# A BEHAVIOURAL FRAMEWORK FOR EVALUATING
## THE PROCESS OF ECONOMIC DEVELOPMENT

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The need for more comprehensive development models to capture the be-havioural dynamics of peasants in subsistence economies was emphaiszed at the 1976 IAAE Conference (Deaton; Mbithi; and Shapiro).   This emphasis is consistent with Polanyi's claim that as a social being, man acts to "safeguard his social standing, his social claims, [and] his social assets" (p. 46).   From this perspective, Deaton posited a general model of satisfaction maximization and illustrated the policy significance of the hypothesized behavioural relationships. The purpose of this paper is to extend the above thinking by: (1) presenting a conceptual framework of essential relationships for a satisfaction maximization model by drawing on three bodies of thought--economic anthropology, adoption-diffusion (sociology), and production economics; (2) analyzing selected inter-relationships; and (3) discussing the significance and implications of the model for economic development.

## A Conceptual Framework

The economic anthropology perspective argues that status and prestige in peasant societies are obtained through expenditures for (1) ritualistic ceremonies and future reciprocal labour obligations, and (2) conspicuous consumption.   The first category may be viewed as socially mandatory.  This expenditure represents the social equivalent of capital depreciation expenses, in that failure to make adequate expenditures in these categories is to risk loss of social standing and the cooperation of peers and kin.   The terms social standing, status, prestige, and esteem are all seen as being synonomous with personal satisfaction.   This is based on the assumption of a socially rational individual, the direct counterpart of the assumption of an economically rational individual.   Thus, just as an economically rational individual maximizes profit for maximum utility, so a socially rational individual maximizes social standing to maximize personal satisfaction.

The second category of expenditures, labeled personal discretionary, includes conspicuous consumption and productive investment above that needed to cover depreciation.   However, productive investment is not usually viewed as contributing significantly to social standing and may in some developing country cultures even detract from it (Foster).

Expenditures aimed at increasing personal satisfaction are largely determined by social norms.   Consequently, maximization of personal satisfaction will include profit maximizing behaviour only if this behaviour contributes more to satisfaction than does alternative behaviour.   Thus, a rational peasant must satisfy competing claims for capital surplus within the framework of his social system.   In more traditional economic terms, the objective function of the peasant requires evaluation of the relative elasticity of unallocated surplus between socially mandatory and personal discretionary expenditures.   Within each of these categories, allocation must be made between ritualistic cere-monies versus reciprocal obligations on the one hand and conspicuous consump-tion versus productive investment on the other.

Additional increments of surplus capital will aid the development process only if used for productive investments.   However, unless the cultural norms favour expenditures for productive investment over other areas, the development process will not be enhanced.   Indeed, the potential for expenditures on conspicuous consumption items is virtually unlimited.   Also, ritualistic ex-penditures to gain social prestige are dependent on the relative level of expenditure of others in the community since the search for prestige and status

is a competitive process. Each participant is forced to spend relatively greater amounts to achieve a desirable level of status as more unallocated surplus becomes available. Hence, we have a social treadmill effect, and any accumulated surplus can quickly be reduced to zero with no expenditures made for production investment.

The production economics approach to development focuses on increasing agricultural production through the efficent use of inputs, especially capital. Whether the marginal profit over traditional practices from using the inputs is large or small, the assumption is that profit maximization is sufficient motivation to assure adoption. Assuming the primacy of profits, the marketing aspect of production then becomes a critical influence on the peasants' perceived economic risk. Accumulating surplus capital depends on the belief that profits can be achieved through commercial product markets.

The adoption–diffusion approach investigates the influence of social values, beliefs, and attitudes on adoption of new practices and capital inputs. Since the individual's beliefs are perceived truths, this approach provides the interface with the economic marketing discussion above. Review of the adoption–diffusion literature reveals that the effect of many variables on the use of capital inputs has been analyzed. However, it is suggested that only perceived technical risk is involved in the dynamics of the system. Therefore, only this variable is discussed here. The reader is referred to Yetley and Deaton for detailed discussion of these variables and the overall model.

