemy were in poor and not especially well administered or controlled areas. Where GVN presence and control had been solid, it tended to remain so. With regard to long term impact of the offensive, the situation in October 1972 was fairly close to that in October 1971 -- pacification was set back approximately one year.

Less hopeful signs emerged from a brief study of possible objectives behind the scale and timing of the offensive. A possible interpretation of the offensive was that factional splits in the North Vietnamese leadership had forced those advocating a quick military victory in the south to make their move before more moderate interests gained an upper hand. Study of the open literature on North Vietnamese leaders and their views revealed no basis for the factional interpretation. The offensive seemed consistent with the expressed goals and strategies for fighting and negotiating. The goals appear unchanged and two opposing armies remain in the South.

Another approach to study of the offensive was attempted but was overtaken by events before the necessary data could be assembled. This effort sought to apply Lanchester attrition models to prediction of outcomes in the areas of major regular force engagement. Tests subsequent to the receipt of province level strength data for use in a curve fitting exercise yielded a set of assumptions and equations that accurately predict the friendly and enemy attrition associated with the initial GVN defense, loss of territory, counter-offensive, and eventual stalemate.

Friendly Initiative – Several revised research strategies were used in a continuation and expansion of the work on RVNAF composition. Friendly activities as well as strengths and combinations thereof were examined relative to several outcome measures under various threat conditions. One of the propositions tested was that for a given level or type of enemy threat there is an optimum level of friendly initiative which is a minimum for total friendly battle costs. Placing all available friendly effort on offensive operations would yield high costs during the operations, but zero effort on offense would also enable the enemy to inflict high costs at his initiative at some future time. The expectation was that the sum of friendly costs due

to current friendly initiative and future enemy initiative versus the level of current friendly initiative has some minimum value. No strong evidence could be found to confirm this expectation. Total friendly costs are almost entirely dependent on the level of friendly initiative.

This negative finding is obvious in view of the additional finding that the several measures of enemy initiative analyzed are essentially unrelated to any measures of friendly strength or activity in the current month or one; two, or three previous months. The reverse is found to be the more likely case - that levels of friendly strength and activity are reactions to enemy initiative. In the study of individual provinces it was found that:

- Terrorism, standoff attacks, and friendly KIA in enemy incidents are negatively related to prior friendly initiative in only 2, 6, and 7 provinces respectively.

- Conversely, these three measures of enemy activity are positively related to subsequent friendly initiative in 6, 7, and 5 provinces respectively.

- Moreover, an adverse or positive relationship between prior friendly initiative and terrorism, standoff attacks, and friendly KIA in enemy incidents existed in 11, 7, and 8 provinces respectively.

Similar negative results were found in looking at the probabilities for a better than average (favorable) score on abstract, composite outcome index for various levels of 16 measures of friendly strength or activity using 6 different measures of threat to partition the data into subsets. The conclusion drawn was than some additional measure such as enemy intentions must be incorporated in the analysis to screen out the cases where enemy activity is deliberately held down.

## Evaluation

The second basic objective of this project was to evaluate the use of the aggregate data and quantitative methods as decision aids. Aside from the subjective value any of the foregoing analysis findings may have had for the appraisal of the situation, allocating resources to alternative programs, or learning from the experience, there are at least five basic questions that need to be asked:

- Did the data actually represent the substantive concepts being examined?
- Did the methods employed accurately disclose the relationships in a useful form?
- Did the interpretation of results bring clarity to an admittedly complex phenomenon?
- Did the effort to clarify complexity conceal any significant limitations or sensitivity of the analysis?
- Did the level of detail examined strike an appropriate balance between the complexity of the problem and the time available to produce results?

An unqualified affirmative response cannot be given to any of these questions. In general, the data and methods probably have a more important role in learning from the experience than they had in support of any particular policy decisions. Many of the findirgs were that relationships implicit in the doctrine were not found to exist in the data. The positive results that were found emerged as less than convincing. This evaluation faces a dilemma in trying to explain what happened. On one hand there is a need to bring attention to all the findings by setting aside any reservations and going directly to a set of positive and assertive policy recommendations. On the other hand there is an awareness of how "soft" some of the data is, the analytical assumptions that were "bent" along the way, and where different approaches could have been followed given two years of hindsight.

The redundancy and inconsistency in the data were time consuming problems, but they also allow a great deal of confidence in the numbers that were eventually analyzed. The most significant defect in the data is not unique to this project. This is the lack of a single, generally valid measure of success or failure. Perhaps it is best to recognize that this episodic war involves complex issues and processes and that the relative importance of factors such as strength, security, attrition, and development will be continually changing over time and space.

The data problems were also responsible for making some relationships difficult to translate into useful forms. In the study of village program effectiveness the essential decisions to be made were for funding specific activities or projects, but the HES data represents only categorical

information at best. Better, more direct results might have been obtained from an analysis of village conditions and behavior in relation to the time and funds expended on specific activities or projects reported by the agencies concerned. In the same vein, it is hard to translate the results of a study of friendly initiative when that initiative was best measured by friendly KIA. It would be better to say that under given conditions the lowest expected battle costs will be for a certain percentage of available effort on offensive missions rather than the level of offense that gives a loss rate of 3 to 5 men per thousand.

A natural problem in this type of work is the need for clear and concise statements of analysis results and their implications. Yet there is also a need to present sufficient detail regarding the origins of the data and procedures employed to prove the credibility of the work. This is especially true in those situations where the results obtained are not intuitively pleasing. A very detailed discussion of the data, method, and findings for a single correlation might require several pages of text and tables in a technical journal. During the course of this project something in excess of a hundred thousand correlations or regression models were considered. The seventy pages of text in the following section can therefore be no more than the essential elements of the purposes, data base, methods, and results of the work undertaken.

The particular nature of the available data and the large size of the data base combine to produce the most important defect in the utility of the data and analysis methods as quantitative decision aids. Very few decisions with respect to issues considered in this project need to be made in three months, six months or a year. Most seem to have a time frame of a week or two at most (and some were "needed yesterday"). The work on this project has shown that a three month response time is hard to meet and when the time is not taken to carefully review all the data and check the various manipulations of that data, errors creep in.

## Conclusions and Recommendations

The experience with the Analysis of Vietnamization project did not produce any simple formulas for data needs, data collection, data analysis, or interpretation of analysis results to say nothing of formulas for the conduct of the war. The project began as a fishing expedition into the sea of readily available Vietnam data. A number of descriptive analyses were undertaken to find the most useful elements of that data. Studies of the data thought to be important to several policy issues were carried out. The products produced were:

- Simplification and refinement of a generalized Vietnam data base.
- Categorization of the war by province-month according to its regular and territorial force characteristics.
- Identification of linear and non-linear relationships between military, administrative, social-economic, and political dimensions of the conflict.
- Application of those relationships to the problem of allocating development efforts in the post cease-fire period.
- Identification of a workable means for using attrition models to major regular force offensives in Vietnam.
- Identification of the absence of general strong relationships between friendly military strength and activity and enemy military initiative.
- Demonstration of the opportunities and limitations of aggregate data and quantitative methods as aids to decision making.

