

Operations Research Application in Marketing of Family Planning Programme with Special Reference to Developing Countries

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requirements for the degree of*
DOCTOR OF PHILOSOPHY

by
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CERTIFICATE

This thesis is submitted under Regulation 8.20 of Academic Regulations for Doctoral Programmes which allows a faculty member of the Institute to do Ph.D research without the benefit of a Supervisor.

I hereby certify that the thesis entitled, "OPERATIONS RESEARCH APPLICATION IN MARKETING OF FAMILY PLANNING PROGRAMME WITH SPECIAL REFERENCE TO DEVELOPING COUNTRIES" which is submitted for award of Ph.D degree of the Institute embodies my original work.

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ABSTRACT

This study deals with the operations research application in marketing of family planning programme with special reference to developing countries. A review of literature is done to find appropriate operations research and marketing models that can be fruitfully employed in understanding and solving problems in family planning programme management. The review identifies the difficulties faced by developing countries in exploring the potential of operations research in the applications of development problems.

The historical development of national family planning programmes of different countries are studied to identify the common nature of problems in programme management. India's family planning programme was studied in detail. Research studies conducted in various countries are analysed and classified from the management perspective. A simplified model of the family planning system was developed to identify the components at the aggregate_A^{level}. From this an elaborate family planning system model was developed. The system model was used to identify the problem areas associated with family planning programme

management. The crucial problem of increasing the effectiveness of the programme is taken up for study. A flow model is developed to identify the sequence of steps in solving the above problem. A sub-problem of facility redesign was taken up and a model for optimal allocation of resources between existing facilities and new facilities to be created is presented. The applicability of the model to various levels of decisions is discussed.

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CHAPTER - 1

INTRODUCTION

INTRODUCTION

In the recent years there is a realisation that development cannot only be measured in terms of growth in the national output but also the social and distributional objectives are of equal importance in the process. Emphasis on urbanization, capital-intensive industrialization, and undifferentiated growth in the national output is giving way to emphasis on rural development, intermediate technology, and community mobilization. Health, nutrition and population are coming to be looked upon as broadly integrated concerns, more as a function of development strategy and income distribution than of conventional sectoral programmes.

These major changes in the developmental strategy raise a host of new management issues and place new demands on government planning and implementing systems. Management scientists can play an important role in filling the void that exists in identifying the issues, analysing them, and providing guidelines for action programmes.

1.1 Operations Research :

Operations research, the scientific method of problem solving is considered a very effective instrument

in the hands of decision makers and planners at policy, strategic and operational levels. Operations research has been increasingly used in U.K., U.S.A. and other developed countries in industry, service, trade and commerce. Significant productivity gains have been achieved by such applications since 1950s.

The application of operations research in solving social and economic problems in developing countries is of recent origin. Okita (1976) comments "Recently many researchers who wrestled with development problems used a scientific approach, and therefore it is of profound significance that new approaches and methods of operations research will focus on the plight of the developing countries for promoting their development".

History of operations research very simply suggests that problems of developing countries faced with the situation of scarce resources, conflicting criteria and need for rapid development, are eminently suitable for operations research applications.

Application of operations research in developing economies pose a number of problems. Gupta and Krishnamoorthy (1976) observe that irrespective of the field of application of operations research, there is a

fundamental issue of the availability of capable operations research scientists in developing countries.

Discussing the challenge to operations research application in developing countries Dholakia et.al.(1979) point out the great scope for operations research intervention in public systems, especially those focussing on basic human needs. The political administrative culture, value orientation of individuals and inadequate infrastructure of these public-systems, however, militate against the use of formal operations research methods.

While there is a general agreement on the big impact, operations research could have on development, there is much less agreement about the style of operations research which should be adopted.

Hindle (1978) classifies three styles; The first concentrates on the use of established analytical techniques for many earlier identified applications in developing countries with quick demonstrable results. The second stress the need to get large numbers of people using simple techniques. It is assumed that main difficulty lies in identifying and formulating the problems, which can then be solved without the need for sophisticated analysis. The third style assumes that problems and solutions are well known, but the

implementation of change is constrained by group attitude and traditions. The selection (or combination) of these styles depend on the details of the problem and its environment.

The problem of transferring operations research technology from developed countries to developing countries has been discussed by Shiba (1976). He has suggested that the technology transfer should be directed to a problem in areas that are controlled by technological and human physiological factors. But in the areas concerning social structure the operations research scientists of the developing countries should by themselves formulate and solve problems at hand despite the delays.

Bandyopadhyay (1977) analysed operations research application in developing countries and commented that traditional skills and techniques would prove inadequate by the problems posed in developing countries. Data gaps would be present. The problems of development are very complex and modeling efforts may have to be iterative. The data problem should not be considered unsurmountable. The first formulation of the model which is bound to be approximate and crude, will often determine the data needs and will indicate the nature of collection effort needed.

1.2 Problems of Developing Countries :

Developing countries face many problems and one of the major problems is the rapid rate of population growth. The reasons for this increase in the population are well known, namely sharp decline in the mortality rates, through the application of technology in the fields of public health and medicine. While the birth rates, though they have also shown some decline, continue to be maintained at relatively high levels. A basic concern of the developing countries is to bring about a decline in fertility rates. The Governments of large number of these countries have launched full fledged national programmes for curbing the growth of population as a part of their national policy.

The most common form of population policy adopted is the formulation of a time bound plan for the reduction of the growth rate of population. Quantitative targets are set and are sought to be achieved through the operation of a national family planning programme. The task of bringing about a decline in birth rates is not easy, as it involves a change in the attitude, norms and values of the people in favour of smaller families, especially among the vast rural population. This poses a great

challenge to the operations researcher.

1.3 Marketing Approach to Family Planning Programmes :

Research in the field of family planning can generally be classified under medical, social science and economics. There is an emerging trend of research in the marketing aspect of family planning programme. The marketing approach can draw upon the output of medical research for product development, social science research for understanding consumer behavior and economics for cost-benefit analysis.

A marketing orientation implies that the programme administration develop attitude that their job is to understand the clients' needs and to satisfy them and to acquire technical knowledge in marketing management.

Viewed upon as a marketing programme demands a thorough understanding of the consumer and the market process. This involves an understanding of the elements of marketing mix, like product, price, advertisement, personnel selling. The administrator needs to know the influence of the quality and level of these elements of marketing mix on the desired results for the purpose of planning and executing the programme.

To aid the understanding of the marketing process and subsequent use in decision making well developed marketing models are available. While existing models are the first choice for any application more often modifications are required to take care of new situations. Model building to assist decision making has become an accepted practice.

The gigantic task of establishing family planning programme infrastructure and operating them have been plagued with many complex problems. The experiences of many national governments' family planning programme activities, indicate the gap between what is desired and what is achieved. In the initial stages of the programme the knowledge about the programme was meagre and many trial and error procedures were adopted. Where it is felt that the programme has not resulted in the maximum benefit corresponding to the effort put in, the need arises for fresh thinking. To answer this need it is felt that operations research methodology can be applied fruitfully for the marketing of family planning programmes in the developing countries. With this view in mind the following objectives are framed for the study.

1.4 Objective of the Study :

1. To review the literature in marketing, family planning and related areas with special reference to quantitative models and studies.

2. To review the empirical studies and family planning programmes of different countries in general and India in particular with a view to draw lessons from these experiences.

3. To identify the various aspects of family planning programme management and to isolate a critical sub-area for the purpose of detailed study.

4. To formulate an appropriate model to improve the programme as a whole through improvement in the operation of sub-area identified in (3) above.

1.5 Summary of Chapters :

It is against the frame of reference described above, the review of concepts, theories and models in the areas of operations research, marketing and family planning is done in chapter two. The review resulted in identifying the suitability of relevant models and concepts for application in family planning programme management. A classification of marketing models for this purpose is developed.

Chapter three deals with the progress made in national family planning programmes of different countries. This chapter also reviews the empirical and theoretical studies in various aspects of family planning.

The history and development of family planning programme in India is traced in ^{the} this chapter. The issues that are to be resolved in carrying out the programme effectively are focussed in this chapter.

With the above background, a system model of family planning programme management is developed in chapter five. The system model delineates the problem areas in family planning programme management. Of the many problem areas identified in this chapter, a critical sub-area is chosen for detailed analysis in the next chapter.

A model for redesign of facility is developed in chapter six. This model can be used as decision aid for the optimal allocation of resources between the existing facilities and the establishment of new facilities. The model utilises consumer response behavior to family planning.

The conclusions drawn from the study and suggestions for further work in this area are given in chapter seven.

CHAPTER - 2

REVIEW OF CONCEPTS, THEORIES AND MODELS

REVIEW OF CONCEPTS, THEORIES AND MODELS

2.1.1 Operations Research - A Brief History :

Most experts date the beginning of operations research during World War II with the formation of British and American teams of Mathematicians and Scientists to study problems of supply, bombing, submarine warfare, and military strategy. When the war ended, many of the "operations researchers" left the military to join large business organisations and apply their skills to classic problems in business. The first business problems they examined were in the fields of production scheduling, inventory control, and physical distribution. (Henderson and Schaifer, 1971).

The scientific origins of the subject can be traced back to earlier years. Primitive mathematical programming models were advanced by economists Quesnay in 1759 and Walras in 1874; more sophisticated economic models of a similar genre were proposed by Von Neumann in 1937 and Kantorovich in 1939. The mathematical underpinnings of linear models were established near the turn of the 19th century by Jordan in 1873, Minkowski in 1896, and Farkas in 1903. Another example of early development is the seminal work on dynamic models accomplished by

Markov, who lived from 1856 to 1922. Two further illustrations are the innovative suggestions for economical inventory control, published in industrial engineering journals during the 1920's, and the pioneering studies of waiting line phenomena completed by Erlang, who lived from 1878 to 1929. (Wagner, 1975).

Now the scope of operations research has widened to such an extent that these methods are finding increasing applications in most spheres of human activity, such as business, industry, agriculture, or social sciences. To mention a few specific areas, operations research has been successfully applied to the study of the effect of advertising on sales; reducing congestions at airports, seaports and road crossings; urban planning; exploration of petroleum in Sahara; allocation of funds to research and development projects, and the like. Its principal thrust continues to be toward resolution of significant problems of management so much so that it has even acquired the new name of "Management Science". As a result of its rapid growth, it has been labelled the future science of action. (Kalro, 1977).

2.1.1 Definition :

As operations research covers diverse fields of activity, a formal definition becomes very difficult.

Karush (1971) defines operations research as "The application of mathematical and scientific methods to problems of military, business, and man-machine systems with a view toward improving the over-all performance of such systems by analyzing the interaction of the various parts".

Wagner (1975) gives a simplified definition of operations research as "a scientific approach to problem-solving for executive management".

One definition finding increasing acceptance looks upon Operations Research as an application of rational methods, techniques and tools to problems involving the operations of a system so as to provide those in control of the system with optimum solutions to the problems. (Kalro, 1977).

2.1.3 Characteristics of Operations Research :

Most operations research applications possess the following distinguishing characteristics :

1. A Primary Focus on Decision-Making. The principal results of the analysis must have direct and unambiguous implications for executive action.

2. An Appraisal Resting on Economic Effectiveness Criteria. A comparison of the various feasible actions must be based on measurable values that unequivocally

reflect the future well-being of the organisation.

3. Reliance on a Formal Mathematical Model. The procedures for manipulating the data should be so explicit that they can be described to another analyst, who in turn would derive the same results from the same data.

4. Dependence on an Electronic Computer. This characteristic is not really a desideratum but rather a requirement necessiated by either the complexity of the mathematical model, the volume of data to be manipulated, or the magnitude of computations needed to implement the associated management operating and control systems.

2.1.4 Operations Research Methodology :

The methodology used in the empirical physical sciences can be described as :

1. Formulation of the problem.
2. Development of a hypothesis for analysing the problem.
3. Measurement of relevant phenomena.
4. Derivation of a solution or basis of understanding of the problem.
5. Testing of the results.

6. Revision to reflect the testing of the hypothesis.
7. Emergence of valid results.

In operations research this methodology begins with a model to define and describe the problem. (Steps 1 and 2). Next the relationships within the model and the input to the model are specified and measured (Step 3). A solution to the model or a specification of the explicit relationships necessary for understanding the problem is found by the application of a solution technique (Step 4). The final steps in the approach are to validate the solution and model (Steps 5,6 and 7).

2.1.5 Types and Uses of Operations Research Models :

Operations research is directed at understanding and solving problems. Within this framework two broad classes of uses can be identified. The first relates to the understanding of problems as reflected in problem identification, definition, and exploration. The second class of uses is related to finding solutions to problems. Both these classes of uses represent attempts to extend the manager's ability to comprehend his environment and make better decisions. In general, models are designed to expand the "bounds of rationality" that limit the manager's ability to find optimal or good solutions to his problems. The class of uses related to problem

identification, definition, and exploration can be subdivided into uses associated with descriptive and predictive models. The classification of model uses as given by Montgomery and Urban (1974) is given below.

(I) Understanding Problems - Descriptive and Predictive Models.

A. Descriptive Models

1. Transform data into more meaningful forms.
2. Indicate areas for search and experimentation.
3. Generate structural hypotheses for testing.
4. Provide a framework for measurement.
5. Aid in systematic thinking about problems.
6. Provide bases of discussion that will lead to common understanding of problem.

B. Predictive Models.

1. Make forecasts of future events.
2. Validate descriptive models.
3. Determine sensitivity of predictions to model parameters.

(II) Solving Problems - Normative Models

- A. Provide framework for structuring subjective feelings and determining their decision implications.

- B. Provide a tool for the analysis of decisions.
- C. Assess system implications of decisions.
- D. Yield solutions to problems.
- E. Determine sensitivity of decision to the model's characteristics.
- F. Provide a basis for updating and controlling decisions.

2.1.6 Operations Research and Marketing :

Many new quantitative techniques have been evolved in operations research applications in the field of production and finance. Marketing, however, has not experienced a parallel development. Although there is evidence of accelerating interest in the operations research approach to marketing, achievements in this remain more modest than in areas such as production and finance.

Montgomery and Urban (1974) have suggested the following factors responsible for this relative lag in the use of operations research in marketing.

1. Complexity of Marketing Phenomena. Complexity is due to the fact that response to market stimuli tend to be highly nonlinear, to exhibit threshold effects, to have carry over effects and to decay with time in the absence of further stimulation.

2. Interaction Effects in Marketing Variables. The impact of any single controllable marketing variable is difficult to determine due to interaction of the variable with the environment and with other marketing variables.

3. Competition and Marketing Decisions. The final outcomes of marketing decisions depend upon how competitors react.

4. Measurement Problems in Marketing. The consumer-oriented nature of marketing makes response relationships difficult, if not impossible, to observe.

5. Instability of Marketing Relationships. The relationships between market responses and marketing decision variables tend to be temporally instable due to changes in tastes, attitudes, expectations, etc.

6. Incompatibility of Marketing and Operations Research Personnel. The underlying attitudinal differences between marketing and operations research personnel form a barrier to innovation.

The underlying explanations for these factors lies in the fact that marketing deals with behavioral rather than technological phenomena.

In recent years there is an apparent trend in the increasing applications of operations research methodology to marketing problems due to advances made in operations research techniques.

2.2 Marketing Models :

Marketing management seeks to determine the best simultaneous settings of various marketing decision variables under their control (price, promotion, distribution and product quality) over time, space and product lines, in the face of environmental variables not under their control (the economy, competitive activity, technology, and so on) and various constraints, that will maximize the firm's long run utility function as defined over a set of goal variables. Marketing models form a set of valuable decision aid in this task.

2.2.1 Market Response Models :

Descriptive and predictive models of market response provide a frame work for organizing and understanding of the complex process of market response.

Amstutz (1970) developed a model of macrostructure to study the marketing system. In this model the product flow and information flow are identified as shown in

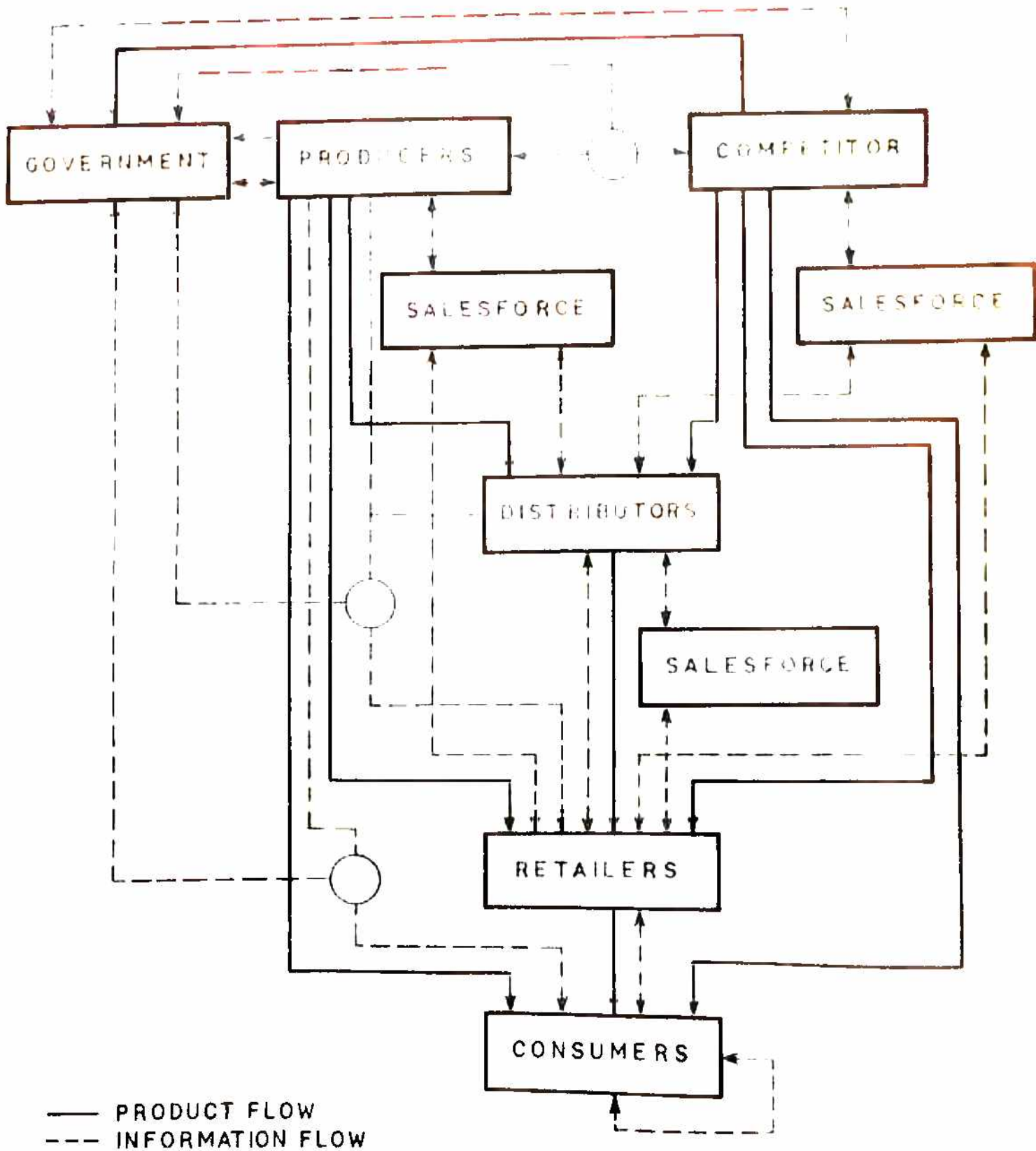


FIG. 2.1 MARKETING MODEL MACROSTRUCTURE

Fig. 2.1. This system model was used to identify the key market subsystems, the important variables in each subsystem, and the interrelations between the subsystems.

The study of consumer behavior by market researchers has resulted in a few comprehensive models which integrate behavioral sciences in a consumer decision making context. The most notable attempts have been by Howard, Nicosia, Engel and co-authors, Howard and Sketh. In these models, the buyer is seen as a problem solver and information processor. A simplified description of the model by Howard-Sketh, (1969) is given in Fig. 2.2. In this figure there are four distinct sections :

- (a) the internal state variables and processes which characterise the state of the buyer;
- (b) the inputs for the marketing environment;
- (c) the inputs from the social environment; and
- (d) the outputs, the dimensions of buyer behavior.

Fishbein (1967) developed a model to describe and explain individual choice behavior. A formal statement of the model is

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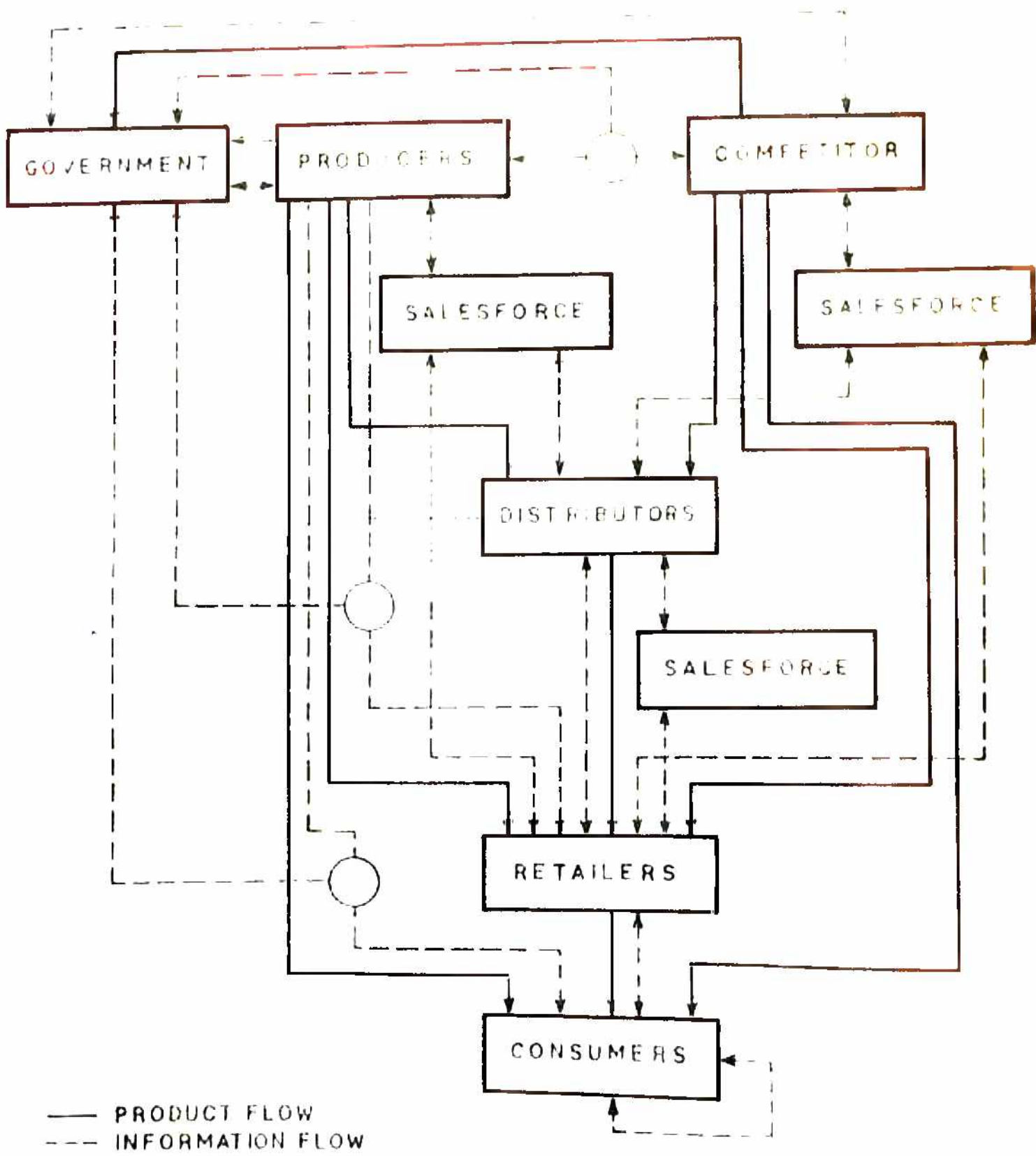


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OUTPUTS

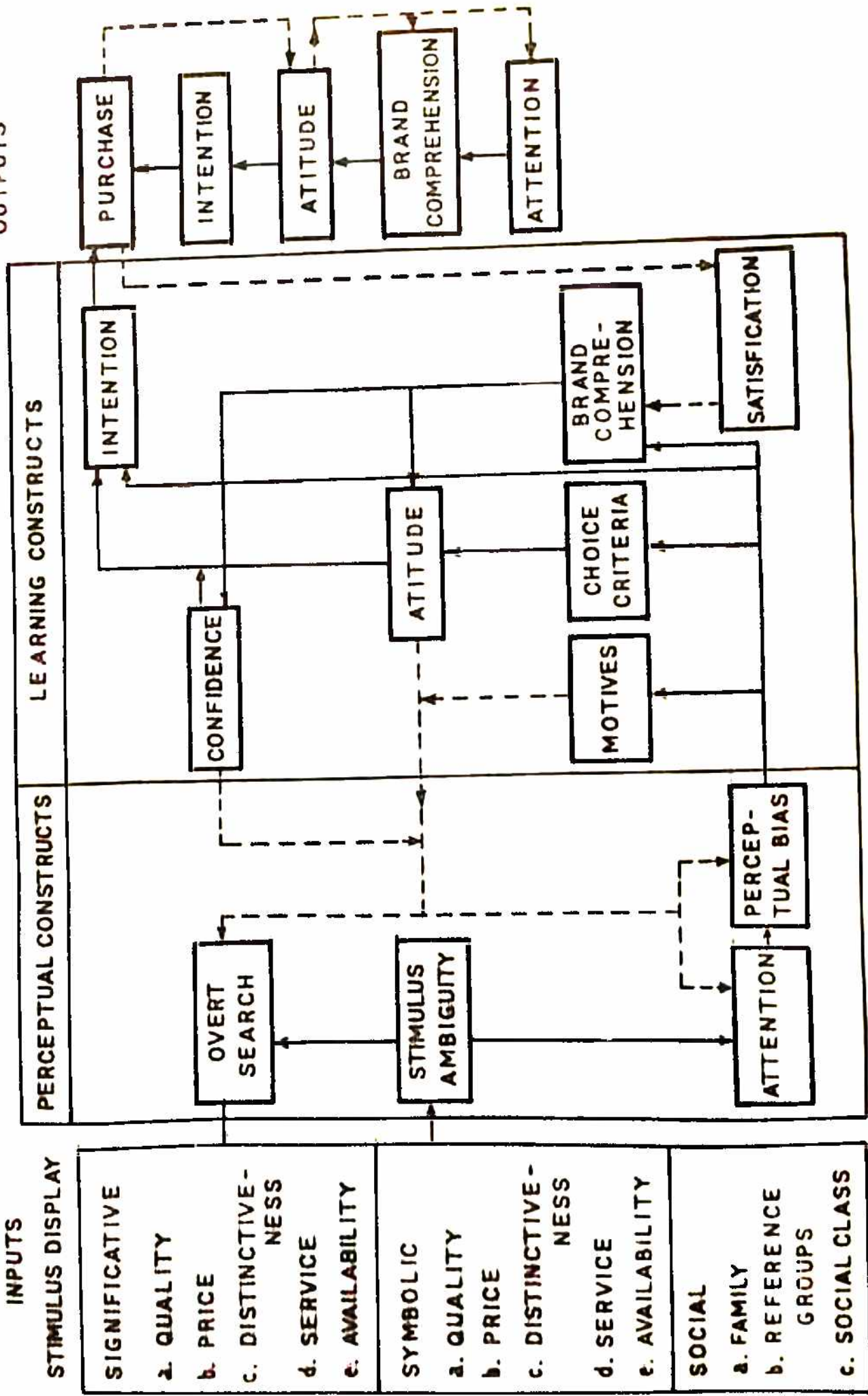


FIG. 2.2 HOWARD-SHETH MODEL OF BUYER BEHAVIOUR.

$$A_o = \sum_{i=1}^n a_i b_i \quad (2.1)$$

where A_o = attitude toward object or act,

b_i = belief about the object with respect to
item i ,

a_i = evaluative aspect of item i .

Several extensions have been suggested for the basic 'Fishbein' model. One extension is of the form

$$BI = \sum_i a_i b_i + \sum_j SNB_j MC_j \quad (2.2)$$

where BI = behavioral intent,

a_i = evaluation aspect of item i ,

b_i = belief about the object with respect to
item i ,

SNB_j = social normative belief,

MC_j = motivation to comply

j = social group scale.

St James' model. This model was proposed by Hendrickson (1969) to relate consumer choice behavior and advertising strategy. It is based on the following assumptions :

(a) Different brands or products are evaluated in a multidimensional attribute space.

(b) Also located in this space is the location of an 'ideal' brand.

(c) The closer a brand is to the ideal the more favourable is the response toward that brand. The model is of the form

$$s_j = 1 / \left[\sum_{i=1}^n I_i d_{ij} + 1 \right] \quad (2.3)$$

where s_j = level of satisfaction in the brand j ,

I_i = importance weight given to the i th attribute,

d_{ij} = dissatisfaction with the brand j along the i th attribute.

First Purchase Model. Fourt and Woodlock (1966) developed a simple model to predict the penetration levels of a frequently purchased consumer non-durable. The model can be represented as

$$q_t = \bar{Q} r (1-r)^{t-1} \quad (2.4)$$

where q_t = increase in cumulative penetration in period t ,

\bar{Q} = market potential,

t = time period,

r = rate of increase of penetration.

Bass (1969) proposed a diffusion model which deals with the timing of first purchase of a new consumer durable. In this two groups of individuals are identified: innovators and imitators. The model is given by

$$Y_t = (p + q \frac{c_t}{\bar{c}}) (\bar{c} - c_t) \quad (2.5)$$

where Y_t = sales in period t ,

p = coefficient of innovation,

q = coefficient of imitation,

c_t = cumulative purchase upto time t ,

\bar{c} = asymptotic level of cumulative sales.

Stochastic models of brand choice identify the underlying process that best describe consumer purchasing behavior patterns.

The simplest model for brand choice is the stationary, homogeneous multinomial law. Consumers are assumed to make selections according to fixed probabilities, which are the same for all families and do not change over time. Then the share of each brand in the market can be described in terms of a multinomial distribution with parameters p_1, p_2, \dots , and N , where N stands for the total number of families

in the market.

Brown (1952) and Cunningham (1956) applied Bernoulli process to study consumer brand and store loyalty. A zero-order modeling approach was utilized by Frank (1962) in an analysis of consumer brand choice.

