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Cost Analysis of Non-formal ETV Systems: A Case Study of the "Extra-Scolaire" System in the Ivory Coast

by

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TABLE OF CONTENTS

SUMMARY

National development concerns have led many less industrialized countries to focus greater attention on the reach, scope, and format of their various educational activities. In 1971, the Ivory Coast, with substantial foreign assistance, initiated an educational reform of its primary school system which included a substantial educational television effort. Building on this system, in order to aid in rural development and to rationalize, in some sense, the existence of ETV capabilities, the Ivorian government began an out-of-school ETV system directed towards the provision of non-formal educational services to rural adults. In this paper we summarize and analyze the societal costs incurred by the "Extra-Scolaire" (E/S) system, both from the perspective of Ivorian decision-makers and that of international audiences.

In Section I we provide a general introduction to the assumptions and limitations of the approach economists bring to an analysis of a system's social costs, we describe the structure of the E/S system and the context within which it operates, and we conclude by focussing on the extent to which the present system is utilized. The basic notion of cost to an economist is as a measure of the value of the opportunities foregone by devoting resources towards a particular activity. In this fundamental sense, the cost of an activity clearly depends on whose perspective is used to value those opportunities foregone. In order to avoid such indeterminacy, economists attempt to view costs from the point of view of the entire society, in terms of the value society as a whole places on the use of its resources. However, in order to derive measures

of social value, economists must make a number of assumptions as to how that society functions. In particular most economists believe that if an economy allocates its resources through competitive markets, in which all prices are determined by the free interaction of supply and demand, that the resulting prices are measures of the relative social value of the resources, goods, and services thus priced. Given that most economies do not behave according to the theoretical description of competitive marketplaces, there is considerable cause for questioning the extent to which prices are valid measures of social value. The lack of alternatives to market prices as measures of social cost lead economists to concentrate on these monetary cost measures as we do in this paper, but decision-makers still need to be more aware of the framework behind such an analysis. Moreover, such considerations indicate that it may be valuable to pay greater than usual attention to social costs that are likely not captured by monetary measures, as we do in Section II.H, and to the general social context and goals within which resource allocations are made, as we do in Section IV.

The Ivorian E/S system produces television programming concerned with a wide variety of topics concerning agriculture, health, nutrition, politics, economics, and culture, directed primarily towards rural adult audiences, although more recently increasing attention is being paid to urban viewers. The programs are produced under the auspices of the Ministry for Primary Education and Educational Television, although topics and financial support are sometimes generated from other government ministries and agencies. About 35 half hour programs are produced annually and are broadcast over the one Ivorian open circuit television

broadcast channel. Although anyone with a TV receiver may therefore view the programs, the E/S system has an organized rural reception structure within which rural adults are urged to come to the local village school, in communities where such schools are equipped for ETV viewing, on evenings when TPT ("Télé Pour Tous," meaning TV for Everybody, the name given to E/S broadcasts) programs are shown. In each village that operates this program reception system, a primary school teacher has been selected or volunteered, at no additional pay, to serve as animateur, notifying villagers of the broadcast, opening the school in the evening, translating the French narration and dialogue to the local language if necessary, and leading discussions and follow-up activities that may be stimulated by the programs.

There is more detailed data available concerning the size and characteristics of the audience viewing TPT broadcasts than for many non-formal educational activities, due to a feedback system that was set up as part of the Ivorian effort to evaluate their ETV system. However, given the reliance on un-verified reports by animateurs who are believed by E/S system personnel to exaggerate the size of their adult viewing audience in order to create a favorable impression of their activities, it is not clear how much faith should be put in these estimates. During the 1975-1976 operating year there were 899 TV schools that had animateurs, although these animateurs did not open their schools for every broadcast. On the average, 305 schools were open per broadcast, with an average audience size of 51 viewers per school, yielding a total of about 15,500 viewers per broadcast. Although the E/S system is mainly concerned with the audience viewing TPT programs within the animated setting, it is also

of interest to consider the many individuals who watch them on private TV receivers. One survey indicates that as many as 300,000 adults may regularly watch TPT programs, although it is unclear whether this survey was based on a truly representative sample and exactly what "regular" means.

Given the general background and context discussed above in Section II of this paper we turn to a specific estimation of the costs of the various components of the E/S system: administration, program production, program transmission, support materials production and distribution, program reception, and system evaluation. Insufficient data were available to estimate year by year system costs since inception. We therefore try to build a picture of yearly costs based on data for the 1975-1976 operating year, including amortized start-up and capital costs. We estimate costs under two broad alternative assumptions (A and B) which in part reflect the difference between the Ivorian perspective, in which the costs of the E/S system reflect only the additional costs resulting from building upon the existing formal school system ETV capabilities (assumption A), and the perspective of international audiences, who may be concerned with replicating a similar non-formal system when no formal ETV system is in place (assumption B). This is <u>not</u> to say that costs under assumption A are the relevant ones for the Ivory Coast, and those under B for international audiences--it is likely that either audience will favor some combination of the two assumptions. For example, we only include an imputed value for the cost of animateur time and audience viewing time under assumption B. However, although neither resource requires an expenditure outlay for the Ivorian government, they may both

be considered costs from the Ivorian perspective, if alternative uses of such individuals' time is considered to be of social value.

Tables 5, 6, and 8 provide some alternative summary cost measures of the Ivorian E/S system experience. The cost of producing an hour of TPT programming is about 8.8 million F CFA (about 35,000 U.S. dollars), which is considerably more than many ETP production efforts, although the need to attract and retain an audience may necessitate more expensive productions than those used for formal school ETV systems which have a captive audience. Overall the Ivorian E/S system, in annualized terms, cost 450 F CFA per viewer per broadcast under assumption A and 965 F CFA per viewer per broadcast from the perspective of assumption B. Whether or not such costs are considered reasonable of course must depend on how society values the effects resulting from the E/S system.

In Section II.H we consider aspects of the E/S system which may entail social costs not captured by the monetary price measures used above, revolving around five topics: foreign aid, the teacher as animateur, the choice of the village school as the reception site, the nature of some TPT programs, and the introduction of the television medium to the rural village environment. Although we cannot summarize each of these considerations here, the general point is that they may have negative impacts in terms of their effects on the individual, the community, the E/S project itself, and the general societal development in the Ivory Coast that need to be examined in any evaluation of the social costs of the E/S system.

In Section III of this paper we take the annualized cost description of the E/S system developed in the previous section and translate it into

cost function terms in order to view the cost impact various policy decisions concerning E/S could have. That is, we first make a number of assumptions about how E/S system annualized costs are related to the following variables of interest:

h_p = the number of ½ hour programs produced annually;

h_t = the number of ½ hour programs transmitted annually;

N_v = the number of villages in the system;

N_o = the average number of village schools open per program broadcast;

and N_a = the average audience per program broadcast.

The assumptions made yield the following two cost functions, one under assumption A and the other under B, which depict the total costs, TC (in F CFA), of the E/S system in terms of the variables above:

(A) $TC = 26,600,000 + 5,350,000\ h_p + 380,000\ h_t + 34,900\ N_v + 1715\ N_a + 74\ (h_t \times N_o)$

and

(b) $TC = 26,600,000 + 5,355,000\ h_p + 380,000\ h_t + 246,100\ N_v + 1715\ N_a + 6129\ (h_t \times N_o) + 75\ (h_t \times N_a)$

As the reader can see the variables included do not enter linearly and further, some of the variables are related to each other; in particular h_p and h_t are interdependent, as are N_v, N_o, and N_a. Nonetheless, if we assume the cost functions are reasonably accurate, we can rather easily trace through the cost impact of policy decisions affecting one or more of the included variables. In Section III.B we examine the costs resulting from potential decisions to expand the following: (a) program production; (b) the proportion of repeated broadcasts; (c) the audience size and the number of animateurs; (d) the training given to animateurs; (e) the production of support materials; and (f) the evaluation

effort. Basically we find the marginal cost of expanding b, d, e, and f to be low relative to total costs, and therefore if any such expansion is believed to yield significant social benefits it should be closely considered. Expanding program production and audience size may be somewhat more costly, although there may be inexpensive means to get some increase in both, through the provision of more available and reliable program production equipment and processing, and through increasing the motivation of the animateur to open the village schools for TPT broadcasts (although this latter action may be difficult unless animation activities are recompensed). In any case, economies of scale will likely make any expansion of programming or viewers result in lower average costs per viewer per hour. Again, whether such expansion is worthwhile must rest on a comparison of its marginal costs with its marginal benefits.

We conclude Section III with a few comments on E/S system financing. We note that at present a sizable portion of total system costs are financed by foreign contributions, about 1/3 under assumption A. Under assumption B, where animateur and audience time is considered to be of social value, we observe that these private contributions amount to about 1/5 of total system costs (with foreign aid under B also amounting to about 1/5 of total costs). We also briefly examine the internal financing mechanisms used in E/S system operations and observe that sometimes the processes of bureaucratic control can impair the efficiency with which the system operates, leading perhaps to lower system output than is potentially possible.

In Section IV we conclude by discussing various perspectives on the Ivorian development context within which the costs of the E/S system must

be assessed. While some view the E/S system as a straightforward provision of useful information to rural adults, other observors question whether its passive instructional mode and the lack of an integrated accompanying service infrastructure, can really aid in Ivorian rural development. The perspective taken will significantly influence how one values system costs and benefits, as well as on what aspects of the system one focusses for needed changes.

I. INTRODUCTION

There has been increasing interest in less industrialized countries in the potential uses of electronic communications technologies as a mechanism by which to expand or improve their formal schooling system. At the same time, many of these same nations, recognizing that their immediate development objectives require it, are also turning greater attention to the present educational needs of their adults, especially in rural regions, and there appears to be a general resurgence of what are usually grouped as non-formal educational activities. In the Ivory Coast these two trends have come together in what is a relatively unusual system of using educational television for rural, non-formal, adult education.

Television is generally considered a relatively expensive educational medium (whether this is in fact the case depends on many factors) and its application in the rural areas of less industrialized countries is quite rare. The lack of electrification in most of the world's rural regions is clearly a significant barrier. In the Ivory Coast a decision was made to utilize educational television throughout the country's primary school system and battery operated televisions have been widely distributed to schools in rural regions. The Ivorian "Extra-Scolaire" (E/S) system grew up, in part, as a way to take advantage of, and in some sense to rationalize the existence of, this ETV reception system.

Despite the fact that the circumstances that led the Ivorians to experiment with ETV for non-formal, rural, adult education were relatively unusual, we are likely to see more similar efforts in the future for at

least two reasons. First, the costs of television, power sources, and other hardware are declining relative to the costs of teachers and human labor in general. Clearly relevant is the development of satellite systems that can broadcast to relatively low cost community receivers and which will likely have a significant effect on world communication and education patterns. Second, the increased attention non-formal education has been receiving will likely yield greater budgets and more international interest. Thus the Ivorian project is of interest to many audiences and in this paper we try to examine system costs from the perspective of these other audiences, as well as from the point of view of Ivorian decision-makers.

This study is able to build on the considerable evaluation effort that has been focussed on both the Ivorian formal and non-formal ETV systems, and as the reader will see, this has been essential to both estimating system costs, and to providing alternative contexts from which to interpret them. Appendices A, B, and C provide summaries of a few of the "extra-scolaire" evaluation results to date and should be of interest to readers not familiar with the project. In the remainder of this introductory section we discuss at some length the approach to economics and cost analysis that lies behind this study, we provide a descriptive overview of the Ivorian context and the project itself, and lastly we examine in some depth the data on audience size, and general system utilization. In Section II we go on to look, component by component, at the costs of the E/S system. In Section III we convert these cost numbers to cost functions, in order to analyze the impact on costs of some possible policy decisions, and we also take a brief look at

system financing. Finally, in our concluding section we discuss the broader societal development context within which such cost analysis is viewed.

A. Economics and Cost Analysis

It is not easy to speak plainly about economics. Around economics as a profession has grown a well developed technical theory, a little understood language, and a mystique as the science of the social sciences. There are different conceptions of economics -- different ways economists view the happenings of the social system that we live in, different conceptions of what are costs, what are effects, and what are benefits, and even different thoughts as to what questions economists should be asking. Public sector decision-makers are becoming more and more aware of this as they are engaging in increasingly more dialogue with economists. The recognition is widespread that cost-benefit analysis has a long way to go before it can say anything very definitive in areas such as education. However, decision-makers seem to hope that despite ambiguities and differences of opinions on the benefit side, some at least relatively unambiguous rationality guides can be found by looking at the cost side. Unfortunately this is not clearly the case.

Decision-makers have recognized that there are problems even on the cost side, and many have heard economists argue about questions of how one views capital costs, discount rates, opportunity costs, and in general, social costs. Economists obviously have more in mind than the budgets that decision-makers face when they talk about costs,* and some

* If they did not, there would be little point in having an economist do a cost analysis, since the decision-maker obviously should know considerably more about budget expenses than an outside economist.

of what they have to say often seem sensible to the decision-maker while other considerations often seem very abstract, esoteric, and inapplicable to the realities of the decision world. Unfortunately, the discussions by economists are often so couched in theory and jargon that decision makers often feel they do not have sufficient knowledge to make comparative judgements. This problem is increasingly common in a world where expertise and specialization are considered the norms for good judgement.

One solution to this dilemma is increased understanding of at least the basic principles behind the "expert" judgements. To understand what costs mean to an economist, one must understand the basic elements of economic thought. We feel such an understanding is important to enable decision-makers to judge the potential contribution and limits of economic analysis, including cost analysis. Therefore in this subsection we devote greater than usual effort towards explaining the basic meaning of costs to an economist, the framework on which such meaning is built, and the significant problems associated with it. We conclude by briefly defining some of the more technical concepts that we will use to examine the monetary costs of the E/S system.

What is usually called economics, is one version of the subject of economics that would be more accurately labeled by any one of a number of expressions -- "competitive market theory," "free market theory," "neo-classical economics," or "capitalist economics." We use these labels equivalently to refer to a body of literature, theory, and applications that has been prevalent in recent years in this country and throughout a large part of the rest of the world. This body of thought traces its intellectual history from the work of Adam Smith in the mid-eighteenth

century and over the past two centuries has devoted considerable attention to the workings of the "invisible hand" of the market system. The basic, underlying conception of this group of economists is that under certain circumstances an economy, whose basic unit is privately owned firms operated for profit, will exhibit an efficient allocation of resources, in which goods and services are produced with as few resources as possible, and the choice of what is provided is directed by peoples' tastes and preferences subject to the scarcities of nature and the limits of our technical knowledge. The appeal of such social system outcomes are recognizable. What is less recognized however is how this conception underlies all conventional economic analyses of both societal benefits and costs for any undertaking.

Competitive market theory begins with some assumptions about how the economy operates -- chief among them are that people who produce goods and services are out to maximize their own happiness; that these profits earned from production, and utility (economist's jargon for happiness) gained from consumption, are unaffected by the production or consumption of others; that there are many buyers and many sellers of what are relatively homogeneous goods and services, among which competition is solely on the basis of price; that none of these individuals or firms can affect the market price by themselves; and that there is complete information available to producers and consumers as to prices, market opportunities, and the alternative technologies of production. Assuming for the moment that these conditions hold, a number of conclusions have been shown to follow that many would deem desirable. For example, under such a system firms would produce those goods and services

most valued by consumers, and would produce them and sell them at the lowest possible cost. Workers and raw materials would be paid at a rate equivalent to what they add to the value of the firm's output. To sum it all up, an economy operating according to the above assumptions would not "waste" anything. The resources society has at its disposal would be used so efficiently that no reallocation of those resources could yield a "clear" improvement. That is, the condition that the neo-classical economist has labelled Pareto Optimality or Pareto Efficiency would hold — the resources of the society could not be reallocated in such a way as to make even one person better off without making someone else worse off.

The behavioral dynamic that gives rise to such an economic state of affairs is individual self-interest, motivating both the producers' and the consumers' choices. Perfect competition relies on prices to act as signals that convert this private self-interest into social gain. In a competitive system no single actor can affect price -- price is determined in the aggregate as an equilibrating index balancing supply and demand. The price of a good or service thus reflects both the relative value that consumers place on a good and the relative value of the resources that go into producing that good, given our knowledge of production techniques. Prices are viewed by market economists as societal opportunity costs. That is, in a market system, they are a measure of the value of the resources that society had to use up or employ in order to produce the particular good or service in question. Given the existence of competitive forces, if those same resources were more highly valued by consumers in another endeavor, then smart profit maximizing entrepreneurs would bid the resources away from the production of the less valued

good or service in order to initiate or augment the production of the more valued good or service.

This notion of social opportunity cost lies at the very heart of the neo-classical economist's approach to cost analysis (and to that of benefits). Note all three terms -- social, opportunity, and costs (we will return to "social" shortly). A sensible conception of "cost" would seem to imply the notion of opportunity foregone. The cost of undertaking any activity is in a very real sense the value one places on the most preferred alternative activity that was given up to pursue the first activity. The cost of purchasing a good or service is the value to the purchaser of the most preferred good or service that could have been purchased instead. One can observe that "cost" in this sense is not equivalent to price. The cost of a shirt to an individual is not the monetary value paid for it, but the value to the individual of using that money for the individual's next preferred alternative, perhaps a pair of shoes.

This basic concept of opportunity cost depends on how one values alternatives -- which serves to point out two things: that "costs" depends on the perspective of the person incurring them, and therefore, that the measurement of cost is quite complex, being both situation and person specific. For example, a public policy-maker, facing a decision as to whether or not to institute a new literacy program, may ponder the costs of such a program. Given that such a program would require a million dollars, the cost, in this sense, of instituting such a program is not the million dollars, but is the social value placed on, let's say, the health program that one could alternatively institute. The million

dollars limits the alternative possibilities but the true cost depends on the valuing of the alternatives foregone.

Above, we talk about how one might think generally of the concept of cost. However the dependence on perspective and the difficulty of measurement make such a concept difficult to use for generating precise choice criteria. What competitive market theory does is to add the notion of "social" to opportunity cost and to equate the whole thing with price. Under perfect competition the price of a good is thought to be a measure of its social opportunity cost, that is, a measure of the value society foregoes by employing its resources to produce that good instead of others.

