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LONG-TERM PLANNING, TECHNOLOGICAL FORECASTING, AND UNDERDEVELOPMENT: THINKING ON THE UNLIKELY?

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In many situations, "planning" is in the realm of sacredness.

Despite the fact that it denotes a "general commitment to rational analysis"¹ and "a goal-directed decision making process"², planning appears now to have entered a "magical" universe.

Perhaps Waterston was thinking of this paradox when he said: "national plan appears to have joined the national anthem and the national flag as a symbol of sovereignty and modernity"³. I suggest that this shift of significance ceases to be paradoxical when both the original context of and the present mood (and assessments) on planning are taken into account. In effect, development planning sprang from a collective intent to impose some sort of rationality upon a non-rational environment. This environment was characterized by market imperfections, severe discrepancies between public and private interests, "perverse" repercussions of trade, technology, financing, and aid on national policies, etc.⁴. Moreover, planners had to face in the underdevelopment matrix intrinsic difficulties (such as capital and information shortages) which hindered the implementation process⁵.

On the other hand, planning performs some non-explicit functions (a rallying-point for political mobilization; a basis for claims regarding foreign aid, etc.), with attendant consequences. These lead in turn to twists of logic and meaning as to key-terms such as "rationality" and "optimality"⁶.

It is no wonder that planning is now at bay, affected as it is by a status of "untouchable" (i.e. a

central) national myth, by ideological agitation, and by gloomy assessments.

Nonetheless, the sacredness permeating development planning and contradictory evaluations on it fail to jeopardise irreversibly this principled premise: that planning is a multi-purpose, plurilevel, and historically-conditioned tool, badly needed by less developed countries (LDC's).

In some circles, technological forecasting (TF) is also a "magic" word. In contrast to development planning, (TF) presumably stems from a pure, rational universe (i.e. the scientific method). Yet, like planning, (TF) stirs debates which hinge around many axes⁷. I will refer to some of these below.

My aim in this paper is to present some thoughts on long-term planning (LTP) and (TF), considered in a development context. The course of my discussion will be guided by two key theses: a) That (LTP) and (TF) represent structural (i.e. strong, self-sustained) requirements of any contemporary society; b) that (LTP), if properly linked to (TF), can correct, orient and demystify development planning.

I will try, first, to characterize the "underdevelopment condition". Second, I will point out certain advantages and merits of (LTP). Third, (TF) will be introduced in order to build some bridges between the two.

Above all, I shall try to be brief, relying on remarks and bibliographical indications at the bottom of the paper to qualify some rather sweeping statements. All along I have also taken into consideration key issues

discussed by the United Nations Conference on Science and Technology for Development.⁸

Underdevelopment: An Unblessed Condition

LDC's have been portrayed in different ways.⁹ Most of them seem to fall between two extremes. One method of describing them consists of the use of "indicators" which are designed to show to what extent, and in which respects, LDC's lag behind industrial societies. For some analytical and comparative purposes this approach may be justified. But its pitfalls are also evident: It prompts, on the one hand, lineal and mechanistic appraisals; and, on the other, an a-historical and, ultimately, self-defeating policy-making.¹⁰

The other extreme is related to broad categories such as "colonization" and "neo-colonialism", "exploitation", "alienation", etc. With these categories in mind some authors claim both to depict the underdevelopment condition as well as to suggest the proper policies to overcome it.¹¹ In my opinion, these categories imply more an ethical indictment against the industrial (particularly capitalist) civilization than an analytical device. Moreover, they tend to be also mechanistic and a-historical, since they barely acknowledge both the specifics of local conditions and the intellectual heritage from which they ungraciously draw.

Between these extremes I suggest that "underdevelopment" can

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be characterized through complex variables, quantitative (i.e. "operationalized") and qualitative; static and dynamic; and, finally, subject both to historical analogies and to unprecedented circumstances.

The variables are: *strategic vulnerability*; *societal disjointness*; and *non-integrative policy-making*.

Of course, the variables have been chosen while bearing in mind linkages and tensions between (LTP) and (TF) in LDC's, but I am convinced they possess a fair degree of generality.