Whereas zero-order models assume that brand choice is independent of past purchases, Markov models presume that only the last brand choice affects the current purchase. Harary and Lipstein (1962) developed a Markov model disaggregating the total consumer population into "hard core" loyal and "switchers",

Morrison (1969) proposed two Markov models of brand switching behavior. Brand Loyal model takes into account heterogeneity between consumers. The last purchase model assumes that loyalty is generated toward the brand last purchased. Telser (1962) has developed a model linking price to the transition probabilities.

Kuehn (1962) developed a linear learning model with the following assumptions :

$$P_{t+1} = \alpha_1 + \beta_1 P_t = \text{probability of choosing brand A at purchase occasion } t+1 \text{ if brand A was purchased at time } t \quad (2.6)$$

$P_{t+1} = \alpha_0 + \beta_0 P_t$ = probability of choosing brand A
 at purchase occasion $t+1$ if some other brand was
 purchased at time t (2.7)

Carman (1966) statistically tested Kuehn's learning
 model and emphasized the beneficial methodological
 feature of stochastic modeling. A modified form of
 linear learning model was proposed by Haines (1964) as
 a model of market behavior after innovation. Ehrenberg
 (1959) considered interpurchase times in brand choice
 model.

Stochastic models have been used to test structural
 hypotheses and to make conditional predictions.

2.2.2 Advertising Decisions :

Several researchers have used sales as a
 criterion to evaluate advertising expenditure. Benjamin
 and Mitland (1958) analysed four different models of
 sales response to advertising and found the sales response
 to advertising relation was given by a logarithmic equa-
 tion of the form

$$R = a \ln (A) + b \quad (2.8)$$

where R = sales response to A in units of products

A = advertising expenditure.

a, b = parameters to be estimated .

Benjamin, Jolly and Maitland (1960) proposed a time response function to an advertising pulse based upon an equation of the form

$$R = a e^{-bt} (1 + ct)^d \quad (2.9)$$

where R = weekly sales response following a single advertising pulse,

t = time in weeks measured from the time of the advertising pulse,

a, b, c and d = parameters which must be estimated.

Tull (1965) proposed two behavioral mechanisms that may generate carry-over effects. First, if advertising introduces consumers to the advertised product and if certain of these consumers become repeat purchasers of the product there will be a sales carry-over effect of advertising. Second, a carry-over effect will occur if advertising impressions cumulate over time to yield sales results.

Palda (1964) used Koyck type distributed lag model for the study of carry-over effects of advertising. The sales response function is of the form

$$S_t = \alpha + \beta A_t + \lambda A_{t-1} + \lambda^2 A_{t-2} + \dots + U_t \quad (2.10)$$

where S_t = sales in period t ,

A_i = advertising in period i , $i=t, t-1, t-2, \dots$,

U_t = true regression residual,

α, β, λ = parameters to be estimated

The attempts to establish sales-advertising relationships have been plagued by statistical problems related to isolating the effects of advertising when sales changes may also be affected by other marketing variables, competitive actions, and environmental shifts. Quandt (1964) recommended the use of classical experimentation to measure the sales effects of advertising.

The simplest model of advertising for budget decision is of the form

$$\begin{aligned} Pr &= pq - A - C(q) \\ p f(A) - A - C[f(A)] & \end{aligned} \quad (2.11)$$

where Pr = total profit,

q = quantity sold,

$C(q)$ = total cost of producing and marketing
(exclusive of advertising),

p = unit price

A = Advertising cost.

If $q = f(A)$ and $C(q) = C[f(A)]$ are differentiable functions and if they are decreasing returns to advertising at some level of A , the classical optimization procedure may be used to solve the above equation for profit maximizing budget level of advertising.

Simon (1965) developed a simple model for determining an advertising budget in the presence of carry-over effects.

$$PV(A_t) = \left[\frac{1}{1-b \left(\frac{1}{1+i} \right)} \right] \Delta R(A_t) \quad (2.12)$$

where $PV(A_t)$ = discounted present value in period t ,

A_t = Advertising expenditure in period t ,

i = firm's cost of capital,

$\Delta R(A_t)$ = incremental net sales revenue generated in present period (t) due to A_t .

b = retention rate of sales revenue per period.

Vidale and Wolfe (1957) considered dynamic advertising effects in a model that is based upon experimental evidence and developed a model of the form

$$\frac{ds}{dt} = r A (M-S)/M - \lambda S \quad (2.13)$$

where S = rate of sales at time t ,

r = response constant (sales generated per dollar of advertising expenditure when $S = 0$)

A = rate of advertising expenditure at time t ,

M = Saturation level (the maximum sales that can be practically achieved via a given campaign),

λ = sales decay constant (the proportion of sales lost per time interval when $A=0$).

The parameters r , M and λ are taken as constant for a given product and campaign. Vidale and Wolfe also presented results for constant advertising expenditure for a period of length T and for a pulse campaign.

Friedman (1958) developed the first game theory applications to advertising to incorporate competitive effects. He considered promotional competition between two competitors in n geographical areas. He derived optimal advertising budget for the firm as a function of the total sales potential which may be influenced by advertising, the competitor's budget and the profit contribution per unit of sales.

Little (1966) developed a model for the adaptive control of advertising expenditure. The model assumes a simple quadratic sales response to advertising that exhibits diminishing returns.

$$s = \alpha + \beta x - \gamma x^2 \quad (2.14)$$

$$Pr = ms - x - c \quad (2.15)$$

where s = sales rate

Pr = profit rate

x = promotion rate

c = fixed cost rate

m = gross margin per unit

α, β, γ = parameters

The parameters of this model are estimated continuously by market experimentation and feedback.

With suitable assumptions linear programming model can be applied to media problem. The model formulation is :

$$\text{maximise total exposure} = \sum_{i=1}^I R_i X_i \quad (2.16)$$

$$\text{subject to} \quad \sum_{i=1}^I C_i X_i \leq B$$

$$x_i \leq L_i$$

$$x_i \geq 0 \text{ for } i = 1, 2, \dots, I$$

where x_i = the number of insertions in medium i ,

C_i = the cost per insertion in medium i ,

B = the total advertising budget available,

L_i = the physical limit of insertions in medium i ,

R_i = the rated exposure value of a single insertion
in medium i .

The linear programming model exhibits the following disadvantages:

- (i) the inability to deal with the integer nature of insertions,
- (ii) the restrictive nature of the criterion of total exposure or deviation from exposure goals and
- (iii) the inability to comprehend the dynamic and cumulative effects of forgetting and intermedia replication.

Little and Lodish (1966) developed a mathematical programming model called MEDIAC. The model uses sales as the criterion for the media schedule.

$$\text{SALES} = \sum_{i=1}^S \sum_{t=1}^T n_i p_{it} f(y_{it}) \quad (2.17)$$

where n_i = number of people in market segment i ,

p_{it} = per capita sales potential of market segment i
in time period t ,

y_{it} = exposure value per capita in segment i during
period t ,

$f(y_{it})$ = proportion of the per capita sales potential
that will be gained in segment i during time t
when the exposure value is y_{it} .

The function $f(y_{it})$ is taken to be a nonlinear function that exhibit diminishing returns to exposure value per capita y_{it} . The mathematical programming problem in the MEDIAC is to maximize the total sales over the planning period subject to budget and media restrictions.

2.2.3 Pricing Decisions :

Pricing determination utilise the classical economic model involving price-demand relationship.

Kotler (1964) developed a multivariate optimization model for price and advertising combination. The general profit equation is

$$Pr = p \cdot q - C(q) - A - FC$$

$$\begin{aligned}
 &= p F(p,A) - C [F(p,A)] - A - FC \\
 &= R(p,A) - C (p,A) - A - FC \qquad (2.18)
 \end{aligned}$$

where Pr = pprofit

$q = F(p,A)$ = quantity sold,
 p = price per unit,
 A = advertising expenditures,
 $C = C(q)$ = total variable costs,
 FC = fixed costs

$R(p,A) = p \cdot F(p,A)$ = total revenue at price p and
 advertising expenditure A ,

$\hat{C} = C [F(p,A)]$ = total variable costs at price p and
 advertising expenditure A .

If the function can be identified, the maximum profit conditions may be specified by the application of multivariate calculus :

For product line pricing Holden (1960) proposed the general formulation as

$$\begin{aligned}
 q_1 &= f_1(p_1, p_2, \dots, p_n, A_1, A_2, \dots, A_m) \\
 &\cdot \\
 &\cdot \\
 &\cdot \\
 q_n &= f_n(p_1, p_2, \dots, p_n, A_1, A_2, \dots, A_m) \qquad (2.19)
 \end{aligned}$$

where p_i = unit price of product i ($i=1, \dots, n$)

A_j = cost of non price offer variant j
 ($j = 1, \dots, m$)

The A 's may be nonprice items such as advertising, personal selling intensity, package design, etc.

The total cost to the firm of selling q_1, q_2, \dots, q_n units of its products may be expressed in functional form as

$$C = C(q_1, q_2, \dots, q_n; A_1, A_2, \dots, A_m) \quad (2.20)$$

The firm's profit function is then

$$Pr = \sum_{i=1}^n p_i q_i - C \quad (2.21)$$

Krishnan and Gupta developed a two-firm model for analysis of two marketing mix elements of price and advertising within the game theory context. The competitive effect is described by

$$MS_i = \frac{e_i A_i}{e_1 A_1 + e_2 A_2} + k(P_1 + P_2 - 2P_i) \quad (2.22)$$

where MS_i = market share of firm i ,

A_1 = Advertising expenditure by firm 1,

e_1 = effectiveness of firm 1's advertising,

P_1 = price of firm 1,

k = price response constant.

2.2.4 Distribution Decisions :

Baligh and Richartz (1967) used a distribution model to investigate the manufacturer's availability decision and the possible role of intermediaries in the distribution system. The total cost equation is of the form

$$TC = C_1 q + C_2 \left[1 + \frac{q^2}{OR(OR-q)} \right] + C_3 e + C_4 \left(\frac{OR}{e-OR} \right) + C_5 (OR-q) + C_2 (OR/e) \quad (2.23)$$

where q = average production rate,

OR = mean order arrival rate,

e = mean rate of distribution,

C_1 = unit cost,

C_2 = holding cost per unit time,

C_3 = unit cost of maintaining the transportation facility,

C_4 = order handling cost

C_5 = shortage cost per unit.

Balderston (1958) analysed the place of middleman, in the distribution information network. He gave the condition for employing middleman as

$$nm \quad (n + m) \quad (2.24)$$

where n = number of customers

m = number of sellers.

Facilities decisions have been approached by two basic methods. The first approach is based on minimising the total cost of distribution. The second approach is based on maximisation of the firm's profits that are produced when distribution is effectively carried out.

Bowman (1958) developed a cost function for distributing goods based on fixed warehouse costs and transportation costs that varied with the areas served by the facility. The function was then differentiated and solved to find the optimal size of area for a facility to serve. The assumption of this method is that demand is fixed and uniformly distributed over the geographic area.

Mossman and Morton (1965) included delivery time effects in the centre of gravity approach to the location of a single facility given a number of point demands.

In this formation, they assumed demand to be related to delivery time by the expression

$$q = a q_0 e^{-t/t_0} \quad (2.25)$$

where t = delivery time,

q = quantity ordered with delivery time t ,

q_0 = quantity ordered with delivery time t_0 ,

a = constants

Harlung and Fisher (1965) gave a model relating sales effects of the density of outlets in an area. The most interesting finding is that the sales of each station of a brand are not independent. In this model the steady state market share of a firm is given by

$$X = \frac{K_2 P}{N + (1+K_2-K_1)P} \quad (2.26)$$

where X = steady state market share of the firm,

P = number of outlets carrying firm's brand

N = number of outlets carrying competitive brands,

K_1, K_2 = constants.

Hlavac and Little (1966) developed a model for facility decision for auto dealership. In this model

the demand creation carried out during distribution are represented by an auto dealer's "pull". This pull reflects the distance that the consumer must travel to reach the dealer, the brand preference of the buyer, and the characteristics of the dealer, such as his promotional policies. The sales equation for a dealer is given by

$$S(j) = \sum_{i=1}^S N(i) P(i,j) \quad (2.27)$$

where $S(j)$ = sales of dealer j ,

$N(i)$ = potential number of buyers in market segment i ,
($i=1, 2, \dots, s$),

$P(i,j)$ = probability of buyer in market segment i
purchasing from dealer j

2.2.5 Personal Selling Decisions :

Semlow (1959) used a historical data-based approach to the problem of determining sales force size. He suggested the following simple marginal rule for adding salesmen :

$$s \bar{p} - c > 0 \quad (2.28)$$

where S = sales volume of each additional salesman,

\bar{p} = expected profit margin per unit on this
sales volume,

C = cost of maintaining this salesman in the field.

The data for \bar{p} and C should be fairly accessible from company records.

Buzzell (1964) reported a deterministic study on the allocation of salesmen between direct and wholesale accounts. He used a sales response model of the form :

$$Q_i = S(1 - e^{-a_i n_i}) \quad (2.29)$$

where Q_i = quantity sold to customer type i ,

S = saturation level of sales to either customer,

a_i = constant reflecting the sensitivity of sales
to increase in n_i

n_i = number of salesmen serving customer type i ,

$i=D$ = direct customers,

$i=W$ = wholesale customers.

The profit function in this analysis was

$$Pr = m_D S(1 - e^{-a_D n_D}) + m_W S(1 - e^{-a_W n_W}) - C(n_D + n_W) - FC \quad (2.30)$$

Where Pr = Profit,

m_D = profit margin per unit of direct sales,

m_W = profit margin per unit of wholesale sales,

C = cost of maintaining a salesman in the field,

FC = fixed cost

Magee (1953) developed a probabilistic model for solving the problem of the allocation of missionary sales effort to retailers on the part of the manufacturer of a food product.

Brown et.al.(1956) attempted to estimate the dynamic response functions of new and old customers and determined an optimal allocation between these two customer classes. The sales response to selling effort for each type of account was determined by field experimentation.

Nordin (1943) described a marginal approach for allocating sales effort between two geographic areas. The problem can be stated as to maximize:

$$\text{Total sales} = X_1 + X_2 \quad (2.31)$$

$$\text{subject to } TC_1 + TC_2 = k$$

where X_1 = unit sales in area 1,

X_2 = unit sales in area 2,

K = the available sales expense budget,

TC_1 = the total sales cost of selling X_1 units
in area 1,

TC_2 = the total sales cost of selling X_2 units in
area 2.

Zentler and Ryde proposed a model for sales effort decision of the type :

$$\text{Maximize } \sum_{r=1}^n N_r R_r (X_r) \quad (2.32)$$

$$\text{subject to } \sum_{r=1}^n N_r X_r = S$$

where X_r = sales effort to expend in area r ,

N_r = sales potential of area r ,

$R_r (X_r)$ = sales response function of area r to selling
effort X_r ,

S = sales effort budget.

2.2.6 New Product Decisions :

Freimer and Simon (1967) used a rating scheme in evaluation of new product opportunities. The interaction of the individual factors on which the product is used to produce an overall result is taken in account.

Urban (1968) developed a new product analysis and decision model incorporating demand cost function. The demand model is structured to consider life cycle, industry, competition and product interdependence effects.

Massy (1970) developed a stochastic evolutionary adoption model for making forecasts of the demand for new frequently purchased products.

2.3 Family Planning Models :

Reinke (1970) presented a hypothetical model considering the utility of child bearing for groups of population. He identified two features of population planning that are of special interest to operations researchers (i) the important interaction among family planning, health, and economic development, and (ii) the substantial but varying impact of social, cultural, political, and economic factors - features that require a multidisciplinary, flexible approach. He suggested

three overriding principles in this regard: (i) The programs of population planning are designed to serve national goals, whereas the ultimate actions concerning family limitation are usually recognised to be private family decisions. (ii) One usually faces a rather ill-defined interplay among a great variety of factors and (iii) the universal importance of the population problem in developing countries is always coupled with severe limitations of resources to cope with the problem. Two hypothetical models are developed in his work.

(i) The family decision process :

In the light of a given pregnancy history, socio-economic status, cultural norm, knowledge of and attitude towards contraception, etc., each family decides at a point of time either to interfere in some way with the birth process, or not to do so. A consequence of this decision is a change phenomenon leading to some outcome such as a live birth, fetal wastage, effective contraception with no ill effects, effective contraception with bleeding and cramps, etc.

The Model :

By implication, at least, each family attaches a value to each of these outcomes and ideally weighs these values according to their likelihood of occurrence

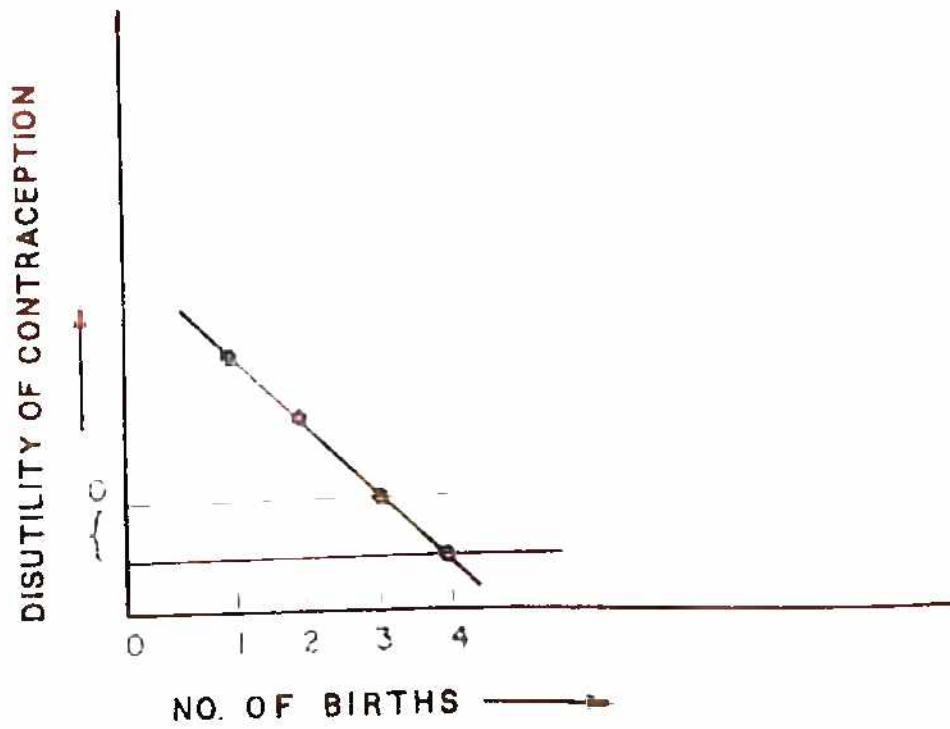


FIG. 2.3 HYPOTHETICAL UTILITY OF BIRTHS IN A SINGLE FAMILY.

as a result of a given course of action. Hence, the perfectly natural family decision maker will accept some form of contraception only if the weighted average of its possible onsequences is deemed more valuable or less undesirable than the weighted average of the consequences of inaction. The relation may be depicted as in Fig. 2.3

(ii) The Allocation Problem :

The problem can be stated as maximise

$$R = \sum_{i=1}^t \sum_{k=1}^v \sum_{j=1}^u r_{ijk} x_{ijk}$$

at minimum cost

$$C = \sum_{i=1}^t \sum_{j=1}^u \sum_{k=1}^v c_{ij} x_{ijk}$$

Subject to

$$x_{ijk} \leq a_{ijk} \quad \text{for } \begin{array}{l} i=1, \dots, t; \\ j=1, \dots, u; \\ k=1, \dots, v; \end{array}$$

where r_{ijk} = result achieved (births prevented) for each acceptor of the i th method in the k th population subgroup.

c_{ij} = cost per acceptance of the i^{th} method
employed by the j^{th} functionary.

x_{ijk} = number of acceptors of the i^{th} method
from the j^{th} functionary in the k^{th} popu-
lation subgroup.

i = methods

j = functionary

k = population subgroup

Bogue et. al. (1972) suggested a scientific method for establishing targets. The model is based on the argument which proceeds by a series of stages as follows:

1. Establishment of the birth rate at the start of the projection period and the birth rate that is desired at the end of the projection period;
2. Projection of the female population of child bearing ages by age;
3. Subdivision of the projected population according to fecundity status;
4. Estimation of women who will be protected by pregnancy and nonexposure;
5. Establishment of a fertility-contraception function.

6. Estimation of the total number of fecund women who must be protected from all sources of the target is to be achieved;

7. Estimation, as a subgroup of (6), of the number of fecund women who must be protected by contraception if the target is to be achieved;

8. TARGET-SETTING: Estimation, as a subgroup of (7), of the number of women who must be protected as a result of the family planning action programme if the target is to be achieved, adjusted for the level of efficiency of contraception; and

9. Partition of the total target according to the methods to be employed.

Kumar (1972) developed a model for optimal allocation of contraceptive methods for achieving a given target. The model objectives were :

- (i) to establish a technique which translates the demographic goals into family planning targets; and
- (ii) to obtain an optimal combination of acceptors of contraceptive methods such that the total cost of administering contraceptive methods is optimised.

(i) The Model : (Target Setting)

The project^{ed} population by age and sex is

given by

$$M_{x+}^{t+1} = M_x^t \times (SM)_x^t$$

$$F_{x+1}^{t+1} = F_x^t \times (SF)_x^t$$

where M_x^t = male population aged x years in calendar year 't'

F_x^t = female population aged x years in calendar year 't'.

$(SM)_x^t$ = single year survival ratio for males

$(SF)_x^t$ = single year survival ratio for females.

The total number of births (β_0^t) that would occur in the t^{th} year in the absence of programme.

$$\begin{aligned} \beta_0^t &= \sum_{x=15}^{44} {}^{t-1}j_x^t (F_x^{t+1} + F_x^t) / 2 \\ &= \sum_{x=15}^{44} \beta_{0,x}^t \end{aligned}$$

where $\beta_{0,x}^t$ = number of births given by women aged x years during the calendar year $(t, t+1)$ due to existing fertility schedule, and

$t-1$ x t = age specific fertility rates in the calendar year (t-1, t) for women aged x years.

The number of births required during the calendar year (t, t+1); (γ_2^t) , to reach at birth-rate goal of the calendar year (t+1) is given by:

$$\gamma_2^t = \frac{(M_{1+}^{t+1} + F^{t+1} + M_0^t + F_0^t) B^{t+1}}{2-B^{t+1} \times (SB)^t}$$

where B^{t+1} = assigned birth rate of the calendar year (t+1);

$(SB)^t$ = survival ratio at birth during the calendar year (t, t+1).

The number of births to be averted during the calendar year (t, t+1) by allocating contraceptive methods (γ^t) is

$$\gamma^t = P_0^t - P_1^t - P_2^t$$

where P_1^t is number of births averted in the calendar year (t, t+1) by the ~~unintended~~ retainers of the contraceptive methods.

$$(SF)_x^t = F_x^t \times p_x^t \times (Sp)_x^t$$

where $(SF)_x^t$ = number of females exposed to risk of conception aged x years.

p_x^t = proportion of women aged x years of reproductive ages, engaging in intercourse, at time t .

$(Sp)_x^t$ = female proportion susceptible at age x in the calendar year t .

Total cost optimization model :

Minimise $\sum_{k=1}^m \sum_{l=1}^k l_{l,k}^t$,

subject to

$$\sum_{k=1}^m \sum_{l=1}^k l_{l,k}^t = I^t$$

$$\sum_{k=1}^m \sum_{l=1}^k l_{1,k}^t = l_1 \times \left(\sum_{x=15}^{44} (SF)_x^t \right)$$

$$\sum_{k=1}^m \sum_{l=1}^k l_{2,k}^t = l_2 \times \left(\sum_{x=15}^{44} (SF)_x^t \right)$$

$$\sum_{k=1}^m \sum_{l=1}^k l_{3,k}^t = l_3 \times \left(\sum_{x=15}^{44} (SF)_x^t \right)$$

where c_k is the cost of k^{th} contraceptive method

x_k^t = optimal number of acceptors of k^{th} method

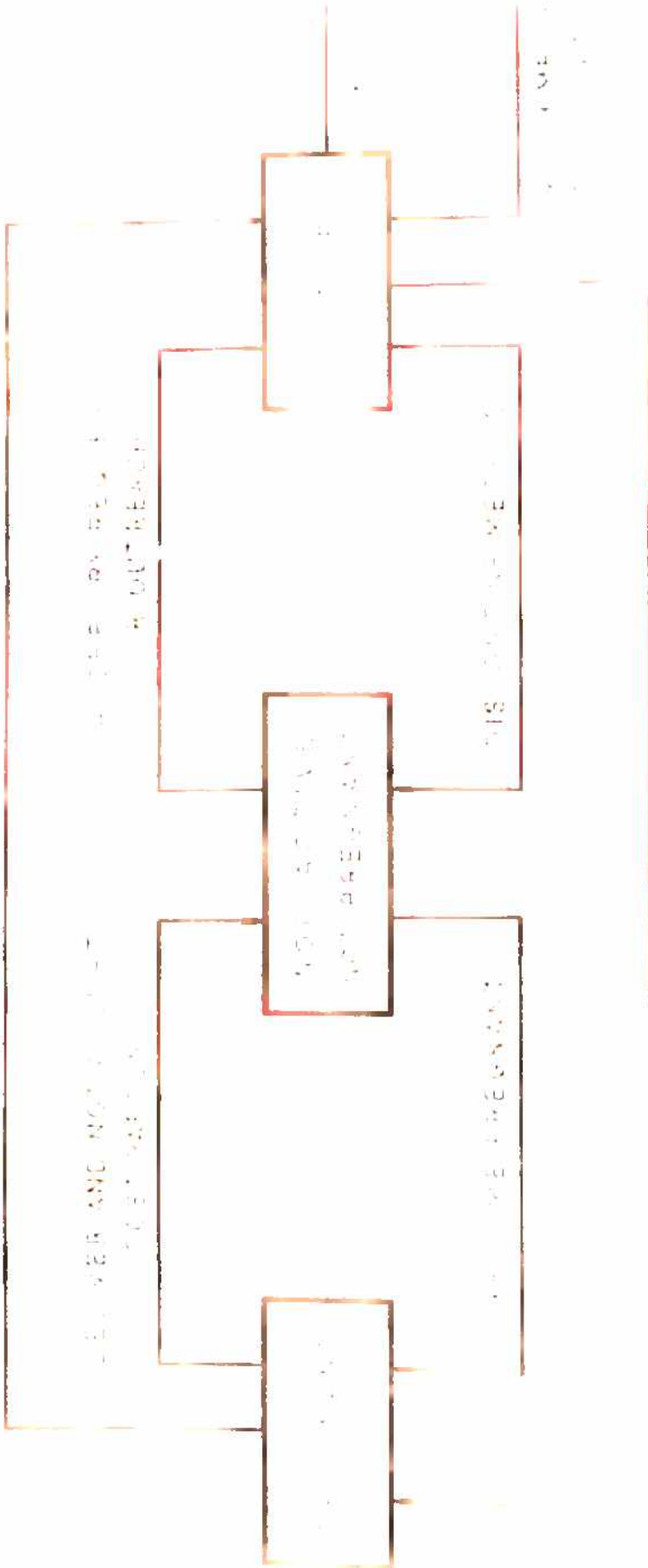
$V_{1,k}$ = number of births averted per acceptor during the first year of accepting k^{th} contraceptive

l_i = preassigned constant proportions ($i=1,2,3$).

Simplex method can be used to determine the optimal number of acceptors of each method.

Urban (1974) developed a planning model designed to be used by managers of family-planning systems to improve understanding, forecasting, and planning. The macro process model is shown in Fig. 2.4. In this model the target group is divided into two basic sections (1) Active and (2) Not active. The model incorporates the flow phenomena between different sections and links up the flow variables to the strategic variables. The model output includes benefit measures of total active patients, couple years of protection, births protected, and unwanted births prevented. The fertility aspects of births prevented are modeled through a nonstationary Markov process submodel.

DELIVER AND ACCEPT POST PARTUM



Ware and Dickert (1976) presented a management planning model for the delivery of family planning services. Markovian probabilistic properties have been adopted for projecting patient flow for a set of various alternative strategies for scheduling visits in a health care system.

Model :

In the scheduling problem, the objective is maximization of the total worth Q where

$$Q = \sum_{k=1}^p x_k U_k$$

subject to

$$\sum_{k=1}^p \sum_{i=1}^r Y_{ijk} z_{is} t_s x_k = ST_{sj}$$

where Y_{ijk} = number of patients in state i in period j under strategy k

where $i = 0, 1, \dots, r$;

$j = 1, 2, \dots, m$;

$k = 1, \dots, p$;

z_{is} = proportion of patients in state i receiving service s

$$s = 1, \dots, q.$$

t_s = time required to perform service s

x_k = proportion of patient population managed
under strategy k .

u_{I_k} = total worth of strategy k

$$x_k \geq 0 \text{ for all } k$$

and $\sum_{k=1}^p x_k = 1$

i denotes the interval in months between patient recall visits.

ST_{sj} Total available time,

The utility index (UI) is a function of the time for which the appointment of a given state of patients is delayed.

A projection technique is used which gives the patient load per time period for the various states of patients in the system.

Show (1976) employed a simulation model and data on desired family size to evaluate feasibility of national population growth targets in less developed countries. He claimed that neglect to consider desired

family size in population planning has resulted in spurious target setting by a number of governments. It is proposed that if presently attainable family size is below desired family size in any society i , then low utilization of family planning services can be expected to continue as a function of absence of demand.

Parker (1977) gave an approach for estimating the minimum cost of holding a specified steady-state growth rate for a population.

Assumptions : Specific fertility and mortality rates are constant over time:

The Model :

$$\sum_j C_j z_j u_j$$

Minimise

$$L_j u_j \leq v_j$$

$$\sum_j b_j z_j = \lambda - \sum_j s_j z_j$$

where u_j = current fraction of women in the age group using birth control.

L_j & U_j Lower and upper bound

C_j = average cost per time period to provide
birth control procedures

j = age bracket

s_j = probability of surviving from age interval
 j to age interval $j + 1$

b_j = the expected number of female infants in
the j^{th} age bracket during a time period.

λ is the maximum eigen value of S of the corresponding
eigen vector.

S is the population matrix.

$$S = \begin{bmatrix} b_1 & s_1 & 0 & \dots & 0 \\ b_2 & 0 & s_2 & \dots & 0 \\ \dots & \dots & \dots & \dots & \dots \\ b_j & \dots & \dots & \dots & s_j \end{bmatrix}$$

The solution determines b_j that minimise cost function
given the inputs s_j and λ .

Haran (1979) presented a quadratic programming
model for the allocation of resources in a family
planning programme. A quadratic cost function is
minimised subject to three sets of linear constraints:
one for a diffusion model of the acceptance, switching

and dropout behavior of the target population; one for manpower limitations; and one for incorporating government policies on desired levels of birth rate. Two important features are emphasised. First, a recruitment cost parameter is introduced to account for the effects of market saturation on new acceptance. Second, by treating the problem as one of cost minimization rather than one of birth rate minimization, the model can be utilised to evaluate the feasibility and the minimum cost requirement of government policies on desired reductions in the birth rate.