Use of any new capital input is perceived by peasants as increasing the level of technical risk (Nietschmann; and IRRI). The importance of this variable lies in its intervening effect between accumulated surplus capital and the use of capital inputs. Omitting this variable would assume that the use of capital inputs is risk free. Perceived technical risk is the peasant's subjective estimate of the probability of obtaining an adequate harvest given a set of technical inputs. It is suggested that peasants view traditional farming practices and inputs as having the lowest possible risk. Therefore any new inputs will, at least initially, be viewed as increasing the risk of obtaining an adequate harvest.

The concepts discussed above have been organized into a systems model (figure 1). The arrows in the model are hypothesized sequences of cause and effect. The nature of the relationships among variables is given by the algebraic sign (+ or -). The system becomes dynamic with the inclusion of feedback loops, labeled socially mandatory and personal discretionary.

Following Schultz, we assume peasant societies are highly stable; that is, development has not progressed rapidly and peasants are allocating their limited resources efficiently, given social mores. New inputs are necessary if development is to proceed. The implication of this position, combined with the above discussion on unallocated capital, is that significant economic development will occur only with continued massive infusions of new capital inputs from outside the system. It is, therefore, instructive to analyze the proposed model to gain insights into strategies that might reduce the magnitude of these capital infusions and simultaneously allow development to become self-sustaining.

By representing figure 1 symbolically, a system of simultaneous equations was specified. This system is amenable to mathematical manipulation, and conditions for stability of the proposed model can be evaluated. Each relationship (arrow) in figure 1 is represented by a $b_{ij}$ term, where b is the strength of the relationship between the two variables $x_i$ and $x_j$ (b is a regression coefficient). That is, $-b_{11,4}$ represents the negative influence of surplus capital $(x_4)$ on the perceived technical risk $(x_{11})$ of harvesting a crop, meaning that greater levels of capital reduce the perceived (subjective) risk of loss. The $b_{ij}$ representing the feedback loops are lagged, thus connecting the successive time periods.

Blalock gives two necessary mathematical conditions for system stability. Condition I states that $\Sigma b_{ii} < 0$. Condition II states that the determinant $|D|$ of