This conception of price as social value rests firmly on the assumptions of perfect competition. Since no economic system operates strictly according to the few, but rather unrealistic assumptions of theoretical competition given earlier, one critical question is what happens to this view of price when the system deviates from these assumptions. Despite much research by neo-classical economists on what are called market "imperfections," this question, in our opinion, has not been really faced. The existing literature does indicate to us that if given almost any real world deviation from the simplistic theoretical assumptions of perfect competition for a good, its price will no longer measure what conventional economists call its social value. In an interdependent economy, one "false" price will send ripples throughout the economy, distorting many prices. A large part of this problem is that there is really a concept of "close to" a competitive economy. A system is either Pareto Efficient or it is not. When a system is not perfectly

competitive it is not at all clear what prices really signify in any social sense.

Furthermore, the whole neo-classical idea of the "society" in "social" costs (or benefits) as some abstract entity that incurs all the costs (and receives all the benefits) of any particular activity is quite problematic. First, "society," as an aggregate of individuals has changing preferences, changes that may themselves result from public and private sector activities (such as in communications and education). Second, both the market principle of "one dollar, one vote," and its public sector extension of investing if the benefits exceed the costs are illustrative of the absence of serious considerations of equity and power in the neo-classical concept of "society." A decision in which, within the neo-classical perspective, the social benefits outweigh the social costs, will not prevent some groups from being harmed by a decision, while other groups benefit. In a world such as this, the "consumer sovereignty" (i.e., that consumers' preferences direct resource allocation) cry of the "free" market economists becomes an ambiguous guide.

The two problems discussed above, taken together, form a critique that questions the basis of most Western economic thought and consequently that of the cost-benefit analytic framework that is most commonly used. First, it is not clear that monetary value represents what competitive market economists consider societal value and second, it is not even clear what "society" as an aggregate concept really means. Competitive market economics orients itself toward Pareto Efficiency: a theoretical state of society in which no one could be made better off without making someone else worse off. Improvements in economic efficiency are defined

as movement toward this state of world. Yet since "modern" economics refuses to consider comparisons of welfare between people, and since no real world decisions benefit all parties, there are, strictly speaking, no practical guides to choice provided by such theory. All of this is reflected in the lack of a conceptual ordering of what "closer to Pareto Optimality" would mean. When some win and others lose, one needs some conception of the whole, the society, to decide if there is a net gain or loss, in order to make social choices. Without such a conception even cost analysis which aggregates resource inputs by price, becomes problematic as a decision tool. To the extent that prices do not reflect a social valuation of goods, services, people, etc., analysis that is based on competitive market theory can yield a seemingly objective mode that covers many implicit interpersonal judgements.

We began this rather lengthy disgression in order to explain how cost analysis, as it is usually practiced, rests in a very fundamental sense on one particular economic theory. When an economist of this persuasion tells the decision-maker that s/he should include a measure of the value of donated labor or services (by a market price proxy) in the cost of a project, the economist is conceiving of this donation as having a "social" opportunity cost. When an economist tells a decision-maker to employ a social rate of discount in converting capital costs to annual costs, the economist is viewing that capital investment as foregoing other alternative societal investments and the social discount rate as the price of tying up capital. And when an economist uses the market price of a resource as a measure of its cost, s/he is viewing that cost as a valid measure of the value society places on resource use.

The problems that we have discussed above make one question to what extent do any of these price measures reflect a legitimate claim to be treated as the proper weighted indices of a social valuation process, and the sum total called the "social cost."

However, alternatives to prices as the correct social indices by which to aggregate resource efforts are scarce. The most well developed alternative to neo-classical economic theory is Marxist theory. However, the cost and benefit framework of conventional economics does not fit well with the structural, historical analysis of Marxism. Marx's labor theory of value might argue for a conception of cost in terms of the value of workers' efforts devoted toward a particular endeavor, but obtaining such measures has significant practical and theoretical difficulties. Marxist theory is, however, quite useful in thinking about possible structural effects of a decision, consequent hidden costs, and the whole nature of what we mean by "society," which is crucial to a legitimate conception of costs.

The points above could be interpreted as giving support to decision-makers who might wish to ignore economists and cost analysis. The economist often berates the decision-maker (or the structure of decision-making) whose view of costs extend only to their budgeting impact. But if prices are not accurate indicators of social valuation then the decision-maker may rightly ask why should s/he pay any attention to the economist who only seems to want to add more esoteric considerations? One answer to this question is that the conventional economist's view of the world has some common sense merit, which we feel the decision-maker usually recognizes, despite all of the above objections. For

example, despite questions about the neo-classical conception of society, there are clearly alternative uses to which a volunteer's time or a large capital investment can be devoted and we, as a society, are foregoing those uses when we employ such resources on a project. Although the measure of value society puts on those resources, or purchased resources, may not be captured by prices or imputed price proxies, such uses are still reasonably viewed as social costs.

What we see this whole discussion as implying is not that one should ignore costs or prices, but that one must try and think sensibly about them. Budgets do constrain choices and a million dollars expended on one project could have purchased a million dollars in different resources, at their going prices (regardless of whether those prices are determined in a competitive market place, by private collusion, or by public administration), for another project. Thus, total monetary costs are useful in delimiting the alternatives that one foregoes.

Moreover, questioning prices as valid measures of social value does not yield a neglect of costs, but focusses attention instead on the relationships among prices, costs, and benefits. In a way costs and benefits are two sides of the same coin -- if we were to purchase something for you, what is a cost to us is a benefit to you. If prices are not guides to social value they are not good means of aggregating resource efforts, but they do give a measure of both the monetary benefits that go to other (perhaps overlapping) groups. This view implies that in evaluating the worth of a project one should look not only at who is paying for it and who is receiving the benefits of the project, but also at who is receiving the benefits of the expenditures on resources for the

project (e.g., what companies' products are purchased). Neo-classical economics makes this latter concern irrelevant, a technical least-cost decision of social optimization. Without prices as valid social indicators, efficiency questions become much more complex, and all decisions must be based on more conscious social valuation processes, which include considerations of the distribution of wealth and power in a society. In such a situation the rule of consumer sovereignty as the guide to resource allocation is replaced with difficult questions of whose preferences really do or should govern such decisions.

The purpose of this subsection has been to explain the basic conceptual underpinnings of the economist's view of costs and their limitations. We believe that with the increased attention being focussed on the "economics" of educational activities, there has been too little attention paid to decision-makers' understanding of the concepts behind the cost (and benefit) figures that have been calculated. Consequently the usually technical work of economists in education is not easily interpreted or evaluated. In our analysis of the costs of the E/S system in this paper we examine, in a rather technical fashion, monetary estimates of the social costs incurred, as well as try to pay some attention to the broader conceptions of costs, that cannot be easily expressed in monetary value.

In terms of our technical analysis of monetary costs, we try to view the E/S project <u>as a system</u>, from conception to reception to evaluation (for this reason alone, the cost analysis reflects considerably more than budgetary costs, since not all parts of the system are financed by the same budget). In order for the reader to understand clearly this

technical analysis there are a few cost concepts that are especially useful: fixed costs, variable costs, and marginal costs. These cost concepts are based on thinking about monetary costs, not as numbers, but as functions of the variables that define the system in question. The translation of cost numbers to cost functions is essential in order to say something about the impact of decisions on project costs.

Fixed costs are costs that are incurred that are not affected by changes in system variables. For example, regardless of how many viewers are in the E/S system, a certain portion of administration may remain relatively fixed, or regardless of how many programs are produced, perhaps some of the basic costs connected with the existence of a program production system remain fixed. From a long term view of most activities, it is likely that few, if any, costs are fixed. However, for decisions that are instituted in the short term, a considerable share of total costs may be fixed.

Costs that are not fixed, are by definition variable. Variable costs are ones that change as various characteristics of the system in question change. For example, within the E/S system, there are likely to be some costs that vary with the size of the geographical area covered, the number of educational programs produced, or the audience size. The manner in which monetary (or non-monetary for that matter) costs vary with any particular system characteristic in question is determined by the nature of the particular process being examined. Some costs may vary in direct proportion to certain system characteristics, while others may vary in a less uniform manner.

Marginal cost, strictly speaking, is that cost increment (or decrement) due to a one unit increase (or decrease) in some particular system output or input. For example, given the E/S system operating in a certain specified manner, one could look at the marginal cost of adding one more viewer to the system, the marginal cost of producing another hour of programming, the marginal cost of having one more animateur, etc. Marginal costs are often confused with variable costs, since sometimes they turn out to be the same number (when certain costs vary in direct proportion to a system characteristic). However, the concepts are distinct: fixed and variable cost concepts are useful for describing the cost behavior of a system, while the marginal cost concept is the one most relevant to examining the cost impact of a decision. Actually, the term marginal cost is often used, not to refer to a one unit change in system output or input, but to refer to the total additional costs (or total decrease in costs) resulting from the decision. The whole idea of rational decision-making is based on the concept of comparing the additional, i.e., marginal, costs of a decision, with its additional, i.e., marginal, benefits.

The cost framework and concepts that have been discussed* in this subsection form the basis for the cost analysis that follows. After in

* The concepts of recurrent and capital costs are also necessary to our monetary cost analysis, although less central than the ones above. Recurrent costs are defined as those costs that are incurred for resources whose useful life extends for one year or less. Capital costs are defined as those costs that are incurred for resources whose useful life is greater than one year. In order to estimate the annual costs of a particular activity one must somehow "annualize" capital costs. Economists, as we mentioned earlier, use a social interest rate as a social price for such capital investment. See Jamison, Klees, and Wells (1977) for a thorough explanation.

the remainder of this section providing the reader with a description of the Ivorian context, the E/S project, and the extent of its utilization, we then, in Section II, use the economist's concept of price as a proxy measure for social costs to examine the historical societal costs incurred by the various components of the E/S system in monetary terms. At the end of Section II, recognizing the limitations of price as a measure of social cost, as described above, we broaden our consideration of E/S system costs to discuss features of the system that may impose societal costs, yet are not estimable in monetary terms. In Section III, we first translate our historical monetary system cost analysis into cost function terms through making a number of assumptions as to what costs are fixed and what are variable with certain system characteristics. We then use the cost functions generated to analyze the marginal costs of a number of possible decision alternatives available to the E/S system in the future. In Section IV we conclude by placing the whole discussion of monetary and non-monetary costs of the E/S system in the context of rural development in the Ivory Coast, for it is only within such a context that reasonable interpretations can be made of the value society places on the resources utilized by the E/S system.

B. Descriptive Overview

The extra-scolaire educational television system began experimental operations in January, 1973. In order to understand its basic direction, organization, and cost it is helpful to have some knowledge of the general Ivorian context within which it operates, and more specifically, of the formal schooling ETV system on which it has built.

1. General Background

The Ivory Coast has a population of about 7 million, 45% of whom are under the age of 15, and it covers a geographic area of about 125,000 square miles. Politically it is a one party state. About 60% of the population is rural, living primarily in the approximately 8,000 small villages and towns. It is principally an agriculture based economy with its chief products being coffee, cocoa, and timber, mostly for export. The production of banana, palm oil, coconuts, pineapple, maize, sugar, cotton, and rubber are being expanded. The industrial sector is rapidly increasing in importance, accounting for about 20% of the Gross Domestic Product (GDP), which reached almost 600 billion F CFA (2.4 billion U.S. dollars) in 1975. With a GDP per capita of about 90,000 F CFA ($350), the Ivory Coast is one of the wealthiest nations in Africa.

The Ivory Coast received its independence from France in 1960. Over the following decade the country seems to have consciously pursued economic policies designed to yield an increase in GDP through following a national development model that economists would generally characterize as one of unbalanced growth.* That is, public policy was focused on developing certain sectors of economy, in the Ivorian case, primarily the nascent industrial sector and the large plantations growing exportable agricultural products, as opposed to other sectors of the economy, of primary interest here being the large populace of small farmers and agricultural workers in the rural areas. An integral part of this development strategy was the considerable encouragement given to foreign

* A number of writers on Ivory Coast development have voiced this view, and have indicated that such is openly acknowledged by Ivorian authorities. See The Institute for Communication Research (1976), Amin (1967), Clignet and Foster (1966).

capital and labor, primarily from France in the area of modern expertise and investment capital, and from neighboring African nations, in terms of low cost unskilled labor.

The pursuit of such policies seems to have had a clear payoff in terms of a 7% real annual growth rate in GDP over the period 1960-1970. During this period industrial production grew at an annual rate of 11% and exports more than tripled.* Other results of these development policies are less clearly a benefit. According to Monson and Purcell (1976, p. 1):

> Some sixty percent of the unskilled jobs in the modern sector are held by these African (mostly Upper Volta and Mali) migrants. Non-African capital and labor are also important. Foreign interests own eighty-five percent of private industrial capital in the country. Expatriate labor (mainly French) numbers about twenty thousand and occupies seventy percent of the managerial and technical positions in the modern sector labor force.

Such foreign involvement in the private sector has its clear counterpart in the public sector (see Cohen, 1974 and Amin, 1967 for discussions from different perspectives of this public sector issue).

During this decade, as a response to the policy described above, there has been considerably greater attention paid to other facets of national development. "The economic options currently pursued seem to favor a modernization of agriculture on a much wider scale, the development of the rural areas and its people as a means to this goal and an Ivorization of the economy as a whole (especially commercial and industrial sectors)." (Institute for Communication Research, 1976, p. 49.)

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* See Monson and Purcell (1976).

We will return to discuss generally some aspects of the Ivorian development strategy and its relation to the extra-scolaire program in the concluding section of this paper. For the moment, this brief picture forms a backdrop against which to view both formal and non-formal educational activities in the Ivory Coast.

The formal schooling system in the Ivory Coast was inherited from the French, set up during colonial times, and considerably expanded since independence. For example enrollments in primary school over the first decade since independence almost tripled, from about 170,000 students enrolled in 1960 to 500,000 in 1970. Expansions at higher levels were also substantial. Nonetheless, during the late sixties dissatisfaction with various aspects of the educational system led to a complete reform of the system of primary schooling. Such reforms were part of a general response to the imbalance of previous economic expansion policies.

More specifically, in 1970 only about 40% of the relevant age group population were enrolled in primary school. Second, the efficiency with which students passed through the school system was low due to high repetition rates, and to a lesser extent, high dropout rates. Third, the primary school system was felt to be implicitly or explicitly encouraging unwanted rural-urban migration. In response to these and other concerns, perhaps most notably the European nature of the curriculum, the Ivorian government, with substantial international aid and encouragement, primarily from France, initiated their primary school reform. The principal components of this reform were the introduction of a system of educational television to carry a substantial portion of the instruction,

an accompanying revision of the curriculum reinforced by the development of new printed materials for students and teachers to support the TV system, and a large effort to upgrade primary school teachers qualification through the use of new and extended teacher training programs and institutions, as well as with in-service ETV training for teachers. In 1971 the ETV system of the Ivory Coast began its first broadcasts to about 20,000 first grade students. In each subsequent year the system covered an additional grade. By the 1976-1977 school year the ETV system covered all six grades and about 325,000 students, which was about half of those enrolled in the public school primary system (40% of total, public and private, primary enrollment). Over 1,000,000 students are projected to be in the ETV system by 1985, reflecting total conversion to ETV (except for almost 10% of the students, enrolled in schools that will not get the TV signal) and the Ivorian government's public commitment to universal primary education by that time. (See Eicher and Orivel, 1977, for a more detailed description and an analysis of system costs.)

2. "Extra-Scolaire" System Structure and Organization

In the original planning for the reform, there was a little discussion of using the television for some form of post-primary education, especially given the knowledge that the existing secondary school system could not cope with the rapid planned expansion of primary school (see SEEPTE,* 1968). However, the nature of such efforts were not specifically defined and at the present time there is considerable attention

* A list of acronyms used is included as Appendix D.

being paid to what forms this type of education should take for primary school leavers (see Danière, et. al. forthcoming; Wells, 1977; and Ministry of Education, 1976). As planning for the primary school ETV system proceeded, the nature of the additional educational uses to which the television system should be put changed, moving from a "post-primaire" conception, focussed on primary school leavers, to an "extra-scolaire" conception, focussed on rural, and more recently urban, adults, most of whom have not completed primary schooling.

The Extra-Scolaire Unit was organized and formed in January, 1973, under the then State Secretariat for Primary Instruction and Television Education (elevated to the status of a Ministry in 1976) which was responsible for primary schooling. The intent was to develop a system of out of school education designed to reach rural adult audiences with a wide range of educational and informational TV programs related to national development.

Cooperation and coordination between various ministries was and is considered essential to the operation. The first year and a half of activities was considered to be experimental in nature and the fully operational phase commenced with the 1974-1975 school year. In the remainder of this section we will briefly describe some of the features of the extra-scolaire system, concentrating on those most relevant to our analysis. For a fuller description see the report done by the Evaluation Service (1975a) as well as some parts of Section II below in which we detail those aspects necessary to an analysis of system costs.

The precise organizational structure of extra-scolaire activities has continued to change since its inception. Basically, there are three

departments within the E/S Unit. One concentrates on the production of broadcast programs, another on the animation of reception activities, and the third on research relevant to the operations. In addition there is a small fourth group that works with video-tape instead of film; they have a self-contained mobile video unit, donated by UNESCO, and engage in a variety of activities such as the production and distribution of ETV programs that are not of sufficient national interest to warrant open circuit broadcast, on-location training of animateurs, and various special projects (see Evaluation Service, 1975b for a report of their activities). Operation of the E/S Unit was initially divided between a group in the center of the country, at Bouaké, where the primary school ETV production system complex is located, and Abidjan, the capital city on the southern coast, where governmental operations are headquartered. However, in 1974, most activities and personnel were shifted to Abidjan to further both internal and external coordination.