2.4 Social Marketing :

The application of marketing to the promotion of social causes was proposed a decade ago. According to Kotler, (1975) the concepts, tools, and models that have worked so effectively to manage products and services in the profit sector are becoming increasingly relevant to the management of products and services in the nonprofit sector.

Nonprofit organisations face a host of problems that would be analysed as straight forward marketing problems if found in the profit sector. Blood banks find it hard to enlist enough donors. Police departments are hampered by a poor image in many communities. Family

planners face formidable problems in selling the idea of "zero population growth". There is hardly a public or private nonprofit organisation in existence that is not faced with some problems stemming from its relations to its markets. Through decades of working in business markets, marketers have formulated a conceptual system that yields systematic insight into the structure and dynamics of market exchanges. Concepts such as market segmentation, market positioning, marketing mix, channels of distribution, and logistical systems, among others, serve to organise the analysis of any marketing problem. It is believed that the application of these concepts to the problems of nonprofit organisations can be of immense help.

At the same time, the transposition of a conceptual system from one domain (the profit sector) to another (the nonprofit sector) poses a number of challenges that call for new creative conceptualization. The concepts of product, price, promotion, and distribution, which are employed by private-sector marketers, have to be redefined for maximum relevance to all organisations. The concepts of markets and exchange processes must be generalised. The concepts of profit maximisation must be translated into benefit - cost maximization so that marketing models can be applied

fruitfully in the nonprofit sector.

The Evaluation of Social Marketing (Fox & Kotler 1980)

The roots of social marketing lie in the informational approach, in the form known as social advertising. Family planning organisation in India, Sri Lanka, Mexico and several other countries have sponsored major advertising campaign attempting to sell people on the idea of having fewer children. Messages on billboards and over radio tell the public that they can have a higher standard of living with fewer children (India) or be happier (Sri Lanka).

Properly designed, these campaigns can influence attitudes and behavior. The problem is that all too often these campaigns are the only step taken to motivate new behavior and, by themselves, are usually inadequate.

First, the message may be inadequately researched. Second, many people screen out the message through selective perception, distortion, and forgetting. Mass communications have much less direct influence on behavior than has been thought, and much of the influence is mediated through opinion leadership of other people. Third, many people do not know what to

do after the exposure to the message.

As these limitations were recognised social advertising evolved into a broader approach known as social communication. Much of current social marketing has moved from a narrow advertising approach to a broad social communication/promotion approach to accomplish its objectives. Social communication make greater use of personnel selling and editorial support in addition to mass advertising. Thus family planning campaign in India utilises a network of agents, including doctors, dentists, and barbers, to 'talk up' family planning to people with whom they come in contact. Events such as "Family Planning Day" and "Family Planning Fairs", together with buttons, signs and other media get across the message.

Only recently has social marketing begun to replace social communication as a larger paradigm for effecting social change. Social marketing adds at least four elements that ^{are} ~~one~~ missing from a pure social communication approach.

One element is sophisticated marketing research to learn about the market and the probable effectiveness of alternative marketing approaches.

The second element added by social marketing is product development. Wherever possible the social marketer does not stick with the existing product and try to sell it - a sales approach - but rather searches for the best product to meet the customer need - the marketing approach.

The third element added by social marketing is the use of incentives. Social communicators concentrate on composing messages dramatizing the benefits or dis-benefits of different kinds of behavior. Social marketers go further and design specific incentives to increase the level of motivation. The sales promotion area is rich with tools that the marketers can use to promote social causes.

The fourth element added by social marketing is facilitation. The marketer realises that people wishing to change their behavior must invest time and effort, and considers ways to make it easier for them to adopt the new behavior.

Social marketing involves coordinating product, price, place, and promotion factors to maximally motivate and facilitate desired forms of behavior. Furthermore, social marketing calls for marketing research

and for preparation of a full marketing plan, strategy, and budget to get initial "sales" and to reinforce the new behavior over time.

2.5 Segmentation Strategy for Family Planning Programme Management :

2.5.1 Market Segmentation :

The concept of market segmentation arises from the recognition that consumers are different. In a given product/service field, substantial differences exist among actual or potential consumers in terms of their specific wants and desires.

Market segmentation is a strategy of allocation of marketing resources given a heterogeneous customer population. Submarkets are defined which are homogeneous in terms of their response to marketing stimuli and marketing strategies developed for each of these submarkets or segments. This definition of market segmentation emphasises the two interrelated components to market segmentation, the strategic and the analytical. The strategic problem is developing a marketing strategy for a specific segment, or alternatively, allocating marketing resources to the various market segments. The analytical problem is developing methods and techniques for the identification and definition of these subgroups

and their response functions to marketing stimuli, such that the subgroups exhibit small within group variability and large between groups differences.

Segmentation strategies can be classified in terms of two dimensions : (a) marketing stimuli and (b) methods of targeting the marketing effort, as shown in ^{Fig. 1.10} Fig. (Frank et.al., 1972).

Marketing Stimuli

Method of targeting marketing effort	Product/Service characteristics and appeals	Promotion price and channels
Customer self-selection	(1)	(2)
Controlled coverage	(3)	(4)

Bases of Segmentation

In a segmentation study the objective is to identify the causal elements which influence behavior in the market and which can be used to group customers.

The alternative bases which may be used to segment markets is shown ⁱⁿ ~~if~~ Fig. (Frank et.al., 1972)

Customer Characteristics

	General	Situation specific
Objective Measures	Demographic or socio-economic factors	Consumption or brand loyalty patterns
Inferred	Personality life style	Attitudes perceptions and preferences

2.5.2 The Need for Segmentation for Family Planning Programme :

The family planning programme is characterised by a national strategy that presents a uniform approach to almost all people in all parts of the country. The message and services of family planning are carried to all sections of the country through rural and urban family planning centres, distinguished only by the number of people to which they cater. The basic approach is uniform irrespective of differences in education, religion, and socio-economic and cultural backgrounds that characterise the different parts of the country. In such a large and heterogeneous country, a strategy composed of several sub-strategies, each adapted to the specific situational characteristics of a region or sector, would give better results.

A Master Plan for Family Planning in the Industrial

Sector is suggested by Nambudiri, (Nambudiri & Sharma 1977). The reasons for not adopting the segmentation approach can be traced to

1. Lack of familiarity with the product (F.P. methods).
2. Lack of familiarity with the market in relation to the product.

Since the First Five-Year Plan in 1951, there has been a significant growth in the product development and service facilities. Continued research efforts are going on in discovering improved products. Large scale evaluation of programme and research studies over the years have contributed knowledge of the market with respect to the programme.

So the time is ripe for the introduction of segmentation approach to the family planning programme. As pointed out earlier in the field of marketing management segmentation approach helps in directing marketing activities to match with different segments. In the field of family planning effort it is desirable to use the segmentation approach in target setting, promotion and service facility design etc.

2.6 Some Generalisations about Family Planning

Communication :

The following are the some of the conclusions of Rogers (1973) based on (1) Communication research and theory about human behavioral change, (2) social scientific research on family planning behavior. These generalisations can help in the formation of communication strategies for family planning.

1. Home visiting clients by full time field staff is more often found in countries with relatively more successful family planning programs.
2. Supply factors (like available clinic services) are less important than demand factors (like home visiting of clients).
3. Substantial use of the mass media is an important factor in the success of the program.
4. Family planning ideas are a highly taboo form of communication, especially among villagers and urban poor.
5. For maximum communication effectiveness, a source and a receiver should be homophilous on certain variables and heterophilous on some variables relevant to the situation.

6. The high degree of homophily between individuals who engage in communication on a taboo topic acts as a barrier to rapid and wide spread diffusion of taboo messages which, in turn, perpetuates the taboo status of the topic.

7. The clinic Era incorrectly assumed that all of the fertile audience would actively seek family planning services, once they were made available.

8. The Field Era followed the classical diffusion model in actively contacting potential clients, in order to inform and motivate them to adopt family planning methods.

9. Family Planning programs, especially in Asia, have made greater use of incentives than have diffusion campaigns in agriculture and other fields, where the innovations are less taboo.

10. Quasi-professional midwives pose difficult problems in recruitment, training, and supervision as change agents due to their heterophily with professional change agents.

11. Competence credibility is more important to individuals at the knowledge stage in the innovation - decision process, and safety credibility is more important at the persuasion stage.

12. Although diffuser incentives increase the rate of adoption of a family planning innovation, the quality of the decision to adopt may be relatively low, leading to undesired consequences.

13. Non-birth incentives are more likely to guarantee continued adoption and officially intended consequences than are contraception incentives.

14. The lack of adequate informational and motivational activities is a more important constraint in achieving higher number of adopters than the further provision of clinical and medical services.

15. Family planning incentives have a greater effect when they are paid "in kind" than when they are paid in cash.

16. Non-birth incentives probably are more effective, and efficient, with the hard-core resistant audience, and contraception incentives are perhaps more appropriate with the receptive audience who adopt in the relatively early stage of a national family planning programme.

17. Taboo communication can be facilitated by re-labelling the taboo topic with different word symbols.

18. Attitude and behavior change are more likely if the message presents both the advantages and the disadvantages of the innovation, especially if the receivers are initially opposed or are relatively more sophisticated.

19. Attitude and behavior change are more likely if fear appeals are not utilised in message construction, unless (1) the source has very high Credibility, (2) the message is well supported, and (3) the fear appeal is to the receivers' valued "other" (e.g. a family member) rather than to the receiver.

20. Family planning program would be more successful if they were not dominated by doctors, who inappropriately fill most administrative position rather than providing medical services.

21. By restricting the accessibility of receivers to sources, organisational structure can be disfunctional by increasing distortion.

22. Private organisations are more flexible and pioneering in launching family planning programmes, but government agencies must eventually become involved if such programmes are to reach a mass audience.

23. Commercial marketing organisations can make an important contribution to a national family planning

programme (1) as a distribution system that can greatly improve client access to a contraceptives (especially condoms and pills), and (2) as a model of organisational procedures that can be borrowed by government agencies.

2.7 Conclusions:

As a result of the slow steady influence of operations research in the field of marketing, many marketing models have evolved over the years. They are finding increasing applications in the field of marketing of tangible products. A recent trend in the application of marketing management is the social marketing. ^{It} is a nascent idea and holds tremendous scope for the researcher. One of such areas of research is the application of marketing concepts to the family planning programmes.

A review of the concepts, theories and models bring out the fact that the marketing discipline has heavily borrowed knowledge from many disciplines. These disciplines include psychology and sociology which have contributed to the understanding of consumer's motivation and behavior patterns. Political science provides the knowledge of environmental factors in which the marketing activities are performed.

Development in quantitative methods have resulted in greater attention to marketing planning and the creation of marketing information centres. Marketing depends on anthropology for the understanding of cultural changes that have bearings on marketing activities. Communication science has contributed to the development of advertising, sales promotion and personal selling.

The systems approach has been a stimulant for understanding of marketing phenomena and process. Biological ideas of evolution, growth, and change have their counterpart in marketing. Technological innovation and marketing are closely intertwined.

As marketing has benefitted from these disciplines and has developed integrated theories for marketing applications, it is increasingly felt that time is ripe for tapping this potential to new areas of problem solving.

The field of family planning requires an integration of knowledge of the many disciplines dealing with human behavior in their surroundings. As quoted earlier Shan^v emphasised the need to understand target populations desired family size, for directing the programme efforts. This calls for understanding of consumer behavior, their latent need and the identifying of potential target audience, which all point to the marketing orientation in this task.

Reinke implied the need for family planning agencies to consider the socio-economic status, cultural norms, knowledge of and attitude towards contraception of the target audience. Haran used a diffusion model for predicting family planning acceptance and utilised constraints of government policies in his model. Rogers brought out the importance of communication strategy in family planning programmes.

It can be seen from the few attempts at the model building in family planning programme decision areas, marketing concepts and theories have found their way in these models. A formal application of the knowledge of the marketing discipline holds promise in this area.

The review of the various concepts and models in marketing and needs of the family planning program management decision areas, is used to develop the following classification of applications of marketing concepts and models to family planning programme problems.

Marketing Models	Application	Use in Family Planning Program
1. Macro System	Identify key elements and structure	Construct system model
2. Micro unit consumer response	Identify variables influencing consumer action	Understanding consumer action for F.P. acceptance
3. Brand choice	Predicting switching behavior	FP method choice
4. Aggregate Sales response	Optimal marketing effort	Acceptors instead of sales
5. Market Share Models	Competitive strategy	Commercial marketing
6. Advertising	Media Selection scheduling	Similar application
7. Pricing	Optimal pricing	Commercial marketing
8. Distribution	Facility Design	Similar application
9. Sales Force	Assignment	Field workers

Marketing Concepts	'Use in FP Programme
1. Segmentation	Grouping prospectus on relevant characteristics.
2. Product life cycle	Development of new products, improved methods.
3. Test marketing	Planning large scale operation
4. Channel characteristics	Influence of intermediaries.
5. Diffusion	Spread of innovation
6. Consumer research	Understand consumer characteristics.

CHAPTER - 3

FAMILY PLANNING PROGRAMME STATUS
IN DIFFERENT COUNTRIES

FAMILY PLANNING PROGRAMME STATUS IN
DIFFERENT COUNTRIES

3.1 Empirical Studies in Family Planning in Different Countries :

A number of research studies in the different aspects of family planning in both developed and developing countries are reported in the literature. A survey of some of the papers published by The Population Council under the title "Studies in Family Planning" is given below.

3.1.1 Family Planning Programme Management :

The model family planning project in Isfahan, Iran attempted to incorporate into one integrated project, a number of approaches to family planning. In this project contraceptive education and service were provided by doctors, family planning clinics, health centres, nurses, midwives, full-time field-workers, functionaries, and the mass media on a comprehensive and integrated basis. The project has increased the acceptance rates and knowledge and use of contraceptives. Field-workers proved to be more effective in recruiting new acceptors than health workers and functionaries; mass media and relatives played indirect roles. (Treadway et.al. 1976).

Valsan (1977) investigated the success and problems in family planning administration in two districts of Kerala, India. Lack of personnel, poor staff morale, inadequate supplies, and political and religious opposition to various contraceptive methods, especially sterilization, existed to varying degrees in both districts' programmes. The Ernakulam experience, involving mass sterilization camps that were part of an overall district development programme, documents the effectiveness of a strong central leader. The Malappuram programme illustrates, in contrast, the handicaps of poor areas where development programmes were just beginning and administrative resources were overtaxed.

Gorosh (1978) has given a series of evaluation techniques that are applicable to the key management areas of operational target setting, administrative monitoring, measuring interim achievements, and cost concerns. He has reviewed the barriers to such evaluation inherent in the training of and relationship between managers and evaluators and has proposed the means to ease the barriers.

Baldwin (1978) reported an account of the evaluation of Thailand's successful family planning programme. The Mc Cormick Family Planning Programme in Chiang Mai

province is an example of financially self-supporting static clinic offering a full "cafeteria approach", supplemented by a rural mobile service that offers mainly pills and injections. The McCormick experience suggests that a well run family planning service need not be integrated into a general maternal and child health delivery system.

Korten (1979) discussed the problems associated with the expansion of family planning services and the administrative implications of these programmes. Many key issues have been raised from a management perspective and the need for consistency between policy, programme design and organisation is emphasized.

The Bohol Maternal and Child-Health-Based Family Planning (MCH/FP) Project in Philippines has shown that it is feasible to set up and to evaluate an integrated MCH/FP project in a developing rural area with midwives as the major provider of services. It demonstrates some of the advantages of setting up an innovative programme within the public health system. (Williamson 1979).

The Matlab Family Planning Health Services Project in Bangladesh provides an example of success due to a strategy of careful personal follow-up that enabled

clients to gain greater benefits from a wide selection of contraceptives. (Bhatia et. al. 1980)

3.1.2 Innovative Marketing Programmes :

Korea's national family planning programme has been widely touted as one of world's most successful. This success is due partly to early reliance on interpersonal communication as a major mechanism for influencing Korean women to adopt contraception. The Korean use of mother's clubs and other such strategies for maximising interpersonal influence is an unusual case. Palmore et.al. (1976) investigated the characteristics that typify Koreans active in communicating family planning ideas.

In the study of three distribution systems in Euiryong gun (Korea) for increasing the availability of services and supplies to cater to the large unmet demand, it has been found that household distribution was culturally acceptable and administratively feasible and that it increases contraceptive use. (Park et. al. '77)

Davies and Louis (1977) have given details of Preethi marketing programme which resulted in sales of more than eleven million condoms during its first 33 months. The programme modeled along commercial lines can be mounted quickly, with very little capital expenditure, by harnessing established channels; the

monetary incentives built into the distribution chain can provide rapid programme growth while reducing service costs; and that small professional marketing management teams can give the necessary expertise and flexibility to the decision-making process.

Sung (1978) describes the Integrated Day Care Programme (IDCP) in Korea. The IDCP provides family planning classes as an integral part of comprehensive day care service for low-income families. The programme was successful in influencing both, IDCP members and nonmembers to use family planning clinic services.

Fisek and Sümbüloğlu (1978) reported the innovative approach to family planning education. It has been found that educating both husband and wife increase recruitment to the family planning programme and decreased contraceptive discontinuation in rural Turkey.

Syed (1979) analyses the effectiveness of different communication channels used in the Pakistan family planning programme. He suggests more widespread and effective radio coverage and an improved programme of contacts by family planning personnel to reach the less privileged, rural and illiterate people who are by far the majority in Pakistan.

3.1.3 Contraceptive Practice :

Cheng et. al. (1977) studied the failure rates for various methods of sterilization and the factors responsible for the failures. In tubal ligation method the site and technique of tubal occlusion are suspected to be the major factors affecting failure. Careful examination of failures can aid the identification and adoption of the most effective surgical techniques.

In a multivariate analysis of data gathered in a Philippine study, it was found that there is considerable potential for improving the effectiveness of the programme through administrative action. Better IUD services and information, more emphasis on the needs of husbands, and improvements in the ongoing support of pill users could substantially improve of the amount of contraceptive protection offered by the programme. (Phillips, 1978).

In a study of male contraceptive acceptance in rural Ghana, it was found that half of the survey respondents accepted foam for use by their partners and half accepted the condom. The continuation rate and use-effectiveness rate reported by men were higher than those reported by women. It is urged that increasing emphasis be placed on providing family planning services

for men in African programmes. (Lamprey et. al. 1978).

Srinivasan et.al. (1978) analysed the level of family planning activities required to counteract the increase in the fertility of married women that was a consequence of modernization. The study is based on two surveys carried out at an interval of 25 years in Karnataka, India. A large reduction in infant and child mortality and substantial increase in literacy due to modernization, and the initiation of an intensive family planning programme has not resulted in high drop in birth rate during this period.

Using data from the Paraguay contraceptive Pervallence Survey, conducted in 1977, Morris et. al. (1978) found the urban/rural difference in contraceptive use paralleled fertility differentials. The data indicate that high party rural women have the greatest need for family planning services in Paraguay.

Johnson (1979) analysed the background and programme factors in Malaysia, to determine the link of these two factors with levels of contraceptive acceptance and continuation. The key finding of the analysis is that programme manipulable inputs are the dominant direct determinants of subsequent levels of acceptance in Peninsular Malaysia.

The results of a nation wide survey of contraceptive use in El Salvador are reported by Morris et.al. (1979). The survey has provided documentation on current levels of fertility, programme admission totals, and prevalence and geographic distribution of contraceptive use that should facilitate the planning of family planning services. The data show that there is a large latent demand for contraception particularly among rural women.

Shah (1979) analysed the behavioral transition during two time periods - the first three years and the first ten years of the Pakistan's national family planning programme operation. It has been found that the family planning programme has not made much headway during this period. It is concluded that one of the areas needed further investigation is the family planning programme structure and inputs in Pakistan.

3.1.4 Measurement Problems :

Ratcliffe (1976) brings out the problems of analyst biases in KAP surveys. In an experiment to determine the extent to which, a lack of familiarity with the culture of data origin might influence survey interpretation, standardized survey data from Bangladesh were presented to four groups of analysts who differed

in degree of familiarity with the Bangladesh culture. Meanings ascribed by the analysts to the same empirical relationships were found to vary significantly by the degree to which they were familiar with the culture.

Knodel and Piampiti (1977) explored response reliability in a large-scale social and demographic survey in a developing country. Using data from the two rounds of the National Longitudinal Study in Thailand, they found that nonrandom reliability at the individual level ranged from quite high to quite low. The response reliability at the individual level for attitudinal questions was found to be distressingly low.

3.1.5 Fertility Factors :

Rizk (1977), on the basis of national fertility sample survey concluded that in Jordan, the fertility rate is extremely high, and that, while rural/urban residence and socio-economic status have no significant influence on fertility, educational attainment of wives does have a marked effect on fertility.

In a study of fertility decline in Barbados, Jones found there are striking regional differences in fertility level. The author argues that a concentration of family planning programmes in areas of greatest accessibility and modernization, contributes to spatial variations in

fertility.

In a fertility study in Taiwan, it was found that fertility fell rapidly during 1961-70 as a result of adoption of contraception and rising age at marriage, while there was little change in preferred family size. Between 1970 and 1976 the practice of contraception reached high levels in all social strata, and preferred family size and fertility both declined rapidly. Practice of contraception for spacing births increased considerably after 1970. These changes occurred while many traditional familiar values, including strong son preference, persisted. (Sun et.al. 1978).

Mauldin (1978) in an analysis of fertility decline in developing countries over a period of 25 years found that since 1965 there have been substantial declines in the crude birth rates of many countries in the developing world, particularly the largest countries. The analysis shows that increases in the age of marriage and decreases in marital fertility were the principal factors affecting decline since 1965.

Glassman and Ross (1978) have developed a linear, interactive model for the process by which education and infant mortality changes may combine to reduce fertility. It is indicated that those countries with

a combination of low infant mortality rates and high educational enrolments experience synergistically large declines in fertility. Patterns of contraceptive use are also consistent with this model.

Jejeebhoy (1978) considers three factors which are usually proposed as inducing the transition from natural to regulated fertility. Fertility regulation may occur when the demand for children is reduced; when general attitudes toward fertility regulation become positive, and finally, when such factors as infant and child survival prospects and natural fertility conditions improve. Using cross-sectional data for continuously married Taiwan women aged 35-44², an analysis was made. The results indicate that at the initial stages of the fertility transition, it is primarily an increase in the potential output of surviving children and a decline in the subjective costs associated with fertility regulation, rather than a decline in desired fertility, that distinguish the natural fertility subpopulation from the regulating subpopulation.

Investigating the differences in the decline in fertility in two provinces in Thailand, Shevasunt et.al. (1978) found that most of the difference in fertility decline is related to the level of family planning programme activity in the province.

Brackett et.al. (1978) studied the role of family planning in rapid fertility declines in developing countries. The findings show that high proportions of women at all socio-economic levels in the countries studied wanted no more children, including large proportions among rural, poor and uneducated women with few children. It was also observed that despite the limitations of underdevelopment, in countries with strong family planning programmes, knowledge and use of contraception was high. These findings confirmed that there was a large unmet demand for family planning and point to the importance of continued allocation of funds to support service programmes.

Hermalin et.al. (1979) investigated to find how well can fertility be predicted from women's reports on whether they want more children and whether they are using contraception. The study was based on data collected in 1967, and follow up in 1970 and 1974 in Taiwan. Using multivariate analysis it was found that marriage duration was the single most important determinant of whether an additional birth occurred, with desire for more children showing a somewhat lower effect. Contraceptive use and parity were about equal importance, while number of sons did not have a significant effect.

It is suggested that a strategy for the programme to concentrate on gaining new acceptors rather than following up prior acceptors, should be adopted.

3.2 National Programmes in Family Planning :

Numerous developments have taken place around the world in the field of family planning. The following account traces the emergence of family planning program in different countries and the progress they attained till 1965.

3.2.1 Japan (Muramatsu, 1969)

Japan experienced a sudden population increase immediately after the second world war. The population rose from 72 million in 1945 to 80 million in 1948. It is attributed to the post war baby boom. Defeat in the war meant an extremely difficult time for the general public. Daily life, especially in large cities, suffered tremendously. Faced with adverse economic conditions people did not take long to recognise the necessity of birth limitation in order not to lower further their level of living.

In the early stages, the primary method to which people began to resort for the purpose of birth control was induced abortion. In 1949, even though the Govt.

did not take any policy for advocating check on population growth, it authorised the sale of some sixty brands of contraceptive chemicals.

In 1952 along with liberalising^{of} the abortion law, the government introduced programmes explicitly designed for the promotion of family planning. The administrative scheme put the task of family planning teaching upon health centre personnel, who had already been occupied with routine health activities.

In spite of many administrative problems of family planning the practice of contraception among the general public made steady progress. In 1955, the government modified the promotion programme by shifting the emphasis from preaching the advantages of a planned family, to strengthen the technical information service and providing subsidized service.

Due to the rapid decline in the birth rate attributed mainly due to the people themselves wanting it, the government changed its strategy in 1965. Decisions on the necessity of family planning education programmes are left entirely in the hands of village administrators.

Major Unsolved Problems

1. The local administrators are to be enlightened so that they take interest in the family planning service within their communities.

2. To find new ways to reduce induced abortions.

3.2.2 South Korea (Cha, 1969)

The Republic of Korea has a population of 28 million, with crude birth and death rates estimated at 40 and 11, respectively, the annual rate of natural increase is about 2.9%, a rate at which numbers double in 24 years.

Seventy percent of the people live in rural areas and the average farm has about two acres to support a family of six persons. Meagre surplus production and crowded living conditions called for new reproduction - production balance. Closely linked with the problem of food and housing is the scarcity of jobs. Also, as did other countries, Korea experienced a 'baby boom' immediately following world war II. By 1960, the need for family planning in Korea was recognised as critical.

After the 1961 military revolution, the government planned to provide nation wide family planning services. The programme placed great reliance on

vasectomies and IUD. The programme held a great appeal to women in the 30-39 year age bracket who have four or more children, including at least two sons. Services and supplies were free for those couple unable to meet the fees.

Responsibility for training field workers was delegated to the Planned Parenthood Federation. A major development in the programme was the undertaking of local manufacture of supplies.

Major Achievements :

The success of the programme is evidenced by the following considerations :

1. Readiness of the Korean people to limit their families to the number of children they feel they can afford to raise and educate in a proper manner.
2. High acceptability of the highly effective loop by Korean wives.
3. Ease of integration of family planning with maternal and child health services.
4. Effectiveness of the media in stimulating discussion and readiness of eligible couples to seek information and services.

5. Growing awareness of the potential of family planning programmes to reduce the number of induced abortions.

Major Problems :

1. Need for establishing referral system for acceptors who develop difficulties that require extra medical treatment.

2. To establish an in-service IUD and vasectomy training programmes for more physicians.

3. To extend the services effectively in rural area.

4. To standardise method of evaluation.

3.2.3 Taiwan (HSU and Chow, 1969)

Taiwan, one of the 35 provinces of Republic of China, had, at the end of 1964, a total of 12 million people. In 1964 the crude birth rate was 34.5, decreased from 38.3 in 1947.

Traditionally family planning has been taboo in Taiwan. In 1954, the family planning association of china was organised. Government participation in family planning started in 1959, when family planning was included as an integral part of the maternal and child health programme. The programme is designated

as Prepregnancy Health (PPH) programme which implies maternal care before pregnancy.

A pilot action programme in 1962 to introduce IUD was implemented preceded by two comprehensive fertility surveys. As a result of the success of the pilot programme, an extension programme was started in 1964.

The programme has been most carefully planned on the basis of various surveys, studies, and pilot programmes, and so designed as to permit continuous evaluation that money and effort are efficiently utilised. This programme is unique in having an evaluation unit to guide programme operations.

Major Achievements

1. Compared to 3,650 cases registered in the pilot programme, the extended action programme recruited 46,600 cases during 1964.

2. The overwhelming majority of women (92%) are in favour of family planning and are eager to learn how to do it.

Major Unsolved Problems

Because of the lack of government policy, only private practitioners have so far been utilised for the programme. The uneven distribution of the medical

personnel is a bottleneck.

3.2.4 Hong Kong (Chun, 1969)

The total population at the end of 1964 was 3.75 million. The Family Planning Association was founded in 1936. Starting with one clinic during the first year it operated five clinics in 1940-41. After a period of lull during war, the Association was revised in 1951. The Association is a non-profit, voluntary organisation financed by donations, membership subscriptions and patients' registration fees. In 1955, the government, realising the importance of the work for the community, gave an initial subsidy.

With the steady increase in population by natural increase as well as by influx of refugees, the need for more clinics-especially in the resettlement and squatter areas where population was most dense and also in rural areas - became even greater. At the end of 1964 the Association operated 50 clinic centres.

The activities of the Association and the services offered are prominently publicized through radio broadcasting, newspapers, posters, and exhibitions. Contraceptive information, materials and services, however, or not normally available outside the programme except from medical doctors, although many contraceptives are

obtainable commercially.

While the popularity of the diaphragm and jelly method has rapidly decreased, the demand for the IUD is phenomenal. All supplies including the IUD, are manufactured by the Association makers in Hong Kong.

Major Achievements :

1. The great demand for the IUD as the contraceptive chosen by Hong Kong people - simple, cheap, and well received.
2. Fewer births and in 1964 the lowest rate ever recorded.
3. The constant and close cooperation of the Hong Kong government as evidenced by the increasing yearly subsidy and the free loan of clinic premises.

Unsolved Problems :

Despite what has been achieved, many barriers still have to be overcome. These include resistance by traditionalists, who still think of a large family as a symbol of prosperity, by the ignorant, who still have the impression that harm or injury caused by appliances or pills; by some religious bodies, English Roman Catholics, who still oppose all contraceptive methods, and by the government which still hesitates

to take over the entire responsibility of family planning.

3.2.5. Malaysia and Singapore (Lim, 1969) :

Malaysia

The eleven states of mainland Malaysia have a combined population (1965) of around eight million. The population has been growing rapidly for some time. Since 1952 the growth rate has consistently been above 3% a year, although a slight decline has been apparent since 1957.

Until the early 1950's family planning in Malaysia was a sporadic activity carried on in some of the states by individual physicians and nurses in conjunction with their routine duties in offices, hospitals, or maternal and child health clinics. The first organised efforts began with the formation of a state family planning association in Selangor in 1953. By 1962 there were family planning associations in all eleven states.

Federation of Family Planning Associations :

A Malayan Federation of Family Planning Associations was formed in 1958 to co-ordinate the work of the then, four state associations. It has been concerned

with over all planning and policy making and with giving stimulation and guidance to the state associations as their programmes have developed.