That the products of this research found only limited usefulness for predicting results of decisions can be attributed to:

- The object of a particular decision not being well measured in the readily available data.
- Errors in interpreting the problem at hand.
- The need for proof that the future will resemble past experience.
- The need for compromise between a prolonged systematic research strategy and a quick and dirty test with respect to problem definition, data acquisition, and choice of method.

Even though direct U.S. involvement in combat and development activities in Vietnam has ended and a repeat of the 1965-1972 experience is not believed possible, a potentially explosive and sporadically intense war continues in Vietnam and Cambodia and there may be a serious need to re-examine doctrine and policies for all levels of involvement in these and other situations. This re-examination as well as planning of support and advice for our clients in Southeast Asia and elsewhere would benefit from:

- Updating the work on village program effectiveness using HES data and replication using data for specific development activities and programs from AID and GVN Ministry of Revolutionary Development sources.

- Independent replication of the analyses showing only weak and possibly adverse relationships between friendly and enemy initiative.

- Application of the attrition models to possible future offensives and alternative GVN defensive deployments.

- Application of the various war type and threat categorizations to other studies of specific operational and weapons system concepts that were employed in Vietnam.

Overall, it should be recognized that the data base on Vietnam was explored in only a very general way. Sources of data on popular attitudes and specific construction or development activity was barely touched. Military initiative was usually treated as a single measure and found to play little role in the political process. More detailed analysis of this and other topics could account for the surprizes found here. In the end, it is believed that the work on this project provides the Government, as well as other students of Vietnam with a strong foundation for systematic learning from the experience.

# SECTION II

# RESEARCH

## Introduction

The essential elements of each major research topic and some incidental by-products of the Analysis of Vietnamization project are presented in this section of the final report. The presentation takes up each topic in the order in which the work was done. The project started by examining various measures of ARVN performance. This effort ended short of its original objective of developing new battalion level evaluations. This work did point up a need for a means of categorizing the nature of the war as it differs from province to province. This need was satisfied with a series of two forms of analyses yielding a description of the war. Variation over time in a large number of data elements was analyzed to determine the bacis patterns of variance in terms of statistically and substantitively independent concepts. Key indicator variables or composite indices measuring these concepts were identified for use in planning subsequent analyses. The descriptive analyses also produced several ways for categorization of the war across provinces. These were analyses seeking to cluster the provinces into relatively homogeneous groups according to similarities in military presence, activity, and direct results (e.g., combat deaths). In an effort parallel to the descriptive work several non-linear models of the relationship between RVNAF composition and AVN control were tested. During the second year of the project a major part of the work was devoted to several approaches to determining the effectiveness of village programs. At the same time events in Vietnam made it important to examine various impacts of the 1972 offensive. Finally, several approaches were tried in a search for regularities between measures of outcome and levels of friendly initiative as well as strength or force mix.

Each research topic described in this section begins with a brief statement of the problem or research question. The basic research strategy followed is described in terms of the data sources, variable selection, and analysis

methods employed. The basic findings of the research are presented in the form of summary tables and listings of major conclusions. In some instances where summarization fails to protray the full complexity or uniqueness of the results, examples of typical cases are given. The work on these research topics has also been documented in detail in one or more technical reports and working papers (depending on the degree of "success") and appropriate references are included here. Additional background information is provided in the following discussion of prior research of the Vietnam War.

## Prior Work

The analysis of Vietnamization project wa planned to build upon prior analysis of the war and to use data already being routinely collected. Numerous reports of this prior work were reviewed both during the planning for this project and during the conduct of the actual research. A relatively small number of these projects employed the data sources and analysis methods that were used in the work contained in this report. The prior work which will be briefly reviewed here can be divided into three categories. The first category consists of the various attempts to evaluate the effectiveness of operational concepts for the military forces. A second category studies deals with the processes of political and economic development in an attempt to evaluate progress in the "other war." The third category of work examines relationships between the military aspects of the war and various social, economic, and political conditions. In this latter group, it is assumed that a better understanding of these relationships will produce better means of determining how the political struggle is progressing and identifying mutually supporting military and socio-economic policies.

Effectiveness of Operational Concepts - A military activity frequently studied is the small unit action where the small unit has been variously defined as any force smaller than three companies downward to a single squad. The actions of interest are usually classed as skirmishes, ambushes, seiges and patrols. In South Vietnam such actions may involve a mix of troops (ARVN, CIDG, PF, RF, US, etc.). They might be reinforced, take place at night or in the daytime, and may be initiated or disengaged at will.

A study by M. B. Schaffer[1] compares observed small unit outcomes with those derived from a general theory on military engagements. Schaffer applied data on selected small unit actions in Vietnam to Lanchester equations he[2] and Deitchman[3] derived. Schaffer found that Lanchester theory could be validly applied to small unit actions, but a non-linear model had to be used instead of the linear Lanchester law (mutual area fire). Predictions

of aggregate enemy losses were limited by a lack of reliable data for enemy strength involved in the actions during a time period of observation. Development of a generally valid set of deterministic equations would provide a very powerful means for examining the military effectiveness of various types of forces, the use of reinforcements, the factors of night and day, and type of operation or force mission. Predicted and actual losses could be compared and coefficients such as exchange ratio or commitment ratio could be determined by curve fitting to gain insight into the effectiveness and staying power of the units involved.

Another effort to develop predictive models for military operations in Vietnam found that small unit actions appear to be more effective than large unit operations in terms of both GVN control and enemy activity. Raymond Tanter[4] used linear regression techniques in this work at the RAND Corporation. He found that only small unit actions were significantly related to various measures of outcome. A difficulty encountered here is in the definition of small and large units. The nature of the war was such that much of the data under the heading of large unit operations would simply be an aggregation of small unit operations. Because the definition centered on who was in command (i.e., reporting the action) of how many troops the distinction between large and small tends to be administrative rather than truly descriptive of the action.

The interest in large unit actions is similar to that for small unit actions. The analyst seeks knowledge of effective tactics that accomplish near-term military goals and of a more lasting effort in terms of city and hamlet control, in terms of city and hamlet control, and in damage to the VC infrastructure.