ECONOMIC ANTHROPOLOGY                    ECONOMICS                    ADOPTION – DIFFUSION

$+b_{6,24}$

Ritualistic Ceremonies $x_6$

Productive Investment $x_5$

$+b_{5,4}$

Surplus capital (Equity) Position $x_4$

$+b_{4,24}$

$+b_{9,6}$

$+b_{9,5}$

$+b_{7,4}$

$-b_{11,4}$

Social Standing Satisfaction $x_9$

Conspicuous Consumption $x_7$

$+b_{9,7}$

Amount of Capital Inputs Used $x_{19}$

$-b_{19,11}$

Perceived Technical Risk $x_{11}$

$+b_{9,8}$

$+b_{12,8}$

$+b_{12,9}$

Social Risk $x_{12}$

$+b_{19,12}$

$+b_{20,19}$

$+b_{8,24}$

Social Reciprocal Obligations $x_8$

$+b_{19,8}$

Productivity $x_{20}$

$+b_{23,19}$

Market Capital Accumulation $x_{23}$

$+b_{24,23}$

Socially Mandatory Allocation

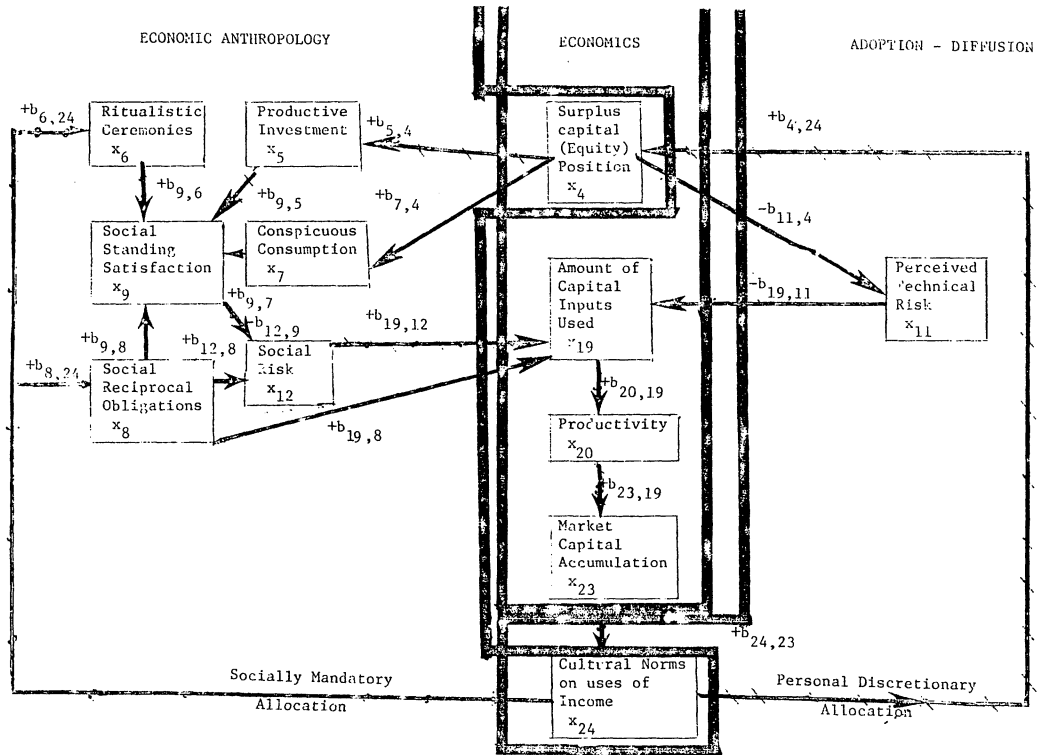Cultural Norms on uses of Income $x_{24}$

Personal Discretionary Allocation

Figure 1: The Dynamic Model with term "c", [ $(b_{6,6}b_{7,7}b_{8,8}b_{11,11})$ $(b_{5,4}b_{9,5}b_{12,9}b_{19,12}b_{20,19}b_{23,20}b_{24,23}b_{4,24})$], and term "f", [ $(b_{4,4}b_{5,5}b_{7,7}b_{8,8}b_{11,11})$ $(b_{9,6}b_{12,9}b_{19,12}b_{20,19}b_{23,20}b_{24,23}b_{6,24})$], where "c" is shown as ⌇⌇⌇⌇ and "f" as ⇢•⇢

the matrix representing the system must be $|D| > 0$ for K = even, or $|D| < 0$ for K = odd, where K is the number of variables. From Schultz's argument, we can infer that both necessary and sufficient stability conditions are met in most peasant economies.

From the model in figure 1, we find that for mathematical stability, the determinant $|D| = K[a + b - c - d - e + f + g - h] > 0$ since K = an even number.

$$|D| = K[+ (b_{4,4}b_{5,5}b_{6,6}b_{7,7}b_{8,8}b_{9,9}b_{11,11}b_{12,12}b_{19,19}b_{20,20}b_{23,23}b_{24,24})$$ ◄ Symbol a

$$+((b_{5,5}b_{6,6}b_{7,7}b_{8,8}b_{9,9}) \cdot (b_{11,4}b_{12,11}b_{19,12}b_{20,19}b_{23,20}b_{24,23}b_{4,24}))$$ ◄ b

$$-((b_{6,6}b_{7,7}b_{8,8}b_{11,11}) (b_{5,4}b_{9,5}b_{12,9}b_{19,12}b_{20,19}b_{23,20}b_{24,23}b_{4,24}))$$ ◄ c