In the programme, focussed educational activity is directed towards the two target groups : Post-partum and high - parity women, through contacts at Maternal and child health (MCH) centres and maternity hospitals; and, to a more limited extent, males in the armed forces, in industry, and on rubber estates.

In mid-1965, the various state associations were operating in 133 clinics and hospitals, many of them government facilities in which the Federation and its affiliates are permitted to work. In addition, several different patterns of service were being offered to about 120 agricultural estates where large numbers of workers are concentrated.

The providing of contraceptive materials and advice is the main service activity. Sub-fertility cases are referred to appropriate hospital departments.

It is felt that the Federation has largely achieved its first main objective, which was to create a climate in which government would be prepared to become more actively involved in family planning. Activities

of the Federation and its affiliates have demonstrated that there is no strong opposition to family planning service in Malaya and that many people are eager to learn how to control the size of their family.

The government of Malaysia has been subsidizing family planning in Malaya since 1958 with annual grants with increased quantum from 1962. It has also permitted the use of government clinic and health centre facilities by affiliates of the Federation, first on an 'after-hours' basis and then at all hours.

Singapore

Singapore is a small island at the tip of the Malaya Peninsula with a largely urban population. It became an independent nation in August 1965, when its affiliation with Malaysia was dissolved. It has a population of about 1.8 million with a recent crude death rate of 5.7 and a birth rate of 32.

Singapore Family Planning Association (SFPA). As in Malaya, organised family planning efforts in Singapore developed from the independent activities of isolated individuals, in this case several social workers and an MCH physician in 1949. Later SFPA was formed using the clinics of private physicians after office hours entirely with volunteer workers.

Upto mid-1965, has been working through a large paid and volunteer staff-services include the provision of contraceptive information and materials; sub-fertility investigations and advice, with difficult cases being referred to an obstetrician.

The programme is aimed at all people in the fertile age groups, but especial attention is given to women patients in MCH clinics and to mothers in the lying-in beds in the maternity hospital. Health education talks, stressing the need for family planning are given by mid-wives to antenatal clinic groups, and advice about family planning and the availability of service is given in post-partum visits to individual homes.

The SFPA was originally organised out of concern for the improvement of family welfare and the health of mothers and children. Later it has also been concerned about population increase as it has become apparent that such increase affect the socio-economic status of families and create pressures on the government for housing, schools, and medical and welfare services.

The major achievements of the SFPA have been in motivating large numbers of people to an acceptance of family planning methods and the allaying of both public and government fears of opposition on religious, political, or traditional grounds.

3.2.6 Thailand (Asavasena et.al. 1969)

It may be said that serious thought about population control in Thailand began with the National Population Seminar which was held in Bangkok in March, 1963. Thailand's very rapid population growth - around 3% per year - and its implications were examined at some length. This led to a decision to carry out "the Family Health Research Project", in Photharam, a rural district of about 70,000 population, located some 85 kilometers west of Bangkok. In the district chosen, settlement is clustered in compact villages rather than spread out, and health facilities already existed in which to house clinics. Local health personnel, village headmen, and others in authority were enthusiastic about the prospect of a family planning services in their area. Their co-operation has since proved to be a valuable asset, to the programme.

The Family Health Research Project :

As a first step in the project a field survey was conducted in August 1964, to obtain information useful to an action programme and to obtain baseline data for the subsequent measurement of changes. The survey revealed a high incidence of illiteracy and rare use of newspapers or other printed matter. Less than

1% of the women had even the vaguest knowledge of contraception. It was clear that mass media would not be useful in disseminating information. In November, 1964 the action programme was started and service was given in six clinics placed in different health installations in the district. The education programme was conducted by field workers. All communication has necessarily been by direct oral and visual means, since neither newspapers nor radio are accessible to more than a small minority.

Achievements of the Project :

In spite of the programme being six months old, there is a tangible measure of success achieved. Starting from almost no contraceptive practice in the district, the proportion of eligible women who now are contraceptive users is approximately 20%. The IUD is the most popular contraceptive.

A national programme poses many problems. Thailand is a highly centralised society. Everyone looks to the central government for guidance, especially when change is imminent. Hence the opinion of the government is of vital importance in the acceptance of a national programme.

It is worth noting that conventional methods of contraception have not proved popular in the project. About 80% of the contraceptive users have chosen the IUD. The greatest use occurs among women whose number of children is close to the ideal family size of four. A special effort to reach high-parity women will be needed.

3.2.7 Ceylon (Kimch 1969)

According to 1963 census, the country's population was 10.6 million. The population growth rate is estimated to be 2.8% and if this persists the population of Ceylon will double itself in twenty-five years.

Population Control Activities :

During 1963 and 1964 fertility studies were conducted with the support of Population Council. The study revealed among other things the following fact. The increase in average age of marriage does not seem to have resulted in a reduction of the average reproduction span. This can be attributed to changes in the health of women, as reflected in decreased death rate.

The Family Planning Association was started in 1953. By 1963, there were 63 clinics in operation, located in all parts of the island, which had received a total of 11,153 cases during the year.

The Family Planning Association receives annual grants from various sources, with the largest amount coming from the government of Ceylon. In addition to its work in the more urbanised areas, the Association is also very much interested in promoting family planning on the tea estates, for which purpose it has appointed a propaganda officer who co-operates with officials from the Planters' Association Health Scheme. All birth control methods are available at the clinics and supplies are furnished at a nominal charge.

A pilot project was initiated with the cooperation of government of Sweden to institute a nation wide program on the basis of experience from pilot areas. The project works in accordance with the principle of action-cum-research, where research means collecting data from different surveys in order to reveal the most effective action.

The Public Health Service of Ceylon is regarded as one of the best in Asia, and the project with help from Sweden has worked toward integrating family planning with maternal and child health services. Health Service subdivision with which it works is typical of the smallest administrative unit in the Public Health Service. Having first been tested in a small unit, the project extended its activities in 1962 to a medium-sized unit and in 1963 to a large unit.

The preliminary results show a decline in the crude birth rate for the project area from about 30 in 1958 to 20.4 in 1964. Because the most notable decline in age-specific rates is among women aged 25-35, it is reasonable to attribute the declining trend to the activities of the project.

3.2.8 Pakistan (Adil, 1969) :

A predominantly Muslim country, Pakistan, with 84% of its people illiterate, has perhaps the highest fertility in the muslim world. The reasons for this very high fertility seem to be early and universal marriage, early motherhood, remarriage of widows; illiteracy; dependence on agriculture, isolation; low standards of living; the form of family organisation; the absence of economic incentive to limit the number of children and, to a certain extent, fatalistic attitudes.

The population in the country was estimated to be 115 million in 1965, with a growth rate during 1961-65 of 2.6% per annum.

In 1953, the Family Planning Association of Pakistan made a tentative beginning to popularise family planning in the country. During the Second

Five Year Plan (1960-65) the family planning program was administered through the existing health services.

Achievements

The establishment of family planning clinics was almost 100% of the total planned target during 1960-64, the new patients visiting the clinics were 31% of the target, training of medical and paramedical personnel 42%, distribution of condoms and foam tablets, 17% and 15% respectively.

The reasons for not covering the target were lack of motivation of people, reliance on mass-media for publicity, emphasis on the urban population constituting 13% of the total population, and utilisation of the existing health and medical services, which, already busy with other clinical work, couldnot devote sufficient time to family planning.

3.2.9 United Arab Republic (Husein, 1969) :

In the UAR the population doubled between 1917 and 1960. At this rate of increase it would double again in less than thirty years.

In the early 1930's some attempt was made to project the population problem. Historically women have always been known to use some non-medical contra-

ceptives, such as foreign bodies inserted in their uteri, and to resort to illegal induced abortion.

It was only in 1952 after the revolution, serious note was taken of the population problem by the authorities. By 1955 eight family planning clinics were established. One of the first clinics started in Cairo was attached to the Moslem Women's Association purposely as a practical illustration that Islam has no genuine opposition to enlightened and well - founded contraceptive devices.

Each clinic was staffed by a physician, a nurse, a social worker, a clerk, and an odd-job man. The medical staff have been chosen from maternal and child health centres.

At the beginning the family planning program was aimed toward high-parity women or those with health indications in urban areas or women belonging to industrial groups.

The method used in the programme in the early stages to inform women about the clinics was by word of mouth in maternal and child health centres advising women of the existence of the clinics.

The clinics were entrusted with the task of assessing the applicability, acceptability, and success of the various contraceptive devices by the different communities in the UAR. The results show that diaphragm, foam tablets, jelly and IUD were well accepted.

The main problem faced in the programme was one of co-ordination between many organisations involved in carrying out the programme.

3.2.10 Tunisia (Daly, 1969) :

It was only in 1962, the family planning problems were discussed officially in Tunisia and direct action was envisaged in this area.

In 1963 a programme was initiated with three main phases : information and preparation phase, operational phase and evaluation at the conclusion of the programme.

In Tunisia with high adult illiteracy rate, radio was found to be the best medium to reach all classes of society throughout the country.

The clinical work started in 1964, condoms, vaginal jellies and aerosols were made available to

the public, while intra uterine devices, oral contraceptives were provided to large hospitals for experimental use.

In Tunisia conditions for developing a family planning programme were most favourable. These conditions were of a demographic, psychological, and economic nature. In all areas where the family planning services were well underway, public attendance was excellent.

In the organisation and execution of the program, it appeared that integration of family planning programme into the existing health services was an effective solution for Tunisia.

3.2.11 Africa (Caldwell, 1969) :

In mid 1964 Africa's population was estimated to be 303 million or about one-eleventh of the human race. But the population density was the lowest of all the continents. From this fact some African political leaders concluded that they have little to fear from continued rapid population growth.

Efforts to reduce mortality and morbidity in many African countries have resulted in decline in the death rate and rise in the rate of natural increase. In spite of an increasing imbalance between birth and death rates, only some governments expressed a desire

for a lower birth rate, they were Morocco, Nigeria, Rhodesia, and Mauritius. Three countries wanted a higher population; they were Sierra Leone, Tanzania and Somalia.

With the exception of the UAR and Tunisia, the only family planning facilities in Africa were in countries influenced by the British tradition. They were South Africa, Rhodesia, Uganda, Kenya, Mauritius, Nigeria, Sierra Leone, Liberia and the Seychelles. By 1965 the number of clinics in the above countries ranged from one to 115.

Family Planning in Africa was still very far from a mass movement. But there was a perceptible quickening of interest on the part of the African population in family planning. It was felt that for the success of the programme governments must be converted to favour or even support the programme. More publicity through mass media was needed from the outset, irrespective of the resistances and resentments that one thus suddenly produced. It was found that progress has been retarded by addressing argument over much to women and insufficiently to their husbands.

3.2.12 Turkey (Metiner, 1969)

Turkish policy in the early 1920's was designed to increase the population at a maximum rate to offset man-power losses incurred in wars from 1911-22. During the period 1945-60 there was a significant change in the population.

In early 1964 with the help of Population Council a Family Planning Organisation was established ^{and} large goals were set for the programme. Turkey is at the threshold of the action programme.

3.3 Conclusions :

The empirical studies quoted in this chapter indicate the importance of management aspects of the programme. The Isfahan project, the Ernakulam mass vasectomy camp, the integrated Bohol project and others stress the need for careful planning and managerial approaches for the success of the programme.

Some of the marketing concepts have been applied to the programmes in Korea and Sri Lanka. With better distribution methods, interpersonal communication and a commercial marketing approach these countries have shown the way to success in family planning programme implementation.

The market studies done for contraceptive practice status is an exercise in feedback of market information. It helps in evaluating the impact of the programme on the population and gives guidelines for improving the programme planning and implementation.

Market research through consumer surveys to find the knowledge, attitude and practice levels of target audience is plagued with measurement problems. Care should be exercised in using the information thus gathered.

Some of the studies point out that acceptance of family planning programme and a consequent decline in fertility are highly correlated to the programme effort.

The national family planning programmes referred in this chapter reveal the different historical beginning of the programme in these countries at the national level. Japan, a developed country, has exhibited rapid decline in the population. In the early stages abortion was resorted to and later contraception became popular. In Korea, Taiwan, Hong Kong and Thailand the IUD became very popular. In Malaysia and Singapore a climate for accepting birth control measures was created. Ceylon (Sri Lanka) with a well established public health system

achieved a fair measure of success in the programme. In Pakistan, U.A.R., Tunisia, and Turkey the programme has not reached the take off stage.

By 1965, family planning in Africa was still very far from a mass movement.

The problem faced by these countries are generally the difficulties of reaching rural areas with facilities, resistance from population with traditional ideas, lack of government support in some countries and lack of skilled personnel to man the programme.

The history of family planning programmes in these countries points out the fact that planning and implementation of these programmes call for systematic study of the factors involved in the family planning programme management, and to apply scientific knowledge of analysis in arriving at the details of the activities of the programme.

CHAPTER - 4

INDIA'S FAMILY PLANNING PROGRAMME

INDIA'S FAMILY PLANNING PROGRAMME

4.1 Family Planning (1916-51)

The family planning movement in India from its very beginning in 1916 till the Government launched an official programme in 1951, was the result of the efforts of a number of social reformers, thinkers and voluntary organisations. These efforts were not only directed towards the masses but also on the Government. The efforts made in this direction ^{are} summarised by Ogale (1975).

The first attempt to advocate the need to limit the population was by the publication of a book "The Population Problem in India" written by Shri Watal in 1916. In the year 1925 the first birth-control clinic was opened in Bombay by Prof. R.D. Karve and almost at the same time the Neo-Malthusian League was established in Madras to propagate birth-control. This was followed by the opening of another birth-control clinic in Mysore in 1930. The Madras University gave instructions in the use of contraceptives in 1932 and a year later the Government of Madras agreed to open birth-control clinics. The All-India Women's Conference (1932) recommended birth-control methods, subsequently

in 1935-36 Miss Margaret Sanger, a pioneer in birth-control in America~~x~~ was invited and her visit created a favourable climate for the birth-control propagation.

It was in 1935, under the leadership of Pandit Jawaharlal Nehru, the National Planning Committee, set up by the All India Congress very strongly advocated a philosophy of Family Planning. This was followed by the Training classes conducted by Dr. A.P. Pillai in 1936 in Bombay. In 1937 the birth-control clinics were also established in Uttar Pradesh and Madhya Pradesh. A resolution to open birth-control clinics was approached in the Upper House in 1940 and in the same year the Family Planning Association of London and Society for Study and Promotion of Family Hygiene started clinics to propagate birth-control. The untiring efforts of Shrimati Dhanwanti Rama Rau lead to the establishment of the Family Planning Association in 1949, to carry out field and advisory work. This Institution, in a way was instrumental in prompting the Indian Government to undertake and promote the Family Planning Programme.

These efforts were the result of a few enthusiastic individuals and forward looking institutions. Though the beginning of any programme is difficult to be traced, but undeniably these individuals and institutions can be

recognised as pioneers in the field of Family Planning programmes in India.

4.2 Family Planning in Five Year Plans :

4.2.1 First Plan (1951-56):

The nation's First Five Year Plan emphasised on the need to reduce the birth-rate to stabilize the population level and to make Family Planning an integral part of the Public Health programme. Intensive study about the attitudes and motivation of people and on the required techniques and procedures for education of the public on family planning was made.

In 1953, a four point policy was brought out by the planning commission. It directed that the family planning programme in India should :

1. Obtain an accurate picture of the factors contributing to the rapid increase in population,
2. Understanding of human fertility and the means of regulating it,
3. Methods to educate the public and
4. To make family planning advice an integral part of services in hospitals.

The programme during the plan period included provision for Family Planning advice in Government Hospitals and health centres, propagation of information on various family planning methods and education on these methods. Also the study of the interrelationships between social, economic and population changes was made for the formulation of a national population policy for developing appropriate measures of population planning. Provision was also made for physiological and medical research on human fertility, and control.

A sum of Rs. 6.5 millions were allocated in the plan for family planning programme and an expenditure of Rs. 1.45 millions was incurred. During this plan period 147 clinics were opened and 205 clinics maintained by various bodies, were given grants by the Central Government. More emphasis was laid on the rhythm method in this plan.

4.2.2 Second Plan (1956-61)

In the Second Plan emphasis was laid on the use of mass communication media, provision of clinical services in urban and rural areas, training of personnel, provision of supplies, research both biomedical and demographic and evaluation of progress.

The posts of state Family Planning Officers were created and a Director of Family Planning was appointed at the centre.

The budget allocation for the Family Planning Program in the Second Plan was rupees 49.7 millions of which a sum of Rs. 21.6 millions was spent. A total of 1502 clinics were opened, 1079 were in the rural areas and 423 in the urban areas. The family planning services were also provided at 1864 rural and 330 urban, medical and health centres in addition to the family planning clinics. The clinics provided both information and services to individuals regarding family planning methods.

In 1956, during this plan period sterilization as a method of family planning was introduced for the first-time. About 2.5 lakhs persons were sterilised by the end of this plan period. Arrangements were also made for the distribution of conventional contraceptives through rural family planning centres, subcentres and other medical centres. In addition contraceptives were also sold at a higher subsidised price through depot holders in both rural and urban areas.

Thus in the first and second plans the family planning programme was taken up in a modest way with

a clinical approach, with a stress mainly on the research in the field of communication, demography, biology and medicine.

4.2.3 Third Plan (1961-66)

The family planning programme in the third plan provided for: education and motivation for family planning, provisions of services, training and supplies, and research on the various aspects like communication, motivation, demographic, biology, medicine etc.

A full fledged department of family planning was created in May 1966, and the clinical approach was supplemented with extension and services. A budget provision for Rs. 270 millions was made but the actual expenses incurred was Rs. 248.6 millions. The extension education and family planning services was intensified. About ten thousand new centres were established during the plan period rising the total number of such centres to ^{12,138} ~~11,474~~ at the end of the plan.

During the plan period emphasis was laid on the publicity and the training of workers. About 7641 persons took regular courses and 34,484 attended the short term courses. The family planning programme cells were located in 22 All India Radio Stations and a mass

education programme through films, exhibitions, wall paintings, hoardings etc. was used by the field publicity units.

It was in this plan that the intrauterine device - the 'loop' was introduced. The results were encouraging and the number of acceptors to this method exceeded the total number of acceptors of all methods in the preceding year. By the end of the plan about 0.8 million intrauterine devices were inserted.

A beginning was also made in the production of contraceptive materials by establishing two factories, one at Trivandrum for production of condoms and another at Kanpur for intrauterine devices. During the third plan period, a commissioner for Family Planning and a number of Regional Directors were appointed. An autonomous Central Family Planning Institute for the technical support and Advisory Committees for demographic, medical and communication research were established. A high level cabinet committee was established, to facilitate the taking of quick decisions.

4.2.4 Annual Plans (1966-69)

In the period of Annual Plans from 1966-69 Family planning was given importance which was reflected in the

increased annual budget allocation from Rs. 290 millions in 1966-67 to Rs. 370 millions in 1968-69. Of which the actual expenditure during 1966-69 amounted to Rs. 704 millions. The number of sterilisations performed, IUD inserted and the number of conventional contraceptives distributed or sold were more than the achievements during the first three plan periods.

4.2.5 Fourth Plan (1969-74)

A sum of Rs. 3,300 millions was provided for family planning in the fourth plan budget and an actual expenditure of Rs. 2,840 $\frac{1}{2}$ millions was incurred. The emphasis was on the (i) small family norm, (ii) information percolation about the various family planning devices and (iii) availability of the necessary devices and equipments.

The most important step taken during this plan period was the integration of family planning services with those of general, maternal and child health services, the idea was to make the family planning programme, an essential component of the family welfare programme.

The introduction of Post Partum Scheme was another significant feature of this plan. This helped in the increased acceptance of tubectomy. The medical Termination

of Pregnancy Act 1971 came in to force from April 1972 and mass vasectomy camps were organised. The achievements of this plan were marked by the strengthening of infrastructure in providing supplies and services to acceptors, motivating and educating the masses in favour of small family norm. Notwithstanding all this, the overall levels of performance were considerably below the targets, which was mainly due to the ^{lack} each of adequate number of trained doctors and other personnel and short supply of the contraceptives. The indicator in terms of number of couples protected is however not satisfactory though the national birth rate declined to about 35 per thousand during the fourth plan period.

4.2.6 Fifth Plan (1974-79)

The weaknesses of the family planning programme in the fourth plan were recognised in the fifth plan and birth control was accorded a high priority in the plan.

A national population policy was announced in April 1976. The integration of family planning services with those of health, maternity, child health and nutrition was strengthened for which the family planning service was to be offered as a part of general health service at the primary health centres and subcentres.

A revised fifth plan allocated a budget of Rs. 4,970 million against the initial budget of Rs.5,100 million. An expenditure of Rs. 4,089 million was incurred. In terms of the achievements the most effective was sterilizations that exceeded the target set for the plan where as the IUD and conventional contraceptives achievements were below the set targets.

4.3 Family Planning Communication in India :

Rogers (1973) considers all family planning activities as part of a communication process. He identifies the aim of these activities as (1) to create knowledge of the idea of family planning, of specific family planning methods, and/or of the small family norm, (2) to form or change individual attitudes toward these ideas so that they are more favourable, and (3) to secure the adoption of family planning methods, so as to prevent births.

In India, films were chosen as an important vehicle right from the beginning. The first film made on family planning dates back to 1949, soon after setting up of the Film Division. In the film 'Planned Parenthood', the appeal tended to be in terms of the national problem of over population.

During the Second Plan period the message that was sought to be projected emphasised the need to 'plan'

the family. As a part of the communication drive, by 1960 about 4,60,000 copies of posters, 80,000 copies of pamphlets, and 70,000 folders on family planning had been distributed. Films and slides were also provided. Occasional radio broadcasts on family planning also came to be in vogue.

During the Third Plan period to meet the requirements of increasing number of family planning workers, a voluminous amount of mass communication material on family planning was found necessary. The principal 'Standard' media utilised were films, radio, press and publications. These were supplemented by the use of 'instant' media such as wall paintings, billboards, matchboxes and the sides of railway carriages.

Family planning programming cells were located in twenty two All India Radio Stations. Thirty audio-visual units were provided under the Directorate of Field Publicity for carrying on intensive campaign in selected districts.

By 1966 research findings led to a strategy of combining new elements with the use of the media. A simple basic design - the four faces of a happy family of two children - was evolved. A simple understandable

message specifying the limits of the small family (Two or three children are enough). In May-June 1966, the Central Family Planning Institute, in the 'Pilot Meerut Nirodh Commercial Project', used as a symbol a triangle with a family of ^{four} four - husband, wife, a son and a daughter - inside it.

In October 1966, the Department of Family Planning decided to use, an inverted equilateral Red Triangle as a national symbol for the family planning programme. The reasons for adopting the symbol were mainly that it is simple, distinctive and easily recognizable. The red colour has great visibility even from a distant, and is generally associated with auspiciousness and gaiety. It has no connotation - it does not conjure up any earlier implanted image. Besides, it can be easily verbalised in all languages, and no special artistic talent is needed to paint it anywhere.

The family planning programmes were introduced on the All India Radio on a regular basis from May 1967. From 6,000 programmes in 1967, the number went upto 12,000 in 1968, and to more than 16,000 in 1969.

During the Fourth Plan period, emphasis shifted from creating awareness to increasing motivation for adoption. The various media units of the Ministry of

Information and Broadcasting were expanded and strengthened. Three man family planning cells were created in each of All India Radio's thirty-six stations. The government also developed ^a to-man direct mailing system designed to reach 2.5 million Key, local opinion leaders with a flow of family planning information.

The main body in the Department ^{of} the Family Planning responsible for mass communications was the Mass Education and Media Division (MEMD). The major MEMD efforts were organised at the State and District levels. Central support was however, provided specially in the field of media like radio and film. The MEMD was required to design the strategy, coordinate the activities of various official and non-official agencies and also provide guidelines and prototypes.

The message was redesigned in an attempt to instil among the people the desirability of spacing child birth. The Information and Broadcasting Ministry helped the Family Planning by providing services in advertising, press information, exhibitions, song and drama, visual publicity, field publicity, publications and still photography.

4.4 Evaluation of Family Planning Programme :

In 1968-69 the Programme Evaluation Organisation, Planning Commission, Government of India, conducted a study of the programme to make a detailed evaluation of the progress of the scheme. (Programme Evaluation Organisation 1970).

The broad objectives of the study were :

1. To study of the problems of Implementation of the programme, availability of services and their utilisation.
2. To review Extension Education and Achievements.
3. To assess knowledge, attitude and reactions of adopters and non-adopters.
4. To find out the popularity of different methods,

The sample coverage for the study extended to 35 districts, 69 rural family planning centres, 15 regional training centres, 350 villages about 7,000 respondents and 271 family planning staff spread over all the states and one Union Territory, i.e. Himachal Pradesh.

The conclusions presented in the report are as given below :

1. The desire for a small family is more due to economic reasons than due to change in social norms. This is evident from reasons for adoption of the family planning programme, views on spacing, fatalistic attitude towards number of children etc.

2. Adoption of family planning methods could be promoted without changing very much the social norms and values. It was noticed that large proportion of respondents had nonrational attitude in respect of the number of children one might have. In spite of this, they had adopted vasectomy or IUD. This shows that human behavior may have both a rational and non-rational orientation. Therefore, new practices could be propagated without modifying directly the existing beliefs and values. This is a pointer to improve programme performance.

3. Friends, relatives and local leaders play an important role in creating the climate for wider acceptance of the programme. This only emphasises the importance of the informal channels of communication in spread of new practices and was fully borne out by this study. Substantial achievement was reported in sample villages with very little or no extension work.

4. The contact of the family planning staff with the local community leaders and organisations, if limited

is likely to affect the progress of the programme to a significant extent. It was noticed that the family planning staff had more contact with community leaders than with the general respondents. But their contact with local organisations and interest groups such as Panchayats, cooperatives, Youth clubs, Mahila mandals etc. appeared to be not as intimate as one would expect. With the data collected, it was not possible to come to any firm conclusion as to how far this had affected the programme acceptance. This needs a deeper probe.

5. Response from the people to sterilisation or IUD programme would be greater from higher age group than from the lower age and parity groups. This is evident from the analysis of the age group of the adoptors of IUD and sterilization. More couples in the higher parity group had responded to the programme than others.

6. People are likely to have feelings of ambivalence about family planning. Therefore, the programme of education and communication should be carried out on a continuous basis in order to overcome this tendency. This is supported by the fact that some of the adoptors had postponed the operations/IUD insertions for some reason or the other. Also, it was noted that the villagers were exposed to both negative and positive information regarding the different family planning

methods. One of the important reason given by the adopters for often not following their advice was said to be apprehensions and fear of consequences. Therefore, it is not surprising that analysis of achievement over a three year period at the village or block levels showed significant rise and fall.

4.5 Family Planning Performance Statistics

System of Reporting:

A fairly elaborate system of concurrent reporting of service statistics from the peripheral units, like the Primary Health Centres (PHC) and Urban Family Welfare Planning Centres (UFWPC) to the Central level, have been in existence in this country right from 1966-67 when the family planning programme gained momentum after creation of a full-fledged Government Department in the Ministry of Health. A Manual on family planning records and returns was prepared by the Central Department of Family Planning with a view to ensure regular and timely flow of returns from the peripheral units to the Centre on a uniform basis. The same forms are used by every reporting unit to transmit information from the peripheral level to the central department; at each higher level - consolidation of lower units is done. At the Central

level information is normally received only from the states/union territories and a few other central agencies like the Ministry of Railways, Ministry of Post and Telegraph, Ministry of Defence, Ministry of Labour etc., involved in the programme. The figures on monthly progress received from states and districts are analysed every month at the centre and in the state. While the state level analysis generally carried out by taking districts as units, the analysis at the centre normally takes the states/union territories as the units of analysis.

For maintaining basic information about each reproductive couple, target couple registers have been prescribed by the central department which are to be kept upto date in each PHC and UFWPC. These registers contain information on age of husband, wife number of living children with their sex and age, pregnancy status of wife, whether practising family planning methods, etc. The objective is to utilise the upto date target couple registers (TCR) in the PHC and UFWPCs in selecting couples who are required to be approached by the family planning staff on a priority basis without much difficulty. The TCR also facilitates in making contacts with the family planning acceptors during follow-up visits by the supervisory staff and in checking

the accuracy of the socio-economic characteristics of the acceptors as reported in the target couple registers or other family planning records. Besides the target-couple registers, certain case cards prescribed for acceptors of sterilisation and IUD also include information on various socio-economic characteristics of these acceptors. However, the monthly information which is regularly compiled and sent by the states/union territories relates to overall performance in respect of various family planning methods only. It does not provide for any cross tabulation of the various socio-economic characteristics of the acceptors of different family planning methods. Even in submission of such simple monthly reports on overall performance often considerable delay is observed from ^{Certain} PHC/districts. This sometimes results in considerable delay in the finalisation of the performance figures pertaining to a particular year. || Non-maintenance of target couple registers on prescribed lines and lack of adequate supervision of work of peripheral staff have also led to various malpractices such as reporting of fictitious and ineligible cases among the acceptors whose demographic impact is either nil or negligible. To remove the aforesaid deficiency and improve the quality of family planning services as well as the accuracy of performance statistics, the Central Department of Family Planning has laid emphasis

on carrying out regular follow-up surveys of family planning acceptors as well as on field checks of performance statistics on a sample basis in each state. The tasks of analysing detailed data available from the target couple registers and case cards on acceptance of various family planning methods, cross classified by age groups and by numbers of living children and of making a comparative study of the performance in relation to the total number of reproductive couples residing in that area have been assigned to the demographic and evaluation cells attached to each State Family Planning Bureau. In addition, an annual report showing inter-relationship between family planning acceptance and the various socio-economic characteristics of acceptors of different family planning methods has also to be prepared by the state Demographic and Evaluation Cell.

For calculating the number of couples protected and the number of births averted it is necessary to utilise some estimates of the following parameters : (i) Age distribution of acceptors of sterilization and IUD methods; (ii) level of mortality in future years so as to determine the probability of couples remaining alive and staying in the currently married state; (iii) attrition rates due to removal and expulsion of IUD; (iv) failure rates of

different methods; and (v) marriage age specific fertility rates.

In the Central Department of Family Planning, estimates of the aforesaid parameters have been derived partly on the basis of some localised surveys carried out in parts; and partly on experiences in other countries regarding attrition and failure rates of various contraceptive method. Broadly speaking, the available data for estimating the aforesaid parameters are still quite inadequate (Seal 1977).

4.6 Commercial Marketing of Nirodh :

The Nirodh marketing programme provides an interesting study of the applications of marketing principles to achieve a social cause like population control. The Nirodh marketing programme was designed as part of an expansion of the service base of the family planning programme. It was developed after a long search for an administratively feasible way of harnessing the resources and skills of the consumer goods industry in support of the national family planning effort.