Strategic vulnerability means and implies several things widely discussed in the literature dealing with LDC's, for example: non-compensatory dependence on external growth and trade fluctuations;¹² a meagre capability for responding to threats and opportunities; an acute shortage of key information;¹³ and narrow room for national maneuvering.

But one feature of this dimension, important to our discussion, has barely been touched on. It is the large dosage of risk and uncertainty that the condition of underdevelopment entail.¹⁴ I will deal with it in due course.

Societal disjointness means severe discontinuities (physical, social, and psychological) within the national fabric; dysfunctional heterogeneities produced by an unequal diffusion of technological changes; and self-perpetuating distances of cardinal collective parameters, such as income, education, health, and power. To these traits—again, widely discussed in the literature—I would add the predominance of vertical communication which has hindered thus far both planning processes and the spread of bottom-up innovations.¹⁵

Finally, *non-integrative policy making* involves a state of perpetual disorganization and re-organizing; sudden ruptures and arbitrary "jumps" in the public decision process; a deep-seated neglect of global consequences of seemingly isolated actions; and "a common-sense" (at best) perception of a world which is rapidly becoming "counter-intuitive".¹⁶

Two reservations are in order. These complex variables *do not* characterize all LDC's to the same degree; factor endowment, geopolitical status and perception, elite composition and turnover, and development goals may temper—or aggravate—their effects. Otherwise put, these variables depict a condition which may take many shapes and degrees.

Nor do they characterize exclusively the LDC's. Industrial so-

cieties may also be (or become) "vulnerable", "disjointed", and "chronically disorganized". Yet these traits are not produced in the same context; nor they persist over long periods; and they do not lack—and this is the main point—counterbalancing forces.¹⁷

Having schematically portrayed "underdevelopment" and intimated some of its inherent constraints for planning (as well as for endogenous technological advance) let me now examine long-range planning.

The Case for Long-Term Planning (LTP)

To date (LTP) is more an intellectual abstraction than an empirical, well-established entity. In not a few LDC's it constitutes a sort of "social UFO", which stirs fantasy and magical thinking. Nevertheless, (LTP)—or better, a long term vision—is becoming a structural need for societies responsive to, or affected by, technological imperatives. Among the latter it is worth mentioning: the lead time of innovative processes; the second and nth... order consequences and ramifications of technical changes; the impact of some "socially sadistic structures",¹⁸ etc.

By definition (LTP) may embrace different time-spans, like 10, 20, 50 or more years.¹⁹ A personal choice on this matter, if well grounded, may be fully justified.

An alternative criterion consists of determining the lead-time of certain prime sequences (for instance, mega-innovations, allocative decisions affecting complex systems, the probabilistic path of a "planetary" problem—food, energy, water) and then fixing (LTP) on the basis of "weighted averages".²⁰

It might also be acceptable to choose a non-positive approach. That is, (LTP) encompasses that time-span which is beyond any intentional design. It provides, however, clues as to what *not* to do, and about what *not* to expect.²¹

At any rate, I believe that (LTP) contains many potential functions in an underdevelopment context, functions which, if obtained, may favorably change the normative, cognitive and institutional climate surrounding development planning.

The ensuing list is not, of course, exhaustive; merely illustrative. Some functions are inter-related.

a) *To identify alternatives* on a macro decisional level, that is, on that level which holds determining factors of collective viability and vitality.

Examples: alternative ways of designing "technological styles"; heightened sensitivity to optional "world images"; differential conceptualization of "relative advantages", etc.

b) *To reduce uncertainties*. This is indispensable (remember "strategic vulnerability") in a world both interdependent and asymmetric. Moreover, this is a cognitive and management requirement for overcoming "turbulent fields"²² to which LDC's are particularly vulnerable and in which they are already enmeshed.

c) *To appraise time-leads of key processes*. To some extent this is a corollary of the last point. However, it contains an important and specific message: that prime processes (particularly those scientifically and geopolitically inspired and propelled) evolve at unequal rates and mostly in a non-linear way. This perception may be both heuristic²³ and didactic for many policy designers in LDC's inclined to static, spasmodic and lineal manner of thinking. By all means the same lesson is relevant to policy makers in DC's.

d) *To search for functional equivalents*. If we assume that the development path of LDC's cannot be similar to that established by DC's (due to circumstances which range from different "initial conditions"²⁴ and the unequal dynamics of trade, technology, etc. to the presumably finite character of known resources and its attendant "revolution of declining expectations"), it then becomes necessary to look for either "short-cuts" or "another development". But neither of them is achievable without a long-range view.