$$-((b_{5,5}b_{6,6}b_{8,8}b_{11,11}) (b_{7,4}b_{9,7}b_{12,9}b_{19,12}b_{20,19}b_{23,20}b_{24,23}b_{4,24}))$$ ◄ d

$$-((b_{5,5}b_{6,6}b_{7,7}b_{8,8}b_{9,9}b_{12,12}) (b_{11,4}b_{19,11}b_{20,19}b_{23,20}b_{24,23}b_{4,24}))$$ ◄ e

$$+((b_{4,4}b_{5,5}b_{7,7}b_{8,8}b_{11,11}) (b_{9,6}b_{12,9}b_{19,12}b_{20,19}b_{23,20}b_{24,23}b_{6,24}))$$ ◄ f

$$+((b_{4,4}b_{5,5}b_{6,6}b_{7,7}b_{11,11}) (b_{9,8}b_{12,9}b_{19,12}b_{20,19}b_{23,20}b_{24,23}b_{8,24})$$ ◄ g

$$-((b_{4,4}b_{5,5}b_{6,6}b_{7,7}b_{9,9}b_{11,11}) (b_{8,12}b_{19,12}b_{20,19}b_{23,20}b_{24,23}b_{8,24}))]$$ ◄ h

where $K = (b_{1,1}b_{2,2}b_{3,3}b_{10,10}b_{13,13}b_{14,14}b_{15,15}b_{16,16}b_{17,17}b_{18,18}b_{21,21}b_{22,22})$.

Letting each term in major parentheses be represented by a letter, the determinant $|D|$ can be written as:

$|D| = K \{a+b-c-d-e+f+g-h\}$, where

$a = (b_{4,4}b_{5,5}b_{6,6}b_{7,7}b_{8,8}b_{9,9}b_{11,11}b_{12,12}b_{20,20}b_{23,23}b_{24,24})$,

$b = ((b_{5,5}b_{6,6}b_{7,7}b_{8,8}b_{9,9}) (b_{11,4}b_{2,11}b_{19,12}b_{20,19}b_{23,20}b_{24,23}b_{4,24}))$,

etc. as noted in the righthand margin.

This can be rewritten as $|D| = K[(a + b + f + g) - (c + d + e + h)] > 0$, which implies that $(a + b + f + g) > (c + d + e + h)$ since K is a positive constant. The $b_{ii}$ in term K derive from exogenous variables included in the overall model (see Yetley and Deaton). These variables are not included in the stability conditions. Specifically, the $b_{ii}$ terms in K are not involved in condition I, $b_{ii}$ 0. We have carefully examined each $b_{ii}$ in K and have tentatively concluded that each is positive. Since K is the product of these $b_{ii}$, K is also positive.

## Selected Interrelationships

The objective of this analysis is to gain insight into those variables and relationships critical to initiating and sustaining the development process. From the previous discussion and figure 1, examination of the two allocative feedback loops and the impact of expenditures for productive investment and ritualistic ceremonies on social standing would appear fruitful. Accordingly, terms f and c from the determinant have been selected for detailed analysis. Both terms have diagrammatic interpretations (figure 1).

From the determinant $|D|$, assume $(a + b + g) \simeq (d + e + h)$, then for $|D| > 0$, the inequality $f > c$ must hold to satisfy stability condition II. Evaluation of the complete set of $b_{ii}$ terms included in this approximate equality, reduces to:

$$(b_{4,4}b_{7,7})+(b_{19,19}b_{20,20}b_{23,23}b_{24,24}) \simeq (b_{7,4})+(b_{19,11}b_{20,19}b_{23,20}b_{24,23}b_{4,24}).$$