External coordination is extremely important to all aspects of E/S Unit operations. Research activities are coordinated with those of the Evaluation Service of the Ministry of Primary School Instruction and Educational Television, and animation and production activities with the ETV production activities of the formal school system and those production and transmission capabilities of the National Ivorian Radio and Television (RTI) broadcast system. Perhaps most significantly is that all E/S activities, especially the decisions concerning ETV programming direction and content, must be coordinated between the many government ministries and agencies concerned with national physical and human resource developments. Despite its organizational location within an

education ministry, the E/S Unit has relied on interministerial committees and outside ministry and agency requests, to guide its development and the content of its program activities.

The stated goals of E/S operations reflect a very general mission to aid in development activities. A promotional pamphlet put out in 1975 listed three goals:

> - To undertake an educational initiative that will allow all Ivorians, rural and urban, to understand the development strategies pursued, to participate actively in the improvement of their condition and a better distribution of the fruits of economic progress;
>
> - To allow adults to reflect on the problematic situations in their milieu, to take decisions on communal actions within real working groups, to express their difficulties and their needs, and to search for, by themselves, some solutions, in coordination with administrative and political authorities;
>
> - To make more efficient use of the existing television network. (SEEPTE, 1975, p. 1)

A more recent document (see E/S Unit, 1976c) prepared for the interministerial Programming Committee is somewhat more specific in proposing and discussing the following five objectives for E/S activities:

> 1. Knowledge of the economic, political and administrative structures, in order to bring especially the rural population in contact with the outside world and to allow the population to use the various services (e.g., Prefecture, dispensary, post office, bank, etc.)
>
> 2. Introducing those techniques which could improve the production, in order to go from a subsistence economy to an exchange economy.
>
> 3. Knowledge of behavior which will improve the social and sanitary conditions.

4. Awareness and analysis of existing situations, research of adequate solutions for inserting the masses in the modern world without breaking with certain traditional values.

5. Preservation of certain traditional values, and awareness of cultural entities within which development without alienation is possible.

[Evaluation Service, 1975a, pp. 78-79]

It seems clear nonetheless that the goals for E/S leave quite a degree of latitude in determining exactly on what types of programs E/S should concentrate on, and on what types of formats their educational activities should take. These are issues that we will return to in the concluding section. Also from above we observe that the target audience included all adults, notwithstanding the emphasis on rural audiences, and it is with this in mind that the E/S system has chosen to publicize its broadcasts under the name "Télé Pour Tous" (TPT), Television for Everybody.

As mentioned above, decisions on program topics seem to come primarily from suggestions made by various governmental ministries and agencies connected with development activities, usually reflecting the priorities of the current Ivorian Five Year Plan. There may be a growing interest in obtaining ideas directly from the field, from the people who will be receiving the broadcasts, but such interest has not yet led to a change in practice (see Evaluation Service, 1975a, pp. 18-24). Over the past four years a veritable potpourri of program topics have been addressed: health and nutritional problems dealing with water diseases, medical care, etc.; agricultural products, problems, techniques, and projects; housing, banking, money, and credit; the rural exodus; folklore and traditions; tourism; the ETV system for school children;

urban problems; electricity; family budgeting; political and cultural documentaries; job counselling and information; and others.

Most programs are about a half hour in length, and produced by ETV production teams working directly for, or loaned to, the E/S Unit. They are broadcast in the evenings once or twice a week by RTI over the national television channel that the Ivory Coast has. About 30 to 35 such programs have been produced and broadcast during each academic year. Some printed support materials are usually developed to accompany the broadcast, although these are primarily directed to the animateurs as opposed to the viewing audience.

The structure within which E/S broadcasts are received has been alluded to above at several points. The target audience of E/S operations has been primarily the rural adult, although increasing attention is being paid to urban viewers in the last two years. About 80% of the Ivory Coast does not have electricity and consequently the formal schooling ETV system installed television receivers in rural areas are powered by alkaline batteries. The E/S system makes use of this structure by attempting to get rural Ivorian adults to come to those village schools that have a TV, on the evenings that an E/S program is broadcast.

A key feature of this reception and viewing system structure is the role of the animateur which has long been an integral part of French development activities. Evans (1976, p. 7) provides a good description of the theory behind this approach:

> the basic technique of animation involves the development of a trained cadre of discussion leaders who promote a non-directive dialogue in their communities which leads to the villages defining their development problems for themselves

> and putting these problems in the larger context of their society. The final step is mobilizing the members of these communities to take common action to overcome the problems.

Although practice seems to differ considerably from theory in the Ivorian E/S, in that the problems are perhaps more other defined (by the programs) than self defined, and the goal of sensitization or awareness seems more predominant than group decision and action as we will discuss later, the animateur still plays a critical role within the E/S system.

The animateur is charged with informing the populace of the broadcast subject and time (usually 8:15 P.M. on Wednesdays and Fridays), urging them to come, and opening up the classroom and unlocking the T.V. He (there are very few female animators, despite the importance of women in rural life and development activities) then is usually called upon, when capable, of translating the programs narrative and dialogue to the local language, since the broadcasts are in the national language, French, which is <u>not</u> understood by perhaps 80% of the population, who speak a variety of local languages. After the program the animateur is responsible for fostering a discussion around the program topic and for promoting whatever follow-up activities are deemed appropriate.

Animateurs are selected from the ranks of primary school teachers. Up until recently it has been a relatively voluntary activity that teachers engaged in (some were assigned to take the position by local school directors), and from the beginning of the E/S system it seems to have been generally believed by these volunteers that some form of monetary recompense would be forthcoming. However in October, 1976 the Ministry announced that henceforth E/S animation was to be considered

a normal part of a primary teacher's job, and that those teachers who served as animateur would not receive additional payment. This has led to a considerable amount of dissatisfaction among the animateurs and clearly has potential consequences for the E/S system, that we will discuss later.

At this point the reader should have a reasonably good idea of the overall structure of the Ivorian E/S system and the context within which it operates. Before moving to Section II which focusses on the costs of the system, it is necessary to examine in some detail system utilization, which will be useful both in estimating costs and in analyzing their significance.

C. "Extra-Scolaire" System Utilization

A number of the efforts of the various groups involved in E/S system evaluation were concerned with an examination of audience and animateur participation. Consequently a few reports have dealt with this issue and for more details on system utilization see Lenglet (1977), Fritz (1976), Lenglet (1976a, b), Evaluation Service (1975a), and IIOP (1975) which are the principal sources from which the information below was drawn.

Table 1 shows the total number of public primary schools in the Ivory Coast that were equipped with ETV since 1972-1973, which form the potential centers for animateurs directed group viewing of TPT programs. We can see (from items b and c) that not all of these schools are yet equipped with television; the Ivorian government plans to achieve complete conversion to the ETV system by 1985, which would then encompass about 90% of all public schools, the 90% limit being set by those

TABLE 1

TV Schools and E/S Animators

	1972-1973	1973-1974	1974-1975	1975-1976
(a) Total Number of Public Primary Schools		1900	2140	2470
(b) Total Number of TV Schools	700	950	1110	1481
(c) b/a (in percent)		50%	52%	60%
(d) Total Number of "Known" Animateurs	175	400	658	899
(e) d/b (in percent)	25%	42%	63%	52%
(f) d/a (in percent)		21%	31%	36%

Source: Lenglet (1977, p. 2, Table 2)

within the geographical coverage area of the one Ivorian ETV channel. The number of "known" animateurs refer to those primary school teachers who have volunteered or have been volunteered, for filling this role. We can see (from items e and f) that there is considerable capacity for increasing audience size through the use of more animateurs and through the installation of TV receivers in more schools.

It should be realized that the number of "known" animateurs is actually also an estimate of the potential number of schools open for E/S viewing, since all animators may not participate. For the 29 TPT programs broadcast between October, 1975 and April, 1976, the data reported by Fritz (1976, p. 9) indicate that on the average only 34% of those schools with a "known" animator were open for viewing, ranging from a high of 63% for a program on water borne deasease caused by guinea worms which is a common problem in a number of regions, to a low of 16% for a cultural documentary on nomadic tribes. (There were two repeated broadcasts during that period and for one, that had just been initially broadcast the previous week, only 9% of the schools were opened by the animateurs.)

These data, like much of the data below, were gathered by means of an animateur feedback system operated within the Evaluation Unit by an evaluation specialist donated to the project by the German government. Much of this information is self-reported by a sample of animateurs who were asked to return weekly questionaires. There is a strong belief among Evaluation Unit personnel that consequently much of this information is biased by animateurs interested in presenting a favorable picture of their efforts, although the extent of this bias is only guessed at.

Estimates of the size of the audience that views TPT programs in the animated setting also comes from this data base (see Fritz, 1976 and Lenglet 1976a for details). In general, it has been observed that for both 1974-1975 and 1975-1976 there was a decline from the initiation of the system each fall to its end at the beginning of each summer in terms of three related factors: the number of TV schools open; the average number of viewers per school; and the total audience size. The average number of TV schools open during the 1975-1976 operational year was 305, exceeding the 279 average for the preceeding year. However, in terms of the percentage of TV schools with a "known" animateur, this reflects a substantial decline, from 42% to 34%, perhaps related to the lack of compensation given to the animateurs. The average number of viewers per school also decreased, from 57 per school in 1974-1975 to 51 the following year. Consequently, the average number of viewers also declined over this period, from about 15,900 the first year to 15,500 the second.

The potential for significant discrepancies between actual and reported attendance does not allow us to put too much confidence in the above data. Fritz (1976, p. 10) suggests the likelihood that, despite instructions to the contrary, animateurs who fill out feedback forms include children in their count. The numbers reported above have been reduced by 20% by Fritz to account for such overestimation, but some evaluation personnel suggest that the correction factor might be as high as 50%.

In any case, the pattern observed over time (within each year and between the two years) may be more reflective of reality and there is

some concern over what can be interpreted as declining interest in formal E/S viewing. However, with the little information we have, the causes of these patterns can only be guessed at and they are likely due to a variety of factors including the lack of monetary incentive for animateur effort, the lack of adequate translation to local language capabilities of the animateur, the work environment of villagers, the insufficient attention paid to the traditional authority structures, the status of the school as a place for children, and the Hawthorne effect* we observe in most new systems. Viewers' interest in the program does seem to make a significant difference as can be seen from the range of the number of viewers, from a high of 31,236 for a program on dysentery to a low of 3,445 for a program on water storage. All of the above figures will be important for the discussion of Section III in that we will be interested in examining the cost of different system expansion strategies, such as increasing the commitment of animateurs, the area and schools covered, and the audience interest.

It is also important in this context to examine the phenomenon termed "l'écoute sauvage," referring to the widespread potential for viewing the open circuit TPT broadcasts on private TV receivers. There is little documentation relevant to this point. In 1975 150,000 TV receivers were reported to be in the Ivory Coast (exclusive of ETV use), and the estimated figure for 1976 of 200,000 indicates very rapid growth (see Ministry of Planning, 1976). A survey by the Ivorian Institute of

* The term "Hawthorne effect" is applied to those results that may appear due to the nature of some intervention, but in actuality are caused simply by the fact that an intervention was initiated; once the newness of a system wears off these effects usually disappear.

Public Opinion (IIOP, 1975) reports that 34% of urban households have television and 40% of these households are regular TV watchers, with the comparable figures for small towns being 14% and 20%, respectively. Only 27% of the urban population is reported as never watching television. Given that there is only one TV channel in the country, and that TPT programs are broadcast during prime viewing time, it is likely that such programs draw many viewers outside the animated classroom sessions.

The IIOP (1975) survey, using a nationally representative adult sample, did ask those interviewed if they viewed TPT programs, and the responses are given in Table 2. We see that 34% of the population has seen TPT broadcast at least once. However, for rural audiences who are the prime target of E/S activities, only 18% of the population ever report viewing TPT. It is impossible to translate these figures into an average number of viewers per program, but we can see that with a total adult (over 15) population of 3,750,000, the data implies that about 300,000 people are regular TPT viewers, which is almost ten times greater than the maximum viewing audience reported in the classroom setting. What "regular" means, however, and the extent to which the sample and responses were not biased, is far from clear. Furthermore, the number of viewers is primarily of interest as an available (but inadequate) proxy for the effectiveness, in terms of knowledge and other benefits gained, of the system. It is felt by many of the E/S system personnel that if any benefits are gained they are at least in part dependent on the animation activities, especially in rural areas, and thus one more independent viewer may not be equivalent to one more classroom viewer. We will return to such considerations again in

TABLE 2

TPT Viewing Among the General Population in 1975

(in percent)

	Frequency Viewed				
	Regularly	Sometimes	Rarely	Never	TOTAL
Urban Population	14	19	16	51	100
Rural Population					
- Semi-rural	7	9	10	74	100
- Village	2	6	9	83	100
- Rural average	2	7	9	82	100
Average Over Total Population	8	13	13	66	100

Source: IIOP (1975)

Section III after we examine the component costs of the E/S system in the following section.

II. COST COMPONENTS OF "EXTRA-SCOLAIRE"

In this section we examine the costs incurred by the various components of the E/S system: administration, program production, program transmission, support materials production and distribution, and reception. In accord with some of the points we discussed in Section I.A, we conclude with a broader discussion of some non-monetary cost considerations.

Throughout this section we will attempt to keep in mind both internal and external audiences, as we discussed at the outset. For those within the Ivory Coast the cost figures of interest relate to the marginal cost of adding the non-formal E/S system to the existing primary school ETV structure, while international audiences may be interested in the costs of replicating a similar non-formal system when no formal ETV system is in place. We will make two, broad, alternative assumptions, A and B, at various points throughout this cost analysis, with assumption A corresponding closer to the Ivorian perspective of building on slack excess capacity, and assumption B corresponding closer to the perspective of another nation deciding to initiate an entire E/S system, without a formal ETV infrastructure to build upon. This is <u>not</u> to say that costs under assumption A are the relevant ones for the Ivory Coast, and those under B, for international audiences--it is likely that either audience will favor viewing some combination of the two assumptions (e.g., depending as we shall see on how social decision-makers value such factors as animateur effort or audience viewing time).

The reader should realize that all categorization is an approximation; available information on costs and the use of resources does not

always conform to the functional categories used. A cost study has not been made of the whole E/S system before this and so the cost data gathered here represents a first attempt to do so. There are two different general approaches taken to costing a particular activity--to break down budgetary and expenditure information into functional categories, or to build up the analysis of the cost components from a more microscopic look at resource use. Both methods will be used in this section, although the emphasis will be on the latter, since budgetary categories do not readily allow breakdowns by specific functions. Questions of budget and financing in general, in terms of who is paying for the system, will be looked at in Section III. Given the dangers of unintentionally neglecting categories of a new system, when costing by the "ingredients" approach, we have tried to be conservative in our estimates, that is, to err on the high side.

Information sources from which the presented cost information was derived are referenced throughout. Additionally, reasonable approximations were made for cost components on which documented information was unavailable, either through conversations with E/S system personnel or equipment manufacturers, or based on the experience of other systems. Insufficient information exists to build an accurate year by year record of E/S costs since its beginnings, and so we have chosen to calculate the annual costs of an operating E/S system based on its size and scope during the 1975-1976 operating year, for which the most information was available (we will include amortized start-up costs however). Again we should emphasize that cost analysis does not yield sufficient information for decision-making, but must be supplemented by some information or guess as

to effects and benefits. We will use the cost information generated in this section to examine the cost aspects of certain decision questions of interest to Ivorians and other audiences in Section III.

A. Administration

The costs of a system's administrative activities are often one of the more difficult item to specify precisely. In this subsection we discuss general administrative activities; since the E/S system is a relatively small operation it is difficult to separate out the costs of administration of particular component activities, and thus their costs are included here. In 1975 the E/S Unit had a staff of about 55, 10 of whom were French technical assistants. Of this staff, approximately 7 persons were concerned full-time with general administration--an Ivorian director, a French technical advisor, a French coordinator, an accountant, an inventory controller, a secretary, and a chauffeur. A rough estimate of salary costs are 1,500,000 F CFA for an average Ivorian employee and 6,000,000 F CFA for an average foreign technical assistant (which includes the fringe benefits accorded to each, most notable for the foreigner being lodging and one round trip to France), yielding a total cost of 19,500,000 F CFA for this aspect of general administration.

The E/S Unit is in turn administered by the Ministry for Primary School Education and Educational Television and this aspect clearly should be included in the administrative costs of the system. Assuming the equivalent of two full-time Ivorian personnel within the ministry are concerned with E/S, we estimate their cost at roughly 3,000,000 F CFA. Also of importance is the administrative contribution made by the inter-ministerial committee that is called upon to aid in directing E/S activities

(exclusive of those interministerial efforts to produce particular TPT programs). We assume that about 70 person days of effort annually are put into this valued at about 14,000 F CFA per person day (calculated from the average teacher salary, see p. 55), yielding a total cost of 1,000,000 F CFA.

There are no data available that break out the operating costs of administrative activities. In the absence of such information we make the assumption that such costs are 25% of personnel costs, which is in line with the experience of the education sector in other nations. Thus we have a total administrative personnel cost of 23,500,000 F CFA and therefore operating costs of 5,900,000 F CFA, yielding a total administrative cost of 29,400,000 F CFA.

One last item to take up here is not strictly an administrative cost, but would most commonly be thought of as general overhead--the cost of the building space taken up by E/S activities. In theory one could allocate this cost according to the functional system component that it serves, but such requires the more information that we have at present. We estimate the inputed rent of the total space used by E/S in Abidjan (2 floors, 600 square meters) at about 40,000,000 F CFA annually, including the cost of office furniture and equipment.

B. Program Production

Below is listed the number of programs produced by the E/S Unit each year since its inception:

Year	Number of Programs Produced
April-May 1973 -	5
1973-1974 -	16 (4 of these were not broadcast for technical reasons)
1974-1975 -	36
1975-1976 -	35
1976-1977 -	38

Each program is approximately one half hour in length. The data above do not include the production activities of the video unit (they produced 3 specialized programs during 1974-1975), nor the experimentation with one minute educational spots (four were produced during 1974-1975). The discussion below does not examine these activities, but their costs are included--the video unit has only one full-time person assigned to it, and both activities rely on occasional slack capacity for taking regular program production team personnel.