In other words, from the premise concerning differential development styles it follows that a systematic search for alternative ways of doing things, for overcoming collective insecurities, and for reducing error-factors are badly needed. (LTP) may offer helpful guidance in this context.

e) *To enhance the likelihood of desirable futures*. This stems from what has been stated thus far. Nonetheless, it seems worthwhile to make it explicit in order to set forth the following premise: that the "underdevelopment condition" does not imply a zero degree of freedom and maneuverability. I spell this out because I think that some "vulgar" versions of the so called dependency theory²⁵ can lead ultimately to a "sophisticated"—though self deprecating and primitive—form of fatalism.

Of course, the shortcomings affecting LDC's are many; their

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fragility with respect to external cycles and factors is profound; and it might be that certain LDC's (disregarding a global catastrophe or an extremely fortunate twist of present circumstances) are "terminal" cases of stagnation and injustice. However, I think that degrees of decisional freedom do exist in most of them, and that through intelligent (LTP) it is possible both to increase the probability of desired futures and to reduce commitments to an "evil" present.²⁶

f) *To encourage public experimentation of new lifestyles.* As has been suggested, (LTP) can pinpoint probable and desirable scenarios. But some constraints inherent in underdevelopment may turn counter productive (or highly risky) in an all embracing attempt to avoid extrapolative courses. Under these conditions, a piecemeal social experimentation seems advisable in order to anticipate perceptions of opportunities and risks. In this case a sort of micro long-term planning will be needed.

g) The last function of (LTP) (I repeat: this is not a full list) is to try to *identify and reconstruct the intellectual framework* which guides the policy making of hegemonic governments and multinational enterprises. This function is as complex as it is necessary. Let me give two provocative examples in this regard.

Malthusian and neo-Malthusian schemes may indeed preside over that policy making (as well as over socio-economic structures of many LDC's). One interesting question is whether in a world of finite resources, escalation of threats, and technological protectionism, these schemes can ultimately bring about a "planetary Darwinism" (certainly, a Darwinism highly *negative* because not the best would survive), or a new genre of humanism. I argue that a penetrating examination, and a public debate on²⁷ intellectual frameworks for policy designing may anticipate clues on this question.

I will give a second example which is related to a different yet relevant universe of discourse. Some people say (including myself) that neo-classical premises cannot explain satisfactorily cardinal aspects and problems of LDC's. From the perspective I am referring to, three intriguing questions emerge. First, whether these premises—insufficient now—would hold true for LDC's in the future under altered conditions. Second, whether the behavior of advanced capitalist countries is *really* fitting neo-classical postulates, or whether it has changed (or is going to

change), with or without an ideological account of this turn. Finally, whether the behavior of advanced socialist countries is in fact governed by a neo-marxist discourse, or whether it has turned (or it is going to turn) to some neo-classical premises.²⁸

This *disciplined* identification of cognitive elements is not a futile exercise from a LDC's viewpoint; nor does it aim at demonstrating the "end of ideologies". On the contrary, it highlights the permanent importance of intellectual frameworks and paves the way for discriminating normative and behavioral components in the decisional design and rationale of overpowering entities.

The Case for Technological Forecasting (TF)

The "art of anticipation" has evolved rapidly in the last years.²⁹ As a discipline it already presents some defining features: a body of knowledge and methods; institutional (academic and non academic) supporting arrangements; formal requirements for professional identity; contesting schools; group rituals; and even hints of coming paradigmatic revolution.³⁰

Unfortunately, the bulk of LDC's have remained aloof to and unaware of, this evolving discipline.³¹ Without attributing to it "magical powers", I believe that this attitude has aggravated the effects of passivity, inertia, and uncertainty which plague many LDC's.