The right hand term is effectively the traditional economic productive relationships which Schultz suggests must be significantly increased to promote economic development. The multiplicative terms to the immediate left of the

approximate sign are the $b_{ii}$ terms which indicate leakage from the system due to exogenous forces. While the details for the above approximation cannot be directly supported by evidence found in the literature, two points argue strongly for its tentative acceptance: (1) there is nothing in the configuration that is obviously contrary to the assumption of approximate equality; and (2) recent research by IRRI indicates that lack of control over various environmental factors can negate gains made by use of capital inputs. Thus, while Schultz's argument may be a necessary condition for sustained agricultural growth, it does not appear to be sufficient. The $b_{ij}$ terms common to both f and c, being on both sides of the inequality, mathematically cancel out. This leaves:

$$(b_{4,4}b_{5,5})X(b_{9,6}) > (b_{6,6})X(b_{5,4}b_{9,5}).$$

Since there is little information on the magnitude of the $b_{ii}$ terms, we tentatively assume that $(b_{4,4}b_{5,5}) \simeq (b_{6,6})$. The inequality then simplifies to $b_{9,6} > b_{5,4}b_{9,5}$. This means that, given stability, the contribution to social standing from expenditures on ritualistic ceremonies is greater than the contribution of productive investments. Not only does this satisfy the mathematical stability conditions, but it is also consistent with empirical evidence and economic anthropological observations.

## Policy Implications

Ritual expenditures clearly reduce the flow of accumulated surplus into regenerative productive investments. The nature of the inequality may be such that virtually all surplus capital is expended on nonregenerative investments within one time period. This implies that external injections of capital are required in each period to sustain the growth process and increase productivity. The need for massive capital investments over extended periods is thus implied. Alternatively, a policy could be designed to change social norms so that product investments contribute more to satisfaction than alternative expenditures. This would encourage expenditures for productive investments from internally generated surplus capital. From the above discussion, such a change would also reverse the inequality of the determinant (that is, $|D| < 0$, because $b_{9,6} < b_{5,4}b_{9,5}$), thus negating the mathematical stability condition II, which may allow the economy to break out of its low level stability trap. Note that increasing productivity by use of capital inputs does not alter the stability conditions. This may explain why development has been so slow in many countries.

In terms of sustained development, it is clearly necessary that a significant portion of accumulated surplus be allocated to personal discretionary expenditures and thence into productive investments. Evidence from economic anthropology suggests this does not now occur in many developing economies. Hence, it is again clear that a change in social norms, specifically those involving allocation of accumulated surpluses, would greatly enhance the development process. Innovative educational approaches are needed to strengthen the relationship between productive investment and satisfaction, such that the same security can be dervied from the new economic order as is now provided by the traditional system.

To summarize, the model meets both intuitive and mathematical stability conditions. Increasing productivity by use of capital inputs will not negate the stability conditions. However, changing social norms to reward productive investments can both negate the stability conditions and direct internally generated surpluses into productive investments, thus allowing sustained development. At present, regenerative investment must compete against both social obligatory and conspicuous consumption for allocation of accumulated surpluses. Hence, these social relationships are suggested as key entry points into the

system to initiate and aid development. This seems reasonable since these relationships relate to fundamental survival needs through acceptance by peers and kin (Polanyi). In addition, these relationships are amenable to educational approaches designed to enable peasant societies to modify their reward systems.

The main conclusion is that current lending programmes will not be sufficient to stimulate and sustain development. Such programmes do not provide the necessary condition for peasant societies to escape the stability trap. However, the necessary conditions can be created through innovative adult education and extension programmes designed to increase social reward for productive investments.

## References

Blalock, H. M., Jr. (1969) Theory Construction, Englewood Cliffs, New Jersey, USA; Prentice-Hall.

Deaton, B. J. (1977) Capital formation in peasant economies, in Contributed Papers Read at the 16th International Conference of Agricultural Economists. Oxford; Institute of Agricultural Economics, University of Oxford, 259-270.