As we mentioned earlier, one of the goals of the E/S system was to "rationalize" the formal ETV system, by which is meant to make more efficient use of the facilities, equipment, and personnel within the formal ETV structure. This intention initially included a heavy reliance on the formal school system's ETV production capabilities within the ETV Complex in Bouaké. However, beginning efforts in this regard proved difficult for a number of reasons. First, there turned out to be little, if any, slack capacity in the formal school system; time devoted toward E/S program production clearly took away from time devoted toward the production of primary school ETV programs and there was already more work planned for the latter than could be produced (see Evans and Klees, 1976, for a detailed examination of the primary school ETV program production

system, and its costs). Second, the longer length of TPT broadcasts (the average length of primary school ETV broadcasts is about 5 minutes) and their orientation towards a non-captive, adult audience demand a different approach than that used for primary school broadcasts. Third, the subject matter for TPT programs required shooting on location in various regions of the country, while for the primary school programs most could be done in the studio facilities at the Bouaké ETV Complex. Finally, close coordination was required with the various ministries in Abidjan in the development of program content and in the shooting, which made it difficult to maintain E/S production headquarters in Bouaké. Thus for all these reasons, in 1975 E/S moved its operations to Abidjan and only one small, four person E/S production team remained located in Bouaké (one French program director and three Ivorians, an assistant director, a cameraman, and a sound man), making only minimal use of the Bouaké facilities.

In Abidjan in 1976 there were two complete production teams working for E/S, and a small team of technicians that sometimes went to Bouaké to complement the small E/S production group based there. Table 3 lists the total number and types of personnel working for the E/S Unit in 1976 on the various stages of program production--conception, shooting, and the development of the final product.

It is important to realize that despite the lack of much reliance on the ETV Complex in Bouaké, the E/S Unit program production activities are not self sufficient. A complete team for TPT program shooting on location may consist of: a director, a producer, an assistant director, three cameramen, a sound man, a script person, a photographer and a

TABLE 3

E/S Unit Production Staff

1975-1976

Position	Number	
	Ivorian	French Technical Assistants
Producers	4	1
Directors	5	3
Cameramen	2	1
Sound	2	
Photography		1
Typists	4	
Supplies	1	
Graphists	2	
Editors	1	1
Chauffeurs	3*	—
TOTAL	24	7

* There were 5 chauffeurs total assigned to the E/S Unit, 3 is an estimate of the proportion of their time devoted to program production activities.

chauffeur. In order to have three complete teams, some personnel in addition to those assigned to the E/S Unit (see Table 3) are needed, probably at a minimum consisting of two cameramen, a soundman, a photographer and two or three "journaliers" (unskilled workers hired on a daily basis). Skilled technicians are often borrowed from RTI, when available, to complete a production team. In addition editing assistance is likely required, either from RTI or the ETV Complex.

In estimating annual TPT program production personnel costs (including fringe benefits) we again use the average figure of 1,500,000 F CFA for an Ivorian employee, and a figure of 6,000,000 F CFA, on the average, for a French Technical Assistant. To the 24 Ivorians and 7 French personnel listed on Table 3, we add 8 Ivorian staff members, as estimated above, who are loaned to E/S production activities. This yields a production personnel cost of 90,000,000 F CFA. To this figure should be added the costs of the staff members and working groups from other ministries who advise E/S production activities. We assume that such efforts are equal to two full time person equivalents (one at French and one at Ivorian salaries) costing 7,500,000 F CFA, making total production personnel costs equal to 97,500,000 F CFA.

Operating costs of TPT program production are quite variable and depend on such factors as the shooting locations needed, whether the program is a single show or a part of a series and the extent to which actors are needed. Two papers prepared by the E/S Unit (1976a,b) examine some aspects of these production costs in some detail and some of that information is presented in Table 4. In the absence of detailed information on the extent to which programs are produced in color (broadcasts

are in black and white, but surprisingly enough there are many color productions) and to which actors are used, we will use an average of the four cost figures presented in Item V, yielding an average operating cost per program produced of 895,000 F CFA.

We should note that the operating costs for program production detailed in Table 4 do not include the cost of film development, sound dubbing, editing, and copying. In the past, these elements of E/S production activity have been done at times by the ETV Complex or by RTI, but often the film is shipped to Paris for processing, primarily to avoid the chance of a repetition of some unfortunate and costly errors that have occurred in the past. We assume that dubbing and editing require only the personnel (which were costed previously) and their equipment (see below). For film processing a cost of 87.5 F CFA per meter is assumed, yielding a cost (for 1350 meters, since the unedited film must be developed) of 118,100 F CFA per program. For film copying a cost of 49 F CFA per meter is assumed (the same price for the working copy in Table 4), yielding a cost for two copies (as is customary in E/S operation) of 29,400 F CFA.

The remaining item to be discussed in this subsection is the cost of E/S production system equipment. The Data Processing Service (then the DOGE, now the SCOGE) which in 1976 was just initiating an inventory of all the Ministry's television equipment, reports equipment valued at about 4,800,000 F CFA.*

* Not all the equipment listed in the DOGE inventory was priced. The cost of those items not priced was estimated through conversations with manufacturers.

TABLE 4

Operational Costs of TPT Program Productions

I. Film and Sound Tracks- One needs about 300 meters of film for a 30 minute program. The ratio of film used is about 4.5 to 1.[a]

A. 16 mn Film

- Black and White:	68 F CFA x 300 m x 4.5 =	91,800
- Color:	132 F CFA x 300 m x 4.5 =	178,200
- Working Copy:	49 F CFA x 300 m x 4.5 =	66,150

B. 6.25 Sound Track

- Smooth Band:	5 F CFA x 300 m x 4.5 =	6,750
- Perforated Band:	16 F CFA x 300 m x 4.5 =	21,600

C. Miscellaneous

- Lead-in film:	26 F CFA x 600 m =	15,600
- Splice film:	350 F CFA x 8 cartridges =	2,800

II. Travel Expenses- Assume an average production team of 7 persons (this is less than we described earlier as a full team, but is probably closer to average practice), with 13 days[b] spent on location at a distance of 250 km, using two vehicles.

- Per diem	2500 F CFA x 7 Persons x 13 days =	227,500
- Gas[c]	120 liters x 2 Vehicles x 50 F CFA =	12,000

III. Actors- An average of 8 professional actors or actresses are used in those programs that have need of them, in addition to a varying number of extras.

- Payment of actors	33,000 F CFA x 8 persons =	264,000
- Per diem	2,500 F CFA x 8 x 12[b] =	240,000
- Extras		50,000

TABLE 4 (Cont.)

IV. Miscellaneous- An average of 10,000 F CFA/day is assumed to be needed to cover the costs of such expenses as flat tires, purchase of batteries, motor repairs, accessories and communications.

10,000 F CFA x 13 days = 130,000

V. Recapitulation of Average Operating Cost/Program by Type of Program[d]

A. Black and White, Without Actors	624,500
B. Color, Without Actors	710,900
C. Black and White, With Actors	1,078,500
D. Color, With Actors	1,165,900

Source: E/S Unit (1976 a,b)

[a]A ratio of 4.5:1 is used, as opposed to the 4:1 ratio used in the E/S Unit (1976b) source, based on conversations with E/S personnel and since the report above cites 4:1 as a minimum ratio.

[b]Thirteen days is used as opposed to 12 days in the E/S Unit (1976b) report, since this source does not take account of the advance on-site preparation work, perhaps 2 days worth, usually engaged in by about half the production team. Such a figure is more close to actual production experience, if we assume thirty work weeks (5½ days each), 3 production teams, and 35 programs produced. Only twelve days is used for actor per diem and salary, as in E/S Unit (1976a).

[c]Instead of the 100 F CFA/liter cost of gas used in E/S Unit (1976 a,b), only 50 F C FA/liter is used, because half the price represent Ivorian import taxes. The latter may be an expense outlay to the Ministry, but represents a transfer payment, not a social cost, for the Ivory Coast. See Eicher and Orivel (1976, p. 46) for a similar accounting and Jamison, Klees, and Wells (1977) for a discussion.

[d]When actors are not included, the cost of extras is.

Additionally, the E/S program production system sometimes makes use of the production equipment of the Bouaké ETV Complex and of the RTI. As we indicated in the introduction to this section, we may make two alternative assumptions (or some combination of the two) relevant to this loaned equipment: (A) it is equipment with excess capacity, having no alternative use for the time it is borrowed for E/S activities, or (B) it is fully employed equipment and as such its use for E/S is a cost borne by some government agency other than the E/S Unit. (Note that it was previously assumed that loaned personnel did not have such "slack capacity.") We assume the value of this equipment is 20% of the total equipment value assigned to the E/S Unit, equal to 1,000,000 F CFA. This latter figure is added to the equipment cost above under assumption B, while it is omitted from consideration under assumption A. Costs under assumption B are certainly of interest to international audiences, who unless they have excess production equipment will have to purchase all the equipment necessary, and perhaps to the Ivory Coast depending on the extent to which A or B describe their operating situation.

Not included in the equipment inventory of the DOGE are the three vehicles and the mobile video van assigned to the E/S Unit. The mobile video van cost about 20,000,000 F CFA and is assumed to have a ten year lifetime. The three vehicles are assumed to cost 1,800,000 F CFA each and have a lifetime of 5 years. Additionally, it is assumed that one vehicle is rented or lent by an employee at an annual cost of 1,000,000 F CFA.

To arrive at a total annualized equipment cost we will assume an average lifetime of 10 years for the inventoried equipment and amortize

all the investments at social rates of discount of 0%, 7.5%, and 15%.* Additionally, we assume equipment operating and maintenance costs to be 10% annually of the total cost of equipment. Thus for a total capital investment of 30,200,000 F CFA under assumption A we have an annual operating and maintenance cost of 3,000,000 F CFA, and under assumption B, for a total capital cost of 31,200,000 F CFA, we have annual operating and maintenance costs of 3,100,000 F CFA.

Table 5 summarizes the E/S program production system costs detailed in this section. We see that in the case of production system costs, the difference in total or average costs between assumption A and B is negligible (this will not be so in examining other E/S system component costs). This would suggest that if significantly increased output (more or better programs) could result from not having to depend on loaned equipment, by making the E/S Unit more able to plan their shooting schedule efficiently, additional equipment purchase may be a wise investment (provided also of course that more and/or better programs, if attainable, are also socially valued).

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* All capital costs (for physical or human resources expenditures that have a useful life greater than one year, see the footnote on p. 15) are converted to their annual equivalent cost by multiplying them by the appropriate annualization factor. This conversion process is termed amortization. The annualization factor depends on the lifetime of the resource, m, and the social rate of interest, r, and is equal to $[r(1+r)^m]/[(1+r)^m - 1]$. (Standard tables are available that list the annualization factors for different values of r and m.) The social rate of interest (or discount) is in effect the price society places on the time value of its resources. In this paper we assume two alternative rates, 7.5% and 15%, and we also show how costs are mis-estimated when capital costs are simply divided by the lifetime of the resources (equivalent to assuming r = 0). See Jasmin, Klees, and Wells (1977) for further explanation of these concepts.

TABLE 5

E/S Program Production Costs

(in million of F CFA)

Item	Recurrent	Capital amortized at 0%	7.5%	15%
Personnel	97.5			
Operating Cost[a]				
= program shooting	31.3			
= processing and copying	5.2			
Equipment (annualized capital cost + operations, maintenance, and vehicle rental)				
= assumption A	4.0	3.6	4.9	6.5
= assumption B	4.1	3.7	5.1	6.7

	If Capital Is Amortized At: 0%	7.5%	15%
Total Cost under A	141.6	142.9	144.5
Total Cost under B	141.8	143.2	144.8
Average Cost/Program under A[a]	4.1	4.1	4.1
Average Cost/Program under B[a]	4.1	4.1	4.1

[a]Total operating costs are derived by multiplying the average cost per program of 894,000 F CFA given in the text by the number of programs produced annually by the personnel and equipment detailed above, assumed to be 35. Average costs per program are then derived by dividing the total cost figure by 35.

Given that each program is almost 30 minutes in length, we also can see from Table 5 that production costs per hour of programming produced are 8,200,000 F CFA under either assumption A or B, not including the costs of office space and equipment which were listed under administration costs. If we assume 1/4 of these facilities were used by production system activities (the total being costed at 40,000,000 F CFA annually), this raises the average production cost per hour of TPT programming to 8,800,000 F CFA (about 35,000 U.S. dollars in 1975). We will discuss this data in the context of international experience and in the context of Ivorian alternatives in Section III.

C. Program Transmission

The TPT programs are transmitted over the governmentally owned and operated RTI on Wednesday and Friday evenings. In contrast to the time devoted to primary school ETV broadcasts, TPT programs displace other programs that would be broadcast and whatever value could be attached to these alternative programs constitutes the opportunity cost of the E/S transmissions. In monetary terms it is difficult to assess the real social costs incurred by RTI for such program transmissions in terms of the personnel, operating, and maintenance costs additional to those that would be incurred without such broadcasts. In the absence of better information we agree with the line of reasoning reported in Eicher and Orivel (1976, p. 46) and use a cost per hour broadcast of 196,400 F CFA. Given about 20 hours of TPT broadcast during 1975-1976 (including repeats), we get a total transmission time cost for that year of 3,900,000 F CFA. In addition, during 1975-1976, the E/S Unit had one full time Ivorian

staff member whose area of responsibility was program transmission, whom we assume cost 1,500,000 F CFA. The extent to which this total cost would reflect the costs to be incurred by other nations instituting a similar system would of course depend on their existing communications system infrastructure.

D. Support Materials Production and Distribution

The group concerned with support materials production and distribution within the E/S Unit is responsible for supplying information and documents to accompany the TPT program to the animateurs in the field. During the 1975-1976 operating year there were 15 people working in this area, 1 French and 14 Ivorians, yielding a total personnel cost of about 27,000,000 F CFA.

A combination of printed materials and posters are produced to support the program content, announcing dates, times, and subjects, and providing summaries, and answers to previously submitted questions. During the 1975-1976 operating year an average of 2.7 pages of printed materials were used to support the TPT programs broadcast that year and 3 booklets of 30 pages each answering questions submitted. Additionally, the animation groups produced 15 pages (material is usually printed on both sides of each page) per person to support the weeklong animator training session held in September of 1975 (see Section II.D below). Finally, approximately 10 posters (about 80 cm x 60 cm) were produced.

The written materials produced to accompany the programs were printed to distribute to all animateurs, as well as to the field agents and some central personnel of relevant ministries, yielding almost 1500 printed copies. For the animateur training session material almost

750 copies were produced, and for the posters about 3,000 copies, since some of these latter were distributed and posted in various locations (such as health clinics and stores) to support desired actions (such as the purchase of water filters).

There is no available breakdown of E/S Unit costs by the task incurred in these animation activities and thus we must estimate roughly the operating and equipment costs necessary. The E/S Unit had two stencil machines, but often document and poster reproduction is given out to be done on the equipment of other government agencies or by private firms. If we assume 7.5 F CFA for two sides of the page printing and 250 F CFA per poster (including all materials and use of equipment), we get a total cost of 2,300,000 F CFA for the printed materials and 7,500,000 F CFA for the posters. To this we will add 10% of the cost of personnel to cover general operating expenses.

The cost of materials distribution is much more difficult to estimate. Packets of material to accompany several broadcasts are sent out 5 or 6 times a year. Various systems of distribution have been experimented with by the E/S Unit such as using the postal service, using the private company (CATEL) that maintains the primary school ETV reception network through regular visits to village schools, or through distributing the materials to primary school inspectors who in turn distribute them to the teacher-animators. Again we return to the question of the extent to which there exists excess capacity (our assumption A) in these distribution systems, for if there does the processing costs are negligible. However, if there is no excess capacity, or in the case of international audiences who may be interested in initiating a similar

system in regions that do not have even a fairly reliable distribution system to rural villages, such costs may be substantial. We will not include an estimate of these costs in this section, but will assume they are included under the costs of maintenance of the reception equipment given under assumption B in our discussion in Section II.E below. Finally, there is occasionally information provided about the TPT broadcasts in the newspaper, or on the weekly TPT program for primary school teachers on Thursday mornings. Both constitute a relatively small effort and are not costed, other than the E/S Unit staff time put in for which we have already accounted.

E. Program Reception

Clearly of critical importance to such a system of non-formal adult education through television programming is the system and context within which broadcasts are received. As described briefly in the introduction, the E/S system is structured so that adults come to the village school and view the TPT broadcast along with an animator, who may introduce the program, provide on-going translation of the French to the local language and who usually attempts to lead a discussion session on the topic after the program has ended. In examining the costs incurred by this structure we can look at two separate elements -- the cost of the human resources in terms of the time and effort put in by both animateurs and viewers, and the cost of the physical resources in terms of the equipment and facilities utilized. Below we examine each in turn.

Again, as we mentioned in the introduction, the animateurs are primary school teachers who have volunteered their time, or whose time

has been volunteered by their school director, to function as TPT animateur for the village. Most of these animateurs seem to have expected the Ministry to initiate some payment for their services and were both surprised and dismayed when in October 1976 the Minister declared E/S animation to be a task expected as a normal component of a primary school teacher's activity.

Despite the fact that there has not been and perhaps not likely to be any compensation for animateur time, there still are a number of reasons to consider the economic cost to the society of such activities. First, for international audiences who may be interested in the cost of establishing a similar system, animateur effort may not be a "free" good, and such workers may have to be paid.

Second, even though no payment is made, one could consider that the Ivory Coast is still incurring a social cost in that the efforts of substantial human resources are being devoted to E/S activities as opposed to other, alternative uses of these teachers' time. The social value placed on the (best) alternative activities in which these teacher/animateurs would be engaged if they were not working as animateurs constitute a social opportunity cost of their time. It is common practice for economists to attempt to impute the value of such donated or non-priced time, when such time has alternative employment possibilities in the labor market (e.g., cost analysis of highways in the U.S. often estimates a value assigned to commuter time). If such time, however, is an alternative for an individual's leisure time activities there is some debate as to whether this constitutes a <u>social</u> cost. This issue brings us back to our earlier discussion in Section I.A; given our

view expressed there that the market mechanism is an extremely imperfect indication from which to determine the value society places on various resources allocation, one must thoughtfully consider the question of what social value should be attached to alternative endeavors and this includes the leisure time, as well as the work time, of people.