An important problem is to show how the large unit is congruent with some model, such as Lanchester's. A large unit action is defined as a military operation of one or more battalions (or three companies operating under a single commander), which also includes supporting action for other units. Analysis of large unit actions has not led to any accurate predictions of KIA. Niskanen's paper[5] is representative of the analyses in which only a weak relationship is found between military operations and casualties. The principal problems of this paper are the failure to account for feedback among the various operations, lack of control for trend effects in the measures over time, and failure to separate size of operations. It should be noted that data of similar quality to that used by Schaffer on small unit actions is not readily available because the beginning and end of the large

unit actions are not always distinct; because some large unit actions are really small unit actions loosely tied together, and because units from several field commands involved in the same action may report redundantly.

In two papers, Schwartz[6] analyzes VC incident patterns and finds that there are definite patterns of geographical location. The incidents are not random, but appear to be highly regulated and perhaps habitual. His second paper adds the TET offensive to the first paper and finds similar patterns. These papers are a landmark effort, geared to the tactical user in the field, to better predict trouble spots in a province. They do not go into overall strategic aspects nor suggest what the overall enemy incident pattern tells about his strategic intentions or capabilities. The study does not relate the findings to force levels, to friendly activity or to the population control as measured by the Hamlet Evaluation System (HES).

The previous discussion of actions, large and small, tend to deal with the effectiveness of the type of action while it was in process. Schaffer indicates which types of small unit actions are most effective but there is no study of similar quality for large unit actions. Another approach to military effectiveness analysis is to study operations of a military force over a prolonged time period.

Niskanen's study is one representative analysis of military effectiveness over long periods time. Types of operations are not identified, but their outcomes are distinguished in terms of casualties. Another study by Johnson and Anello[7] measures progress in terms of proportion of th population under control of both sides, changes of control, and rates of change. They use data aggregated by Corps Tactical Zone and apply significance tests. This technique could help determine "progress", estimate force requirements, and forecast future trends. Another popularly suggested measure of progress is attrition of enemy fighting personnel. Opposed to this approach is the contention that enemy attrition and "kill ratios" have very little meaning and that surrender rates best index who is winning.[8]

Periodic reviews of progress, including some measures of military effectiveness, were accomplished quarterly by each service component command in South Vietnam and their major subordinate commands. These evaluations attempt to measure progress in terms of goals specified in a combined campaign plan. These reports contain substantial amounts of supporting data, however, the evaluations are based primarily on field observation and hunch rather than by careful analysis of the data. The

consolidated quarterly report issued by CINCPAC "Measurements of Progress in Southeast Asia," RCS 3100-4, appears to provide a valuable complement to aggregate data analysis. Our review of numerous issues of quarterly MACV reports convinced us that they were inadequate to assess the effects of Vietnamization. There was a strong bias toward optimistic interpretation of trends. For example, an increase in ARVN losses might be termed "improved aggressiveness" while in another report a decline is indicative of "improved use and control of supporting arms."

Still another approach to using Lanchester models was used by Voevodsky[9] in a long time frame study of aggregate attrition data. He found a wave effect in cummulative casualties for wars and campaigns. When this curve begins to flatten a crisis is reached where that side must add more forces or take greater percentage losses (increase commitment) or withdraw from the contest. Application of this approach to Vietnam data on a countrywide basis clearly shows how major decision points for both sides might have been anticipated. The method can also be applied to major campaigns as will be illustrated later in a curve fitting examination of attrition trends during the 1972 offensive.

A very early work seeking to model the course of a limited war was carried out by Charles Wolf, Jr.[10] He simulated the outcome of alternative military assistance concepts for Iran and South Vietnam. The alternatives which correspond to the regular-territorial dichotomy used in our work each have merit, but his depends on the correct choice of potential threat and, of course, the potential opponent then has the option of using the means for which the defender is least prepared. Overall, the simulation outcomes were dominated by factors which could not be changed for alternative strategies, namely: the terrain, the existing road net, distance of major junctions from the border, loyalty of population, etc.

An example of very detailed simulation of ground combat is the work by Lind, et. al. at the RAND Corporation.[11] They stop just short of modeling the individual rifleman in their comparison of a simulation and after action data for an actual firefight. The use of correlation and regression to evaluate performance of ground units was attempted by an IBM analysis group supporting OASD/SA.[12] The unexpected findings from analysis of the Vietnam data used in our work may have ended further inquiry along this line. They found that if one controls for the size and number of operations conducted, ARVN units tend to look better than US units in terms of enemy killed. Neither air support nor force mission appear to make much difference in unit performance.

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The use of military resources is often aggregated by special types of operational forces, such as bombing, and the interdiction of border crossings or supply lines external to SVN. These studies[13] have a limited analytical objective and use only secondary indicators of effectiveness. While they shed light on specialized problem, they are not by themselves broad enough to serve the purpose of studying "control" in SVN.

In conclusion, analysis of military effectiveness has been used to try to answer a variety of questions. The questions are different, the criteria distinct and the results often conflicting. It could be that no single military effectiveness measure is satisfactory and even that no combination of measures exists which is satisfactory over an extended period as an indicator of establishing and maintaining government control of the population over time and space.

Effectiveness of Political and Economic Development - A common but complex concept is that of the "other war," the war to win the "hearts and minds" of people. A single word, "pacification," has come by usage to represent the gaining of allegiance of the population. Yet pacification, as we shall illustrate, has several components and meanings according to the type of program being employed and the methods proposed for its achievement.

Hickey[14] analyzed the somewhat informal political structure of the rural and urban groups in South Vietnam and suggested that combining their interdependence can lead to a "kind of solidarity." Pacification in this case was equated to accommodation of the central government with the social and political groups, such as FULRO (Front Unifeide Lutte des Races Opprinces), or the Cao Dai and Hoa Hao religious sects.

The central government can accommodate groups by supporting the leadership through encouraging them to consolidate, increase their communication and internal structure, and continue recruitment. New and old groups should be given more prerogatives over territories and regions in which they predominate. Finally, they should be given strong representation and voice in the central government.

In short, Hickey's pacification is the accommodation by the central government with socio-political groups to gain their allegience through democratic processes. He suggested that rural and urban groups are becoming stronger and the possibility exists for such a process. Some of the variables for this assessment might be party or group membership, recruitment rate (net), frequency and attendance at meetings, and the like.

While Hickey's work was not supported by extensive data (ethnic and religious group membership is the extent of his data), other analyses approach Hickey concern from the other end, i.e., recruitment by the Viet Cong. Denton[15] has analyzed interviews of captured or defected VC as to why they joined the VC. Only data from the captured or defected VC draftees were used by Denton as the non-volunteer portion of his sample. There were three general categories of non-volunteers: (1) those joining the ARVN; (2) those drafted by the VC; (3) those not joining either side. Denton found that the following characteristics formed the volunteer background:

- Zero or large land holdings
- Greater education
- Greater intelligence
- Real or imagined grievances against the government
- Couldn't get along with society
- Lost one or more parents
- Relatives in VC (or no relatives in government)
- Local villagers favored VC
- Complaints about life under government.