Foster, G. M. (1967) Tzintzuntzan. Boston; Little, Brown and Co.

IRRI (1977) Constraints to high yields on Asian rice farms. Los Banos, Laguna, Phillipines; International Rice Research Institute.

Mbithi, P. M. (1977) Farm decision-making with respect to social psychological elements and the human factor in agricultural management, in Decision-Making and Agriculture (edited by T. Dams and K. E. Hunt). Oxford; Alden Press, 131-139.

Nietschmann, B. Q. (1970) Between land and water: The subsistence ecology of the Miskito Indians, Eastern Nicaragua. Ph.D. dissertation. Madison, Wisconsin, USA; University of Wisconsin.

Polanyi, K. (1967) The Great Transformation. Boston; Beacon Press.

Schultz, T. H. (1964) Transforming Traditional Agriculture. New Haven, Connecticut, USA; Yale University Press.

Shapiro, K. H. (1977) Efficiency differentials in peasant agriculture and their implications for development polices, in Contributed Papers Read at the 16th International Conference of Agricultural Economists. Oxford; Institute of Agricultural Economics, University of Oxford, 87-98.

Yetley, M. J.; Deaton, B. J. (1978) A consideration of the dynamics of satisfaction maximization in the process of economic development. College Station, Texas, USA; Texas A&M University.

## OPENER'S REMARKS--Martin H. Yeh

This paper is welcomed for its comprehensive approach to the process of economic development, based upon the behaviour framework for a satisfactory maximization model. This approach draws together essential relationships among economic anthropology, adoption–diffusion theory (sociology), and production economics. It also analyzes the linkages involved in the dynamic process. The model's policy implication for economic development is also presented.

The paper mainly emphasizes the conceptual framework for evaluating the process of economic development. However, any treatment of development is bound to be misleading when limited to economic and social factors, neglecting political and institutional aspects. To effectively promote social and economic development goals requires a wider conceptual framework of the development process as an integrated system of societal change in which a whole complex of economic, social, political, and institutional forces interact, permitting all human and physical resources of a society full participation in the development process.

The authors suggest that a system of simultaneous equations can be used to gain insights into critical development relationships and to follow social norms governing the allocation of surplus capital and the behaviour resulting in increased satisfaction.  Besides a system of simultaneous equations, I would suggest considering a set of specific techniques which can be used in various stages of development; namely, the systems research technique for identification, the program planning and budgeting system for formulation and control, and the performance evaluation and review technique for adjustment and reformulation.

With respect to policy implications, the authors suggest that external injections of capital are required in each period to sustain the growth process and to increase productivity.  Their analyses further suggest that current lending programmes will not be sufficient to stimulate and sustain development.  Such programmes do not provide the necessary condition for peasant societies to escape the stability trap.  However, the necessary conditions, according to the authors, can be created through innovative adult education and extension programmes designed to increase social rewards for productive investment.  It would be helpful for the authors to clarify what is involved in the social reward system.  What are the basic criteria for assessing alternative capital investments for development?  How is control exerted over environmental factors in the economic development process?

The authors have presented a conceptual framework for evaluating the economic development process in a very systematic manner.  However, the empirical evidence and testing of such a behaviour framework for stability conditions are lacking.  A systems approach to development planning in general, and to agricultural sector development planning and policy analysis in particular, as suggested by the authors, is both feasible and promising.  The potential for the future application of the systems approach to development is very great in both developing and developed countries.


## RAPPORTEUR'S REPORT--Lorraine C. Bassett

Discussion of the paper was limited to the author's response to the opener's statements.  Concerning the need for a broader conceptual economic development framework (which includes both political and institutional aspects in addition to the social and economic aspects presented by the authors), Yetley commented that this approach to the process of economic development is only in an infancy stage.  Further criticisms were made concerning the lack of empirical evidence and testing of the behavioural framework for stability conditions.  Yetley indicated that they would be proceeding in that area in the future.