Of course, I favor any form of forecasting (social, political, economic, cultural) *provided* that this form be cultivated with scientific and social responsibility. Here I will limit myself to the *technological* dimension in order to sharpen the statement of some issues connected with (LTP), development planning, and R & D policies.

What is (TF)? "A description... of a foreseeable technological innovation... that promises to serve some useful function, with some indication of the most probable time of occurrence".³²

In this brief characterization I encounter the main components of (TF) for our discussion.³³ Some might refine it; while others might reject the very idea of forecasting. My stand is eclectic. I believe that this is an evolving and promising discipline, which fully justifies taking professional and institutional "risks".

What are the functions and tasks of (TF) in an underdevelop-

ment matrix? Again, my list will not be complete; only preliminary.

a) (TF) *permits the reduction of specific uncertainties* linked to the upsurge of and the demand for new techniques. As it is well known, LDC's have had plenty of unfortunate experiences in this regard, codified in a semi-esoteric language (eg. "low price elasticity of demand"; "international demonstration effect"; "barriers to entry"; "cultural mimetism", etc.). I do not assure that through (TF) these perverse phenomena can be averted; other conditions are necessary too. But at least the *understanding* of what is occurring—and of the main trends—might improve; perhaps, in this way, some preventive or anticipatory policy-prescriptions could be implemented.

b) (TF) *offers illumination of the lifetime of technologies*, its phases, diffusion curves, and cycles, thus paving the way for more effective and discriminating technology policies.

Regretfully, the LDC's grasp of technology sequences and "missing links" is weak, and tends to confine itself to remarks on "institutional and communication gap", "poor infrastructure", "lack of critical mass", "need for endogenous growth", etc. All these explanatory and exhortative categories are correct; they reflect realities and aspirations. But they are not enough.³⁴ They permit neither a well articulated theory of technological advance in LDC's nor wellbalanced policy making. (TF) can moderate—and perhaps reverse—the process of declining social and analytical utility of those loosely connected notions.

c) (TF) *facilitates a finer distinction among "minor", "major", and, particularly, "mega" innovations.*³⁵ By mega-innovation I mean two things: i) a cardinal breakthrough which engenders a great number of effects and consequences (i.e. integrated circuits; telecommunication devises, etc.); ii) a *cluster* of innovations which jointly shake and invade a market (or any social sphere) changing it radically.

d) (TF) *owns the determination of specific levels of support* for R & D, including personnel, equipment, and organizational environment. Moreover, it sensitizes policymakers both to marketing risks and to the need of finding "market niches" in keeping with dynamic advantages of LDC's.

e) (TF) *renders less difficult the political understanding of technology-related processes and decisions* which are taking place in the global and national arena. This point merits here some scrutiny.

I shall take the New Economic International Order as a crucial case, and within its framework, the attitudes of some big powers towards the new sea legislation advocated by LDC's. In my opinion, to state that these powers are not ready to accept that legislation out of "malice" is very naive. I rather believe that industrialized nations will "give in" to LDC's on this question after they have made optimal use of sea resources (the predicted date for this turning point is set in the 1990's)³⁰

Perhaps the same may be true regarding the whole NIEO, which is particularly sensitive to technological evolution and considerations. Namely, the LDC's would accept new institutions and procedures after proper accommodation and when this Order becomes obsolete (or perhaps better, "obsolescible")³⁷ from their technology-based point of view. If this happens, NIEO will strengthen the powers that be, both on a global and national level.

It is clear that a more refined political understanding gained through (by no means exclusively) (TF) may produce —if the LDC's have indeed the political will for doing this— new concepts, goals, tactics, and instruments.³⁸

f) (TF) may prevent "self-reliance" from becoming, with time and regardless of the will of its original advocates, a self-strangling and segregating policy practice. In other words, by facilitating an early detection of new uses of processes, products and materials, (TF) can lead to a constructive division of technological labor among and within countries, coupling hopefully growth with equity.