While the primary objective of a commercial enterprise is to maximise the profits of the firm, the

express objective of the Nirodh marketing programme was to generate high economic benefit to society relative to the programme cost. The designers identified the many factors to develop a strategy for all-out sales maximization. It called for the best quality product, the best packaging, specially designed to appeal *to the Indian consumers, an extremely low consumer price, the broadest, best managed retail distribution network, a promotion budget limited only by availability of effective media.* After a one-year pilot study in a single district (Meerut), the programme was launched in September 1968 in representative test market areas covering about one-third of the country. At the same time, a huge media campaign was initiated. Nirodh condoms were advertised all over India, through a variety of mass media channels. In movie theatres, on road signs, on matchboxes, in newspapers and magazines, and even on the covers of telephone directories.

Nine months after the marketing campaign began, consumer purchases of condoms had risen 300 percent; further, Nirodh had captured about 65 percent of the total market. It was found that Nirodh was selling well to urban middle-class and lower-middle class men. (Gupta, 1970).

The Nirodh marketing programme utilised the retail outlets of six commercial firms : Brook Bond Tea, Lipton Tea, Hindustan Lever, Indian Tobacco, Union Carbide, and Tata Oil mills. These companies operate in six exclusive regions, covering the entire country with 1,70,000 retail outlets.

To cater to the needs of the rural areas and urban poor the Nirodh marketing ^{Campaign} ~~campaign~~ in the second phase of expansion, devised the depot-holders programme.

4.7 Conclusions :

India has a long history of family planning programme. The growth of different aspects of the program during the different plan periods are summarised in Fig. 4.1 to 4.6.

The budget allocation for the programme steadily grew from one plan period to the other by the following ratios.

<u>Between Plans</u>	<u>Increase</u>
I and II	8 times
II and III	5 times
III and annual plan	3 times
Annual plan & IV	4 times
IV and V	1.5 times

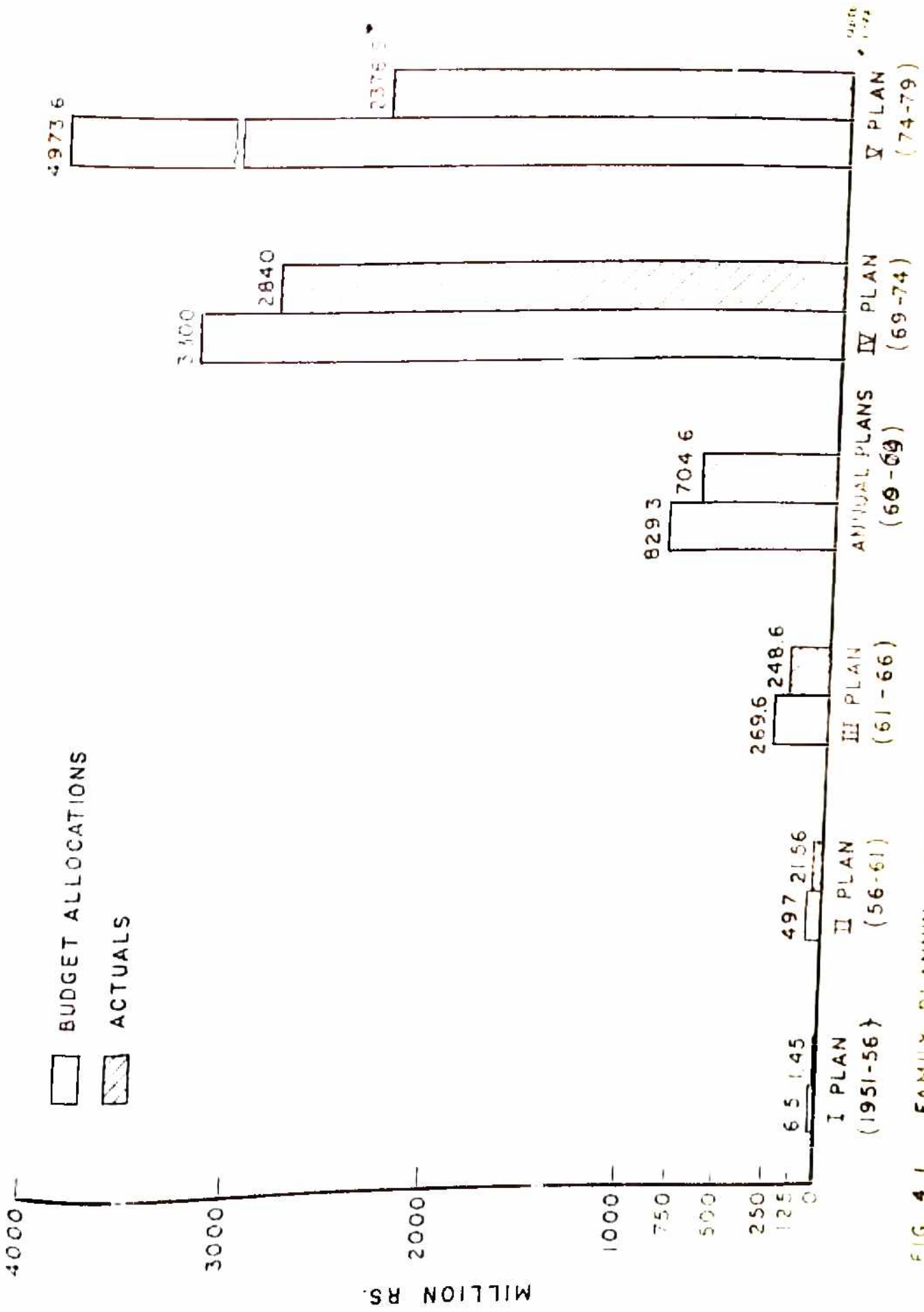


FIG 4.1 FAMILY PLANNING BUDGET AND EXPENDITURE IN DIFFERENT PLAN PERIODS (1951-79)

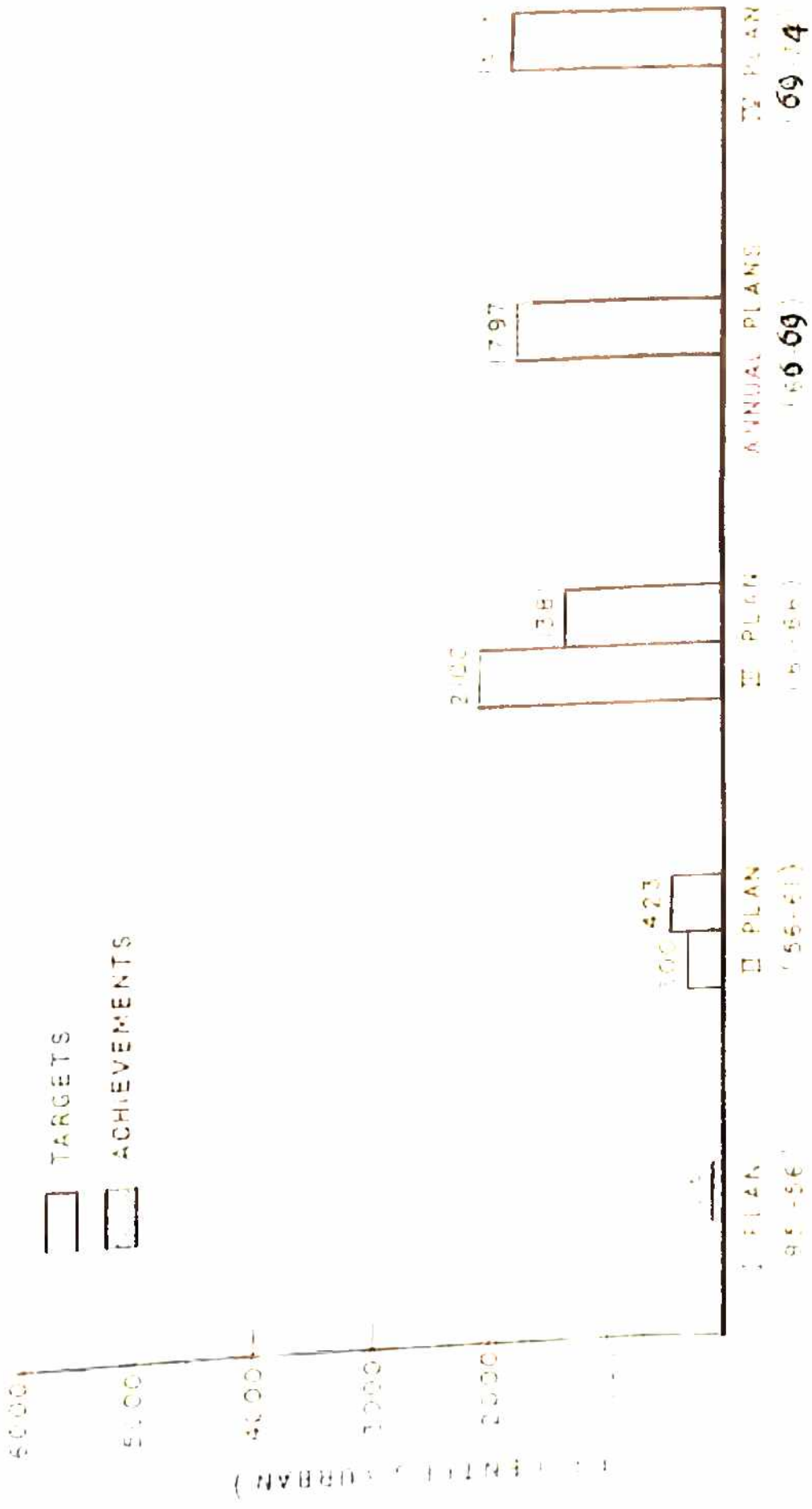
This indicates the large growth rate needed for getting a break through in the beginning of the programme and a smaller growth to sustain the programme. The interrelation between the budgeted funds for the programme and the actual expenditure show that in early stages (I & II plan) 22% and 43% were utilised. In the III plan, annual plans and IV & V plans the utilisation of funds was more than 80%.

Fig. 4.2 and 4.3 show the development in number of rural and urban centres over the various plan periods. The number of centres in both categories increased very rapidly during each plan period.

Fig. 4.4 shows the trend in the performance of sterilizations. The number of sterilisations with each plan period increased considerably but within plan periods there had been ups and downs in the performance.

Fig. 4.5 gives a picture of the number of IUD insertions. The saturation level was reached very early and the ambitious target of 8.51 million during 1966-69 was brought down to 4.08 million in the fourth plan.

Fig. 4.6 shows the pattern for acceptance of conventional contraceptives. Before the 1969-74 period



FAMILY PLANNING CENTRES ESTABLISHED IN DIFFERENT PLAN PERIODS (1951-74).

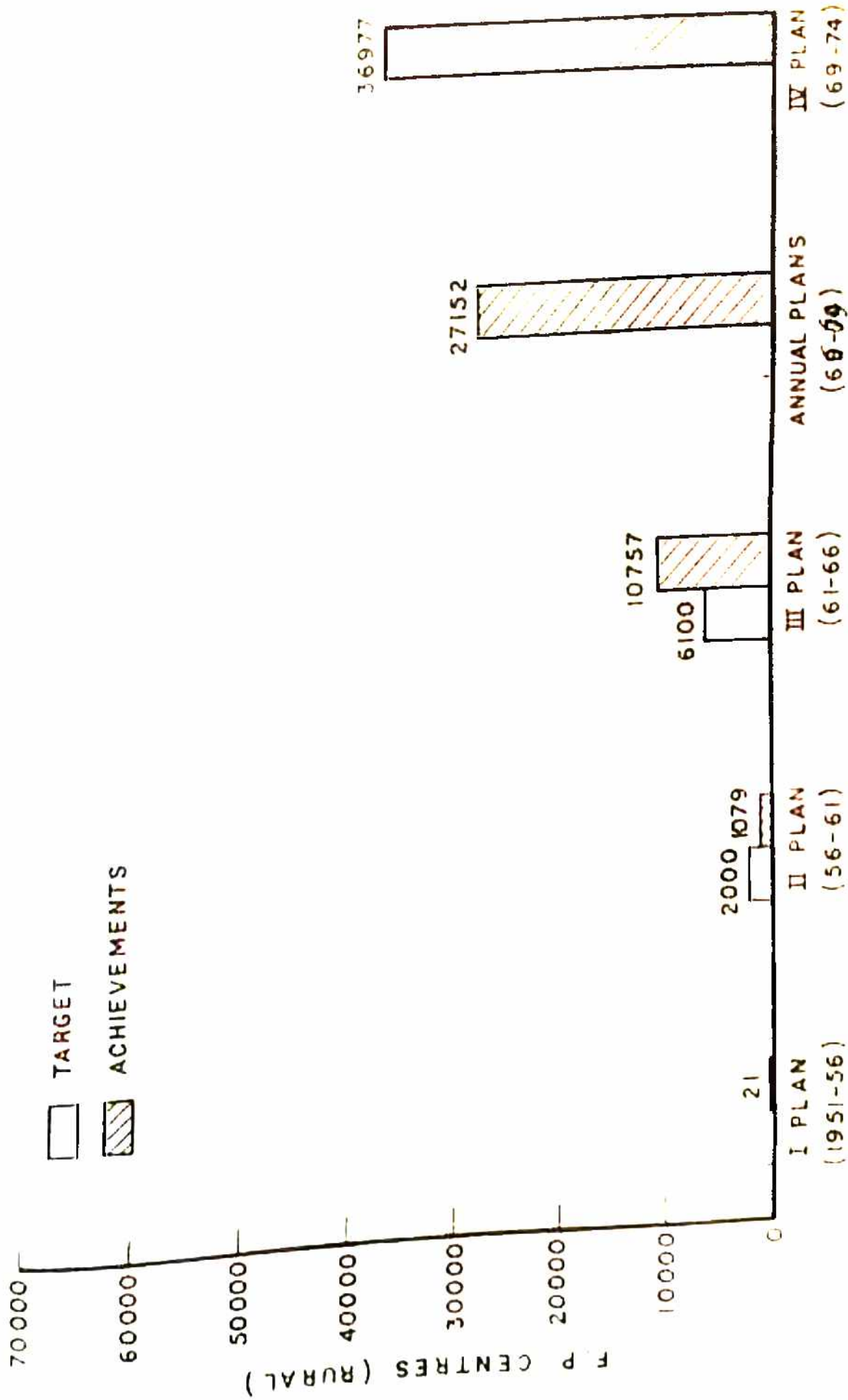


FIG 4.3 FAMILY PLANNING CENTRES ESTABLISHED IN DIFFERENT PLAN PERIODS (1951-74).

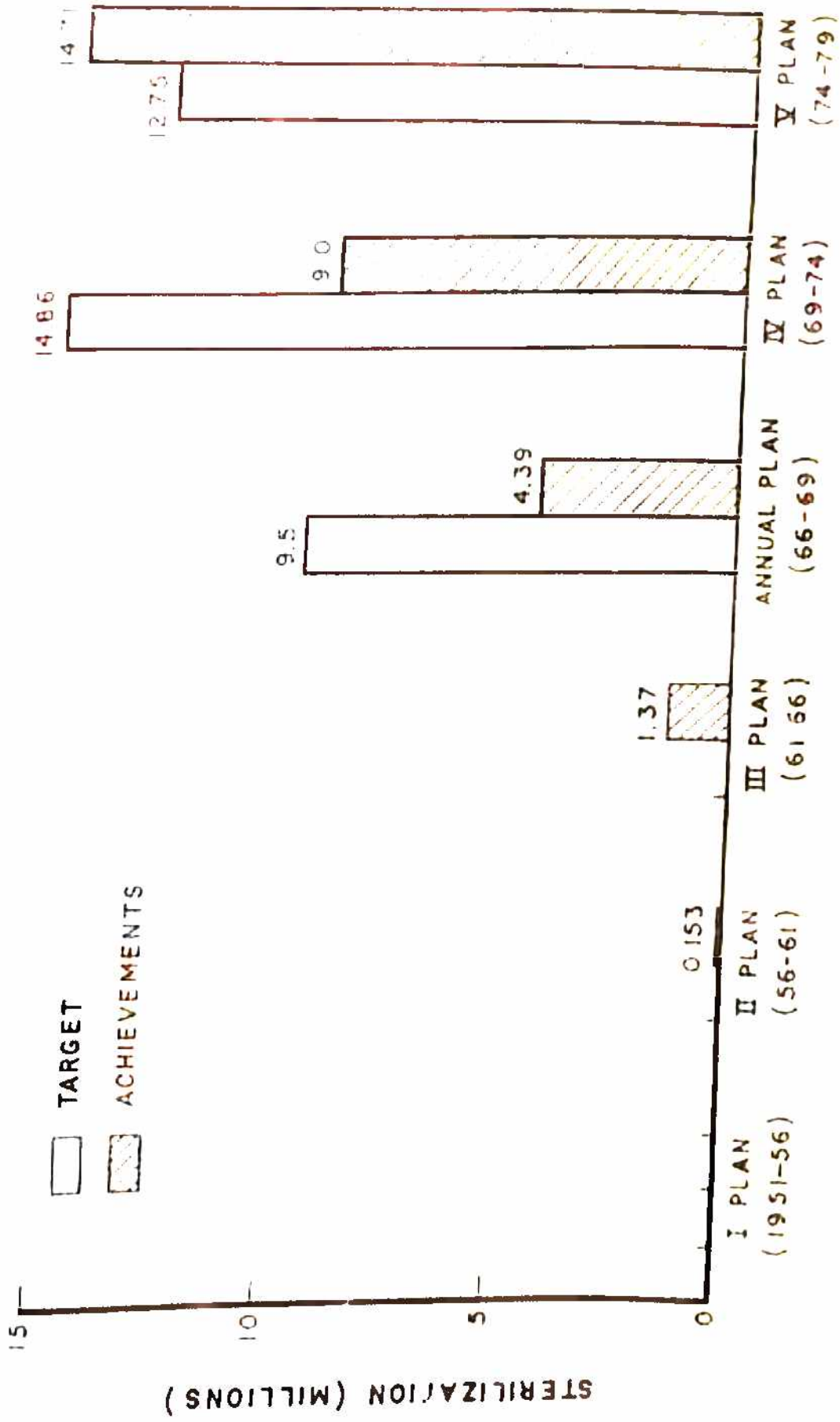


FIG 4 4 FAMILY PLANNING PERFORMANCE STERILIZATION IN DIFFERENT PLAN PERIODS (1951-79)

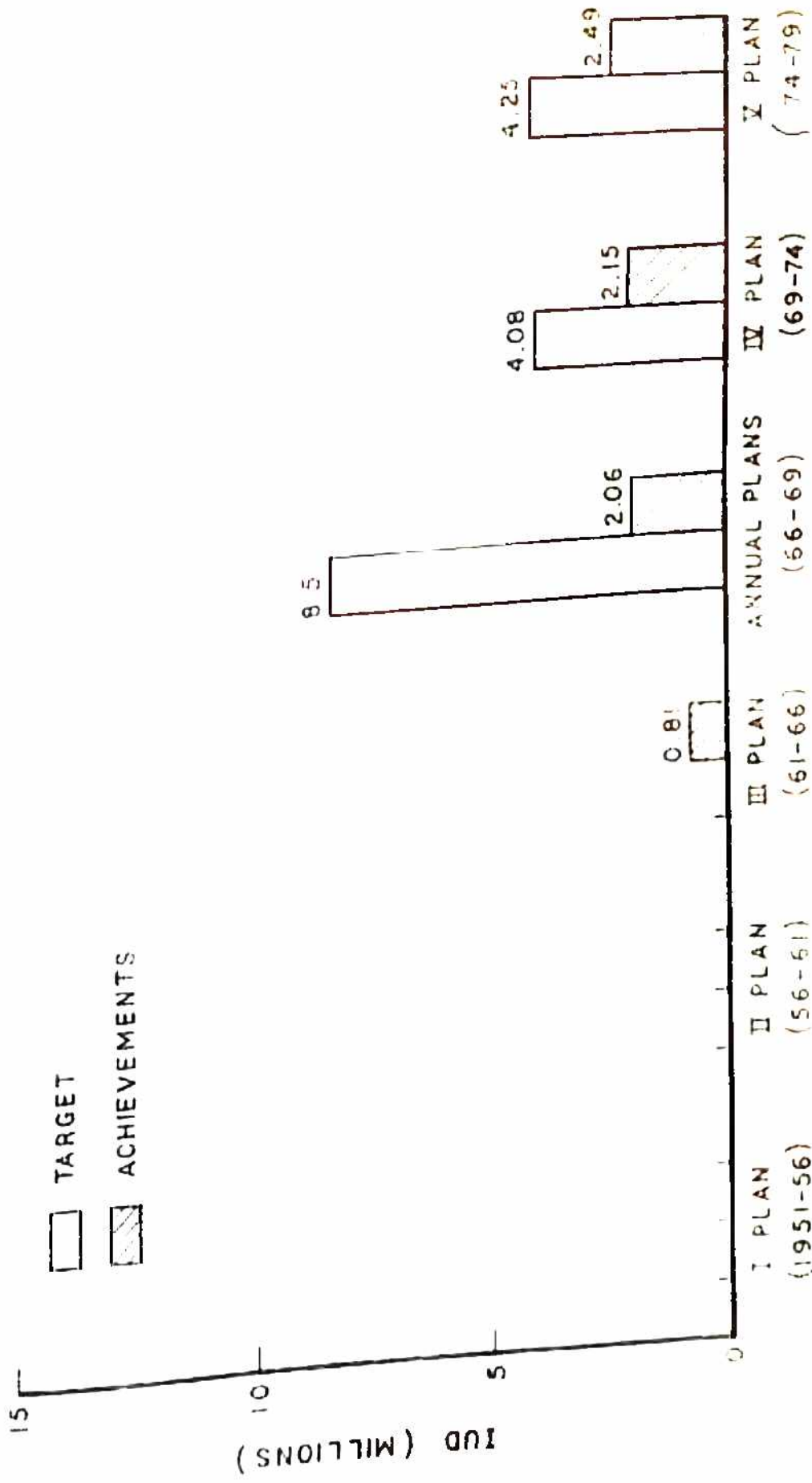


FIG. 4.5 FAMILY PLANNING PERFORMANCE INTRAUTERINE DEVICES (IUD) IN DIFFERENT PLAN PERIODS (1951-79)

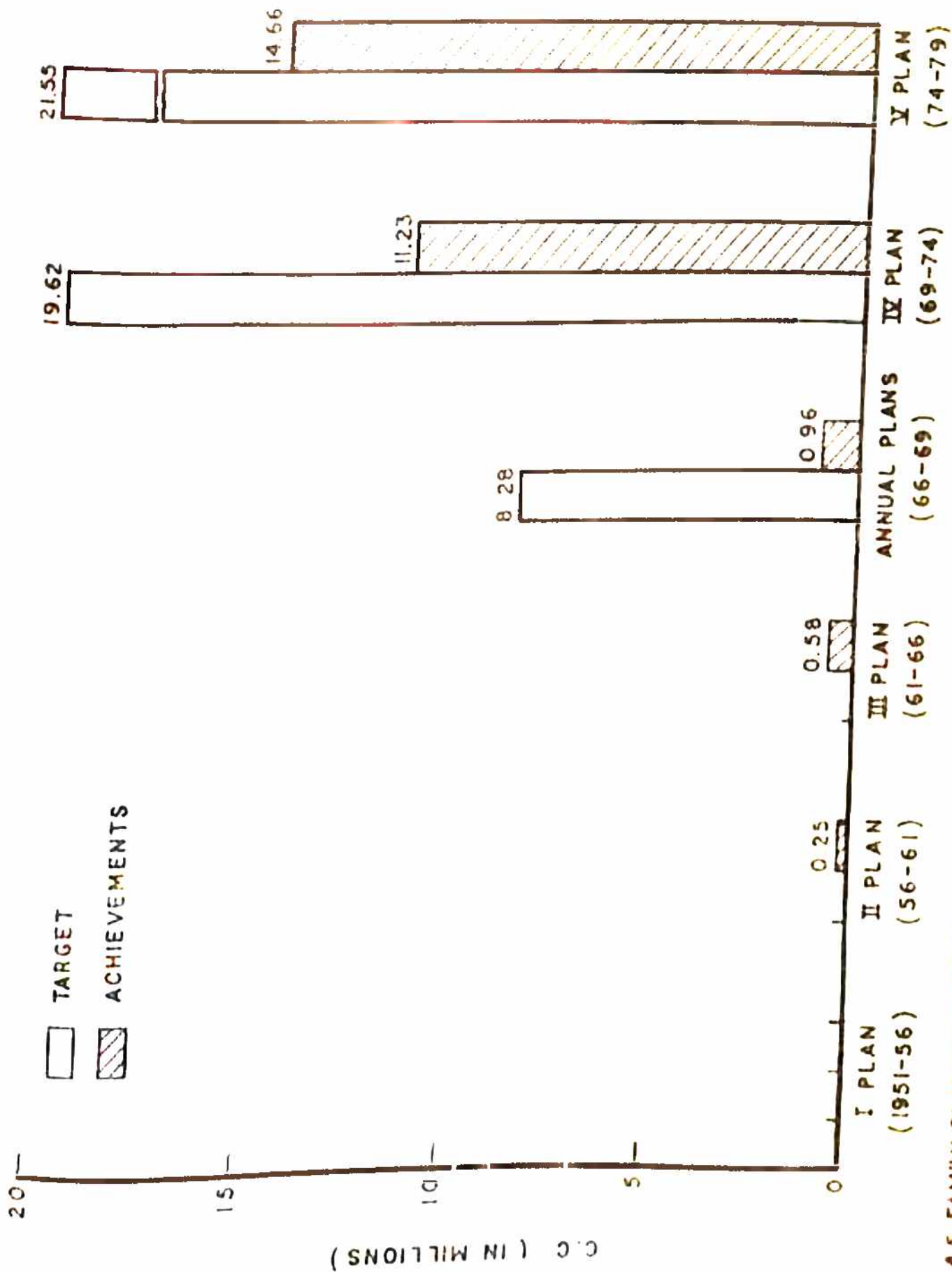


FIG 4.6 FAMILY PLANNING PERFORMANCE CONVENTIONAL CONTRACEPTIVES (C.C.) IN DIFFERENT PLAN PERIODS (1951-79).

the number was less than one million, but there was a tremendous increase in the number during the subsequent period. The Nirodh marketing programme resulted in a steep rise in the number of acceptors of conventional contraceptive. The number rose to 11.23 million during 1969-74 plan period.

The programme evaluation efforts brought into focus many issues that ~~one~~ to be resolved in carrying out the programme. A number of pitfalls have been identified. The evaluation work helps in rectifying the faults and act as guidelines for future course of activities.

A well planned statistical system of reporting the performance of the family centres has come into being. But the implementation of the data collection work is far from satisfactory. A researcher who uses these data is handicapped by nonavailability of many details. Proper supervision of data collection on performance statistics is called for.

CHAPTER - 5

MODEL OF FAMILY PLANNING SYSTEM
AND PROBLEM AREAS

MODEL OF FAMILY PLANNING SYSTEM AND
PROBLEM AREAS

5.1.1 The Family Planning System :

The family planning system as shown in Fig. 5.1 consist of the change agency which promotes the idea of family planning among the target market and provides facilities and services. To perform its function effectively the change agency needs to do market research to guide its activities.

5.1.2 Functional Hierarchy :

In India the role of the change agency has been taken by the Government. The functional hierarchy of the agency administering the family planning programme is as shown in Fig. 5.2

Both the promotional activities and provision of service facility for the programme are taken up by the government agencies. These agencies are well established over the years and they have acquired a special character in performing their activities. They have the necessary infrastructure throughout the country for carrying out the national programme. They also control the major mass media.

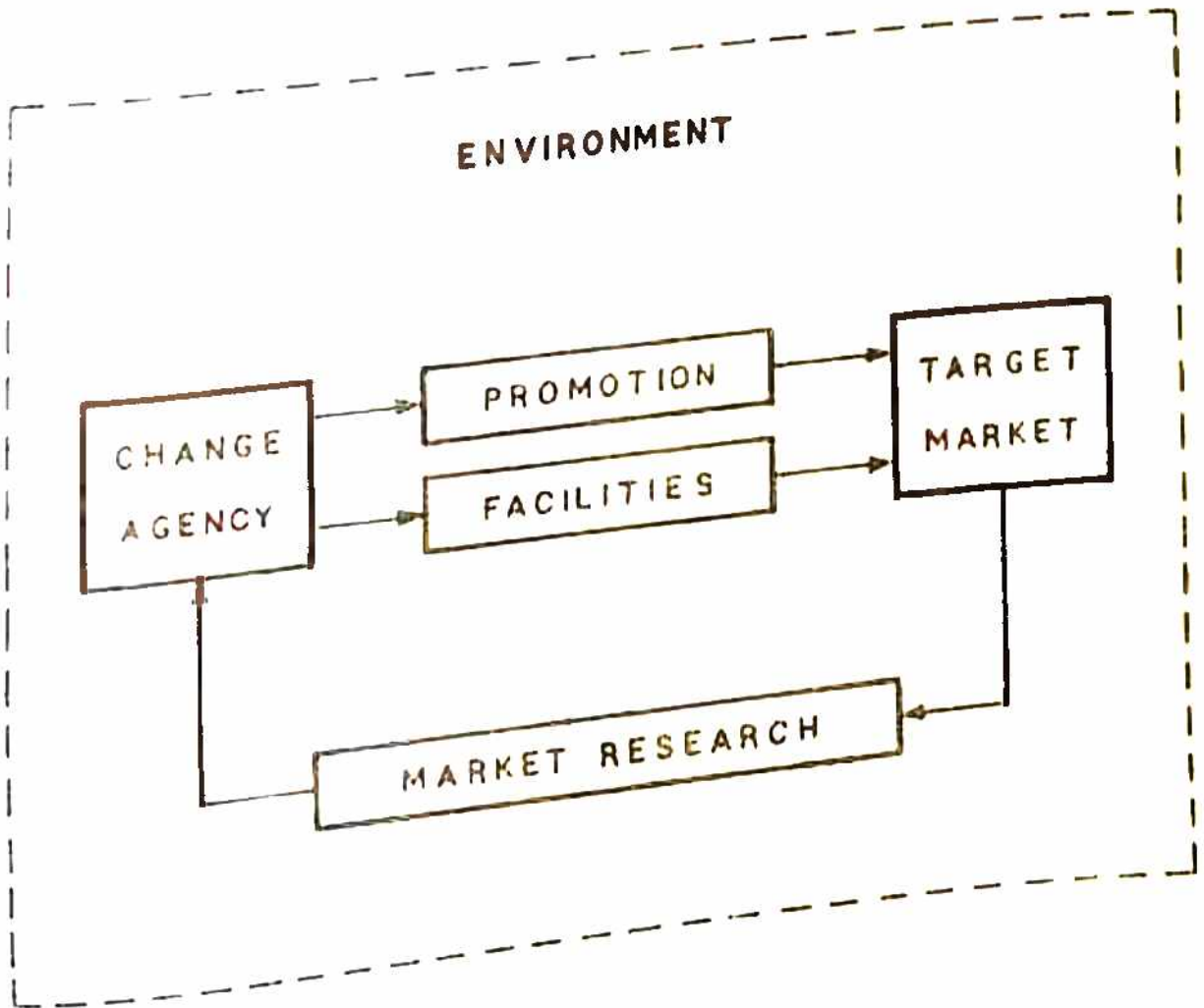


FIG. 5.1 THE FAMILY PLANNING SYSTEM
(A SIMPLIFIED MODEL)

CENTRAL GOVERNMENT

1. NATIONAL POLICY
2. BUDGET ALLOCATION
3. PUBLICITY
4. TRAINING
5. RESEARCH

STATE GOVERNMENT

1. PLANNING & IMPLEMENTATION
2. STATE LEVEL PUBLICITY
3. REGIONAL TRAINING

DISTRICTS

1. PROVIDING FACILITIES
(a) URBAN (b) RURAL
F.P. CENTRES
2. EXTENSION SERVICES

FIG. 5.2 FUNCTIONAL HIERACHY

The Central Government lays down policy regarding family planning in terms of long term national target for birth rate reduction, provides training for programme personnel, allocates budgets among states, arranges nation wide publicity campaigns and supports research activities. The research activities cover product development through medical research, demographic research, communication research and evaluation programmes.