A third rationale for considering the animateurs' efforts as a social cost is that with the Minister's recent declaration, animation activities are henceforth considered a paid component of a primary school teacher's duty and thus a portion of their existing salary, despite the lack of a raise for the extra duties, can be considered payment for animation activities. In fact, in 1976, teachers and other public education employees were given a very substantial increase in salary, amounting to about 40% of their previous salary, and the Ministry may have viewed this as more than sufficient to compensate for an expansion of primary school teacher duties.

In order to cost the animateur's time we must determine how much time they sepnd engaged in E/S activities. The typical practice seems to be to devote some time in the day of a broadcast (or on the previous day) to notifying people in the village of the subject and reminding them to attend. A variety of mechanisms may be employed: telling the school children to remind their parents, notifying village officials, going door to door, telling the village crier to announce it, or ringing the school gong. All in all, E/S Unit Personnel estimate that an animateur may spend about one hour, on the average, doing such tasks. On the evening of the broadcast the animateur usually opens the school classroom between 7:00 and 7:30, and often viewers turn up early to

watch the 7:45 news program. The TPT broadcast usually runs from 8:15 to 8:45 (although for the first few years they were frequently delayed, on the average of a half hour, seemingly due mostly to a low priority attached to their timeliness) and are followed by a half hour to an hour discussion. Thus we estimate an average of about 3½ hours is spent by an animateur per broadcast. To estimate a monetary cost of this time we use the information that a teacher works about a 35 hour week, 33 weeks per year, at an average salary (after the increase) of about 2,000,000 F CFA (1,400,000 of which is salary, the rest being fringe benefits in the form of housing and services). This yields an average hourly compensation of 1730 F CFA, which means an animateur cost per program animated (remember, not all animateurs open the schools for every TPT broadcast) of 6055 F CFA. We will use this figure as the recurrent cost of animateur effort under assumption B; under assumption A we will assume the animateur's time does not involve a social cost.

Additionally, there is some training provided for animateurs through an annual week long training service held in Bouaké in September. About 450 people attended the first such session held in September 1974, and about 550, 20% of whom were coming back for the second time, attended the second in September, 1975. Animateurs re not paid for attending, although they are reimbursed for their travel. Instruction is provided by E/S Unit personnel (and some borrowed from the ETV complex), the cost of whose time has already been accounted for. The facility utilized has excess capacity at this time of year and the marginal costs of travel and food are estimated at about 6250 F CFA/participant for the week long stay. Again, we have the question of whether we should include the

animateur's time as a social cost and the earlier rationales again apply, yielding a cost per participant under assumption B (assuming 35 hours/ participant) of about 60,550 F CFA for the week of their time.

To understand these training costs in terms of the E/S system we have to make two modifications. First we must consider that 20% of the animateurs attending the September 1975 seminar were repeaters. Second, in terms of the whole E/S system, we must realize that not all animateurs have attended such sessions, and not all those who attend the training session become animateurs. Given that we estimate the total attendance at the two (1974-1975) sessions at 1000, of which almost 100 individuals attended both sessions we get a total of 900 animators with either one or two weeks of training. However, of the 899 animateurs functioning during the 1975-1976 operational year, only half reported receiving such training, implying that about half of those trained were not functioning as animateurs. To calculate the <u>average</u> cost of animateur training over all those animateurs functioning (i.e., some with no training, and some with one or two weeks of training) we must spread the total cost of both sessions over the number of animateurs functioning. The total cost of the two sessions according to our assumptions is 6,250,000 F CFA for operation and an additional 60,550,000 F CFA if we impute salary costs to the animateurs' time. Dividing this cost by the 899 animateurs reported functioning we get an investment of 6950 F CFA per animateur for training costs (to be included under either assumption A or B) and an additional 67,353 F CFA per animateur if we included the imputed costs of people's time (as we will under assumption B).

This cost reflects the historical peculiarities of the Ivorian effort at animateur training thus far and decisions need to be taken on what form such future training should take. In the absence of such plans we will assume that the rather haphazard training system now in effect will continue, with some animateurs getting no training, and others having one or two weeks training. Furthermore we assume that the training is updated every 5 years and thus we will treat the cost figures above as an investment in human capital to be amortized over a five year period at social discount rates of 0%, 7.5%, and 15%. Alternative training schemes will be considered in Section III.

We now turn to the question of the social cost, if any, incurred in the time spent by the audience watching and discussing TPT programs. In the consideration of the rates of return to formal schooling by economists, account is always taken of the value of the student's time in terms of foregone income, and such is also becoming more prevalent in cost-effectiveness studies as well (see Wells, 1976 for a review of some of the literature applicable to higher education). The previous discussion concerning the social value put on alternative uses of the animateur/teacher's time, be it work or leisure, is equally applicable to that of the viewer's time. What societal value is placed on alternative adult evening time activities must be a societal decision (but perhaps no more so than what is the social value of the resources used up in making a TV receiver, as was discussed in SectionI.A); nonetheless, below we will impute an average cost of viewer time based on GNP capita.

Again we will assume that such time is socially costless (regardless of its value to the individual) under assumption A and impute a cost for

it under assumption B. In this latter case we will assume a time per viewer of 1½ hours (including their time going to and from the broadcast as well as the time spent watching and discussing). Given an average GDP per capita of about 90,000 F CFA (which is a high annual income for the average rural population but according to Fritz, 1976, the TPT broadcasts seem to attract persons who are more educated, and probably have higher income than average) and an assumed 1800 work hours per year, we will impute a cost of 50 F CFA per hour of viewer's time, yielding a cost of 75 F CFA/viewer/program.

Finally, we must examine the costs of reception system equipment and facilities. Again we view these costs from the perspective of both assumptions A and B. From the former perspective, we view the E/S system as an add-on component to the already established primary school ETV system. In this case the only costs incurred are the marginal costs of the operation of the television for the TPT broadcast.

The television receivers are powered by mainline current in about 20% of the schools, while in the remainder of the schools a system of 32 alkaline batteries is used as a power source for 2 or 3 receivers. Mainline current costs about 2 F CFA per hour of use. The batteries are quite expensive; in 1975 a set cost 307,200 F CFA. However, approximately 40% of this price reflects an import tax and although this is clearly a cost to the Ministry purchasing the batteries, represents an internal transfer of funds and not a social cost to the Ivory Coast. Thus we use a price of 184,320 F CFA per battery set, and furthermore assume a 2000 hour lifetime, yielding a cost per hour of operation of 92 F CFA. The average cost for an hour of TV operation over the whole E/S network is

therefore a proportional combination of the cost of those receivers operating off batteries and mainline current (80% and 20% respectively), equal to about 74 F CFA per hour of operation.

Each TPT program is only ½ hour in length, but as we indicated earlier, people often gather at the village primary school earlier to watch other programs. Furthermore, after the TPT broadcast there are reports that often the television receiver is left on during the discussion without sound, to function as a light when there is no available lamp (as in most cases). Aside from the obvious distraction that the ensuing programs provide, this clearly is a costly source of illumination. Despite the situation, requests for kerosene lamps to be provided were turned down by the Ministry. It is difficult to decide to what extent the costs of such illumination and other program viewing should be attributed to the E/S system. We will assume that one hour of TV operation per program is thus assigned, again at an average cost of 74 F CFA per hour.

If, as under assumption B, we are looking at the costs of initiating a non-formal adult ETV system similar to the Ivorian operation, when there does not already exist a maintained television system reception network in rural areas, the costs are obviously much higher. Below we use data gathered in the cost analysis of the Ivorian formal school ETV system (see Eicher and Orivel, 1977 and Klees and Jamison, 1976) to approximate roughly such costs. We assume the country in question has a TV signal transmission network that allows for such reception (see Klees and Wells, 1977, and Butman, Rathjens, and Warren, 1973 for cost analyses of alternative types of signal transmission systems).

The equipment necessary for reception and their cost in 1975 would be as follows:

antenna	13,000F CFA
mast	110,000F CFA
platform for batteries and TV	22,500F CFA
TV receiver	96,000F CFA
installation (including materials)	27,000F CFA

We assume a lifetime of 10 years for the first three items and one of 7 years for the latter two. For the sake of simplicity we assume a constant annual maintenance cost per village of 150,000F CFA, which is the projected cost figure at which the present Ivorian maintenance systems will level off (see Eicher and Orivel, 1977, p. 32). In 1975 such costs averaged 240,000 F CFA per school, but it must be remembered that such maintenance costs are based on several operating receivers in each school. We will summarize all the costs of reception detailed here in Subsection G below.

F. System Evaluation

Evaluation should be considered a normal, on-going, component of the operation of most education projects. In the case of the Ivory Coast, however, substantial foreign aid has been involved in the evaluation efforts of the entire formal and non-formal ETV project and it is unlikely that the Ivory Coast would have initiated such a large evaluation effort if left to its own funds. Despite this, we should remember that the entire ETV project, not just its evaluation component, has received considerable foreign technical and monetary aid, and it is also unlikely

that such a large ETV project would have been initiated by the Ivory Coast on its own funds. Replications of a similarly large ETV project in other nations will likely rely on such aid as well, and perhaps generate similar evaluation efforts. Thus we will consider all the E/S evaluation efforts in our cost analysis of the E/S system. However, we will view most of that portion of the effort that has been externally funded until now as a start-up investment cost, to be amortized over an assumed 10 year life, after which time another substantial increase in evaluation effort would be useful to E/S system decisions.

The considerations above do not mean that evaluation is not considered an on-going project activity; it signifies that we will only consider a certain portion of the present effort, described below, as an on-going recurrent cost component of the E/S system. First, during 1975-1976, the E/S Unit had about 1½ persons fully employed in research in the project, yielding a recurrent salary cost of 2,300,000 F CFA. To this we assume a 20% addition as the cost of operations, yielding a cost of 2,800,000 F CFA. In addition, the Evaluation Unit of the Ministry has devoted a considerable portion of its attention, perhaps 35%, to the examination of the E/S portion of the general ETV reform. Given a budget of about 12,000,000 F CFA in 1975-1976, this yields a cost for E/S evaluation of 4,200,000 F CFA.

In terms of foreign contribution to the evaluation effort, the U.S. will have spent approximately 131,500,000 F CFA by the end of this calendar year, about 80% of which was spent on E/S evaluation, yeilding a cost of about 105,000,000 F CFA. In addition to that other foreign government and agencies by the end of this year will have contributed about six

person years of technical expertise to the E/S evaluation effort, at an assumed cost of 6,000,000 F CFA per person year, yielding a cost of 36,000,000 F CFA. We will treat this total 141,000,000 F CFA cost as a lump sum investment (neglecting its time structure), assumed not to continue after 1977 (which may or may not be correct), to be amortized over an assumed 10 year lifetime as we discussed above.

G. Monetary Cost Summary

Table 6 summarizes all the cost information put together thus far in Section II under both assumptions A and B, in terms of total annual recurrent costs, total annualized capital costs, average costs per program broadcast, and average cost per viewer per program broadcast, the latter 3 figures under differing assumptions as to the appropriate rate of interest. Not using a discount rate is an erroneous practice (see Jamison, Klees, and Wells, 1977), and we include a 0% interest rate only in order to show the magnitude of the error introduced into the analysis through the neglect of this factor. However, in the case of the Ivorian E/S system we see that the magnitude of such an error is likely to be small. Even under assumption B, the use of no discount rate, if, in fact, 15% were the appropriate rate, would only understate total costs by about 6%. This indicates that recurrent costs for the E/S system are generally considerably larger than capital costs, at least at the size of the reception network in 1975-1976, 899 schools. If expansion were to occur without relying on already installed reception equipment (as under assumption B), capital costs would increase in importance and thus the choice not to employ a discount rate would yield a larger error. Alternative expansion strategies and their costs will be discussed in Section III.

TABLE 6

Annual Costs of the E/S System[a]

Cost Component	Annual Cost (millions of F CFA)			
		Capital amortized at		
	Recurrent	0%	7.5%	15%
Administration				
- personnel	23.5			
- operations	5.9			
- facilities[b]	40.0			
Program Production				
- personnel	97.5			
- operations	36.5			
- equipment (A)[c]	4.0	3.6	4.9	6.5
(B)[c]	4.1	3.7	5.1	6.7
Program Transmission	5.4			
Support Materials Production[d]				
- personnel	27.0			
- operations	12.5			
Program Reception				
- animateur time (B)[e]	70.2			
- animateur training				
- operations[f]		1.3	1.5	1.9
- animateur time (B)[g]		12.1	15.0	18.1
- audience time (B)[h]	44.2			
- reception equipment				
- operations (A)[i]	.9			
(B)[j]	135.8	28.9	40.0	52.7
Evaluation				
- personnel & operations	7.0			
- foreign contribution[k]		14.1	20.6	28.1

TABLE 6 (Cont.)

	If Capital Is Amortized At:		
	0%	7.5%	15%
Under Assumption A:			
Total Cost[l]	260.7	263.9	267.7
Average Cost/Program Broadcast[m]	6.9	6.9	7.0
Average Cost/Viewer/ Broadcast[n] (in F CFA)	455	450	455
Under Assumption B:			
Total Cost[l]	551.2	568.5	588.1
Average Cost/Program Broadcast[m]	14.5	15.0	15.5
Average Cost/Viewer/ Broadcast[n] (in F CFA)	935	965	1000

TABLE 6 (Cont.)

Footnotes to Table 6

[a]This is based primarily on information for the 1975-1976 operating year.

[b]The reader should remember that this figure includes building space and office furniture for the entire E/S Unit, not just the administrative staff.

[c]In this case A assumes that equipment borrowed from other agencies reflects their excess capacity, while B assumes such equipment necessary and therefore costly to a similar foreign (or to the Ivorian) non-formal education effort.

[d]The reader should recall that support materials distribution is included under assumption B on the reception equipment system, in that the maintenance system costed out under this alternative is assumed to distribute the TPT materials.

[e]Under assumption A we assume such time is socially costless. Under assumption B we have a cost of 6055 F CFA per animateur per program animated x 305, the average number of schools open (i.e. animateurs working) per TPT broadcast in 1975-1976, x 38, the number of TPT broadcasts in that year (including three broadcasts repeated).

[f]This views the total 6,250,000 F CFA spent on animateur training through 1975-1976 as an investment to be amortized over a 5 year lifetime.

[g]Under assumption A animateur time is socially costless, while under B such time, valued at 60,550,000 F CFA, is treated as an investment to be amortized over 5 years.

[h]Under assumption A viewer time is considered socially costless while under assumption B its worth is estimated at 75 F CFA/viewer/program. Given an average of 15,500 viewers per program during 1975-1976, and 38 programs broadcast, we get a total cost of 44,200,000 F CFA.

[i]Under assumption A we only consider the marginal cost of operating the TV receiver for TPT broadcasts estimated at 74 F CFA per program viewed. Again with 305 schools open on the average for 38 programs during the 1975-1976 operational year, we get a total cost of 900,000 F CFA.

TABLE 6 (Cont.)

Footnotes to Table 6 (Cont.)

[j]Under assumption B, to the costs above (see footnote i) are added the costs necessary to provide TV reception in rural villages, assuming a signal transmission network already exists. These include: the capital cost of antennas, masts, and platforms valued at 145,500 F CFA per school with a lifetime of 10 years; the capital costs of TV receiver and installation (including materials) valued at 123,000 F CFA with a lifetime of 7 years; and a recurrent cost of system maintenance of 150,000 F CFA per school annually. Amortizing the first two at the discount rates used and multiplying all costs by the 899 schools in the system during 1975-1976, we get the costs shown in the table.

[k]This treats the entire foreign contribution to E/S system evaluation through the end of this present year of 141,000,000 F CFA as a lump sum investment (neglecting its time structure) to be amortized over an assumed 10 year lifetime.

[l]This includes both recurrent and capital costs.

[m]This is the total cost divided by the number of program broadcasts, equal to 38 in 1975-1976 (including three broadcasts that were repeated).

[n]This is the average cost per program divided by the average number of viewers per broadcast, equal to 15,500 in 1975-1976.

The total and average E/S system costs differ substantially according to whether one views costs from the perspective of assumption A or assumption B. If we value (under assumption B) animateur time and viewed time, and assume that reception equipment is not already installed, as would be the case perhaps in the initiation of a new project, costs are over twice as large (as under assumption A). For the Ivory Coast, the E/S system can be viewed as an addition to the existing formal ETV network; nonetheless Ivorian decision-makers may still want to include the cost of animateur and viewer time, if these are viewed as having social value, and thus costs (total and average) could be about 60% higher than those given under assumption A.

Finally, we should reiterate that cost data, such as those provided here, are clearly not sufficient for any sort of decision-making, but offer only partial information as an aid to any particular decision. Still, the average costs per program and per program viewer are useful as ways of thinking about the investment in social resources that are devoted towards this particular endeavor. One can ask the question, is it worth society an average of 6,900,000 F CFA per program (at r = 7.5%, under assumption A) to deliver 38 of these types of broadcasts to an average of 15,500 people per broadcast (we will discuss non-school viewers in Section III)? Or, alternatively, one can think of the value of the E/S system in terms of asking the question, is it worth society an average of 450 F CFA (at r = 7.5%, under assumption A) per viewer per program to annually broadcast 38 programs, each of which reaches an average of 15,900 people?

Given that one decides to use price as a proxy measure for social value, as we discussed in Section I, the cost information presented can thus serve as a yardstick against which to ask questions of evaluation as those above. Further consideration of this information in a decision context will be undertaken in Section III. In the remainder of this section we turn to a discussion of broader cost considerations that cannot be translated very easily to a monetary proxy.