In short, (TF) has no "magic powers" nor has it yet entered the sterile realm of institutional-emotional sacredness, as some other concepts have done in LDC's. It is plainly a helpful instrument for a new style of policy making. Moreover, properly linked to (LTP), (TF) may prevent dangerous tendencies to "re-enchant" (in Weber's sense) the world through seemingly rational devices as development planning. I will now address myself to this question.

(LTP), (TF), and Development: Linkages and Tensions

Some links between (LTP), (TF), and development planning have already been touched on. Most functions attributed to (LTP) and (TF) help ameliorate the condition of underdevelopment. To mention some examples: the identification of alternatives

and the reduction of uncertainty diminish, in my view, the "strategic vulnerability". Furthermore, the appraisal of time-leads and the encouragement of "public experimentation" stifle counter-productive effects coming from prevalent policies.

Put more explicitly, social, cognitive and managerial links between (LTP) and (TF) can invigorate development planning through: i) internalizing "world images"; ii) cultivating sensibility to error/risk factors; iii) sharpening the eye for geopolitics; iv) encouraging bottom-up orientations in planning; v) getting away from too facile reductionisms and simplifications.

Does this signify that there are no tensions (i.e. instability inducing mechanisms) between (LTP/TF) and development planning?

I am inclined to answer conditionally to this question. If I were a "true believer" in the intrinsic "benevolence" of the State, my response would be positive. That is, if (LTP) and (TF) are capable of transforming "underdevelopment" into a historical memory, and if development planning (the State included as its main component) really moves to overcome backwardness, then a successful convergence could be produced among the three.

But if development planning represents at bottom a "social pacifier" and a way for mobilizing external support and fragile national consensus, then (LTP) and (TF), if adopted by any public agency, will become sources of group animosity and, ultimately, of structural tension.

To recapitulate: if the present talk on science and technology for development is serious; if LDC's want in earnest to moderate and reduce the perturbing effects of transnational environments and factors; and if development planning represents a real commitment to rationality, growth, and equity, then (LTP) and (TF) may become powerful tools for achieving these ambitious goals. But, if all is a matter of ritualism and cynical knowledge; if external and national entities converge in supporting rigidities and inertias; and if development planning is merely either a passing mood or a rallying cry, then (LTP) and (TF) will become subversive, perturbing and impertinent guests. At best, both will provide, to a small band of thinking people living in LDC's, a poignant form of social autism.

NOTES

1. R. Vernon, "Comprehensive Model-Building in the Planning Process: the Case

of the Less Developed Countries", *The Economic Journal*, 30, vol. LXXVI, March 1966, p. 57.