In the next stage State Government is responsible for state level planning and implementation of the programme in accordance with the general instructions of the Government of India.

At the next level District authorities are responsible for providing facilities through urban and rural family planning centres and providing extension services. In the rural areas, the family planning service has been made an integral part of the Maternity and Child Health and Public Health Services.

Government of India has prescribed a uniform set-up of the family planning organisation at the state, district and local levels. The following is the set-up. (P/ anandiker, 1978).

State Level

State Family Planning Bureau	1 State Family Planning Officer
	1 Health Education Officer
	1 Deputy/Assistant Director (Mass Media)
	1 Deputy/Assistant Director (Planning)
	1 Deputy/Assistant Director (Training)
	1 Statistician

District Level

District Family Planning Bureau	1 District Family Planning Officer
	1 Mass Education and Information Officer
	1 Assistant Surgeon (Male)
	1 Assistant Surgeon (Female)
	2 District Extension Educators
	1 Statistical Assistant

Urban Family Planning Welfare Centre

The staffing pattern is based on the population which the centre is required to serve.

Block Level

Primary Health Centre	1 Assistant Surgeon
	1 Extension Education Family Planning
	Field Workers (1 for each 20,000 population)
	1 Lady Health Visitor
	1 Auxiliary Nurse Midwife
	1 Compounder
Sub-Centre	1 Auxiliary Nurse Midwife

The state family planning bureaus have been set-up in the Directorate of Health Services. They are headed by the State Family Planning Officer.

At the district level, there are District Family Planning Bureaus which are responsible for providing family planning services in government hospitals, organising sterilisation camps in the area and supervising the work of the primary health centres and family welfare planning centres. These Bureaus are headed by the District Family Planning Officers.

In the urban areas, urban family welfare planning centres have been organised by the Government as well

as by local bodies and voluntary organisations.

In the rural areas of the districts generally one Primary Health Centre (PHC) is located in each community development block. The PHC has a number of sub-centres which operate as the primary functional units. These sub-centres have been organised on the basis of population coverage. Each sub-centre generally covers a population of about 10,000. The PHC is headed by a medical officer.

Committees :

For the purpose of adequate policy making and administrative and financial control, a number of Committees are set up at various levels. These committees aim at reviewing the performance of the programme enlisting cooperation between officials and non-officials; and seeking co-ordination amongst government departments; and, government departments and non-official agencies. At the state level the following committees are set up: Cabinet sub-committee, State Family Planning Council, State Level Implementation Committee and State Grants Committee. Of the many committees constituted, those formed at the district and block levels, occupy a key position in implementation of the programme and in

broadening the participation of non-officials and staff of other departments in the family planning programme.

Facilities :

The facilities created by the Government for providing family planning services are complemented by private nursing homes and voluntary organisations clinics as shown in Fig. 5.3.

IUD and sterilization services are being offered through mobile and static agencies as well as through camps. Condoms are distributed through three channels. The first scheme provides for free distribution through all the family planning centres and sub-centres. Under the second scheme call the Depot Holder Scheme, a nominal price is charged and is retained by the depot holders who are honorary workers. The third scheme relates to the distribution of condoms through commercial channels.

Mass Vasectomy Camps are a special feature of the programme facilities. During mass vasectomy camps the incentives paid to the acceptors are high. The needed services of doctors for these camps are provided by doctors drawn from nearby villages. The district administrator is responsible for organising these camps periodically.

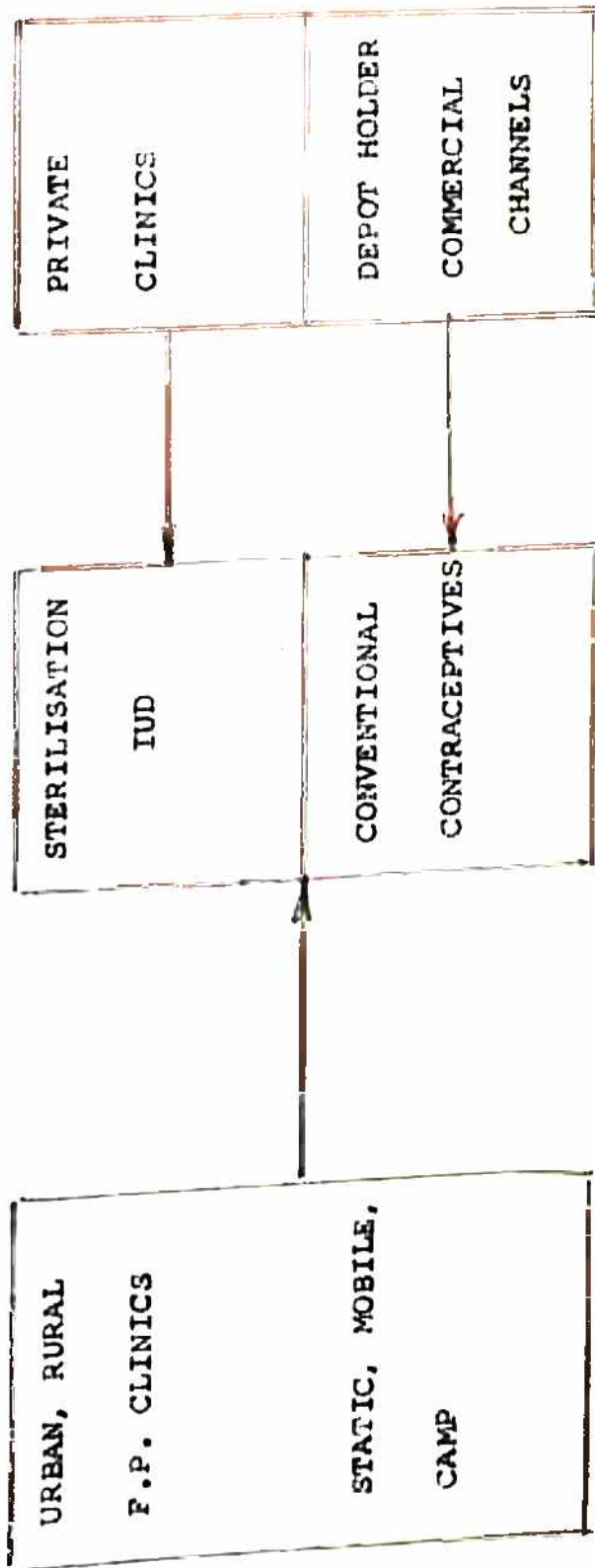


FIG. 5.3 : FACILITIES

5.2 Family Planning Management System :

A more detailed diagram of the family planning system bringing out the management aspects is developed as shown in Fig. 5.4. The family planning management system can be studied with reference to these aspects of managerial functions, resources, activities, decision problems, models and information system.

5.2.1 Management Functions :

The programme management involves all the managerial functions of planning, organising, coordination, evaluation control and implementation. The importance of these functions and the application of management principles has been already referred in chapter 2.

5.2.2 Resources :

The resources to be created by the programme management for carrying out its task are detailed in this system representation. In the earlier representation in Fig. 5.1 these resources were classified under broad headings of facilities, promotion and market research. The establishment and operation of these resources can be analysed along the dimensions of the managerial functions.

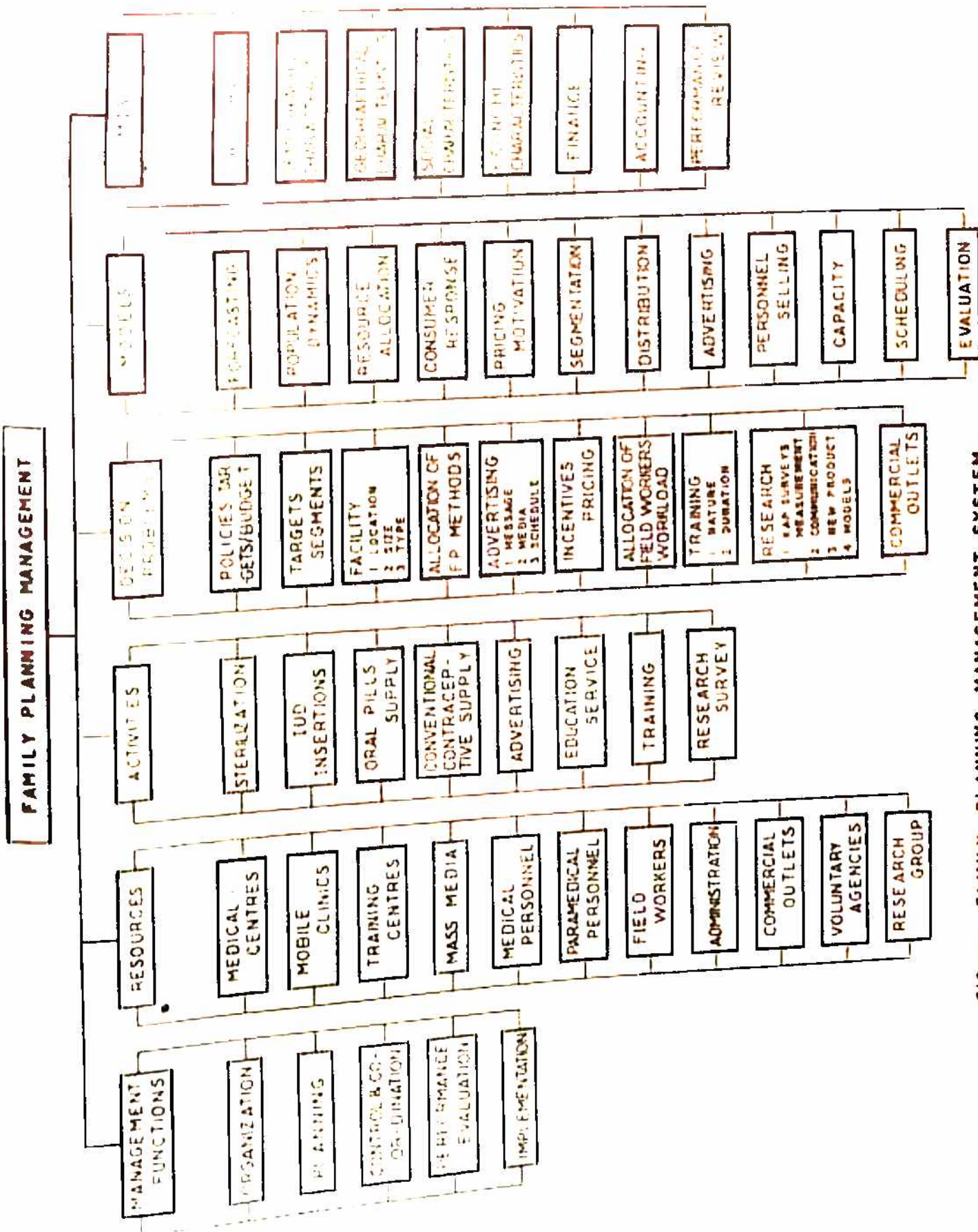


FIG. 3.4 FAMILY PLANNING MANAGEMENT SYSTEM.

5.2.3 Activities :

The promotional, and research activities and the delivery of services are detailed and elaborated in this system representation.

5.2.4 Decision Problems :

A number of decision problems arise in the management of the programme. At the planning stage setting up of national policies regarding the nature and magnitude of the programme are to be established. The various decision problems are listed as shown. These problems are to be faced with, both at the time of inception and during the operating stage and they cover a wide field encompassing all the functional areas and the activities discussed above.

5.2.5 Models :

A number of models developed in the field of marketing and other areas discussed in chapter 2 can be utilised in solving these problems. The models which find their application in decision problems in fairly planning programme management are classified as shown in the figure.

5.2.6 Management Information System (MIS) :

Market research provides the information required for using these models in specific applications. Many of the national programmes came into existence on the basis of information provided by census. While demographic characteristics provided by the census brought out the need for family planning, additional information of specific nature for carrying out the family planning programme effectively are collected by special efforts. The management information system (MIS) serve this purpose. The elements of this systems are elaborated in the figure.

5.3 Family Planning Programme Problem Areas :

A study of the different aspects of the family planning programme management system indicates a number of problem areas needing research considerations. These areas are schematically represented in Fig. 5.5.

As many developing countries have started the family planning programme many years ago and have experienced different degrees of success, they pose many problems in programme management. The major problem can be visualised as how to achieve the best results with a given amount of resources. With scarce resource availability in most of the developing countries

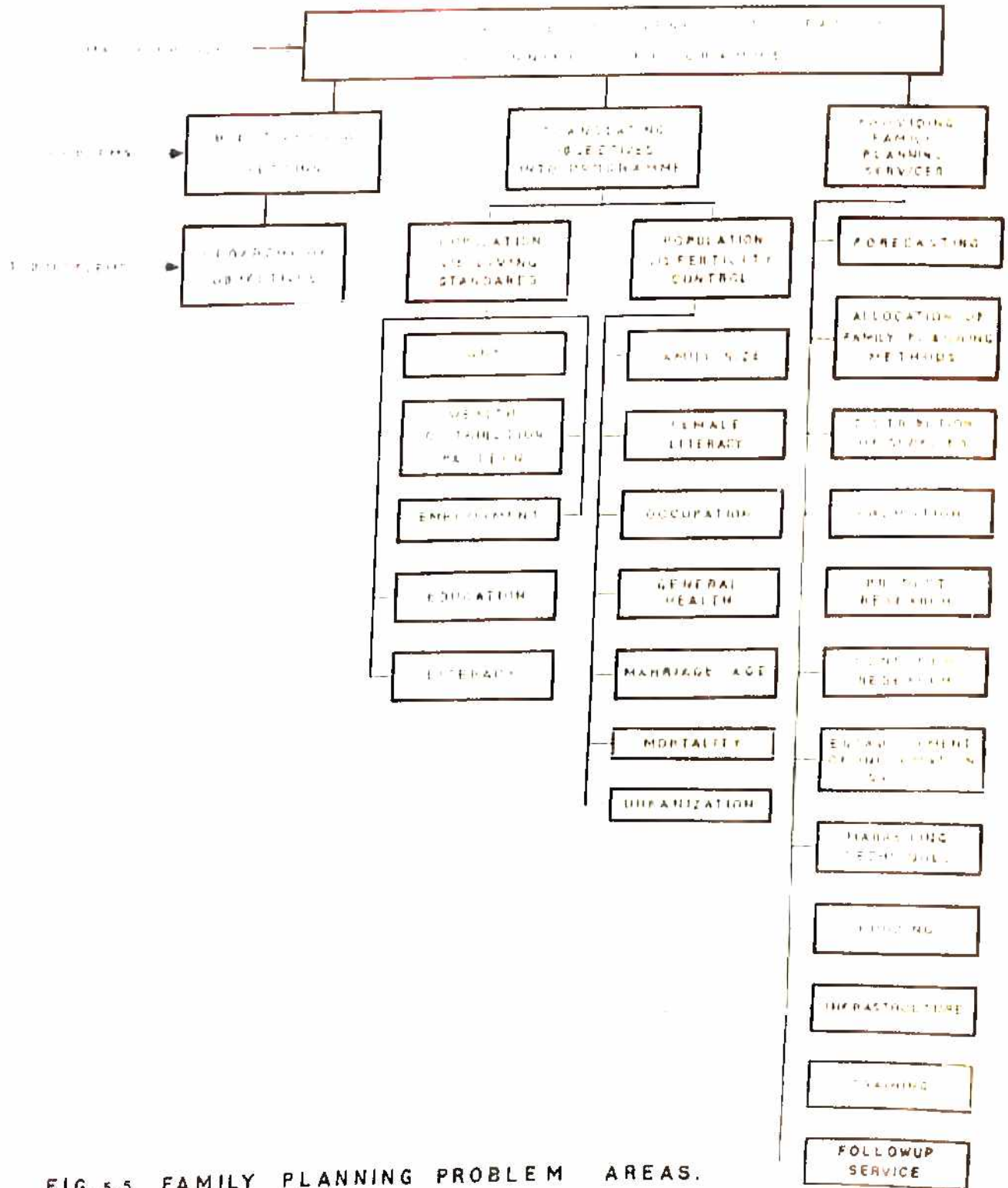


FIG. 5.5 FAMILY PLANNING PROBLEM AREAS.

it is imperative that the resources are utilised in the most effective manner. This calls for an understanding of the different problems that crop up in carrying out the programme and finding out suitable solutions for them.

The major problem can be stated as to increase the effectiveness of the family planning programme. This major problem can be attacked by considering the different aspects of the problem. These problems can be classified as problems associated with objective or goal setting at the planning stage, the translation of these objectives into programme activities, and the details of these activities in terms of providing the appropriate family planning services.

5.3.1 Hierarchy of Objectives :

In the study of the system the hierarchy of objectives play an important role. Fig. 5.6 identifies the various goals of national family planning programmes. (Rogers 1973). The family planning programmes aim at the ultimate objective of attaining better living standards for the people. The objective is achieved through a series of sequential steps as indicated in the figure. The family planning activities result in increasing the

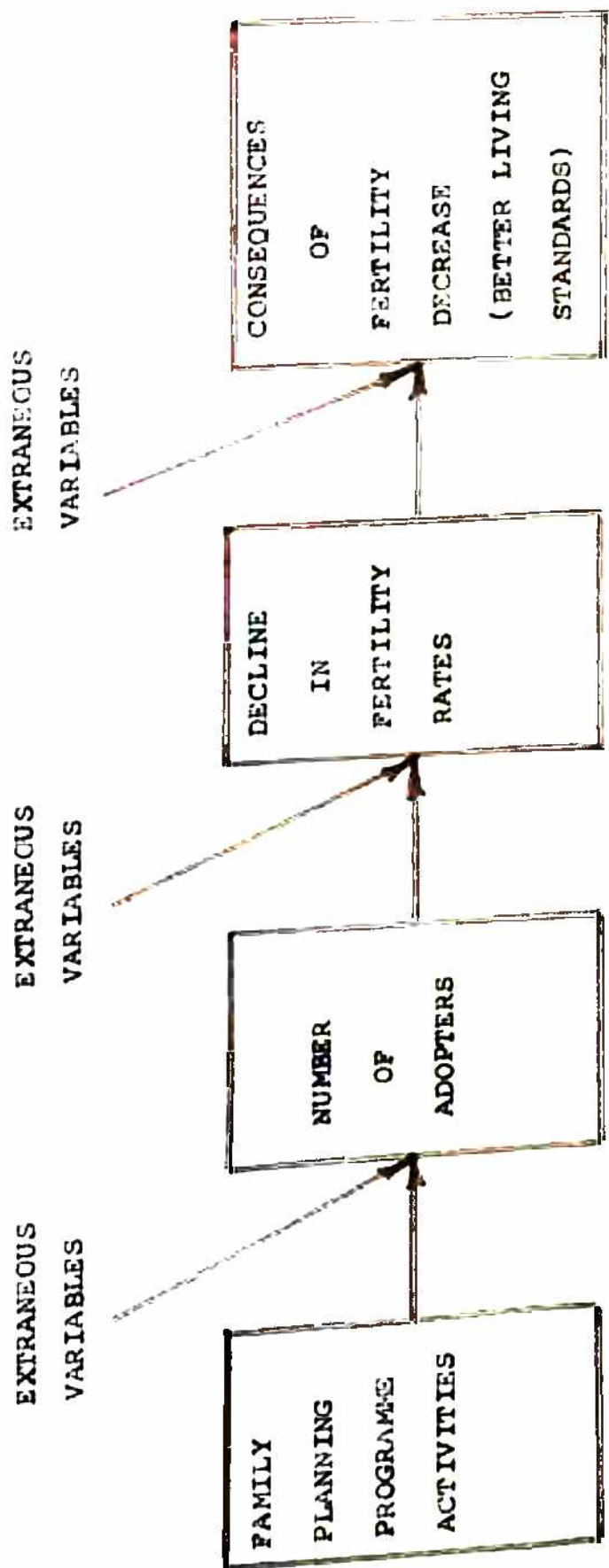


FIG. 5.6 TYPES OF OBJECTIVE FOR NATIONAL FAMILY PLANNING PROGRAMMES.

number of adopters which in turn reduces their fertility and consequently leading to better living standards.

In relating the ultimate goal of better living standards through decline in fertility rates, doubts have been expressed regarding the extent to which family planning can work to reduce fertility in relevance of development. The question is whether development must accompany or precede family planning. Thus a vicious circle is formed as shown in Fig. 5.7. While the mutual dependence of fertility decline and development status is generally accepted there are some countries (e.g. Mexico) which have been able to experience substantial economic progress despite rapid population growth (Brackett, 1978). According to Murickan (1974), urbanisation and industrialisation automatically tend to reduce fertility among the people affected by these two processes. The exact reasons are still not fully known. Srinivasan et. al. (1978) as cited in chapter 3 questioned whether increased economic and social development leading to modernity automatically leads to fertility reduction.

At the family level, in many cases, the family planning programme is not perceived as one relating to the ultimate goal of attaining better living standards. Ackoff (1978) pointed out that after obtaining its

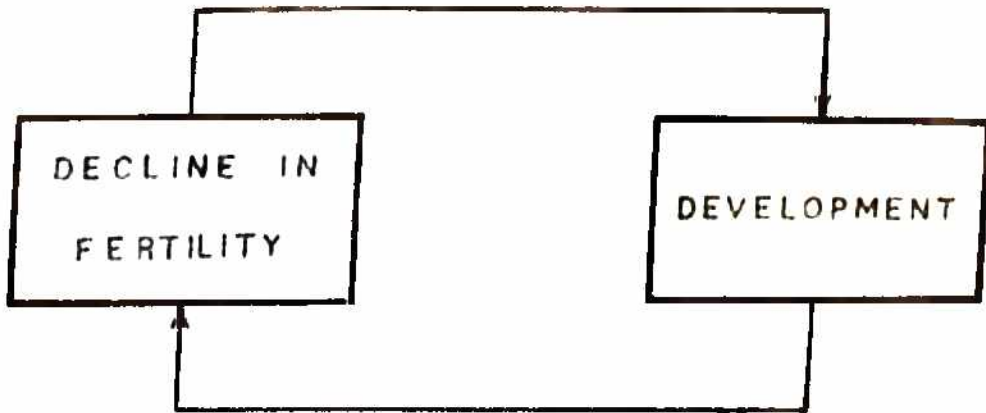


FIG. 5.7 DEVELOPMENT & FERTILITY INTERRELATIONSHIP.

independence, India had increased the expected length of life of adults dramatically, but it had not increased the span of employable life. The poor Indian could expect to work for only about the first half of the employable years available to him. Therefore, while young and employed, Indians were preoccupied with planning for financial security during the subsequent period of unemployment. Therefore, to ask Indians to have fewer children was to ask them to commit a delayed ^{suicide} ~~sincide~~.

While the success of family planning programmes are indicated by the number of adopters, in some situations it need not lead to the sequential attainment of the ultimate objective of better living standards. Consequently the intentions of immediate objectives of the family planning programme activities loose their meaning. This brings in the aspect of addition of human resources and its effect on sharing the resources of the country. If it is viewed that every additional child is a strain on national economy due to its being a consumption unit, the fertility reduction is justified. On the other hand if it is viewed as a positive contribution to the economy then fertility decline leads to loss of resources. This poses a problem of identifying human quality.

Fertility decline can also be achieved by methods other than family planning. Abortion and raising the age of marriage may lead to decline in fertility.

5.3.2 Programme Activities :

The many factors which influence the translation of objectives into programme activities as discussed above are detailed in the figure. The programme activities take the final shape of family planning services. The classification of problems under services are listed in the figure.

5.3.3 Consumer Research and Promotion :

According to Ogale, 1975 the following points are listed as important reasons for the prevalent apathetic attitude and resistance to progress of family planning concept:

- "1. Some people are convinced that practising family planning is a contravention of the popular belief that children are blessings or gifts of God. They have not been able to understand the difference between children by choice and chance, and they are far from convinced as yet that the family can be kept within limits, as they are hardly aware of the progress made in the field of medicine. It is also felt that resorting to family

planning would be going against and interfering with ^{its} ~~its~~ growned upon.

2. There is also the feeling that the family planning movement would lower moral standards leading to an increase in illegitimate sex relations, in turn causing discard in the closely knit family life and the community would be faced with yet another social problem.

3. It is felt that recourse to contraception is not only against well-established religious practices, but would count the disapproval of elders as well as religious heads.

4. The general impression has been that only the middle class accepts the philosophy of family planning with the result that the intelligentsia or 'brain power' in the country is being whittled, which would ultimately create an imbalance in the composition of the society. Such a doubt lurks even in the minds of some educated people, who try and keep aloof.

5. Tradition has it that parents should depend on their sons in their old age. Surveys have proved that this desire for many sons has been a very real compulsion that has led to over-large families.

6. Community leaders and religious heads have mooted a possible likely imbalance in the population strength

community-wise thus giving a communal facet to the element of fear.

7. Family Planning work does not bring in quick and speedy results, which makes political parties and leaders chary of lending support, as it does not help build up the image in any election campaign - from Panchayat to Parliament.

8. As regards the methods of family planning, prejudices and misunderstandings still linger in certain quarters. Some equate sterilisation with castration, while others feel that sterilisation leads to impotency, and yet others fear that after the operation, the sex-urge would diminish. It is also feared that sterilisation affects physical strength and stamina leaving the patients in an unfit condition to undertake strenuous work.

9. The IUD came into disrepute because of certain unfounded beliefs and prejudices. Some women felt that the device might travel from womb to other parts of the body and could then be removed only by a major operation. Fear of bleeding, dislodging of the device has led to resistance to adoption.

10. As regards pills, side effects such as increase in body weight, nausea, heart trouble in one form or other, adverse effect on lactation etc. have been

reported and this discourages adoption. To cap it all one mishap or unsuccessful case gets more adverse publicity, where ten thousand successful cases handled with care and caution pass unnoticed."

According to Bogue, (1975) any country can bring about a rapid decline in its birth-rate with in a surprisingly short time if it only critically evaluate, overhaul, ^{up} and put more money into its program of communication-education for family planning. By combining the change-producing power of personal contact and the far-reaching impact of the mass media in a comprehensive program, most family planning programmes would move to an entirely different plan^s of performance than the one on which they now operate.

Failures of family planning to date can be traced more to failure to apply skilfully what is already known than to inherent weakness in the idea of family planning itself.

Bogue identifies twenty five major communication obstacles and suggests solutions to overcome them. The obstacles are listed below:

- " (1) Fears of permanent damage to health from prolonged use of the pill, IUD, or other contraceptives.

- (ii) Fears of the short time side effects of the pill and IUD.
- (iii) Lack of leadership awareness that the masses want family planning.
- (iv) Irrational fears of the vasectomy method.
- (v) Inadequate communication between husband and wives about ideal family size, spacing, contraceptive methods, and whether to practice family planning.
- (vi) Insufficient emphasis on the spacing of children among young adults.
- (vii) Slowness to desexualise family planning and reduce shyness about family planning behavior.
- (viii) Negative influence of peers and elders.
- (ix) Family planning rumours.
- (x) Lack of awareness of family planning services.
- (xi) Failure to diffuse information about private and commercial family planning sources.
- (xii) Prejudices for and against particular methods of contraception.
- (xiii) Tolerance of the low status of women and weak support of the movement for women's rights.

- (xiv) Contraceptive fatigue, carelessness, and negligence.
- (xv) Desire to have a large family for personal reasons.
- (xvi) Fatalism and control of one's own career.
- (xvii) Anxieties about contraceptive failure.
- (xviii) Male preference in child bearing.
- (xix) Neglect of environmental protection, national economic development, and community welfare as motives for family planning.
- (xx) High infant mortality.
- (xxi) Infidelity and modern family planning.
- (xxii) Exaggeration of the economic value of children.
- (xxiii) Withholding family planning information from sexually active teenagers and other mature unmarried persons.
- (xxiv) Under exploitation of the immediate and intermediate advantages and benefits of family planning.
- (xxv) Insecurity in old age."

5.3.4 Programme Dynamics :

With the excess of actual births over desired birth ~~is~~ substantial family planning becomes indispensable. The long-run problem is to alter those aspects

of the social structure that motivate couples to have large families. If a substantial portion of ready acceptors at the initial stages of a family planning programme the Government would be wise enough to expand rapidly the scope of the programme since the ratio of benefits to costs is high. But as the actual family size gets closer to the ideal family size, the ratio of benefits to costs decreases. More studies are needed to determine the optimal balance between investment in family planning programme and investment in those aspects of socio-economic development that will reduce the family size. (Murickan, 1974).

5.3.5 Conclusions :

First a simple model of the family planning system is developed to identify the elements of the system at a broad level. A typical organisation of the system (India) is described in detail with reference to the functional hierarchy. Then an elaborate family planning management system model is developed to study the various aspects from management perspective. Using this system model the problem areas are identified. While a number of problems mentioned deserve the attention of the researcher, it is felt that the investment problem involving the dynamics of the programme poses a challenge. In an attempt to solve the problems in this critical area a model is developed in the next chapter.

CHAPTER - 6
FACILITY REDESIGN

FACILITY REDESIGN

Resource allocation decisions are frequently faced by planners at many levels. In the family planning activity area, International agencies provide large amounts of funds to developing countries. It is imperative that these scarce resources are allocated amongst the countries in an optimal manner. To evaluate the various alternatives in this decision situation, it is necessary to estimate the impact of the alternative schemes of allocation on the performance of these fund-receiving countries in their family planning programmes.

To predict this impact, an understanding of the population's characteristics which influence the acceptance rate of the family planning is essential. Sometimes the demographic and socio-economic variables of the population are used as predictors of performance in family planning.