The support by Benton's analysis of Hickey's suggestions is readily seen from the latter three causes in the listing above; however, Hickey did not mention reducing government-created grievances. We should suppose that improved treatment of the population is a form of accommodation consonant with Hickey's suggestions.

A second definition of pacification is extent of the government's "control" of the population. In a sense, operationalizing the two definitions can lead to contradictions. Strong military control can easily produce grievances ahainst the government which may turn into more volunteers for the VC. However, in one view of pacification, the proportion of the population under control is assumed to measure effectiveness for that side. Analyses employing

data limited merely to military control are not of great value because long term effects may be ignored. To be effective, control must be transformed into allegiance.

A broader investigation of pacification is needed to determine the degree of government control accounted for by economic, social, topographic, and ethnic factors. Mitchell's regression analysis[16] relates these factors to government control. Mitchell's finding, that greater land inequality accounts for greater government control was given wide circulation in the policy community. Mitchell suggests that poor peasants are too apathetic to respond to the flandishments of the VC. However, another investigator, Russo,[17] conducted a much sounder analysis across 94 hamlets as well as the 26 provinces and found that those provinces having high land inequality also had higher levels of food production and less poverty. In other words, the poorer, landless peasant in the provinces having unequal land ownership is probably still better off than a good portion of the peasants owning land in the poorer provinces. Thus, Russo found that hunger and land distribution are very powerful in predicting to VC control — a contradiction of Mitchell.

The basic point about the analysis of government (or insurgent control) made by Russo and Mitchell is that non-military factors can be shown to explain approximately 75% of variance in control. These factors usually change slowly over time but not necessarily across areal units of analysis. They are, generally, not easily or rapidly changed by governments or insurgents. Even land redistribution takes time, and religion, language, real income, and productivity are also not quickly responsive to the instruments of U.S. foreign policy or to action by the government or insurgents.

Mitchell also used regression analysis on the Hukbalahap Rebellion in Central Luzon.[18] With an unusual application of a multiplicative model, he was able to explain 86% of variance in Huk control across 57 municipalities in terms of language, proportional of population who were farmers, land tenancy, percent sugar cane grown, topography, and adjacent Huk control. Note that only the last two independent variables are "military" and that topography is not subject to military manipulation. Mitchell's economic "theory" upon which he purportedly builds his model is not represented by his choice of variables. Nevertheless, his analysis is another convincing demonstration of the need to include non-military factors in any study which deals with political control in an insurgency.

Because both Russo and Mitchell used the Hamlet Evaluation System data to measure government control, it is important to digress at this point to consider some studies of the HES as a source of data.

- Progress Indicators for the Conflict of Southeast Asia, WSEG Report 130, Serendipity Associates, Inc.

  This study made internal consistency checks of the HES data and is the best around for that purpose. (Murray Kamrass of IDA is reported to have published a similar report of less depth but not dissimilar findings.)

- The Hamlet Evaluation System in the Republic of Vietnam, RAC Report TP-308 (FOV) October 1968 by D.K. Clark and C. Wyman.

  This paper provides one of the most complete documentations on the development of the Hamlet Evaluation System (HES). It is must reading for anyone using HES for analysis. While it is weak in analyzing the reliability and validity of HES ratings, it does a good job of laying out data problems, such as the difficulty of obtaining a complete GVN hamlet roster. The authors headed the contract team which devised the HES concept and wrote the computer programs to implement it.

- "Preliminary Examination of the Hamlet Evaluation System--A Methodological Study," an undated draft manuscript by C. Marshall at IDA.

  Marshall used Schwartz's geographical methodology to correlate HES scores with local VC incident rates. It is a good first step in developing a usable method but it does not include enough variables (e.g., friendly presence, friendly activity rates, local territorial security forces, etc.) to validate HES ratings.

- "Pacification Measurement in Vietnam: The Hamlet Evaluation System," paper prepared for SEATO Internal Security Seminar, Manila, June 3-10, 1969, by Col. E. R. Brigham, MACV.

  This paper summarizes most of the available literature regarding the Hamlet Evaluation System (HES), gives an historical account of the evaluation of pacification, describes the HES in detail and

provides the rules for scoring hamlets. The paper claims that confidence in the HES increased sharply after the February 1968 TET offensive because HES faithfully reported the situation in February.

A problem with the paper, however, is that it ignores the negative aspects of critiques which have been done by outside agencies, such as the "Hamlet Evaluation System," a report prepared by the Simulmatics Corporation, Cambridge, Mass., May 1, 1968, and "A Probabilistic Evaluation of Pacification Indicators," a report prepared by Pacific Technical Analysts for ARPA, March 15, 1968.

Another example of the application of HES data is in Schaffer's[15] attempt to explain VC control with it. He uses three independent variables: US bombing, US large unit actions and US small unit actions and found small unit actions effective, large unit actions having no effect, and bombing obliterating the hamlet.

The report of a seminar[19] to improve communication between analysts and field operations personnel contains a number of interesting observations on the meaning and importance of pacification. The papers presented at this seminar ranged from restatement for the "domino theory" to some systematic analysis of patterns found in the data including:

- "Field Work with MACV" by R. Behnke of PTA, Inc. described a methodology for data collection and analysis (a Bayesian approach to developing evaluation index measures). Lack of data was not a difficulty, but data defined and collected before first stating the problem for which the data is collected will be of limited value.

- "Pacification Information Systems," by Major L. Dworshak of MACV CORD-ORD presented the logic for improving the HES in 1969.

- "A Method for Anticipating Characteristics of Enemy-Initiated Incidents in South Vietnam," by A.I. Schwartz of IDA reported a careful analysis of daily SITREPS for the 1964-1968 period. He found that, "...from early 1964 through...1968 the locales in which large numbers of incidents were clustered did not change materially...25% of all enemy-initiated incidents took place in 1% of SVN..."

- "Force Requirements in a Counter-Guerrilla End Game," by R. Rhyne of Johnson Research Associates found that aggregate numbers of the opposing forces in an area are not vital. It is the sizes of units likely to make contact that will determine the military outcome.

In summary, a number of analyses have appeared focusing on the social and economic variables of South Vietnam (Denton, Mitchell, Russo, the HES analyses). Some have been related to military aspects, such as VC incident patterns (Marshall) and US action effectiveness (Schaffer, 1968). The interaction of military and socio/political variables, although treated in these reports, has not been as well organized as is possible or desirable. In the remainder of our discussion of prior work we will consider studies that attempt to relate a larger number of variables.

Effectiveness of Military and Development Strategies Combined - There have been a few studies of the relationship of military effectiveness measures to socio-political variables. The possible combinations increase beyond sensible bound without some careful examination of data limitations and theoretical structure. There is much data of varied quality, and there are a few attempts at combination of "hard and soft" data to predict outcomes of apparent military or political significance in South Vietnam. Conceivably one needs three types of models that can accept the data. The first model combines military effectiveness with important social variables. Niskanen, Johnson and Anello have developed this type of model which deals with military and population control at the province level. Although the model may not be easily understood by potential users and suffers from an excess of data without interpretation, it represents a useful background analysis.