2. Quoted by E. Jantsch (ed.), *Perspectives on Planning*, OECD, Paris, 1969, p. 29.
3. Quoted by D. A. Rondinelly, "National Investment Planning and Equity Policy in Developing Countries: The Challenge of Decentralized Administration", *Policy Sciences*, vol. 10, 1, August 1978, p. 47.
4. On this see, for instance, C. Vaitos, Patents Revisited: Their Function in Developing Countries", *The Journal of Development Studies*, 9, 1, October 1972; and K. Griffin, "The International Transmission of Inequality", *World Development*, vol. 2, 3, March 1974.
5. Other factors are contemplated by ECLA, "Planning and Plan Implementation in Latin America", *Economic Bulletin for Latin America*, vol. XII, 2, October 1967.
6. Rondinelly rightly says: "optimality" as a technical goal is always reinterpreted, in terms of political costs and benefits," *op. cit.* p. 71.
7. See, for instance, R. W. Ayres, *Technological Forecasting and Long Range Planning*, Mc Graw Hill, New York, 1969.
8. For my stand on UNCSTED see my paper "UNCSTED: Constraints and Perspectives," in M. S. Wionczek-B. Thomas (eds), *Science, Technology and Development*, Pergamon Press (forthcoming).
9. For instance, R. Cohen et al. "The Sociology of "Developing Societies", *The Sociological Review*, vol. 25, 2, May 1977.
10. On the limits of "indicators" see for a recent discussion Y. Elkana et al. (eds) *Toward a Metric of Science*, John Wiley, N. Y. 1978.
11. For examples of this kind of hortative style see Z. Sardar- D. Rosser Owen, "Science Policy and Developing Countries", in I. Spiegel-Rösing and D. de Solla Price (eds) *Science, Technology and Society*, Sage Publications, London, 1977.
12. The key problem is not dependence in itself but the lack or weakness of compensating mechanisms. This important distinction is frequently overlooked. See, for instance, "The Extent of Technological Dependence in Latin America", by C. R. Bath and D. D. James, in J. H. Street-D. D. James (eds), *Technological Progress in Latin America-Prospects for Overcoming Dependency*, Boulder, Colorado, Westview Press (forthcoming).
13. I am thinking, for instance, of information for "response planning", "crisis management", and the like.
14. For an interesting illustration see Y. Shapira, "The 1954 Guatemala Crisis", *The Jerusalem Journal of International Relations*, Vol. 3, 2-3, Winter-Spring 1978.
15. On this see Rondinelly, *op. cit.*
16. On "counter-intuitive" trends see J. W. Forrester; for instance his "Planning under the Dynamic Influences of Complex Social Systems", in E. Jantsch, *op. cit.* Besides, this is the main line of reasoning of P. K. Rohatgi, among others. See his *Potential Use of Long-Term Studies by Development Agencies*, The World Bank, Washington D.C. (mimeo) w/d.

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17. "A counter-balancing force "may range from an influencing investigation to a significant pressure group.
18. "Social sadism... refers to social structures which are so organized as to systematically inflict pain, humiliation, suffering, and deep frustration upon particular groups and strata", according to R. K. Merton, *The Sociology of Science*, Chicago University Press, 1973, p. 131. For examples of unawareness of ramified consequences, especially relevant to LDC's, see W. Leontieff *et al.*, *The Future of the World Economy*, Oxford University Press, New York, 1977.
19. M. Jahoda says in this context: "All forecasting is done with a purpose in mind and based on fundamental assumptions". See "Conclusions", in Ch. Freeman-M. Jahoda (eds) *World Futures*, Martin Robertson, London, 1978, p. 381.
20. The maturation period, for example, of a new city is 35 years; of a power project, from 10 to 30 years; of developing fresh water resources- 10/20 years, etc. See Rohatgi, *op. cit.*
21. From this perspective it was stated that "forecasts are necessary for practically all good planning, but in themselves forecasts are not plans..." See *Handbook of Forecasting Techniques*, Stanford Research Institute, December 1975.
22. About this concept see F. E. Emery- E. L. Trist, "The Causal Texture of Organizational Environments", in F. E. Emery (ed) *Systems Thinking*, Penguin, 1969, p. 248 ss.
23. "...heuristic design specifies principles and procedures... but does not preclude specific preconceptions of specific problems", according to M. S. Soroos, "A Methodological Overview of the Process of Designing Alternative Future Worlds", in L. R. Beres- H. R. Targ (eds) *Planning Alternative World Futures*, Praeger, New York, 1975, p. 18.
24. For a discussion on "initial conditions" see V. Myrdal, *Asian Drama*, The Twentieth Century Fund, vol. I, N. Y. 1968, p. 673 ss.
25. For critical overviews see, among others, R. Gilpin, "Three Models of the Future", in C. F. Bergsten-L. Krause (eds) *World Politics and International Economics*, Brookings, Washington, D.C., 1975; and F. H. Cardoso, "The Consumption of Dependency Theory in the United States", *Latin American Research Review*, XII, 3, 1977.
26. For remarks in the same vein see F. Hetman, *The Language of Forecasting*, Futuribles, SEDEIS, Paris, 1969.
27. "...public debate about forecasts... may be a pretty bad system, but all the others are worse", Jahoda says rightly. *Op. cit.* p. 384.
28. For an interesting example see M. Jahoda, *op. cit.* p. 384.
29. Apart from "classical" statements in this field see W. Bell- J. A. Mau, "Images of the Future. Theory and Research Strategies" in W. Bell-J. A. Mau (eds) *The Sociology of the Future*, Russell Sage Foundation, New York, 1971; and for a recent contribution, W. Asher, *Forecasting*, The Johns Hopkins University Press, Baltimore, 1978.
30. On this see S. Cole, "The Global Futures Debate -1965-1976", in Ch. Freeman- J. Jahoda (eds) *op. cit.*
31. On some experiences see P. K. Rohatgi *et al.*, "Futures Research in India", *Futures*, vol. 9, 5, October 1977; and V. M. Glushkov *et al.*, "CMEA Experience in Multinational Forecasting of Science and Technological Advance", *Technological Forecasting and Social Change*, 12, August 1978.
32. According to Prehoda; quoted by B. Twiss, *Managing Technological Innovation*, Longman, 1974, p. 68.
33. For an alternative definition see J. Brian Quinn, *Technological Forecasting*, The Amos Tuck School, Reprint Series, 43, 1967.
34. For newer explorations in this field see F. Sagasti, *Science and Technology for Development*, STPI Project, IDRC, 2, Ottawa 1978; and J. Hodara, *Science Policies in Five Latin American Countries*, NCRD, Jerusalem, Israel (forthcoming).
35. On "minor" and "major" innovations see N. Rosenberg, *Perspectives on Technology*, Cambridge University Press, 1976, p. 73 ss. And also the research work undertaken by the BID-ECLA Group.
36. For a candid discussion on this matter see Ch. Horner, "Who Owns the Sea?", *Commentary*, vol. 66, 2, August 1978.
37. The word is suggested by M. Soroos, *op. cit.* p. 17.
38. At least tactically speaking, NIEO entails a sort of non-cooperative game. I suggest that LDC's should adopt attitudes and procedures stemming from this premise. Help for analogical thinking in this direction may be found in W. R. Phillips, *Is anti-Submarine Warfare Research and Development Wise?* University of Maryland (mimeo) W/D.