H. Non Monetary Costs

As we discussed in Section I.A, the economist's conception of price as a valid measure of the value society sets on the use of its resources relies on a number of assumptions that are unlikely to hold. It is not clear to what extent is price, if not a perfect measure, then at least a useful approximation to social value. It is therefore of even greater importance to pay attention to considerations that are not easily priced, if at all, but nonetheless are likely to involve a cost in terms of societal welfare. (We have seen above an attempt to use indirect price information to impute a value to animateur and audience time; however, not all such considerations are priceable, even roughly.) Certainly an examination of these considerations is not perspective free, but then again, neither is the examination of price. In the remainder of this section we discuss a few issues, relevant to the development of the E/S system, that seem significant to consider in the evaluation of its social costs.

There are five principal topics we wish to consider here: foreign aid, the teacher-animateur, the school, the TPT programs, and the

television medium.* First, the significant foreign technical expertise and monetary aid, primarily from France, that accompanied all aspects of the Ivorian ETV reform may have social costs for the Ivory Coast (or for another nation trying a similar system) beyond their monetary impact. How one generally views the costs to a nation of foreign dependencies between less and more industrialized nations, will depend on one's view of development (which we explore in Section IV). Clearly the Ivory Coast recognizes the problems associated with too strong a dependence on France, and this is reflected in the promotion of the government policy of Ivorization, the training of Ivorians to take over positions often filled at present by foreigners. However, it is not clear whether such projects as the ETV reform promote such objectives by increasing the training of nationals, or thwart such objectives by introducing another system which is dependent on foreign aid.

Our second topic focusses on the primary school teacher as the TPT animateur; this selection seems to have been made, as many social process choices are, more as a result of the historical development of the system than as a consequence of a reasoned social choice. The Ivorian system was initiated within the education ministry; the E/S system added on,

* The topics discussed in this section could also be examined in studies of the effects and effectiveness of the E/S system (actually they have and it is from those sources that we have drawn the information included). Our point in including these topics in a study of system costs is to draw attention to the fact that they can also be viewed as affecting the social costs of a project. Prices in any system will not capture all the social costs imposed by resource use, and one may usefully consider as social costs impingements on individual well-being and conflicts with other social goals that may result from system resource use and structure.

despite careful attention to other ministries and agencies in the generation of adult education and information materials, remains within the education structure for the reception of such materials. However, as Benveniste (1976, p. iv), in an intensive study of the animation of the E/S system in four villages, concludes:

> The structure of participation [in the E/S system] is also tied to the kind of relations that bind the teacher to the village people on the one hand, and the school to the village on the other. The teacher is often viewed as an agent of the government whose role is to give children an education to help them escape the rural area. He is almost never seen as an intermediary between the village and the outside, nor as a development leader. His lack of real integration in the village, because of frequent moves does not foster this.

It has been a conscious policy in recent years to keep teachers mobile and to promote the assignment of teachers to schools in areas to which they are not native. A partial justification of this latter policy is the belief that if the teacher does not know the local language, the teaching of the French language, the principal goal for the first few years of primary school, will proceed that much more rapidly. Regardless of the reasonableness of such a policy, it seems likely that the teacher's ignorance of local customs and language, as is common, makes him (again, there are very few women animateurs) a problematic choice as animateur.

The teacher-animateur clearly recognizes aspects of this problem; in a study of the reception in 23 villages of the series of TPT programs on water, the Evaluation Service (1976, p. 49) reports that

> there is widespread agreement among animateurs that their relations with villagers are sparse, and when they exist are often strained. First, the physical layout of the typical village separates teachers from local inhabitants. Teacher housing is constructed conventionally on the periphery of the village, in an area often referred to by villagers as the "white" neighborhood. It must be remembered that teachers are in most cases from other tribes than the predominant village tribe and are consequently considered outsiders.

The study goes on to comment on the lack of more than perfunctory communication between teachers and villagers in general, and that in the rare cases where there is a close rapport, the animateur speaks the local language and has been in the school for a number of years.

The point of this discussion is that there are social costs (not well captured by price) in choosing teachers as animateurs, both in terms of the E/S project's goals and broader societal issues. It seems quite possible that more effective choice of animateurs (either from or outside of the teaching force) could increase both the size of the audience, the comprehension of the message, and perhaps even the ability to translate some messages into community action. In broader societal terms, there is also the question of the desired development of local leadership, initiative, and authority (villagers have occasionally indicated a desire for one of 'their own' to function as animateur), and whether the use of the teachers as animateurs is viewed as disruptive to that structure.

Closely related to these questions of societal costs is the choice of the school as the locale for non-formal adult educational activities. Benveniste (1976, p. 3) observes that "the school is also marked as an outside organization, and the government's choice to organize adult education through the school is not conducive to unanimous acceptance,"

and the Institute for Communication Research (1976, p. 54) concurs that "the school is still an urban phenomenon alien to most small villages." Fritz (1976, p. 20) is more explicit:

> The second factor [for the lack of popularity of TPT] is the fact that the place where TPT broadcasts are viewed, the primary school-if one does not have access to a private TV receiver-, is little suited to adults. The school, with its benches made for children, is not only uncomfortable for adults, but it especially represents a place for children. And this fact has many implications for the members of a society of which one of the major criteria for social organization is age, that is to say where authority is traditionally defined by age. The fact that the adult peasant is put in a place with which he has little familiarity, and where the youth, more educated than he, can easily make fun of him, that is to say attack his authority, puts him in a psychologically uncomfortable situation.

The extent to which the use of the school environment adversely affects the audience size or the understanding of program content is uncertain, but it would seem that such factors deserve further scrutiny.*

A third issue we want to consider here is related to the TPT programs themselves. Evaluations have been undertaken of the extent to which particular TPT messages have been received, understood, and acted upon. Some preliminary results are interesting, indicating general comprehension of the programs, but little translation of this understanding to actions (e.g., see Lenglet, 1976 b). Two of the more important factors blocking

* Fritz (1976, p. 23) argues that the presence of traditional village authorities at TPT broadcasts can help transform a "place for children" into a "place for adults," and thereby help preserve some traditional values that may make it easier to pursue development strategies. He also presents some evidence indicating higher TPT attendance in villages where such notables are present at broadcasts, although it is not clear whether one can attribute simple causality to such presence or such presence reflects a particular village structure and animateur rapport.

such actions appear to be insufficient personal or community resources (e.g., to buy a water filter or construct a well), and a development infrastructure that, when it exists, is often not well prepared to mobilize for such actions. While we will return to the nature of these problems in the concluding section of this paper, for now we should note that regardless of the effectiveness with which information is transmitted, a system that raises the expectations of the rural population without being able to fulfill them may incur serious social costs. This appears to be a factor deserving significant attention within the E/S system.

Furthermore the TPT programs may impart more than their planned messages to the viewing audience. Two relevant concerns of some viewers have been the programs' limited use of tribal languages and the image portrayed of the rural peasant. Broadcasts are primarily in French, but many are shot in village locations with scenes that use native speakers of tribal languages. However, because of their proximity to Bouaké, almost all such shooting is in Baoulé villages (the predominant ethnic group in the center of the country) using the Baoulé language. While this is well received by Baoulé viewers, numerous complaints have been voiced by villagers in other regions about such one-sided ethnic and linguistic coverage.

The image of the rural adult depicted on TPT programs also seems to have caused some concern:

> In the eastern village of Dufferebo, a peasant vehemently protested: "What I do not like in 'TV for Everybody' is the way we peasants are portrayed. We are dirty and unreliable. We are made fun of and I don't like it. The city folk, on the contrary, are all nice, clean-people." We might have dismissed this protest as

> being only one of its kind. However, after its utterance, we clearly noticed approval and support for the position taken coming from other interviewers in the session. The speaker was saying aloud what the others were thinking deep down but did not dare articulate. It appears to us, moreover, that this criticism is justified; for rural folk, consciously or unconsciously, are portrayed as unintelligent, uncouth, and unpolished people to whom everything must be taught.
>
> [Evaluation Service, 1976, p.19]

The impact of these type of general, cultural considerations can be as significant as the intended message, and may well even conflict with the message. The social costs incurred by the production and broadcast of TPT programs are therefore not simply determined by the monetary considerations discussed earlier--for example it may be more costly, in monetary terms, to film on location in non-Baoulé villages, but this may be less socially costly in terms of audience size and cultural acceptability.

Finally, it is also important to consider the impact, and therefore the social costs (and benefits), resulting from the introduction of television to the rural village environment, beyond the question of the messages transmitted by TPT broadcasts. The Institute for Communication Research (1976, p. 58) comments on this issue:

> Little research within the ETV project has been directed at the traditional forms of communication in the Ivory Coast. There seems to be an assumption by outside experts as well as by many urban oriented Ivorian decision-makers that the important media to be studied are radio and television and that drums, dance, drama, story telling, and gesture incorporated into traditional communication will soon be replaced. Such an assumption is a dangerous one on which to build an effective communication system between center and periphery.

The point is that the introduction of television, regardless of whether or not it is good at transferring certain types of messages, is

not neutral with respect to the rest of the rural environment. Furthermore, the presence of television opens up the likelihood of villagers viewing programs other than TPT (see Grant 1974, p. 54 for an interesting relevant comment), a large part of which consists of French and American exported serials. The social consequences of what many might view a massive cultural invasion (see the Aspen Institute for Humanistic Studies, 1974, for discussions of many facets of this issue, and Klees and Wells, 1977, for a more detailed exposition of how such matters relate to economic evaluation) clearly need to be considered in the evaluation of the social costs of the E/S system. Lastly, the one way nature of television as a communication medium has implications for the structure of the development strategies that the Ivory Coast pursues. We will return to this latter topic in our concluding section; we now turn primarily to an analysis of the monetary costs of the E/S system in a decision context.

III. COST ANALYSIS OF E/S SYSTEM

In this section we will take the cost information generated in Section II and translate it to a functional form which is more useful for evaluation. We then analyze it from the perspective of various decision questions that may be of interest. Lastly we briefly examine some issues in project financing.

A. Cost Functions

As we discussed in Section I.A, it is usually more useful to think of costs as functions of system variables than as numbers. The intention behind a functional representation of costs is to be able to say something more than 'this system has cost so much,' to examine how costs have varied with system characteristics and thus with past and future educational decisions and policies.

In this subsection we will describe E/S system costs as a function of five variables:

h_p = the number of ½ hour programs produced annually;

h_t = the number of ½ hour programs transmitted annually;

N_v = the number of TPT villages in the system;

N_o = the average number of village schools open per program broadcast; and

N_a = the average audience per program broadcast.

Total annual costs will be represented by a non-linear function of these variables, as follows:

$$(1)\quad TC = F + V_{h_p} h_p + V_{h_t} h_t + V_{N_v} N_v + V_{N_a} N_a + V_{h_t,N_o}(h_t \times N_o) + V_{h_t,N_a}(h_t \times N_a)$$

where F refers to fixed costs, and the various V's refer to those costs that vary directly with the particular variable or variables in the subscript. That is, for example, V_{h_p} is the cost that is directly variable with the number of hours of programming produced. The last two terms of equation 1 above are not linear and reflect interactions between pairs of variables. V_{h_t,N_o} signifies the cost that is dependent on <u>both</u> the number of programs transmitted and the number of schools opened. In the Ivorian E/S system this is a reasonable way to think about the social costs of animateur efforts,* which we assume variable with the total animateur time put in. (Total animateur is proportional to the number of programs transmitted x the number of schools open, i.e., animateurs working, per broadcast.) Likewise V_{h_t,N_a} signifies a cost that is dependent on the product of h_t and N_a, which is one way the cost of audience time can be thought of. Also we observe N_o does not enter the equation linearly, but only in interaction with h_t.

Furthermore, the reader should note that these five variables are not necessarily independent of one another, in terms of their relationship within the E/S system. In particular we can hypothesize, based on 1975-1976 data that:

$$(2)\quad h_t = 1.09\ h_p;$$

$$(3)\quad N_o = .34\ N_v;$$

$$\text{and } (4)\quad N_a = 52.13\ N_o.$$

That is, equation 2 holds if we assume that 9% of the TPT broadcasts are repeated once (3 of 35 were during 1975-1976); equation 3 holds if we

* Effort and time are clearly distinct concepts, but in the absence of better quantitative information we use the latter as a very imperfect proxy for the former.

assume that on the average 34% of the total number of schools with animateurs and TV are open for each broadcast (305 out of 899); and equation 4 holds if on the average there are about 52 viewers at each session. Of course these relationships are not necessarily constant as depicted and both happenstance and policy can affect these coefficients. The choice of which factors to view as constant and which to view as variable is not determined. In Section III.B we will examine the effects of certain decisions on these constants, as well as on the variables.

There is no "correct" or "proper" way, in practice, to construct a cost function such as this. Many, differently structured cost functions could have been posited. Types of costs, like that of animateur time, could just as easily have been looked at as a function of total annual time spent, instead of having that time broken down into two of its components, h_t and N_o. The choice of this function reflects two judgments: the structure we feel fits well with the nature of the cost information gathered in Table 6; and the variables chosen to put in the equation are interesting ones from the perspective of how the system functions, and for education policy and decision-making. Clearly even this representation is only a very rough approximation to the behavior of system costs, as there are many other variables that do or could influence the costs of the system, and probably none of the relationships are strictly linear or interactive as described by equation 1.

Table 7 presents the values of the fixed and variable cost parameters for the function above, based on the pattern of costs observed during the 1975-1976 operating year reported in Section II above and some assumptions as to how costs vary that are detailed in the table's footnotes. Cost

TABLE 7

Cost Function for the E/S System[a]

Cost Component	Cost Function Parameters (in F CFA)						
	F	V_{h_p}	V_{h_t}	V_{N_v}	V_{N_a}	V_{h_t,N_o}	V_{h_t,N_a}
Administration[b]	17,400,000	495,000		19,300	1,120		
Program Production							
(A)[c]		4,085,000					
(B)[c]		4,090,000					
Program Transmission[d]			140,000				
Support Materials Production[e]		770,000		13,900			
Program Reception (A)[f]				1,700		74	
(B)[f]				212,900		6,129	75
Evaluation[g]	9,200,000		240,000		595		

TC (A) = $26,600,000 + 5,350,000h_p + 380,000h_t + 34,900N_v + 1,715N_a + 74\ (h_t \times N_o)$.

TC (B) = $26,600,000 + 5,355,000h_p + 380,000h_t + 246,100N_v + 1,715N_a + 6,129\ (h_t \times N_o) + 75\ (h_t \times N_a)$.

TABLE 7 (Cont.)

Footnotes to Table 7

[a]All capital costs are amortized at a 7.5% social rate of discount. The values for the four variables in the TC equation are taken from the data for the 1975-1976 operating year presented in Section II as follows: $h_p = 35$, $h_t = 38$; $N_v = 899$; $N_o = 305$; $N_a = 15{,}500$. All cost information comes from Table 6.

[b]Administrative costs are likely to increase with the geographical area covered, with the number of the rural adults reached, and with the TPT program production effort. It is also likely that some portion of administration costs remain relatively fixed, independent of these variables. In the absence of more information, we assume ¼ of the total administrative costs in Table 6 represent fixed costs, ¼ vary with h_p, ¼ with N_v, and ¼ with N_a.

[c]Program production costs are assumed to be entirely variable with h_p. Under assumption B borrowed equipment is costed, while under A it is viewed as excess capacity available at no social cost.

[d]Program transmission costs (including the size of the staff within the E/S Unit necessary to handle coordination with RTI), are assumed to be entirely variable with the number of programs broadcast, h_t.

[e]Support materials production personnel costs are assumed to vary with the number of programs produced, h_p while its operations costs, involving mostly duplicating, are assumed to vary with the total number of villages in the system, N_v.

[f]Under assumption B animateur and audience time are viewed as social costs while under A they are not. Under A, only the marginal costs of TV receiver power, and animateur training (excluding their time) are included, the former variable with $h_t \times N_o$, and the latter variable with the number of animateurs in the system which is the same as N_v.

[g]Total evaluation costs (including the foreign contribution, assumed not to be a recurrent cost, but amortized over ten years) are assumed to be 1/3 fixed, 1/3 proportional to h_t, and 1/3 proportional to N_a, h_t is chosen over h_p since h_t will increase with both h_p and the number of repeat broadcasts, and we assume that both of these factors will increase evaluation costs.

function parameters are given for both of the general assumptions A and B made in the previous section, A reflecting the use of resources with "excess capacity" at no social cost, and B reflecting social costs attached to all resource uses.

The two versions of the total cost equation (1) given at the bottom of Table 7, one under assumption A and the other under B, describe the behavior of total E/S system costs as partially fixed and partially variable with respect to the five factors included. How changes in these five factors marginally affect total costs is interesting as partial information about the consequences of decisions that yield changes in these factors. Such an analysis of particular decisions and their marginal cost will be pursued below in Section III.B. In the rest of this subsection we discuss briefly some common summary cost measures that are often used in both internal evaluation and external comparison.

A number of summary project cost measures are interesting from the point of view of the historical evaluation of the E/S system and they are presented in Table 8. All are derivable from the cost function data given, by filling in the value of the variables (in this case we used the data for the 1975-1976 operating year of the E/S system), calculating total cost (TC), and dividing by that output measure from which perspective you wish to view the costs of the projects. Such measures indicate aspects of the overall, average project cost experience. Average cost measures are generally not the correct costs to view for current decision making, unless the average cost of past experience is equal to the additional (i.e., marginal) costs incurred by future decisions. Usually this is not the case, since the marginal costs of system expansion are likely

TABLE 8

Summary E/S System Cost Measures[a]

		F CFA
I.	Under Assumption A:	
1.	Total Cost	263,900,000
2.	Average Total Cost/Program Broadcast	6,900,000
3.	Average Total Cost/Viewer	17,000
4.	Average Total Cost/Viewer/Program Broadcast	450
5.	Average Total Cost/Viewer/Hour Broadcast	900
6.	Average Production Cost/Program Produced	4,400,000
7.	Average Production Cost/Hour Produced	8,800,000
II.	Under Assumption B:	
1.	Total Cost	568,500,000
2.	Average Total Cost/Program Broadcast	15,000,000
3.	Average Total Cost/Viewer	37,000
4.	Average Total Cost/Viewer/Program Broadcast	965
5.	Average Total Cost/Viewer/Hour Broadcast	1,930
6.	Average Production Cost/Program Produced	4,400,000
7.	Average Production Cost/Hour Broadcast	8,800,000

[a]These measures are derived assuming the parameters values for the 1975-1976 operating year of the E/S system, and a 7.5% social rate of discount for the amortization of capital costs. The term viewer in summary cost measures 3, 4, and 5, refers to N_a = 15,500; that is, we use the average audience/program figure in a sense as a proxy for the size of a captive viewing audience in order to compare costs with formal school system cost/student measures. These measures may also be derived from the information in Table 5 and 6. Measures 6 and 7 include ¼ of building and office equipment costs, as discussed on p. 49.

to be less than average costs. However, from an international point of view, where one may be interested in replicating a similar system, such average costs may be a guide to replication costs, and thus they are relevant to the evaluation of a current decision.