The second type of analysis is the one that examines socio-political variables with apparently significant military effectiveness measures introduced. Some appropriate models have appeared in which the social, ethnic, and topographical characteristics are correlated with military security. Their purpose is to predict to future situations; but they have not included (1) types of guerrilla activity, (2) combinations of the activity with the social data and (3) predictions.

The third type of analytical model should be able to add political variables, to examine sequential interaction between both sides, to predict to the future, and to relate the findings to policy in a simple, understanding fashion.

Work by J.S. Milstein[20] was concerned with the problem of why the Vietnam war escalated. He focused upon how the models of the relationships between what was said and done by each side were related to the actual combat operations and other behaviors. Using unclassified DOD data from January 1965 through December 1967, Milstein postulated and tested models of the conflict held by policy makers on both sides in the war.

An empirical model was developed using a mediated stimulus-response concept to better predict the action-reaction patterns, including the publicly stated preferences and perceptions of policy makers regarding the war. Milstein also used indicators of political support, such as U.S. public opinion polls, numbers of Viet Cong and North Vietnamese defectors, and the black market value of the Piaster. In addition, he employed measures of force commitments, bombing, sorties, and damage.

The empirically derived model was compared with the various policy makers' models of the Vietnam war using a method developed by William Charles Mitchell of Stanford University. On the basis of the empirical models, Milstein and Mitchell developed a computer simulation which forecasts more than a year into the future on variables of interest, e.g., killed in action, using simultaneous multiple regression equations.

The techniques explored by Milstein and Mitchell make an important contribution to foreign and military policy making in two ways. First, they provide a means of evaluating the reliability and validity of the policy maker's models upon which ongoing policy is based. Secondly, they provide a means of testing probable outcomes of alternative policies through computer simulations. These simulations are based upon simultaneous multiple regression equations, in which crosslagged correlation is used to infer the causal relationship between variables.

Some of the findings reported by Milstein and Mitchell are:

- Escalation of the bombing of North Vietnam provoked a subsequent counter-escalation of North Vietnamese troop commitments.

- Bombing de-escalation, on the other hand, led to increased North Vietnamese and Viet Cong willingness to negotiate.

- While sustained bombing inflicts physical damage on the Communists and did impede their troop and supply movements, the increases in bombing rate provoked increases in infiltration by North Vietnamese.

- The greater the rate of U.S. troop commitments, the higher the rate of increase in U.S. casualties.

- Changes in popular support for President Johnson were related to the "hawk" and "dove" policy statements made by the administration: The public reacted negatively to "Hawkish" statements and positively to "dovish" ones.

- The public reacted favorably when there was evidence, for example, in the number of South Vietnamese troops killed that the South Vietnamese were taking over more of the fighting in support of their own country.

- There is clear evidence that the American people wanted a de-Americanization of the Vietnam war.

The implications of Milstein's and Mitchell's work is that policy makers may be operating under a needless handicap, for they have available such tools as data on the war, multivariate analytical techniques, and computer simulation which can be used to evaluate ongoing policy. Once a valid model of the conflict is developed, it can be used to make forecasts, as long as the relationships among variables remain as they have been in the past. Such a model would enable planners to experiment on the computer with alternative strategies without actually implementing them on the battle fields or at the negotiating table.

There is a need, however, to develop more comprehensive models of the Vietnam war. There seems to have been a change in the system of relationships of the variables at the time of the TET offensive of 1968. Several models may be needed to explain and predict the outcomes and behaviors over the period 1965 to 1969. In addition, Milstein's and Mitchell's work is based upon country-wide data. Clearly, the relationships that they talk about should be tested across smaller spaces within Vietnam, e.g., at the province, corps, V.C. military district level, and hamlet level.

Examples of this level of detail in an analysis include another of Schaffer's RAND studies,[21] a project of Henry Peskin's at IDA,[22] and a very comprehensive project at RAC.[23] Schaffer obtained and interpreted correlations for province level HES and military operations data for the 15 month time series from January 1967 through March 1968. The strong upward trend in HES evaluations by advisors (which they were then) was not strongly related to activity in the military realm. The enemy may have been disengaging militarily at the local level, but was clearly not giving up as the TET 1968 actions revealed. Looking back at old data is always more revealing than the slight changes from last month to the current month's data. The other two studies are also interesting in view of the findings reported here. Peskin's use of discriminate function analysis found that friendly military operations were apparently beyond the point of diminishing returns with respect to pacification scores. This probably was not a very popular discovery for the period of maximum U.S. military activity in Vietnam. The analysts at RAC could not believe the adverse relationship found between U.S. strength and GVN control so this bit of information remained buried back in the seventh appendix of their final report. Perhaps it was not just an artifact of the analysis method?

ARVN Performance[24]

Problem – At the start of the Analysis of Vietnamization project a problem facing the Department of Defense and the GVN was the cost of the war. One way of lowering the cost might be a reduction of ARVN strength, the most expensive component of the Republic of Vietnam Armed Forces (RVNAF) as compared with Regional Forces (RF), Popular Forces (PF), or Peoples Self Defense Forces (PSDF). If ARVN were to be reduced by ten battalions, it would be best to select the ten least effective battalions. Thus, the problem was to develop a means of rank ordering ARVN battalions on the basis of their combat effectiveness or observed combat performance.

This was nothing new. U.S. advisors had been making evaluations of ARVN battalion combat effectiveness, leadership, training, morale, etc. for several years. Battalion, regiment, and division performance evaluations were being published quarterly by the U.S. Military Assistance Command,

Vietnam (MACV) on the basis of data reported under the System for Evaluating the Effectiveness of the Armed Forces of the Republic of Vietnam (SEER). Because the evaluations reflect the judgment of individual advisors, the tendency would be for the evaluations to be made in terms of the advisor's own experience or what he would expect from a U.S. unit in the same circumstances. While a U.S. unit might be a very good standard, the circumstances were usually quite different (the one year tour to name one). Thus, the research question included the avoidance of comparison to U.S. units as part of the problem.

Approach – Along with the basic statistics, the MACV quarterly evaluations contain a narrative explaining unusually high or low scores on performance criteria such as enemy killed, kill ratio, use of combat support, etc. While waiting for the full data set from OASD (SA), the Bendix study used the MACV quarterly evaluation report data on divisions and independent regiments to carry out a few preliminary tests to see if the factors cited by MACV actually did account for variation in unit performance. If strong multiple regression models could be developed from these factors, it would be relatively easy to compute the "expected" performance of the "average" ARVN unit under various circumstances. Then the ratio of observed to expected performance could be a relatively simple means of rank-ordering ARVN units while taking their different missions and combat situations into account.