LONG-TERM PLANNING, TECHNOLOGICAL FORECASTING, AND UNDERDEVELOPMENT: THINKING ON THE UNLIKELY?

SUMMARY: *The author deals with different aspects of planning in a context of underdevelopment. He argues that though planning denoted originally a general commitment to rational analysis and decision tools, it has become, in that context, a mean for "enchanted" the world. That is, planning is in the realm of sacredness; as a national symbol of sovereignty and modernization it constitutes a sort of "untouchable". Thus, the structural irrationalities and weaknesses of developing countries are paradoxically multiplied by planning.*

Nevertheless, these countries badly need planning. It represents the single instrument to overcome market imperfections, severe discrepancies between public and private interests, and perverse external dependencies. More specifically, they need to institutionalize categories and tools for technological forecasting. So, after portraying the condition of "underdevelopment", the author presents the case for both long term planning (LTP) and technological forecasting (TF). The former can perform some helpful functions in developing countries. Among them: to identify alternatives with a view to heighten the collective viability and vitality of low-income and fragile nations entrapped in an internation-

al scene characterized by "sadistic schemes"; to reduce uncertainties in order to overcome internal and external turbulent fields; to appraise time-leads of key processes; and to enhance the likelihood of desirable futures.

On the other hand, technological forecasting permits the reduction of specific uncertainties which stem both from a rapid technological tempo and from a lack of control of key technical changes. (TF) sensitizes to the lifetime of technologies, facilitates a finer distinction among minor, major and mega innovations, and allows the determination of specific levels of support for research and development. Moreover, it might prevent "self-reliance" from becoming, with time and regardless of the will of its original advocates, a self-strangling and segregating policy practice.

The author elaborates on the social, cognitive and managerial links between (LTP) and (TF), demonstrating that those can be forged unless development planning is in truth a sort of "social pacifier". If it represents a real commitment to rationality, growth and equity, then long term planning and technological forecasting may become powerful tools for achieving these ambitious goals. But if all development schemes are matter of ritualism and cynical knowledge, these tools will provide at best a painful form of social autism.