As we said earlier (in Section II.G), to use such summary cost measures in an evaluative sense, either historically or currently, one needs to assess the value of the output produced and compare it with the costs incurred or to be incurred. However, since explicit values placed on outputs are rare, the decision-maker may want to use measures like those in Table 8 to ask implicit assessment questions. For example, measure 2 (under assumption A) can be used to ask the evaluative question, 'is (was) it worth 6,900,000 F CFA per program to broadcast 38 programs (including 3 repeats) to an average of 15,500 persons/program?' Alternatively measure 3 (under assumption A) can be used to ask the evaluative question, 'is (was) it worth 17,000 F CFA per viewer for an average of 15,500 viewers to see 38 TPT broadcasts?' Or measure 4 can be used to ask the evaluative question 'is (was) it worth 450 F CFA/ viewer/program for an average of 15,500 viewers to see each of 38 programs?' As the reader can see each of these questions is simply another way of focusing on the question of the overall worth of the E/S system. Since outputs are usually so difficult to place a social value on, it is often helpful to reflect on questions of cost and worth from a number of different perspectives.

To this point we have neglected to consider the relatively large viewing audience that likely exists apart from the school animated groups. If we recall the IIOP (1975) survey data presented in Section I.C (see

Table 2), we observe that about 300,000 adults (over 15 years of age) report that they regularly view TPT programs. If we assume that "regularly" translates to viewing every other broadcast, this implies an average regular viewing audience of 150,000 people (including the 15,500 animated group viewers). One could use this figure to recompute some of the project summary cost measures presented above. For example, one could then ask the evaluative question, 'is it worth an average of about 45 F CFA/viewer/program (instead of 450 F CFA as above under assumption A) for each of 150,000 group and private viewers to see 38 TPT programs annually?' Of course, the social benefits of independent viewing may be entirely different than that of animated rural group viewing and thus the lower average costs that result from the former perspective may or may not indicate that the E/S system is of net social benefit. Clearly, however, the impact of TPT programs on the non-animated audience needs to be more carefully studied and thought about.

Although in this paper we do not examine how one might approach answering the type of evaluation questions posed above (again, see Klees and Wells, 1976, for a discussion of what economic theory has to say about the benefit side), it is nonetheless sometimes useful to view at least the costs of the system in the context of international experience. This is quite difficult to do, however, since international experience with non-formal educational television projects is minimal, and cost analysis of the few existing projects in less industrialized nations is not available. We can however look at the costs of formal school ETV systems, although it is likely that the large differences between formal and non-formal educational systems make such comparisons only slightly useful.

Summary cost measures 3 and 5, the average cost per viewer and the average cost/viewer/hour broadcast, are perhaps the closest to the types of summary cost measures used to examine formal school ETV systems. We can think of the average audience size of 15,500 as in some sense similar to the size of the student population of a formal ETV system. Klees and Jamison (1976, p. 43) report costs/student between $2.88 and $54.23, and cost/student/hour between $.017 and $.460, (all in 1972 U.S. dollars), for five formal school ETV projects (including the one in the Ivory Coast). Assuming the rapid inflation described by Eicher and Orivel (1977, p. 19) applies, the average cost/viewer in 1972 U.S. dollars for the E/S project would be $52.29 under A and $113.81 under B, and the average cost/viewer/hour would be $2.77 under A and $5.94 under B. The cost figure most directly comparable to the formal school ETV costs will be somewhere between assumptions A and B, in that the costs of TV reception equipment are included, but the costs of animateur (teacher) time and audience (student) time are not. In any case, the costs of the E/S system are considerably greater than those for the formal schooling systems given above. The large cost differential is due mainly to the substantially smaller amount of programs broadcast and population reached by the E/S in comparison to the formal school systems. Expansion of the E/S system would yield lower average costs as will be seen in the next subsection.

The average costs of ETV program production are also able to be examined from the standpoint of international experience. Evans and Klees (1976, p. 42) report average production costs per hour of programming produced ranging between $91 and $13,700 (in 1972 U.S. dollars) for seven formal school ETV projects, with the Ivorian formal ETV project

having the highest cost. For the E/S system, the average production cost per hour of programming produced is about $27,100 in 1972 U.S. dollars, considerably higher than any of the others. However, professional educational television productions have even greater production costs; Sesame Street production costs have been estimated at about $40,000/hour. The TPT broadcast costs may be reasonable when one considers that unlike a formal ETV system, a non-formal, adult oriented system does not have a captive audience, and must therefore design programs that not only educate, but also are interesting and/or entertaining enough to attract a viewing audience. Furthermore, we must realize that such program cost comparisons are also quite problematic since different systems differ along many different dimensions that affect costs, such as the average length of programs produced, the proportion shot on location versus in a studio, or the amount of effort devoted within the system to the training of prsonnel (which is important to the policy of Ivorization in the Ivory Coast).

Given the many difficulties of international comparisons, another approach to looking at the reasonableness and value of the E/S system is to think more carefully about the opportunity costs of the system. In a broad sense, as we said at the beginning of this paper, prices may reflect opportunity costs. In a narrower sense, however, one can conceive of a number of alternative systems designed to accomplish a set of objectives similar to those of the E/S system and attempt to weigh the value of E/S in comparison to such specific alternative projects. For example, one could ask what type of rural development extension service, or what type of and how many rural radio broadcasts, could be initiated at a cost of

about 17,000 F CFA (under assumption A) per person reached, as opposed to reaching those same persons with 38 ETV broadcasts. The design of specific, reasonable alternatives is beyond the scope of this report, but devoting some effort toward such design may be a useful way for Ivorian decision-makers to consider some aspects of the value of devoting resources towards the E/S system.

Finally, we should again mention that the two general perspectives taken in this cost analysis, labelled assumptions A and B, are not matters of choice. The question is which perspective is the correct one from the standpoint of social evaluation, and that depends on to what extent there is excess capacity equipment, facilities, and personnel to draw upon, and to what extent audiences and animateur time should be socially valued. The first set of factors depends on the technical conditions that exist in the Ivory Coast or in a country initiating a similar system, while the second set of factors depend on a social decision in terms of how alternative audience and animateur evening activities are valued.

B. Decisions and Costs

In this subsection we examine six areas and describe the way in which certain policy decisions would affect E/S system costs. The six areas looked at are: program production; program diffusion; size of audience and animateur staff; animateur training; support materials; and evaluation. All cost calculations are based on the cost function parameters given in Table 7 and the cost data on which these were based given in Table 6.

1. Program Production

As we calculated previously, the average production cost per program during the 1975-1976 operating year was 4,085,000 F CFA under assumption A and 4,090,000 F CFA under assumption B (not including office space and equipment, which will be included below with administrative costs). If we assume, as we did in estimating equation (1), that such costs are completely variable with program production, then these figures are the direct marginal costs incurred as a consequence of the decision to expand programming. In addition to this direct marginal cost there are a number of indirect costs that would also increase with program expansion. First, we have assumed that a portion of both administrative costs and printed support materials production costs are directly variable with the number of programs produced. One additional program would thus add another 1,265,000 F CFA to total cost. Second, increasing the number of programs produced increases the number of programs broadcast, providing the repetition rate remains constant. This would increase both transmission and evaluation costs, yielding a 415,000 F CFA increase in total costs ($1.09 \times V_{h_t}$) per additional program. Additional TPT programs transmitted also, of course, mean more programs received and therefore the costs of operating the TV receivers and the costs of audience and animateur time (under assumption B) are increased. Under assumption A, given the same average number of open schools per broadcast, such costs are 24,600 F CFA (1.09 x 74 F CFA x 305 schools). Under assumption B, which includes the social value of animateur and audience time, and assuming the same average number of spectators per program, such costs are 3,305,000 F CFA (1.09 x 6129 F CFA x 305 schools + 1.09 x 75 F CFA x 15,500 viewers).

Thus the total marginal cost of adding and making use of one more program to the E/S system is 5,790,000 F CFA under assumption A, and is 9,070,000 F CFA under assumption B. We see that the marginal costs of program expansion are less than the average total cost per program in the past of 6.9 million F CFA under A and 15.0 million F CFA under B (see Table 8) as one would expect. Whether one should increase the number of TPT programs produced and broadcast (either within the Ivorian system, or in another similar system elsewhere) depends on whether one values the exposure of 15,500 rural adults to the additional program(s) greater than the marginal costs of expansion. Another way of looking at this same question is, 'is it worth a marginal cost of 375 F CFA under A, or 585 F CFA under B, per viewer for each additional program produced and broadcast?'

Since the marginal costs of program expansion are less than the average total costs of production presently incurred, program expansion would yield a lowering of average costs. For example, if program production were doubled to 70 programs annually (with 76 broadcast, 6 being repeat broadcasts) the average cost/viewer/program broadcast would fall from 450 F CFA, under assumption A, to 395 F CFA, and from 965 F CFA, under B, to 750 F CFA. Again, although these hypothetical average cost figures may be of interest in examining the end state of a system with doubled program production, it is the marginal cost of such expansion, presented above, that are most relevant to the evaluation of the decision on whether such expansion is worthwhile.

One final point that should be noted with respect to program production decisions is the very low proportion of total system costs constituted

by program production equipment. If greater availability of equipment or greater equipment maintenance efforts could result in considerably more program output than is now produced, such may be a very worthwhile investment, since the marginal costs of this investment would be quite small relative to the project as a whole.

2. Program Diffusion

A greater repetition of programs already produced may be thought desirable, from the point of view of reaching people who missed a broadcast and would wish to see it, as well as from reaching people who would wish to see the broadcast more than once. Actually, interviews with TPT program viewers did indicate some desire for programs to be repeated, coupled with comments that it was sometimes difficult to catch all the information presented in certain broadcasts. This is far from surprising given the importation of an industrialized world approach to education and information transfer to vastly different cultures. Repetitions may well increase learning, one of the primary intended goals of the E/S system (more study of and attention to the cultural modes of learning of rural Ivorian adults, a relatively neglected process, might yield even larger returns).

The marginal costs of program repetition are considerably less than those of program production since not only are no additional program production costs incurred, but no additional administrative expenditures or printed support materials reproduction costs would be added. The additional costs of TV operation and audience and animateur time (as under assumption B) would be the same as they were for program production expansion (divided by 1.09 since we are adding repeats). The total marginal cost of repeating

one program would thus be 405,000 F CFA under A, and 3,410,000 F CFA under B.

The figures above assume the same average amount of audience and animateur participation for program repetitions as for original program broadcasts. This is unlikely to be the case, as feedback data from the Ivorian system indicate. Lenglet (1976a) reports about 3/4 the participation, in terms of schools open and associated audience size for the two broadcasts repeated during 1974-1975, and Fritz (1976) reports about ½ the participation for the two repeats on which feedback data for the 1975-1976 operating year is available. It seems likely that this lesser participation is caused by many animateurs not opening their schools for these broadcasts since the average audience size for repeat TPT broadcasts is the same as for first time broadcasts. If we assume the 3/4 figure would again prevail if a concerted effort was made to get the animateurs to open their schools for repeats the marginal costs per additional program would be about 395,000 F CFA under A, and 2,655,000 under B.

Again, although the marginal costs above are the ones directly relevant to the decision to repeat more TPT programs, it is interesting from the perspective of the overall behavior of system costs, to examine the effects of such a decision on average costs. If the E/S system were to repeat each of the 35 programs produced (instead of just 3) during 1975-1976, then the average cost/viewer/program broadcast would fall from 450 F CFA to 290 F CFA under A, and from 965 F CFA to 690 F CFA under B (assuming 3/4 particiaption for repeats, as above).

3. Size of Audience and Animateur Staff

There are a number of different ways in which the size of the animated group audience can be increased, most of which involving additional animateur effort or more animateurs. Below we discuss the marginal costs of expansion by three means: an increase in the viewing audience per village; an increase in the average number of schools open; and an increase in the number of villages covered.

An increase in the average viewing audience per village could perhaps be generated through a number of alternative strategies, for example, by a TPT publicity campaign or by animateurs following different or expanded audience recruiting strategies. Other than the additional costs engendered by the use of such techniques, the marginal cost of this means of audience expansion are relatively small. Up to the seating capacity of the classroom (which is about 80 persons), they are costless under assumption A, and involve more substantial costs depending on the need for an additional animateur (if translation is necessary and/or if the audience becomes too large for effective animation) and an additional television receiver (those schools with ETV in the Ivory Coast all have more than one).

A different strategy to yield an increased audience would be to encourage animateurs to open their schools for every TPT broadcast. The marginal costs of such expansion would be those associated with the functioning of the reception system--TV receiver operation costs, and those of animateur and audience time if considered appropriate. If all 899 animateurs were to open their schools for all TPT broadcasts, the average audience per program would increase from 15,500 to 45,800,

provided the audience size per school is maintained. As earlier, the marginal costs of such expansion (to calculate them, compute TC when N_a increases by 30,300 and N_o by 594) are considerably lower than the average cost incurred in the past. If this had been the situation during the 1975-1976 E/S operating year, the average cost/viewer/program broadcast would have been 180 F CFA instead of 450 F CFA under assumption A and 485 F CFA instead of 965 F CFA under B.

The primary mechanism of E/S system expansion to date has been our third alternative: by increasing the number of villages and animateurs in the system. This is the most expensive of the three strategies since in addition to the marginal costs incurred by the previous two alternatives, more animateurs, printed materials, and reception equipment (under B) would be needed. The marginal costs per village added under this alternative would be 123,500 F CFA under A and 558,000 F CFA under B (calculated by increasing N_v by 1, N_a by 51, and N_o by .34). If the number of villages covered (and therefore audience size) was doubled, with all other operating parameters remaining the same, the average costs/viewer/program would have been 320 F CFA, instead of 450 F CFA under A, and 910 F CFA, instead of 965 F CFA under B.

If one judges the E/S system to be worth its social cost for the audience it now covers, then one would likely value its expansion, especially at a lower cost than incurred in the past. Each of these alternatives may be a viable mechanism for audience expansion, if desired. The point of cost analysis is not that only the less expensive alternatives should be pursued, but that each strategy should be considered in the light of its expected costs and benefits. This cost analysis does

suggest, however, that Ivorian decision-makers should not neglect the first two alternatives as possible ways to reach a larger audience.

4. Animateur Training

Increased training of animateurs may well be worthwhile if it were to result in a number of desired E/S system outcomes such as more effective animation of TPT broadcasts yielding greater audience learning and actions, or a higher percentage of opened schools. The costs presently spent on animateur training are a small fraction of total costs and could be increased considerably with only a small increment in average costs, even if no effect on audience size were discernible. For example, if the investment in animateur training were increased fourfold, average cost/viewer/program would only increase to 455 F CFA from 450 F CFA under A and to 1050 F CFA from 965 F CFA under B. If these training efforts were to lead to significant increases in audience size, average costs could fail substantially.

5. Support Materials

An increase in the amount or quality of printed support materials, in terms of posters, or documents provided the animateur, might also result in increased E/S system benefits. The costs of increasing the current effort are again small relative to total costs (although they are more substantial than the same percentage increase in effort devoted to animateur training--during 1975-1976 the former was 15% of TC, while the latter was 1% of TC, under A). For example, if one were to double support materials production expenditures, the average cost/viewer/program would increase from 450 F CFA to 515 F CFA under A and from 965 F CFA to

1030 F CFA under B. Both research and judgment, of course, are required to decide whether such increased expenditures would be of net social value.

6. Evaluation

The evaluation effort, although large relative to many other instructional technology evaluations, is again not that large relative to total cost (during 1975-1976 evaluation was 10.5% of total costs, under assumption A). If the expenditures on evaluation were doubled, given the same operating parameters as for 1975-1976, the average cost/viewer/program would increase to 495 F CFA from 450 F CFA under A, and to 1010 F CFA from 965 F CFA under B. This estimate is dependent upon our assumption that views the foreign contribution to evaluation thus far as an investment, not to be repeated for ten years. Doubling the evaluation effort would mean having a large evaluation effort every five years, as well as doubling the annually recurrent expenditures on evaluation incurred by the Ivorian government. Again, whether this is a worthwhile endeavor depends on how one values the benefits of such evaluation efforts.

C. Financing

The analysis of a system's finances is usually considered by conventional economists as separate from an analysis of the social costs of a system. Conventional economic theory views the analysis of social costs and benefits as a question of social efficiency; that is, the society is in some sense thought efficient when it chooses investments that accrue benefits that outweigh the costs incurred. The analysis of system financing, how one pays for the system, is seen to be a question of

social equity. The rationale for this separation becomes less clear when one questions the validity and reliability of resource prices as measures of social value; in this case, as we discussed in Section I.A, efficiency and equity considerations become almost inextricably intertwined, with all decisions having impact on both efficiency and equity in a manner that cannot be easily discerned by an analysis of monetary costs. However, as we also said earlier, we do not have any clear alternatives to at least looking at monetary costs as some proxy for social value, and thus we have presented the analysis above. In this section we briefly examine two aspects of E/S system financing: a partial look at who pays for the E/S system and a short discussion of the operational means by which some system activities are financed.