Data – The data were extracted from the MACV quarterly evaluations for 1969 and 1970. To compensate for variation in assigned strength these data were expressed in terms of events or actions per standard battalion. The basic data elements included order of battle, activity, outcome, and evaluation measures organized as follows:

- Order of Battle
  - Maneuver Battalions
    - ARVN/VNMC
    - US/FWMF
    - NVA
    - VC Main Force
    - VC Local
    - VC Sapper
  - Force Density (troops/sq. km.)
    - Total Friendly
    - Total Enemy
  - Force Ratio
    - Total Friendly/Total Enemy
  - Force Mix
    - ARVN/VNMC % of Total Friendly
    - NVA/VC Main Force % of Total Enemy

- Activity
  - Friendly Mission Allocation
    - Offense
      - Combat Operations
      - Active Pacification
    - Defense
      - Security
      - Static Pacification
    - Reserve, Training, or Rehabilition
  - Friendly Combat Support
    - Artillery Rounds
    - Tactical Air/Gunship Sorties
    - Air Lift/Medevac/Resupply Sorties
  - Enemy Initiated Action
    - Ground Assaults
    - Ambushes
    - Attacks by Fire
    - Incidents against Civilians

- Outcome
  - Friendly KIA
    - Ground Assaults
    - Ambushes
    - Attacks by Fire
    - Terrorism
    - Mines and Booby Traps
    - On Friendly Offense
    - Total
  - Pacification Scores (population)
    - ABC
    - DE & Other
    - VC Controlled
  - Enemy KIA
    - Ground Assaults
    - Ambushes
    - On Friendly Offense
    - Total
  - Civilians
    - Killed
    - Wounded
    - Abducted

- Evaluation
  - Operational Effectiveness
  - Personnel/Morale
  - Training
  - Leadership

Results – Respectable multiple regression mode s (both linear and non-linear) were obtained and the ratio of observed to expected values computed for the following measures of effectiveness:

- Enemy eliminated on offensive operations
- ARVN offensive KIA ratio
- Enemy offensive KIA ratio
- Total enemy initiated incidents
- Enemy incidents against civilians
- Artillery rounds per enemy eliminated
- Gunship/tactical air sorties per enemy eliminated
- Operational effectiveness ratings
- Leadership ratings

Three factors ended this effort with the first briefing and working paper. One was a lack of credibility because the ratios revealed less difference between units and less change over time than expected on the basis of the MACV reports. The other was the finding that while country-wide models were generally weak, strong models were obtained by partitioning the data into subsets according to whether the nature of the war could be categorized as main force, guerilla, or mixed. This finding was responsible for re-direction along the lines of inquiry followed in the descriptive analyses. Finally, the SEER reporting system ended in 1970 so the same level of detail was no longer available for application of the technique at the battalion level. In retrospect, this attempt to model ARVN performance may not have been so incredible,so two examples are included in this report.

Examples –

Enemy Eliminated per Battalion on Offensive Operations

The models (by war categorization) developed for this performance measure make the expected value a function of:

- Probability of contact including -
  - Enemy force density
  - ARVN density
- ARVN Percent of Effort on Offense
- ARVN Strength
- War Categorization (combat environment)

The average scores for the 1969-1970 period are:

| Unit | Raw Score (Rank) | Index Scores (Rank) Country-Wide Model | War Category Models |
|---|---|---|---|
| 5th Div | 18.5 (11) | 0.69 (12) | 0.84 (12) |
| 18th Div | 14.2 (12) | 0.73 (11) | 1.23 (1) |
| 21st Div | 49.0 (5) | 1.18 (3) | 0.99 (7) |
| 23rd Div | 10.9 (13) | 0.64 (13) | 0.86 (11) |
| Guerilla War Category Averages | | | |
| | 23.2 | 0.81 | 1.00 |
| 1st Div | 46.0 (6) | 1.07 (5) | 1.18 (2) |
| 25th Div | 59.5 (2) | 1.13 (4) | 1.02 (4) |
| 22nd Div | 35.0 (9) | 0.94 (8) | 0.96 (8) |
| 42nd Regt | 38.0 (8) | 0.74 (10) | 0.73 (13) |
| Main Force War Category Averages | | | |
| | 47.6 | 0.99 | 1.00 |
| 2nd Div | 96.2 (1) | 1.60 (1) | 1.17 (3) |
| 7th Div | 51.7 (4) | 1.31 (2) | 0.86 (10) |
| 9th Div | 43.6 (7) | 0.98 (6) | 1.02 (5) |
| 22nd Div | 24.0 (10) | 0.89 (9) | 0.89 (9) |
| 51st Regt | 57.7 (3) | 0.96 (7) | 1.00 (6) |
| Mixed War Category Averages | | | |
| | 57.1 | 1.17 | 1.00 |
| Country-Wide | 52.4 | 1.00 | 1.00 |

ARVN Offensive KIA Ratio

The models (again by war categorization) developed for this performance measure make the expected value a function of:

- Force Ratio
- Enemy Force Mix
- ARVN Percent of Effort on Offense
- Combat Support
- War Categorization (combat environment)

The average scores for the 1969-1970 period are:

| Unit | Raw Score (Rank) | Index Scores (Rank) Country-Wide Model | Index Scores (Rank) War Category Models |
|---|---|---|---|
| 5th Div | 6.39:1 (7) | 0.94 (8) | 0.99 (7) |
| 18th Div | 8.30:1 (5) | 1.14 (5) | 1.19 (3) |
| 21st Div | 5.91:1 (9) | 0.88 (9) | 0.93 (9) |
| 23rd Div | 5.26:1 (12) | 0.83 (12) | 0.88 (11) |
| Guerilla War Category Averages | | | |
| | 6.51:1 | 0.95 | 1.00 |
| 1st Div | 8.92:1 (3) | 1.30 (2) | 1.18 (4) |
| 25th Div | 11.11:1 (1) | 1.12 (4) | 1.00 (6) |
| 22nd Div | 8.92:1 (4) | 1.34 (1) | 1.22 (2) |
| 42nd Regt | 3.56:1 (13) | 0.78 (13) | 0.66 (13) |
| Main Force War Category Averages | | | |
| | 8.24:1 | 1.12 | 1.00 |
| 2nd Div | 9.30:1 (2) | 1.21 (3) | 1.24 (1) |
| 7th Div | 6.24:1 (8) | 0.96 (7) | 0.99 (8) |
| 9th Div | 5.85:1 (10) | 0.88 (10) | 0.92 (10) |
| 22nd Div | 7.76:1 (6) | 1.01 (6) | 1.04 (5) |
| 51st Regt | 5.37:1 (11) | 0.83 (11) | 0.86 (12) |
| Mixed War Category Averages | | | |
| | 6.78:1 | 0.97 | 1.00 |
| Country-Wide | 7.06:1 | 1.00 | 1.00 |