6.1 Correlation Between Demographic/Socio-economic Variables and Family Planning Acceptance :

An exercise is done to check the relationship between some demographic variables and the family planning programme achievement in ten Asian countries.

The variables tested were : Birth rate, Life expectancy at birth (female), females aged 15-44 married ratio to total population, infant mortality rate and percent urban of total population. Table 6.1 presents the data. In the analysis the family Planning performance was measured as percent of family planning acceptors of total population of the countries with government supported family planning services. It is found that the correlation of the socio-economic variables with the percentage of family planning acceptors during 1972-76, is significant only at 10% (Multiple correlation coefficient = 0.6241).

A multiple correlation analysis to determine the relationship between family planning acceptance rate and some socio-economic variables was done for ten states of India. The data is shown in Table 6.2. The variables tested were : percent literacy rate, mean age at marriage (female), death rate, birth rate and percentage of urban population. It is found that the correlation of cumulative acceptance rate with these variables was very low. (Multiple correlation coefficient $R = 0.608$; significant only at 10%).

TABLE 16.1 SOCIO-ECONOMIC MEASURES AND FAMILY PLANNING
ACCEPTANCE : 10 DEVELOPING COUNTRIES

Country	X_1	X_2	X_3	X_4	X_5	X_6
Hong Kong	17.7	75.6	0.11	20	95	3.71
Indonesia	37.4	48.7	0.16	140	19	6.07
Malaysia	30.3	70.3	0.14	41	29	2.93
Philippines	37	61	0.12	82	35	8.1
Singapore	18.8	71.8	0.12	21	90	7.46
Taiwan	25.9	73.4	0.13	19	63	8.84
Thailand	37	63.6	0.12	80	20	4.97
Bangladesh	44.5	49	0.15	140	8	2.8
India	35	48.8	0.175	130	22	5.6
Nepal	43	42.5	0.186	200	5	3.68

X_1 = Birth rate per 1000 population

X_2 = Life expectancy at birth (years) Female

X_3 = Females aged 15-44 Married Ratio to total Population

X_4 = Infant mortality rate

X_5 = Percent urban of total population

X_6 = Percent of F.P. acceptors 1972-76 of total population

Source : Nortman and Hofstatter, Population and Family
Planning Programmes. Population Council 1978.
p. 9-11.

TABLE 16 - SOCIO-ECONOMIC MEASURES AND FAMILY PLANNING
ACCEPTANCE : DIFFERENT INDIAN STATES

State	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆
Andhra Pradesh	24.57	16.4	16.1	35.8	19.35	32.9
Assam	28.72	18.5	19.9	36.4	8.39	17.4
Bihar	19.94	15.5	18.3	33.1	10.04	15.9
Orissa	26.18	15.5	20.0	34.5	8.27	41.2
Karnataka	31.52	17.9	12.8	31.5	24.31	26.4
Kerala	60.42	20.9	9.2	31.2	16.28	38.3
Madhya Pradesh	22.14	15.2	18.7	39.3	16.26	26.9
Punjab	33.67	18.8	12.6	34.6	23.8	62.7
Rajasthan	19.07	15.4	16.8	42.4	17.61	15.8
Uttar Pradesh	21.77	15.6	25.6	43.3	14.00	17.6

X₁ = Literacy per cent

X₂ = Mean age at marriage (female)

X₃ = Death rate

X₄ = Birth rate

X₅ = Percentage of urban population

X₆ = Cumulative F.P. acceptance rate/1000 population

Source : Agarwala S.N. India's Population Problems,
Tata McGraw Hill p. 95-181 1977 p.128-129

Statistical Abstract India 1972, No. 19,
C.S.O. Govt. of India p. 609

6.2 Classification of Indian States Based on P.H.O. Status:

However in published literature the family planning performance characteristics of different regions are compared on the basis of more relevant variables. Table 6.3 shows the classification of Indian states based on the public health organisation status measured with respect to the number of hospital beds per thousand population and the doctor population ratio. The states are divided into two categories and Group 1 states the public health organisation is better developed than in Group 2 states. The performance measures are expressed in percentage of population. In general group 1 states show better performance in sterilisation than group 2 states. But in IUD performance there is not much difference between the group during the period shown.

Table 6.4 presents the data for the years 1968-69 and 69-70 for the above states, the performance is measured in terms of percentage of targets achieved in sterilisation and IUD. For states in group 1 sterilisation performance is better than group 2 states but the IUD performance does not show this trend.

Table : DIFFERENTIAL PERFORMANCE IN INDIAN STATES

GROUP 1 ^a	1969-70 Popula- tion (milli- ons)	STERILISATIONS		IUDs	
		1969-70	1970-71 ^b	1969-70	1970-71 ^b
Maharashtra	49.2	4.63	3.89	0.17	0.16
West Bengal	44.0	1.82	1.24	0.21	0.14
Andhra Pradesh	42.6	4.84	3.92	0.22	0.15
Tamil Nadu	39.0	2.78	1.43	1.01	0.97
Mysore	28.8	1.69	1.34	0.45	0.27
Gujarat	26.1	3.62	2.92	0.41	0.28
Kerala	21.0	2.84	2.66	1.78	1.19
Punjab	14.4	2.84	1.55	2.07	1.29
Haryana	9.9	1.88	1.67	2.75	1.73
Total	275.2	3.22	2.47	0.67	0.49
GROUP 2 ^a					
Uttar Pradesh	89.4	0.87	0.74	0.91	0.84
Bihar	56.8	1.18	0.93	0.63	0.51
Madhya Pradesh	40.0	3.07	1.74	1.03	0.77
Rajasthan	25.8	1.69	0.98	0.87	0.55
Orissa	21.3	4.81	3.92	1.75	2.14
Assam	15.3	1.12	0.85	0.60	0.30
Jammu & Kashmir	4.0	1.85	1.26	1.09	1.21
Total	252.6	1.73	1.25	0.91	0.81
Other Territories	12.5	1.84	2.63	1.26	1.39
All India	540.3	2.54	1.91	0.81	0.66

a - Public health organisation is better developed in Group 1 than in Group 2 - No. of beds/1000 population & doctor population ratio.

b - Jan. 1971

Source : An Assessment of Family Planning Programmes, OECD, Paris 1972. p.71

Table : 6.4 STERILISATION AND IUD TARGET ACHIEVEMENT
IN INDIAN STATES

GROUP 1 ^a	PERCENTAGES OF TARGETS ACHIEVED			
	STERILIZATION		IUD	
	1968-69	1969-70	1968-69	1969-70
Maharashtra	95	77	6	6
West Bengal	67	30	13	7
Andhra Pradesh	82	82	11	7
Tamil Nadu	49	46	11	34
Mysore	55	28	18	15
Gujarat	66	60	12	14
Kerala	60	47	44	43
Punjab	50	47	65	69
Haryana	34	31	77	92
Total	68	54	20	22
GROUP 2 ^a				
Uttar Pradesh	30	15	26	30
Bihar	28	20	11	21
Madhya Pradesh	58	51	23	34
Rajasthan	25	28	21	29
Orissa	57	80	43	59
Assam	17	19	37	20
Jammu & Kashmir	50	31	48	36
Total	35	29	24	30
Other Territories	36	31	45	43
All States	53	42	23	27
National Targets	79	62	61	63

a - Public health organisation is better developed in Group 1 than in Group 2 - No. of beds/1000 population. Doctor - Population ratio.

Source : An assessment of Family Planning Programmes, OECD, Paris 1972. p. 71.

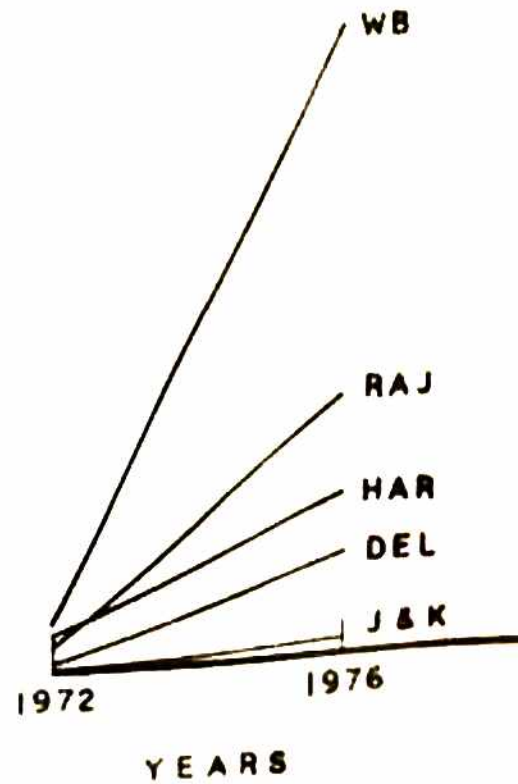
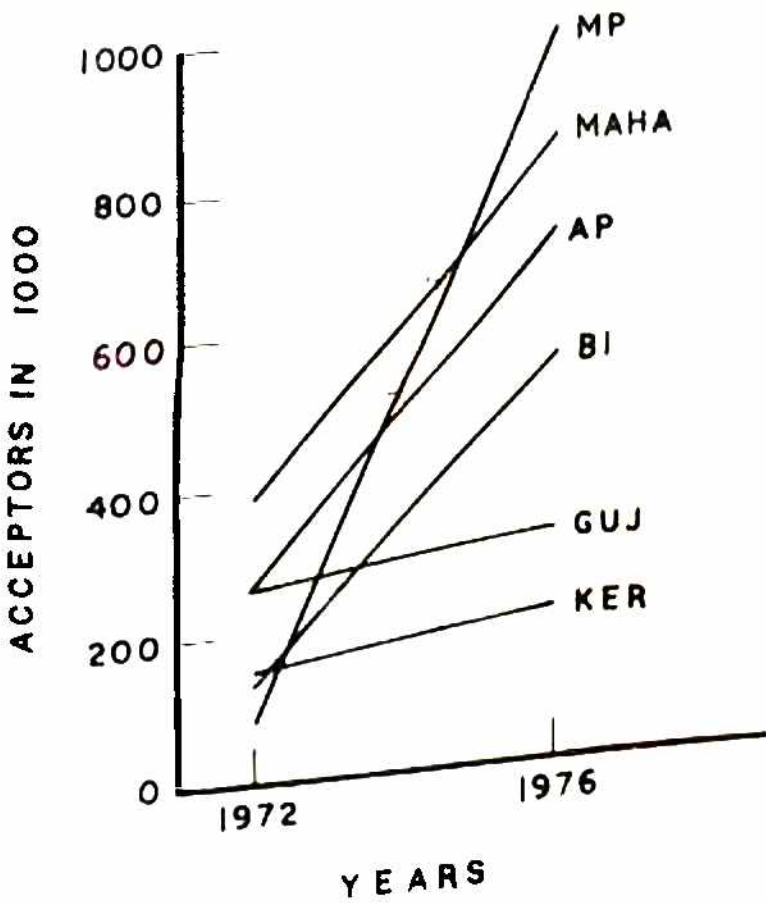
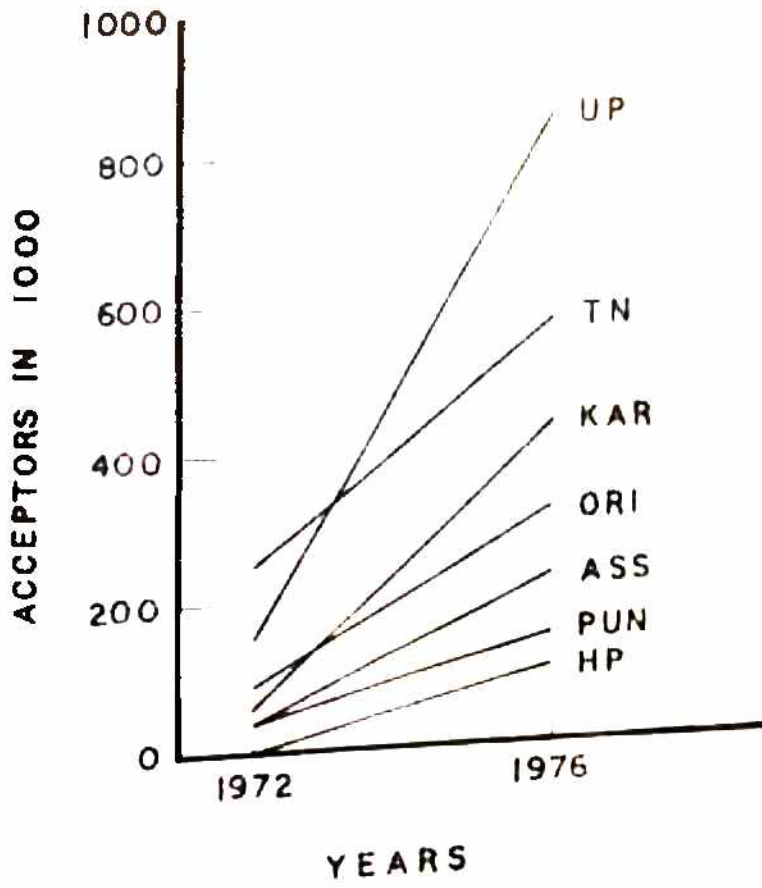


FIG. 6.1 STERILIZATION PROGRESS IN INDIAN STATES 1972-76

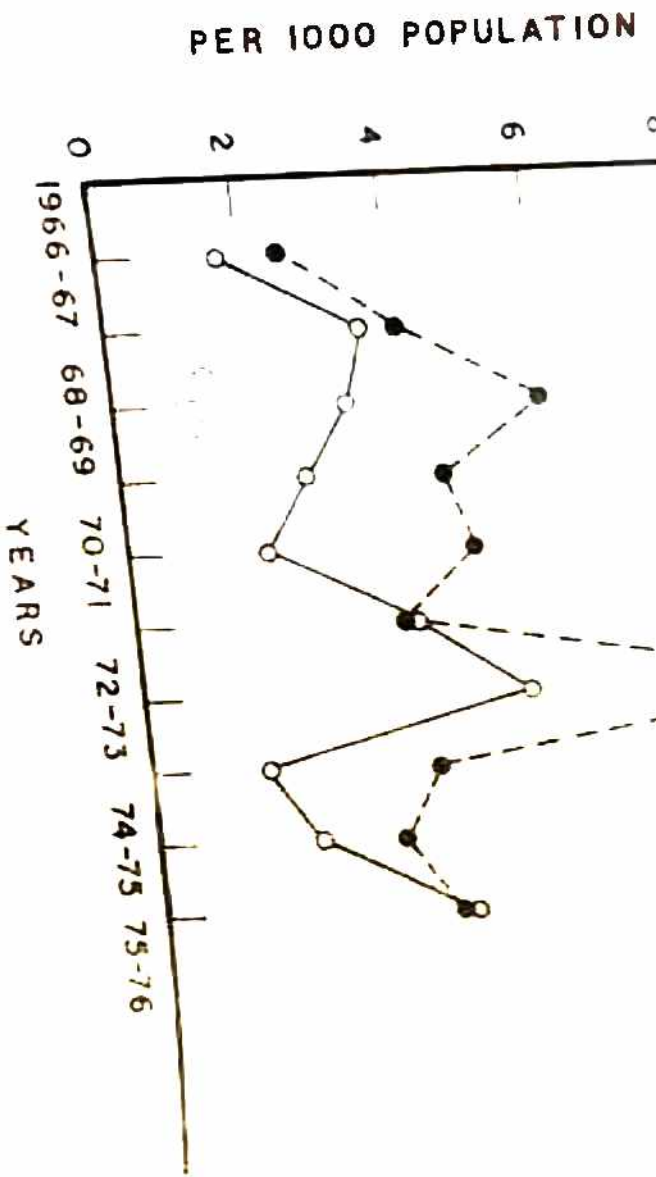
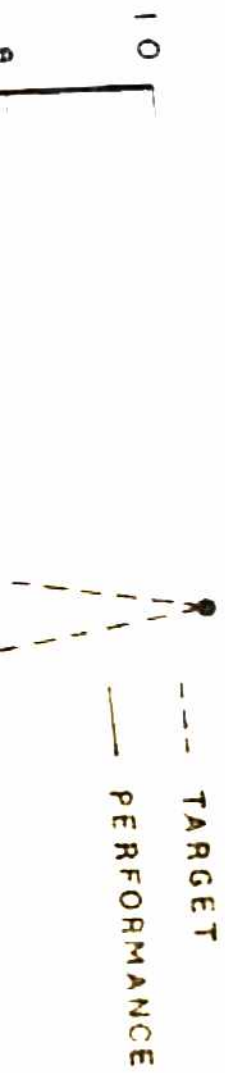


FIG. 6.2 STERILIZATION IN INDIA 1966-76



6.3 Progress in Family Planning Programme (India) :

Table 6.5 presents data indicating the sterilisation progress of twenty one states between 1972 and 1976. Compared to the performance in the previous years 1969-70, and 1970-71, the progress in sterilisation during 1972-1976 in three states show a marked improvement. For these states, Uttar Pradesh, Madhya Pradesh and West Bengal the slope of the performance lines are steep as shown in Fig. 6.1.

At the All India level the progress of sterilisation from 1966-67 to 1975-76 indicate the fluctuating nature of the programme acceptance. Table 6.6 gives the data for these years for sterilisation performance. As seen the graph shown Fig. 6.2 the target set for the year 1972-73 was very high, even though the rise in the performance in 1971-72 would have suggested this target. The high target was not achieved and this seems to lead to setting of more realistic targets in the subsequent years.

The data for these years (1961-67 to 1975-76) for IUD performance is given in table 6.6. In the case of IUD performance the target level set in 1967-68 was too high as the results show. After this poor achievement,

TABLE 6.5 STERILIZATION PROGRESS IN INDIAN STATES 1972-76

		(1000)	
S.No.	State	1972	1976
1.	Andhra Pradesh	272	741.7
2.	Assam	41	226.2
3.	Bihar	134	572.6
4.	Gujarat	294	317.1
5.	Haryana	5	221.1
6.	Himachal Pradesh	5	101.0
7.	Jammu & Kashmir	5	15.8
8.	Karnataka	56	431.4
9.	Kerala	152	206.6
10.	Madhya Pradesh	94	1001.3
11.	Maharashtra	391	862.5
12.	Manipur	0.4	6.3
13.	Meghalaya	0.5	7.5
14.	Nagaland	-	-
15.	Orissa	86	320.3
16.	Punjab	39	139.4
17.	Rajasthan	33	364.5
18.	Tamil Nadu	33	569.8
19.	Tripura	245	12.7
20.	Uttar Pradesh	2	837.6
21.	West Bengal	153	880.2
22.	Delhi	74	138.5
		13	

Source : Statistical Abstract India 1972. CSO Government of India. p. 609. Mortman and Hofstatter, Population and Family planning Progress. Population Council 1978 p. 54.

TABLE :6.6 FAMILY PLANNING TARGET AND PERFORMANCE
FOR STERILIZATION AND IUCD (1966-76)

S.No.	Year	Per 1000 Population			
		Sterilisa- tion		IUCD	
		Target	Actual	Target	Actual
1.	1966-67	2.50	1.70	3.00	1.80
2.	1967-68	4.00	3.60	8.00	1.30
3.	1968-69	6.00	3.20	4.00	0.90
4.	1969-70	4.50	2.60	1.50	0.80
5.	1970-71	4.80	1.90	1.60	0.84
6.	1971-72	3.66	3.83	1.46	0.82
7.	1972-73	10.02	5.34	1.60	0.60
8.	1973-74	3.96	1.55	1.15	0.62
9.	1974-75	3.37	2.24	1.01	0.71
10.	1975-76	4.14	4.35	1.51	0.98

Source : Agarwala S.N., India's Population Problems.
Tata McGraw Hill, N. Delhi, 1977, p. 202-203.

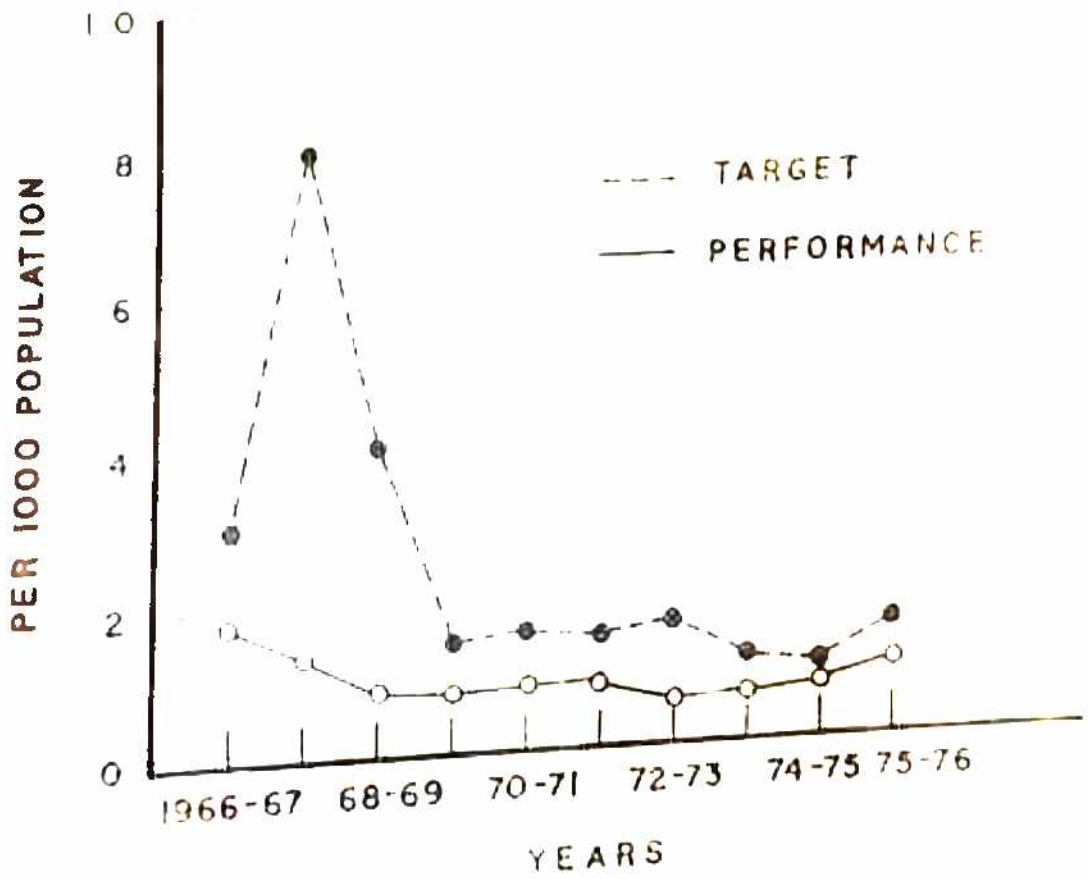


FIG. 6.3 IUCD IN INDIA 1966-76

Table :6.7 PERCENTAGE OF COUPLES PROTECTED IN 1972-73
IN INDIAN STATES BY SOCIAL SETTING AND
PROGRAMME EFFORT

Programme Effort	SOCIAL SETTING					
	HIGH		MIDDLE		LOW	
Strong	Punjab (and		Orissa	17.2		
	Haryana)	23.0	Andhra			
	Kerala	19.2	Pradesh	16.6		
			Karnataka	11.6		
	Mean	21.1	Mean	15.1		
Moderate	Maharashtra	23.4			Madhya	
	Gujarat	17.9			Pradesh	13.5
	Tamil Nadu	17.7			Bihar	7.1
	Mean	19.7			Mean	10.7
Weak	West Bengal	11.6	Assam	8.1	Uttar	
			Jammu &		Pradesh	7.7
			Kashmir	7.6	Rajasthan	6.8
	Mean	11.6	Mean	7.9	Mean	7.3

N.B.: Index of social setting is based on per capita income literacy and rural infant mortality and index of programme effort on medical and paramedical personnel and technical staff of family planning department.

Source : Sinha: Dynamics of India's population growth, National 1979, p. 457.

TABLE 6.8 FAMILY PLANNING BUDGET PROVISION AND ESTIMATED EXPENDITURE (1969-70 to 1974-75)

(Rupees in Crores)

Year	Budget Provision	Estimated Expenditure
1969-70	42.00	36.18
1970-71	52.00	48.90
1971-72	60.60	61.75
1972-73	63.20	79.74
1973-74	54.85	57.84
1974-75	54.13	62.04

Source : Agarwala, S.N., India's Population Problems, Tata McGraw Hill, N.Delhi, 1977, p.205.

the target for IUD in the subsequent years is set more realistically as shown in Fig. 6.3.

While socio-economic variables do not completely describe the acceptance levels, when combined with programme effort variable show a better relationship. Table 6.7 illustrate the point.

Table 6.8 presents data on budget provision for family planning programme over the period 1969-70 to 1974-75. It is seen that the increase in budget level is followed closely by the estimated expenditure level but in 1972-73 the expenditure was more than that shown in budget. During this year sterilisation target was high. Fig 6.4

The above analysis clearly indicate the complexity of understanding the behavior pattern of acceptance to the family planning programme. Many factors interact in the process of acceptance. While dealing with aggregate data the distribution of characteristics among the population is overlooked. A microlevel study may reveal better understanding of the acceptance pattern. The macro analysis can however be used for arriving at broad conclusions.

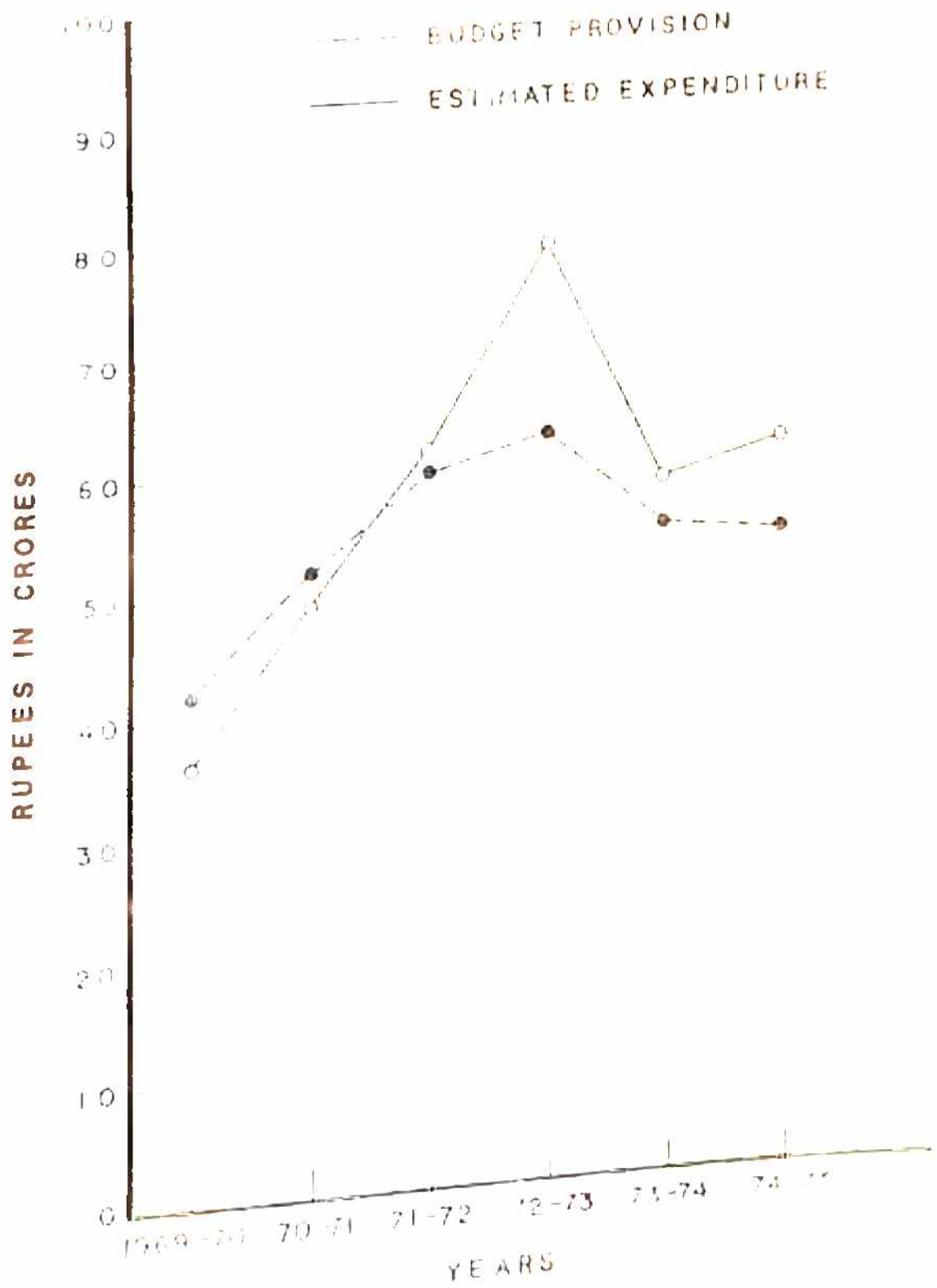


FIG 8.4 FAMILY PLANNING EXPENDITURE IN INDIA 1969-70 TO 1974-75

The above discussion points out the difficulties in identifying the variables influencing the performance of the programme. Difficulties arise in target setting also. The task of target setting begins with the determination of potential market size for the programme.

6.4 Target Setting :

Targets are a useful mechanism to spur action and to help goal achievement. However care should be taken in setting targets. If the target is set at a high, beyond the hope of achievement, it may lead to discouragement and disillusionment among the workers directly involved with implementing a family planning programme. If the target is so low that they are easily achieved, workers may become lazy and careless. A scientific method for establishing targets was referred in chapter two. It calls for refined data on many items involving fertility behavior of the target population.

The potential target for family planning programme is related to the total population by the formula

$$F_{XC} = P.F.F_X C$$

(6.1)

where F_{XC} = The number of females falling in the age group 15-45 and married.

P = Total population

F = Ratio of number of females to total population,

F_x = Proportion of 15-45 ^{in the female population,} and married.

C = Proportion of married women in the 15-45 years age group.

On the basis of 1971 census the following values are obtained

P = 548.6 millions

Sex Ratio = 930 females per 1000 males

$$F = \frac{930}{1930}$$

$$F_x = 43 \text{ percent}$$

$$C = 96 \text{ percent}$$

Number of target couple using equation (6.1)

$$F_{XC} = 548.6 \times \frac{930}{1930} \times \frac{43}{100} \times \frac{96}{100}$$

= 109 million.

The same formula can be applied to state level for identifying the total target couple in each state.

The population percentage for a few states based 1971 census and the 1974 estimates of percentage of couples in the reproductive ages are given in table 6.9.

It is seen from the table that the distribution of target population amongst the states is highly correlated to the distribution of total population. (The correlation coefficient $r = 0.977$). Therefore the allocation of national target amongst states based on the population of states will not be much different from allocating on the basis of number of couples in the reproductive age group.