Table 9 presents the shares of 1975-1976 total social costs (as calculated in Table 6) borne by the Ivorian government, foreign governments and aid agencies, and private Ivorian contributions. A full analysis of system financing would go further and attempt to trace through who in fact is paying for the various government contributions through an examination of who bears the particular tax burden. We can see from Table 9 that as in the formal schooling ETV system, foreign aid is quite substantial. When the scheduled phased withdrawal of most of these foreign contributions is completed, the Ivory Coast will have to increase its expenditures significantly in order to maintain the system as it is presently constituted. It is also interesting to remember, that when audience and animateur time put in is considered socially valuable (as under assumption B), that private individuals carry a significant share of the social costs of the E/S system.

TABLE 9

E/S System Financing[a]

(per cent share of each group, 1975-1976)

		Share
I.	Under Assumption A:	
1.	Ivory Coast Government	68%
2.	Foreign Contributions	32%
3.	Private Contributions	0%
	Total Costs A (millions of F CFA): 263.9	100%
II.	Under Assumption B:	
1.	Ivory Coast Governments	55%
2.	Foreign Contributions	23%
3.	Private Contributions	22%
	Total Costs B (millions of FCFA): 568.5	100%

[a]A social discount rate of 7.5% is assumed. Foreign contributions are the costs of foreign personnel in administration and program and support materials production, program production equipment, evaluation donations, and reception equipment (under assumption B). Private contributions are audience and animateur time.

Finally, it is important to consider that the financing mechanisms set up, internal to the system, for the purpose of funding various project activities, may have an impact on the efficiency with which the system operates. A particularly troublesome example of this is the bureaucratic mechanism set up to finance program production, which has often been delayed as a result of the relatively lengthy administrative processes that must be gone through in order to obtain funds necessary to production operations. Other ministries that agree to contribute towards a production sometimes do not do so. Funds that do come in often have to be switched from the task to which they were assigned to meet more urgent current needs. This year's E/S system budget request had most of program production operating expenditures cut out before it was approved. These conditions make it difficult to maintain an efficient operation and likely diminish the quantity and quality of production. The general point is that the additional central control that results from highly bureaucratized finance mechanisms could have considerable impact on system output, and such trade-offs need to be carefully examined.

IV. CONCLUSIONS

The initiation of the E/S system has been characterized as resulting largely from a situation where the television was "a means looking for a goal" (Evaluation Service, 1975a, p. 64). The desire to 'rationalize the costs' of the primary school ETV system was used in part to justify the development of E/S. Whether the educational television system that E/S developed is a sensible approach to non-formal rural (and urban), adult oriented education and information activities is a quesion of clear interest to the Ivory Coast, as well as to the international community. Television is generally perceived as a relatively expensive educational medium and its use in non-formal adult education, which generally receives considerably less funding than the formal education of children and youth, is rarely even considered, especially in less industrialized nations. However, many factors have been promoting greater interest in the television medium, such as: the advent of high powered satellites that can relay a TV signal to relatively low priced community receivers; the increase in less industrialized nations' experimentation with ETV for formal schooling, allowing non-formal ETV add-ons, as in the Ivory Coast; and the promotion by industrialized countries, through private industry and governmental activities, of the use of new, capital intensive, education and communication technologies.

Whether the resulting Ivorian E/S system is viewed overall as positive or negative, what specific aspects of it function well or poorly, and how can improvements be made, are all questions that depend on the context in which social valuation takes place, and the perspective from

which that context is viewed. At the end of Section II and throughout Section III we derived summary cost measures describing the E/S system at present and under alternative future decision possibilities. Whether these costs of the E/S system are considered reasonable, justifiable in some sense by its perceived individual and societal benefits, is also dependent on the context observed and the perspective taken.

The costs examined in this paper must be viewed and understood within the context of development in the Ivory Coast (and probably elsewhere). As we have said earlier, the economists' concept of "social cost" refers to cost to society, and how one views the development of that society will determine what one considers as social costs. The E/S system is specifically oriented towards governmental rural development activities. We have commented earlier on some aspects of the general development strategy of the Ivory Coast--particularly the seemingly conscious choice of a strategy of uneven development, with a focus on industry and large scale agriculture in the sixties, and greater concern in the seventies for the small farmers and agricultural workers that constitute the large rural population. What the present Ivorian rural development approach looks like and the relationship of the E/S system to it requires more attention than we can give here. Below, however, we can sketch out some perspectives on this situation developed in other literature as useful contexts for viewing and interpreting the social cost analysis presented in this paper.

The main objectives of the rural development strategy proposed in the Ivorian Plan has been summarized as follows:

1. the training of agricultural entrepreneurs;

2. the instruction, training and education of all who live in the rural areas, because they are actors in the modernization process of the rural milieu;

3. the education, instruction, etc. of youth in rural areas because they must introduce the necessary supplementary dynamics into the process;

4. the encouragement of the formation of professional organizations within the rural milieu.

[Institute for Communication Research, 1976, p. 50]

The E/S system of non-formal adult education can certainly be viewed within the framework of objectives 1, 2, and 3, as a system that promotes certain types of education for rural adults necessary to the desired modernization of the rural milieu.

From a different perspective, however, the E/S system and the general Ivorian strategy for rural development have been viewed as problematic. The Institute for Communication Research (1976, p. 61) comments:

> Within the highly centralized administrative process of French organization, the community is not considered the privileged cell of development but rather as the bottom element of a national apparatus, and the aim is often to make peasants aware of development problems as seen by the government and to "persuade" them to take part in centrally planned development schemes.

In a report done for the Evaluation Service of the ETV ministry on the TPT water series, Lenglet (1976b, p. IV-9) makes a similar point:

> In contrast to Tanzania, for example, the rural population in the Ivory Coast is not considered to be or to become an active independent force in this structural transformation. The rural masses are looked upon as the people that have to be integrated into the national development plans as they are proposed and carried out by the Ministry of Planning

> and the Government. They are considered to be a kind of executive body which has to follow the orders from above. There is certainly no place for more or less spontaneous mass mobilization. The possibilities for local action are limited to those occasions that fit into the pre-determined development plan. Here we come across another reason why the actions advocated by the out-of-school television have only a mitigated success. On the one hand the spectators of TELE POUR TOUS are solicited to take decisions and undertake actions, while on the other hand the room for such actions and decisions is rather limited: no money, no administrative support, and a consequent discouragement.

In some senses, this development strategy has been viewed as somewhat contradictory. The Institute for Communication Research (1976, p. 62) comments with specific reference to the E/S system:

> The animation being promoted in the rural areas seems to be a much less universal tool for eliciting participation than a mobilization in the Tanzanian style. There seems to be a contradiction in the Ivorian approach at present. At one and the same time people are being urged to take part in their own development but are not being organized sufficiently to do so. Sitting in front of a TV set and discussing messages coming from the Center does not seem to be a solution.

In a piece that is highly critical of the E/S system, Josiane Jouët (1975, p. 44), a former French technical assistant to the project, comments on particular aspects of the system that support this perspective:

> The style of program production is itself tightly linked to the content of programs. It is a very didactic and authoritarian process of telling the peasants what they should do without trying to demonstrate the need for change. No problem-solving approaches are used and the non-formal educational programs are a kind of general interest documentary film, lacking any specific pedagogy. The quality of the programs is low and little attention is given to the problems of rural, mostly illiterate audiences, in understanding motion picture images (close-ups, flashbacks, etc.) that they are not used to. The content and style of the non-formal education programs are, of course, directly determined by the principles

> and the status of the out-of-school organization as mentioned above. The goal of the sponsoring agencies is more to gain the support of the rural audiences in furthering their own goals rather than in advancing the masses' real interests.

Two contrasting conclusions have been drawn from the types of development strategy critiques presented above. On the one hand, Benveniste (1976, p. iv) argues that the rural population cannot themselves resolve the problems that the TPT broadcasts present:

> The village people's acceptance of the model proposed by television is limited everywhere by the socio-economic constraints of its application. The village people more readily accept the TV model when it conforms to the model of urban consumption demanding all the while the help of the government to put it into practice. This attitude explains the barrier to discussions at the level of problems which are basically political, and whose solution cannot come from villagers themselves. The animation sessions do not result in community decisions, especially since the participating groups are not representative of the groups in power.

On the other hand, some of the comments already discussed imply a perspective from which ultimately the rural population must itself define the problems and institute remedies. Jouët (1976, pp. 46-48) argues that such an approach can only come from "a political setting based on mass mobilization" as opposed to the present Ivorian model of development that "mainly appeals to the promotion of individual interests" within a context of "foreign dependency" and "capitalistic development."

A striking illustration of the type of direct impact that the broad development framework followed can have is provided in one of the Evaluation Service (1976, p. 41) reports in a discussion of the remuneration of E/S animateurs:

> The animateurs cannot understand why they do not get paid for performing additional work. They are exploited. For, after all, they live in a capitalist society where the notion of sacrifice is out of place. "If everyone sacrificed himself for the nation," one animateur told us, "I would not demand a cent for the animation work which was asked of me. Unfortunately in this country everyone is out for himself."

Jouët argues that the lack of such remuneration is simply another indication of the low priority the Ivorian government places on the E/S system, which she sees primarily as a sort of advertising mechanism for Ivorian government development ideology.

As we have seen above, the perspective taken on the Ivorian development strategy (which is common to many nations) influences considerably how one would perceive the social costs and benefits of the E/S system. Whether or not the E/S system has resulted or will result in an improvement of rural life is difficult to judge, and the evaluation of relevant impacts are far from complete. To give the reader a more specific idea of the types of conclusions that such evaluations have drawn to date, we present a summary of the results of three such studies in Appendices A, B, and C.

One point that is reasonably clear is that the E/S system will likely generate rising expectations among the rural population. If such expectations cannot or will not be met, there are likely to be significant societal costs incurred. Furthermore, such concerns are not limited strictly to the domain of TPT broadcasts as Grant (1974, p. 54) observes:

> A third element which has to be taken into account in regard to concentration on rural education is what is shown right before or right after the [TPT] program. Before there is the evening news which is oriented toward the upper-class urban viewers.

> Before he gets his program, the villager is dazzled by images that are foreign and inaccessible to him: official receptions and banquets at the Hotel Ivoire, for instance.

One should not make the mistake of thinking that the rural populace is unaware of the process that is occurring. The Institute for Communication Research (1976, p. 60) comments that:

> surveys made of peasants' attitudes toward development projects over a period of years reveal the degree to which they see their own values as quite different from the city values connected with the projects. Research data show that the attitude of many villagers toward the outside world of the city is rather ambiguous. On the one hand they are attracted by the banners, gadgets, and life-style of the "blancs" and the "évolués;" on the other hand they sense that exactly this foreign life with its attributes exerts a destructive influence on the structure and culture of their society. One should assume the same kind of suspicion is being directed at the adult programs. It has been found that villagers blame the ETV for corrupting the traditional values of youth and leading them to the city. Might they not be even more suspicious when the television is directed at them?

Whether or not the television medium can be an aid to rural development strategies is becoming of greater interest to more nations and the Ivorian system has been and will continue to be closely examined from this perspective. The difficulties of using a one way communications medium, and in the case of the Ivory Coast, one oriented towards a national audience, for non-formal rural adult education are substantial. All evaluations of the E/S system seem to agree that its future success will depend on significant changes in the scope, effort, and coordination of the Ivorian rural development infrastructure. Whether or not the monetary and non-monetary social costs incurred by the project that have been discussed in this paper are a good social investment will likely depend heavily on the extent of such changes.

APPENDIX A

The Results of Grant's (1974) Study of the E/S System in Four Villages as Reported in Evaluation Service (1975a, pp. 17-18)

-- different aspects of the animation of the reception (it was noticed that there were great differences in the quality of the animation in the four villages);

-- the conditions of the audience selection: it is obvious that the classrooms are not large enough for the audience and in two cases hostility was noticed toward the presence of young school drop-outs during the programs;

-- the regularity of the audience attendance;

-- the integration of the teacher in the village; often a teacher comes from another region than where he is working and he is afraid to become involved in village matters; this can have an important influence on his efficiency as an animateur;

-- discussion and action: in the various centers, many intentions to follow up the various lessons given during the programs were expressed, but not any example has been found with respect to concrete actions or changes in behavior. It is evident that an efficient extension system of field agents (Health, Agriculture and so forth) is necessary to achieve concrete changes;

-- the relevance of the programs and the aspirations of the audience: to what extent did these programs correspond with the real needs of the villagers, and do they present an environment which corresponds to the village situation?

-- the setting of the programs: several factors seemed to be rather important: the presentation of the programs by the announcer, the kind of program which precedes the extra-scolaire broadcasting; the sudden unannounced changes in program hours and dates.

APPENDIX B

The Conclusions of the Report by the Evaluation Service (1975a, pp. 75-78)

3.2.3. Conclusions and Perspectives

1. We have seen that the work group charged with preparing the water series was under considerable pressure to provide the programming and to produce and to approve the scripts in a short period. However, considering the final programming schedule - the series started in the beginning of April instead of the beginning of January - there was much more time for discussing extensively the general goal of the series and the particular objectives of each program. The haste with which the work group worked is understandable but not justified for a balanced and thoughtful preparation. For the year 1975-1976, an important improvement in the programming was introduced during the Programming Seminar 1975-1976 at the end of April 1975 and by a series of meetings with the requesting ministries and organizations and other interested institutions to discuss and prepare each program or each series of programs.

2. The precise definition of program objectives is a necessary condition of producing a product that will have a certain effect (in the desired direction) on the target group. The more the objectives and the target audience are specified, the more the program's impact can be predicted. That is, a program will have a larger effect when the change (of attitudes, knowledge, behavior) wished for the target group has been defined beforehand. It is too much to expect that TV programs will affect and change knowledge, behavior and attitudes when one does not have a clear idea of this knowledge, this behavior and these attitudes. When the characteristics of the target audience are not known all pedagogical action is bound to fail.

At the same time one should not exaggerate the influence of one TV program all alone. Even if it forms part of a program series or campaign, like the water series, in which the program content can be repeated and emphasized, its impact will be relatively weak when there is not a "reception structure." For the TELE POUR TOUS programs this structure is formed in the first place by the listening groups under the direction of the teacher-animateurs. They play an essential role in the translating and the understanding of the program. Therefore, much attention should be devoted to their equipment (in terms of material, time and training) and their motivation (the problem of their being paid an allowance).

The understanding is a necessary but not a sufficient part of the impact of the broadcasted message. The reception structure must also contain the social, economic and political "instruments" to facilitate and support the "positive change" in behavior, knowledge and attitudes. The activities of the field agents of the requesting organization (e.g., the CENAPEC or SERIC agents), the active interest of the Sous-Prefets, their administrative and financial support, radio programs, newspaper articles, practical demonstrations, and "experimentation plots," all these could be considered as examples of these "instruments." With respect to the water series we have the impression that the absence of such instruments has much attenuated its possible effect. If a reception structure is missing it is also possible that the diffused information will create frustration among the population instead of bringing solutions for certain problems. The absence of any correspondence between the content of the program and the daily life, and the lack of material and psychological field support could create unforeseen effects contrary to the goal of out-of-school education in general.

- Earlier we have noticed that the Ivory Coast Government has not yet formulated a coherent out-of-school and post-primary education policy. Many institutions are working in this domain without any coordination and integration of their actions. The ONPR as well as E/S have been charged with the coordinating role for rural education

and animation. Authority problems and problems of the boundaries between the two institutions' activities are the consequence. The absence of a defined E/S education policy could also explain the ambiguous relationship between the E/S television and the collaborating ministries and organizations. During the work group sessions on Water and during other programming meetings we have noticed a confusion between the roles of coordinating (E/S) and requesting (the interested ministry). The governmental organizations and State Development Agencies want E/S to give them instructions during the planning process of the TV programs. But E/S is expecting their suggestions for the program content. (Moreover, we have seen that neither E/S nor the ministries have a clear idea of the pedagogical objectives of a program.) These two expectations are not incompatible, but before the working group starts its activities the precise tasks for E/S and the demanding institutions respectively should be defined. It must be clear that E/S is the final authority for the production and the reception animation. Within the working group the requesting organization is the principal counselor for the technical and partially for the pedagogical aspects of the program message and content.

APPENDIX C

The Recommendations of Benveniste's (1976) Intensive Study of E/S Reception in Four Villages

Recommendation 1. For a more effective utilization of the traditional channels of information diffusion, the influential village members ought to be directly advised by an official memorandum from a central agency such as the Administration of the Ministry of Education or of the Party (PDCI). The central source of information would be relayed to the village by influential intermediaries rather than leaving the task of information to the teachers. Then the process of traditional communication would be able to operate, diffusing the information through the normal channels.

Recommendation 2. Organization of an information campaign would be desirable to explain clearly the aims of the project. The radio is a good diffusion medium for such a campaign and for regular information about contents and the schedule of broadcasts.

Recommendation 3. In order to obtain broader participation of the target audience of adults a less scholastic, less rigid organization of the animation sessions could be planned and held, for example, in the school yard. Their organization could be turned over to a village group so that participation would be free from the stigma of relations existing between the school and the village, and limiting access of television.

Recommendation 4. Animation sessions should be taken over by the real local leaders, from the village. For their role to be effective they must be officially appointed to this work and be paid for it, because coerced volunteers do not seem to be an effective means of asking animateurs for a realistic participation in community activities. On the one hand, local leaders will be more motivated and more involved in the problems of their community. On the other hand, their remuneration would give them a status in comparison with village people and would reimburse them for any subsequent loss of income their involvement might call for.

Recommendation 5. The collaboration of local agents would be more effective if it did not depend on their good will and of that of the animateur but if it was institutionalized.

APPENDIX D

Glossary of Acronyms

CATEL	-	Compagnie Africaine de Télévision
CENAPEC	-	National Center for the Promotion of Cooperative Enterprises
DOGE	-	Division d'Organisation de la Gestion de l'Education
E/S	-	Extra-Scolaire
ETV	-	Educational Television
IIOP	-	Ivorian Institute of Public Opinion
ONPR	-	National Office of Rural Promotion
SATMACI	-	Ministry of Agriculture
SCOGE	-	Service Central d'Organisation de la Gestion de l'Education
SEEPTE	-	Secrétariat d'Etat de l'Enseignement Primaire et de la Télévision Educative
SERIC	-	The Research and Development Company of the Coffee and Cocoa Industry

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