## Description of the War[25]

Problem – The Southeast Asia Province file (SEAPR) was the first large data set obtained from OASD (SA). It contains more than 250 data elements. The SEER data files (two different sets for 1968 and 1969-70) and a Territorial Forces Evaluation System (TFES) summary file were soon added. After a means for merging the two versions of SEET data was found and pertinent extracts were selected from the TFES data, another 150 data elements were available to describe the war. Some 70 more data elements were acquired by weighting the responses to HES/70 questions contained in a HES Question file (QHES). While all this data could be said to describe the war, it is not very efficient or manageable for analysis purposes. Thus, one aspect of the description problem was to achieve some parsimony. Do all the nearly 500 data elements measure substantially and statistically indepedent concepts in terms of variation over time, or can the description be reduced to a more manageable set of key indicators or composite indices? The other aspect to the description problem was to develop a means of categorizing province-months as to the nature of the war. The main force, guerrilla, and mixed war categories used in the work on ARVN performance had two shortcomings. It was based on an OASD (SA) paper on the nature of the war in late 1970. Secondly, only 15 of the provinces were assigned to the three categories leaving 29 provinces in a sort of non-descript "other" category.

Approach – Factor analysis was the basic analytic method employed along two lines – one for each aspect of the problem. To achieve parsimony and identify the most useful data elements or combinations of data elements a series of factor analysis of the variance over time were carried out – initially on each data source separately and eventually on elements of all data sets for various time periods. In addition to testing to determine if the same results are obtained for different periods of the war (1967-70, 1969-70, 1967-71, and 1969-72), tests were conducted on data from which the overall trends and seasonal variations had been removed. Province to province variation was removed in all cases by subtracting province mean values from the observations at the onset. These tests revealed that the basic pattern of variance over time are rather stable with regard to both the different stages or campaigns since 1967 and the known seasonal fluctuations in intensity. For further analysis this concept definition work meant that different sets of key indicators or indices are not needed to describe pre Tet, post Tet, 1969 accelerated pacification, the 1972 offensive, wet or dry seasons.

In order to categorize province-months several iterations of a factor analysis across provinces were carried out. The first simply sought annual categorizations for 1967 through 1970 on the basis of some 27 measures of military resources, activity, and direct results. This effort to develop province cluster "profiles" also used the OASD (SA) main force, guerrilla, mixed, and other categorization as the theoretical structure to provide a familiar frame of reference. Review of this work led to a change from annual aggregations to analysis at sit month intervals, April- September and October-March, to capture seasonal changes. Still another revision of the approach involved elimination of the US/FWMF - ARVN distinction and use of a 22 variable data set making friendly-enemy, large unit - small unit, and regular-territorial/local distinctions. While the four category basis for defining province clusters yielded rather interesting results that were credible, these groupings of the provinces were not especially useful as an analytic device. There was still the problem of more than half the provinces falling into the "other" category which was not necessarily unimportant even if nondescript. Nor were the categories mutually exclusive — a feature desired for any basis of data set partitioning. These problems led to the use of a two factor (dimension) solution which could be named regular and territorial according to the province cluster profiles.

Data — The concept definition work (analysis over time) eventually incorporated more than 300 of the available data elements. Those not used were excluded because of obvious redundancy or general absence of variance (less than ten percent non-zero observations). A complete listing would be excessive for this summary report, however, the essence is as follows:

- Resources (units and/or strengths)

| Friendly | Enemy |
|---|---|
| ARVN/VNMC | NVA |
| US/FWMF | VC Main Force |
| RF | VC Local |
| PF | Local Guerrillas |
| Police | VC Infrastructure |
| PSDF (HES questions) | Main Force |
| Regular | Local |
| Territorial | Total |
| Total | |

- Activities (mission days and/or events)
  - Friendly (by force)
    - Large or Small
    - Offense or Defense
    - Day or Night
    - Short or Sustained
    - Contacts
    - Contact Duration
  - Enemy (by target)
    - Ground Assaults
    - Standoff Attacks
    - Harassment
    - Coercion
    - Terrorism (HES questions)
    - Propaganda (HES questions)
- Direct Results (by force, target, mission, and/or event)
  - Personnel Killed, Wounded, Missing, Captured, or Rallied
  - Weapons Captured or Lost
  - Arms/Food Caches Discovered
  - Property Damage (HES questions)
- Social-Economic Conditions (HES questions)
  - Availability and Use of
    - Health Facilities
    - Education Facilities
  - Local Market Conditions
    - Size and Area Served
    - Variety of Goods Available
    - Quantity of Goods Available
  - Local Agriculture
- GVN Administration (HES questions)
  - Hamlet & Village Officials
    - Presence and Activity
    - Training
    - Election
  - Law Enforcement
  - Corruption
- GVN Social-Economic-Information Activity (HES questions)
  - Health Services
  - Self Development
  - Land Reform
  - Technical/RD Cadre
  - Information Cadre
  - Movies/Cultural Drama Terms

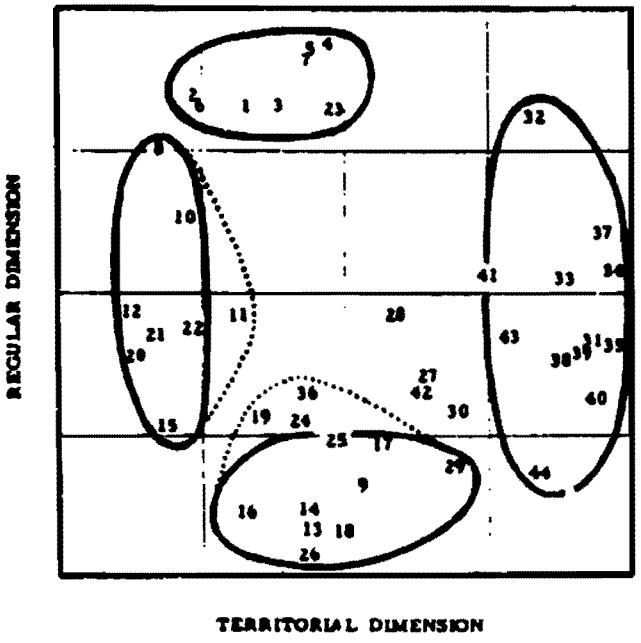
- Political Mobilization/Popular Behavior (HES questions)
  - Cooperation with Either Side
    - Tax Payment
    - Labor/Self Development Participation
    - Family Member in Service
    - Attendance at meetings

Results – The basic patterns of variance over time found through analysis of these data sets can be represented by less than 20 key indicators and composite indices. Specific questions will naturally dictate some modification and disaggregation or additions, but for a general description of what was happening the following measures are sufficient:

- Military Dimensions
  - Friendly Presence
    - Regular Maneuver Battalion Strength
    - Territorial/Para-Military Strength
  - Enemy Presence
    - Main Force Maneuver Battalion Strength
    - Local Force Strength
  - Friendly Activity
    - Friendly Killed on Large Unit Offensive
    - Contacts on Small Unit Offense
  - Enemy Activity
    - Friendly Killed in Enemy Initiated Action
    - Standoff Attacks

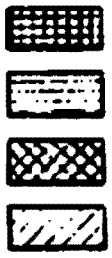
- Social-Economic Dimensions
  - Social Benefits Index
  - Economic Strength Index

- Political Dimensions
  - Political Influence Indices (popular behavior)
  - GVN Presence and Activity
    - Administrative Presence Index
    - Economic Stimulation Index
    - Information/Psyops Activity
  - Enemy Presence and Activity
    - VC Infrastructure
    - Security Index (non-selective terrorism)
    - Coercieve/Political Activity




(a) Subset Partitions

(b) Geographic Distribution



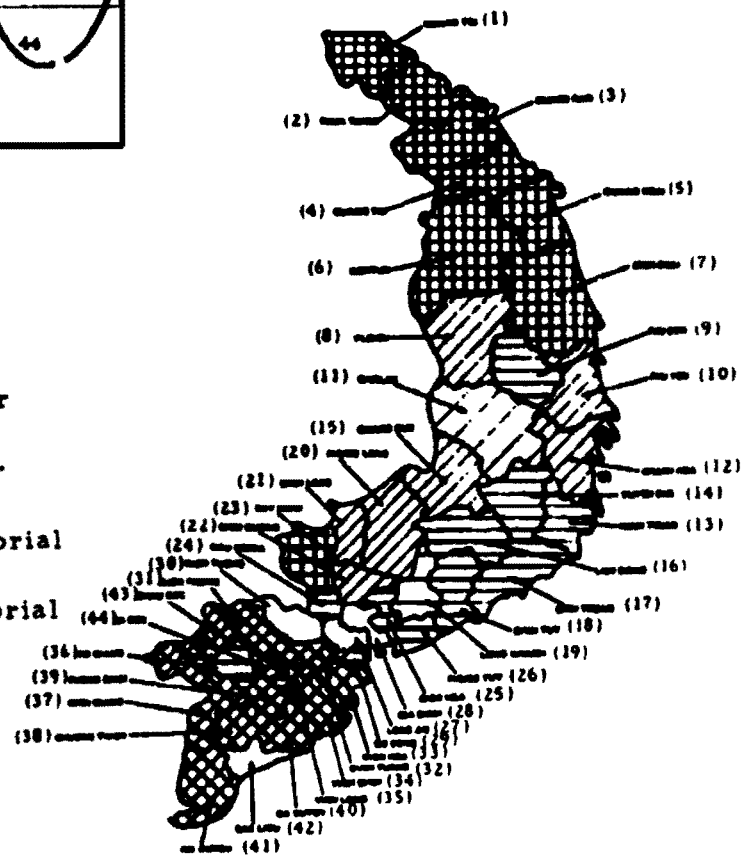



Figure II-1

Average Province Clusters, 4/67 - 9/72

Data – The final version of the analysis across provinces covered the April, 1967, through September, 1972, time period using the following variables derived from the SEAPR data and aggregated at six month intervals:

- Friendly Deaths on Friendly Initiated Action
- Total Friendly Deaths
- Total War Deaths
- Enemy Initiated Incidents
- Enemy Personnel Strength
- Friendly Personnel Strength
- Total VCI Strength
- Large Operation Percent of Friendly Regular KIA
- Friendly Regular Percent of Total Deaths
- Percent of Enemy Attacks Against Military Targets
- NVA Unit Personnel Strength
- VC Unit Percent of Enemy Strength
- Regular Unit Percent of Friendly Strength
- Friendly Large Unit Operations
- Small Operation Percent of Friendly Regular KIA
- RF/PF Percent of Total Friendly Deaths
- Small Unit Operations with Contact
- RF/PF Percent of Small Unit Operations with Contact
- VC Local Strength
- RF/PF Strength
- RF/PF Percent of Total Deaths
- Percent of Enemy Incidents Against Civilian Targets

Results – The categorization of provinces according to their location on two statistically independent dimensions was noted during the discussion of the research approach as being the most useful result of this effort. The characteristics of the high ends of these dimensions led to terminology "regular" and "territorial". This two dimensional structure yielded a very strong explanation of the variance across provinces in all eleven of the six-month time slices. Figure II-1(a) is a plot of the average solution in this two dimensional sample space. The province number key (1-44) and geographic distribution of the "high" and "low" province clusters are shown in Figure II-1(b). Any four of the provinces do not clearly belong to one of the clusters. One is an understandable special case, Gia Dinh. The other three lay between high territorial and low regular and this too could be reasonable for Long An, Kien Tuong, and Bac Lieu.

The distinctive characteristics of the mutually exclusive province clusters illustrated in Figure II-1 are found in the variables describing total war deaths, various categories of personnel strength, and activities. These are summarized in Table II-1 below:

TABLE II-1

PROVINCE CLUSTER CHARACTERISTIC SUMMARY

| | Regular Dimension | | Territorial Dimension | |
|---|---|---|---|---|
| Indicator | Low Cluster | High Cluster | High Cluster | Low Cluster |
| Total War Deaths | Low | High | Average | Low |
| Total Enemy Strength | Low | High | Average | Low |
| NVA Unit Strength | Low | High | Low | Average |
| VC Local Strength | Low | High | Average | Low |
| Total VCI Strength | Low | High | High | Low |
| Total Friendly Strength | Low | High | Average | Low |
| RF/PF Strength | Low | High | High | Low |
| Total Enemy Incidents | Low | High | Average | Low |
| Friendly Large Operations | Low | High | Average | Low |
| Friendly Small Operations | Low | High | Low | Low |
| RF/PF % of Friendly KIA | High | Low | High | Average |

A final example of the results obtained from the regular-territorial categorization of the provinces is in the form of selected plots of the trends over the eleven time periods. These data for cluster average values are both illustrative of cluster characteristics and interesting for the insight they offer as to "progress" in the war. Figures II-2 and II-3 present the trends for the distinctive characteristics of the high and low clusters on the regular and territorial dimensions respectively. Figure II-4 shows the trends of cluster means for overall force ratio by war category. An index measure of initiative can be represented by the ratio of friendly killed in friendly initiated action to friendly killed in enemy initiated action as shown in Figure II-5. Two other ways of looking at the deadliness of the war are the plots of friendly and enemy killed per 1000 men assigned as plotted in Figures II-6 and II-7 respectively.