However, if the values of F_x , F_c and C in equation (6.1), all are high for one state and all low in another state in any planning period then the allocation rule will be affected.

6.5 Death Rate Reduction :

The progressive achievement of the family planning programme depends on two main factors. One is the increasing acceptance of the family planning concept and methods by the people and the other by the capacity of

TABLE 16.9 STATEWISE PERCENTAGE POPULATION AND PERCENT
OF ALL-INDIA COUPLES IN REPRODUCTIVE AGES

State	Population in millions (1971) ^a	Percentage Population ^a	Percent of all India couples in reproductive ages (1974)
Andhra Pradesh	43.50	7.9	8.2
Assam	14.96	2.7	2.4
Bihar	56.35	10.3	10.9
Gujarat	26.69	4.9	4.8
Haryana	10.04	1.8	1.6
Himachal Pradesh	3.46	0.6	0.7
Jammu & Kashmir	4.62	0.8	0.9
Karnataka	29.30	5.3	5.1
Kerala	21.35	3.9	3.2
Madhya Pradesh	41.65	7.6	8.2
Maharashtra	50.41	9.2	9.4
Orissa	21.94	4.0	4.2
Punjab	13.55	2.5	2.2
Rajasthan	25.77	4.7	4.9
Tamil Nadu	41.20	7.5	7.4
Uttar Pradesh	88.34	16.0	16.7
West Bengal	44.31	8.0	7.5

Source : ^aCensus of India, 1971, General Population
Tables, Series 1 - India, Part II A(1) p 54-71

^b Nag, Moni, India's Experience with steriliza-
tion Programmes, 1965-75 : An overview of
Research Results in Journal of Family Welfare
Vol. XXIII, No. 2 1976 p. 7

the agencies to provide the required service. This brings in the concept of agency client interaction. The family planning programme implementing agency namely the government health department has built up an image over the years by its previous activities. The birth rate reduction activity is preceded by attempts at death rate reduction. It will be of interest to evaluate the performance of this agency in the activities concerning the death rate reduction. It is interesting to note that six states namely Kerala, Tamil Nadu, Maharashtra, Karnataka, Orissa and Uttar Pradesh form a group with high slope representing the sensitivity of family planning acceptance to death rate reduction. This is shown in Fig. 6.5 as group I.

Bihar

Four states Rajasthan, Assam and Madhya Pradesh, group II show a different degree variability of family planning acceptance with respect to death rate reduction. The three states of Andhra Pradesh, Gujarat and Punjab do not show high correlation when grouped to these states. The data is given in Table 6.10 and 6.11.

The death rate reduction is taken for the period 1941-51 to 1972. This is the period preceding to the data period for acceptance variable. It is concluded

TABLE 6.10 DEATH RATE REDUCTION AND PROGRESS IN
FAMILY PLANNING PROGRAMMES.

State	Death rate (a)		Reduction in Death rate	Cumulative (b) number of F.P. acceptors upto 1972 rate/1000) Population
	1941-51	1972		
Kerala	18	9.2	8.8	38.3
Madras (Tamil Nadu)	22.8	15.1	7.7	35.8
Maharashtra	24.9	12.8	12.1	46.1
Mysore (Karnataka)	18.9	12.8	6.1	26.4
Orissa	29.9	20.0	9.9	41.2
Uttar Pradesh	27.2	25.6	1.6	17.6

Source : (a) Agarwala S.N., India's Population Problems.
Tata McGraw Hill, 1977 p. 128, 129.

(b) Statistical Abstract India 1972 No. 19
C.S.O. Govt. of India. p. 607.

TABLE 6.11 DEATH RATE REDUCTION AND PROGRESS IN
FAMILY PLANNING PROGRAMME.

State	Death rate (a)		Reduction in Death rate	Cumulative (b) number of F.P. acceptors upto 1972 rate/ 100 population
	1941-51	1972		
Andhra Pradesh	29.5	16.1	13.4	32.9
Gujarat	29.9	14.9	15.0	40.3
Punjab	26.3	12.6	13.7	62.7
Bihar	26.6	18.3	8.3	15.9
Rajasthan	27.2	16.8	10.4	15.8
Assam	31.8	17.9	13.9	17.4
Madhya Pradesh	38.5	18.7	19.8	26.9

Source : (a) Agarwala S.N. India's Population Problems
Tata McGraw Hill, 1977, p. 128-129.

(b) Statistical Abstract India 1972, No. 19
C.S.O., Govt. of India p. 609

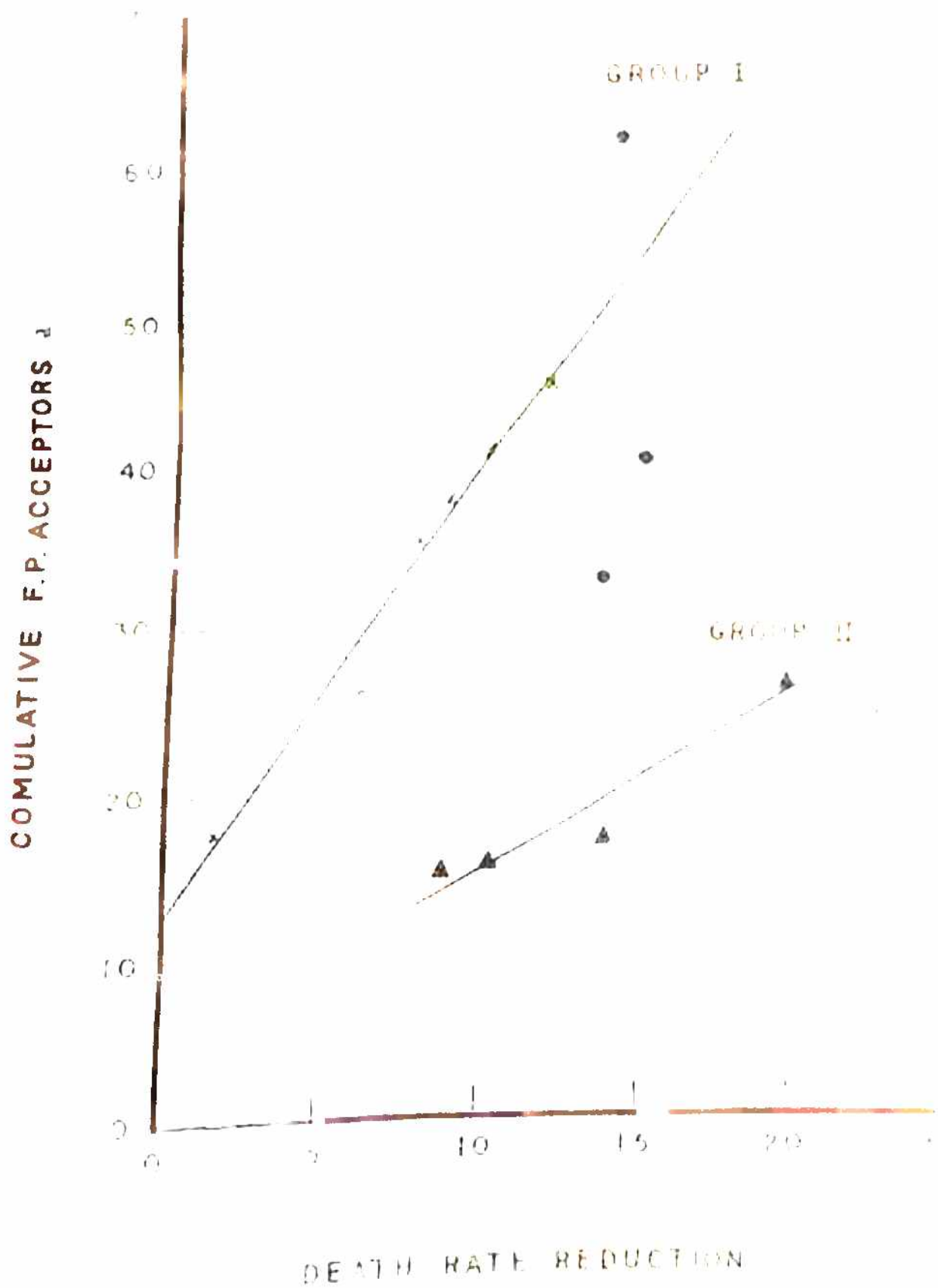


FIG 6 5 DEATH RATE REDUCTION AND PROGRESS IN FAMILY PLANNING PROGRAMME.

that death rate reduction over these thirty years had made impact on the population to have better response to the health department carrying out family planning activities. This lag is natural as the process of comprehension takes time.

6.6 Facility Redesign :

Many countries have started the family planning programmes years back and have gone through different degrees of success as noted earlier in chapter three. In the initial stages the knowledge about the marketing of the programme was meagre and many trial and error procedures were adopted. Where it is felt that the programme has not resulted in the maximum benefit corresponding to the effort put in, the need arises for fresh thinking. One of the problems associated with increasing the effectiveness of the programme is proper allocation of the resources available to the creation of facilities. To increase the output of the programme many areas are to be researched. Specifically if the problem is one of increasing the number of acceptors in the future period, then a series of steps can be visualised connected with this problem. These steps are depicted in the flow chart shown in Fig. 6.6

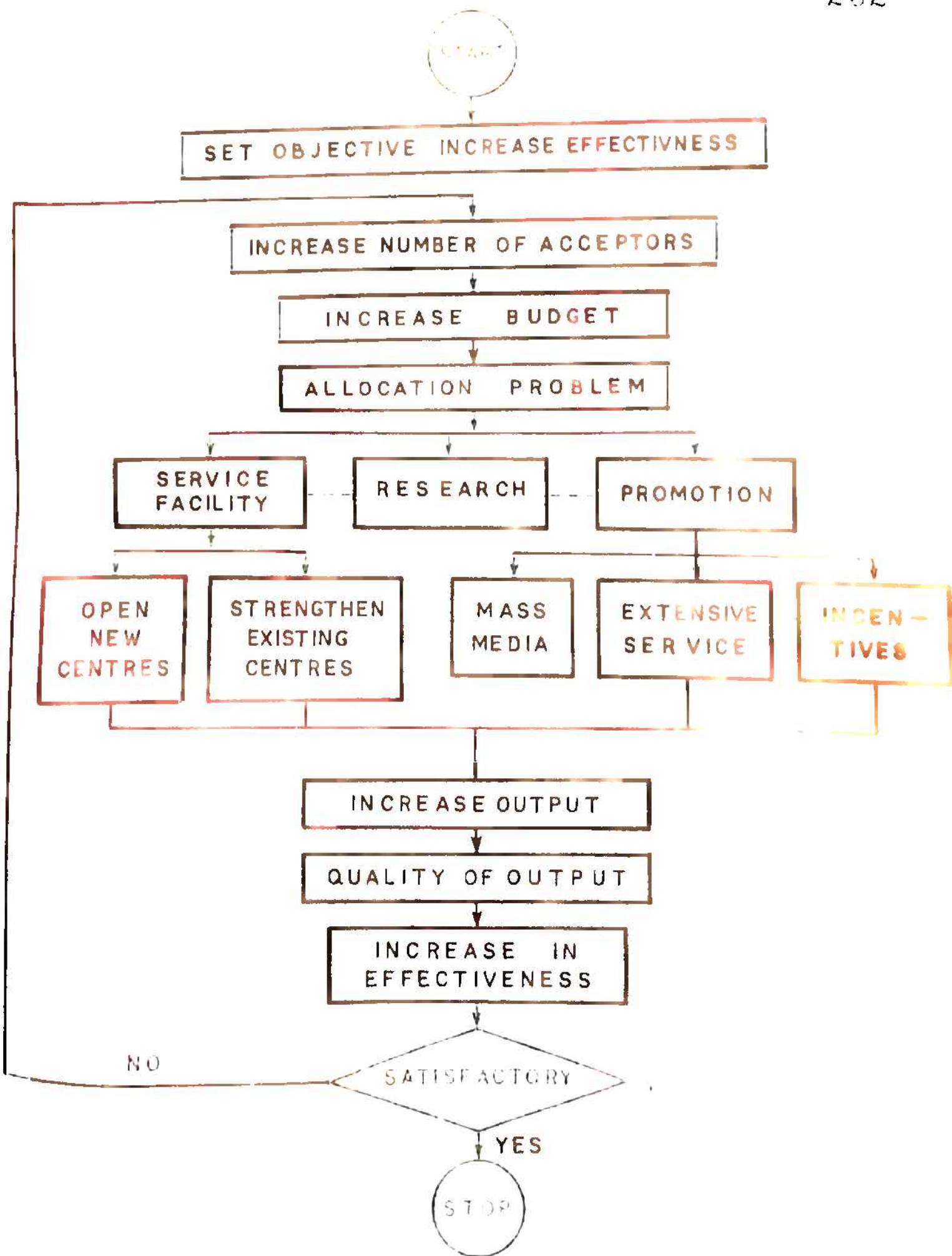


FIG. 6.6 PROBLEM: TO INCREASE EFFECTIVENESS OF FAMILY PLANNING PROGRAMME

The objective is set close to the programme, as increasing the effectiveness of the programme. The increase in effectiveness is measured in terms of the number of acceptors of the programme. To achieve this output additional programme effort is required. This calls for additional provision of budget.

This budget is to be allocated between service facility, research and promotion. The needed funds for promotional activities will be dictated by the status of the market segment with respect to awareness, attitude and acceptance level. Research needs will be dictated by already acquired market information.

The total budget provided for the service facility is to be judiciously allocated between the existing facilities and creation of new facilities. In a later section a model is developed to determine the optimal allocation in the redesign of facility, corresponding to the allocation of budget, the number of acceptors can be estimated from the response pattern assumed in the above model.

If the quality of the acceptors is taken into account the output in terms of acceptors is to be converted into effectiveness of the programme. If the

effectiveness of the programme is not upto desired level then the process is repeated till a satisfactory level is reached.

6.6.1 Segmental Response :

Considering the growth pattern of facilities to meet the increased target, it is apparent that services and money for the programme are made available to urban residents in the initial stages and gradually extended to rural residents. It can be visualised that availability of technical and administrative personnel to man the programme and the promotional tools are more easily available at urban localities. In addition to this fact, the target audience at urban places are more likely to be receptive to the programme. This phenomenon can be represented in graphical form as shown in Fig.6.7. The curves I and II show the different, response rate of acceptance of family planning programme for two different market segments. The response behavior contains a threshold point and a saturation level. It can be argued that the introduction of a new product, service or idea a minimum amount of marketing effort is needed before any significant response in market is observed. Once the product gains acceptance the additional marketing efforts rapidly bring in increasing response denoted by the



FIG. 6.7 DIFFERENTIAL RESPONSE BETWEEN SEGMENTS.

steep slope of the curve. The saturation level is reached when the full market potential is tapped, and further expenditure of marketing effort can bring in very little additional response.

Curves I & II show different response rates to the agency effort of two different market segments. For example the response to family planning programme among the urban population may follow curve I and the rural population may follow curve II. Under these assumptions market segment I is more attractive than segment II in the initial stages. But near the saturation level of segment I additional response can better be obtained by segment II. In addition the segment II may have a very high saturation level. This analysis can be extended to many segments in the market.

To meet the requirement of covering the whole population of the nation through the programme which can result in significant control of the population, the programme has to be extended to remote corners of the country. There arises a situation when new facilities are to be created, the available scarce resources are to be shared between existing facilities and the new ones that are to be created.

The following model attempts to find an optimal allocation procedure between existing facilities and the new facilities.

6.6.2 The Basic Model :

Problem Statement :

To allocate optimally the given budget between existing and new facilities. The criterion for optimality is the total number of acceptors of the programme through existing and new facilities.

For the two types of facilities the model assumes

suitable response patterns relating number of acceptors to the amount of budget allocated to the facility. Let X be the total budget

X_E budget allocated for existing facilities

X_N budget allocated for new facilities.

$$A_E = f(X_E)$$

$$A_N = f(X_N)$$

where A_E and A_N are the number of acceptors for the programme through existing and new facilities respectively.

The problem can be stated as to :

$$\text{maximize } A_T = A_E + A_N \quad (6.2)$$

$$\text{subject to } X_E + X_N \leq X \quad (6.3)$$

where A_T is the total number of acceptors.

To solve this problem, a knowledge of the response function for the two types of facilities is required.

Assume the response function for the new facility to be

$$A_N = \bar{A} (1 - e^{-\delta X_N}) \quad (6.4)$$

where A_N = Response of new centre,

\bar{A} = Saturation limit of response for new centres,

δ = Parameter

The response function is shown graphically in Fig. 6.8.

The response of the existing centres will be influenced by the performance of the centres already achieved and the current budget allocated.

Let the response function be

$$A_E = h A' \quad (6.5)$$

where A' = previous performance and

h = coefficient relating previous performance of existing units and is a function of the budget allocated to the existing centres.

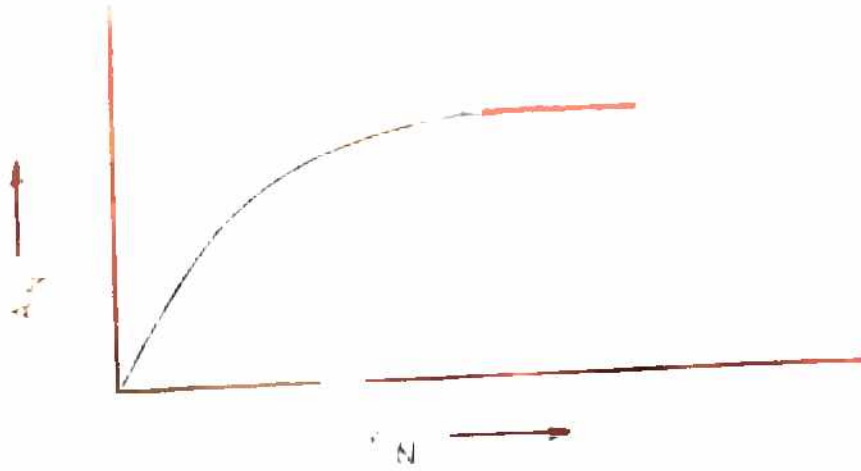


FIG 6.8 RESPONSE FUNCTION TO NEW FACILITY.

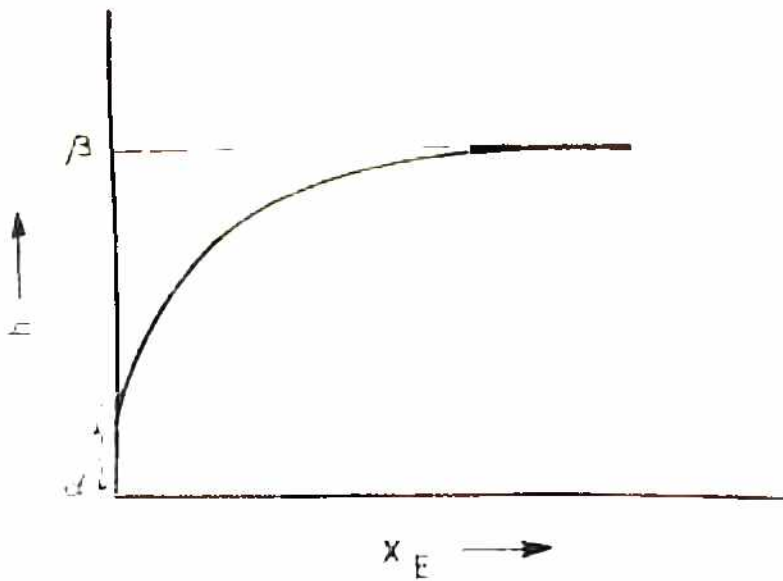


FIG. 6.9 PERFORMANCE CO-EFFICIENT
V/S EXPENDITURE.

$$h = f(X_E)$$

$$\text{Let } h = \bar{h} + (\beta - \alpha) (1 - e^{-rX_E}) \quad (6.6)$$

where \bar{h} , β and r are parameters. This relationship is shown graphically in Fig. 6.9.

\bar{h} represents the highest value of the coefficient h , and α is the minimum value of h .

When the current budget allocation is zero to the existing units, the market continues to respond to the centre due its previous effort.

So the problem can be restated as to :

maximize

$$A_T = \bar{A} (1 - e^{-rX_N}) + A' \left[\bar{h} + (\beta - \alpha) (1 - e^{-rX_E}) \right] \quad (6.7)$$

subject to

$$X_N + X_E \leq X \quad (6.8)$$

Using Lagrange multiplier it can be shown that for this constrained optimization problem, the solution is given by

$$X_E^* = \frac{1}{r + \delta} \left[\frac{A' (\beta - \delta) Y}{\bar{A} e^{-rX}} \right] \quad (6.9)$$

$$\text{and } X_N^* = X - X_E^* \quad (6.10)$$

6.6.3 Model Application :

For illustrating the model application the following hypothetical example is taken.

$$\text{Let } r = 0.05$$

$$\beta = 0.90$$

$$r = 0.40$$

$$\delta = 0.20$$

$$\bar{A} = A'$$

and let the total budget available be $X = 10$ units.

The parameters δ , β and r describe the characteristics of the existing facilities. Under the assumption of the model near saturation level of the market segment served by existing facility, the current performance is influenced by the performance of the facility in the previous period given by A' . With the assumed values of the parameters δ , β and r for the existing facilities and δ and \bar{A} for the new facility the allocation of the total budget of 10 units can be done. The optimal allocation for the existing facility is calculated for this

example using equation (6.9).

$$X_E^* = 1/r + \delta \ln \frac{A' (1 - e^{-\delta X})}{\bar{A} e^{-\delta X}}$$

Substituting the values in this equation results in

$$X_E^* = 4.2 \text{ units}$$

$$\text{and } X_N^* = X - X_E^* = 10 - 4.2 = 5.8 \text{ units}$$

It is seen that the investment in the new facility is 5.8 units out of the total budget of 10 units.

The total output of these allocations is given by equation (6.7).

$$A_T = \bar{A} (1 - e^{-\delta X_N}) + A' (1 - e^{-\delta X_E})$$

substituting the values of X_N^* and X_E^* in this equation the total number of acceptors for these two facilities is found to be

$$\underline{A_T = 1.428 A'}$$

If instead of considering the nature of market response of the existing facility without reference to its previous performance, for the same parameter value r the output of existing facility on the basis of equation (6.4).

$$A_T = A' (1 - e^{-rX})$$

If all the total budget is allocated to the existing facility, the output will be

$$\begin{aligned} A_T &= A' (1 - e^{-(0.4 \cdot 10)}) \\ &= 0.9817 A' \end{aligned}$$

Comparing the above two methods it is seen that by including the new facility and sharing the budget in an optimal manner between the new and the existing facilities the total output of acceptors is more.

On the other hand if all the available 10 units are allocated to the new facility the output as calculated by using equation (6.4) is found to be

$$\begin{aligned} A_T &= \bar{A} (1 - e^{-(0.2)(10)}) \\ &= 0.866 \bar{A} \\ &= 0.866 A' \quad (\text{since } \bar{A} = A' \text{ assumed}). \end{aligned}$$

This output is also lower than the optimal allocation.

In the hypothetical example, it was assumed that $A' = \bar{A}$. However if A' higher than \bar{A} then the allocation X_E for the existing units will increase. If \bar{A} is greater than A' the allocation for existing facilities will decrease further.

6.6.4 Estimation of Parameter :

The parameter δ in equation (6.4) provides insight into the speed with which the saturation level for the market segment is reached as the funds allocated to the service facility is increased. The value of δ depends on the characteristic of the market segment served. The relevant segment variables influencing δ are the demographic and socio-economic variables discussed in chapter five. It was also pointed out that death-rate reduction play a significant role in the acceptance behavior of the clients towards planning. The other component of the programme effort namely promotion plays a vital part in the value of δ .

A few values of δ estimated from programme statistics of five Indian states are shown in Table 6.12. The data refer to the period 1979-80, expenditure and the output in terms of acceptor of family planning during that period. The saturation level is taken as the number of married couple (with wife aged between 15-44 years) provided by census 1971. This will be a reasonable percentage of the actual number in the group 1979-80, to be treated as saturation level. The value of δ for these states range from 0.0169 to 0.415. Equation (6.4)

TABLE 6.12 : ESTIMATION OF PARAMETER

States	Expendi- ture 179- 80 (Rs. in Lakhs)	No. of target in couples	Steri- lization	IUD	CC	Total	δ * (100)
Andhra Pradesh	978	1499	181	12	37	230	0.169
Assam	139	180	22	7	16	45	0.204
Bihar	843	969	85	21	63	169	0.023
Gujrat	953	1200	220	37	186	43	0.048
Haryana	219	208	26	26	114	166	0.415

Source : Censuses of India 1971, General Population, Tables series 1, India

Family Welfare Programme in India Year-Book 1979-80
Government of India, p. 97, 98, 100, 182.

*Parameter δ estimated using equation (6.4)

was used for the estimation of values of ν . These values referring to the state level market behavior can be utilized for making decisions regarding allocation of funds to different states. For decision regarding microlevel of individual facility centre the market covered by the centre should be specified by suitable boundary. The parameter λ and μ can be estimated by subjective judgement.

6.6.5 Market Saturation Indicators :

The above model is highly suitable for decision situation where the existing facilities are operating in a market segment which are nearing the saturation level. The consideration for establishing new facilities for tapping new market segments become important under such a condition.

It is suggested that the amount of programme fund expended for gaining unit acceptor can be used as an indicator for the condition of saturation level being reached. Table 6.13 gives data for the number of acceptors per amount of fund for family planning programmes for seventeen developing countries. It is seen from this table that many countries exhibit a trend towards decreasing number of acceptors per dollar expended from the year 1972 to 1976. Dominican republic is a case where

TABLE 16.13 PERFORMANCE IN TERMS OF NUMBER OF ACCEPTORS PER AMOUNT OF FUND FOR F.P. PROGRAMS FOR 17 DEVELOPING COUNTRIES (1972 to 1976).

Country	1972	1973	1974	1975	1976
1. Bangladesh	$\frac{142.5^{(a)}}{3750^{(b)}}$	$\frac{205.1}{6250}$	$\frac{187.8}{9375}$	$\frac{655.4}{13,062}$	$\frac{1103.1}{14,420}$
(a)/(b)	.038	.038	.020	.050	.076
2. Costa Rica	$\frac{26.7}{368}$	$\frac{34.5}{422}$	$\frac{25.7}{1171}$	$\frac{31.0}{1695}$	$\frac{28.6}{u}$
	.072	.082	.022	.018	-
3. Dominican Republic	$\frac{18.7}{278}$	$\frac{24.3}{238}$	$\frac{38.1}{990}$	$\frac{58.3}{1958}$	$\frac{61.5}{2212}$
	.067	.102	.038	.029	.028
4. Elsalvador	$\frac{36.8}{878}$	$\frac{32.7}{1101}$	$\frac{41.3}{u}$	$\frac{43.9}{1692}$	$\frac{56}{2617}$
	.042	.029	-	.026	.021
5. Ghana	$\frac{30.5}{562}$	$\frac{29.8}{849}$	$\frac{34.2}{1139}$	$\frac{31.2}{1488}$	$\frac{32.0}{1952}$
	.054	.035	.030	.020	.016
6. Hongkong	$\frac{30.3}{455}$	$\frac{31.4}{709}$	$\frac{28.3}{724}$	$\frac{22.4}{623}$	$\frac{54.3}{614}$
	.066	.044	.039	.035	.088
7. India	$\frac{5899}{109,248}$	$\frac{4369}{79,249}$	$\frac{4406}{75,699}$	$\frac{7009}{91,920}$	$\frac{12456}{162,945}$
	.053	.055	.058	.076	.076

Contd...

TABLE (Contd..)

Country	1972	1973	1974	1975	1976
8. Indonesia	$\frac{1079}{10,563}$	$\frac{1345}{14,824}$	$\frac{1593}{22,304}$	$\frac{1967}{28,486}$	$\frac{2213}{21,007}$
	.102	.090	.071	.069	.105
9. Iran	$\frac{445}{10,696}$	$\frac{470}{13,000}$	$\frac{481}{19,830}$	$\frac{506}{28,000}$	$\frac{572}{29,600}$
	.042	.036	.024	.018	.019
10. Mauritius	$\frac{7.9}{312}$	$\frac{15.4}{635}$	$\frac{13.6}{857}$	$\frac{13.5}{1221}$	$\frac{12.1}{u}$
	.025	.024	.016	.011	-
11. Nepal	$\frac{50.6}{528}$	$\frac{72.9}{613}$	$\frac{104.4}{1035}$	$\frac{104.7}{1440}$	$\frac{138.8}{u}$
	.096	.119	.101	.073	-
12. Philippines	$\frac{622}{8,415}$	$\frac{738}{10,882}$	$\frac{753}{17,027}$	$\frac{751}{17,534}$	$\frac{643}{25,258}$
	.074	.068	.044	.043	.025
13. Puerto Rico	$\frac{43.4}{4503}$	$\frac{28.7}{4,938}$	$\frac{47.0}{6,382}$	$\frac{53.4}{6,493}$	$\frac{u}{11,008}$
	.010	.005	.007	.008	-
14. Singapore	$\frac{27.5}{389}$	$\frac{33.5}{558}$	$\frac{34.5}{698}$	$\frac{36.9}{950}$	$\frac{39.2}{931}$
	.071	.060	.049	.039	.042
15. Taiwan	$\frac{272}{u}$	$\frac{261}{1,396}$	$\frac{284}{1,643}$	$\frac{299}{1,727}$	$\frac{325}{2,629}$
	-	.186	.173	.173	.124

Contd...

TABLE (Contd..)

Country	1972	1973	1974	1975	1976
16. Thailand	$\frac{384}{3,454}$	$\frac{355}{3,488}$	$\frac{415}{4,959}$	$\frac{449}{3,686}$	$\frac{527}{u}$
	.111	.102	.084	.122	-
17. Tunisia	$\frac{u}{1,029}$	$\frac{43.8}{1,165}$	$\frac{50.9}{2,309}$	$\frac{58.1}{2,711}$	$\frac{73.5}{2,588}$
	-	.038	.022	.021	.028

(a)- Total funds for Family Planning Programs in thousands of US dollars.

(b) -Acceptors of government supported family planning services, (in thousands)

(a)/(b) -Indicator of performance/cost ratio;

u - Data unavailable

Source : Nortman, and Hofstatter, Population and Family Planning Programs, Population Council, 1978.
p.38-40, 53-56.

the number of acceptors per dollar spent is decreasing from 0.067 to 0.028 . Costa Rica the decrease is from 0.082 to 0.018 . Ghana 0.054 to 0.016 . One of the possible reasons for this situation is that the market for family planning programme is gradually approaching the saturation levels. Other reasons could be the inefficient use of funds and high cost of infrastructure. International funding agencies face a decision situation where allocation of funds between the various countries pose a problem. Barring political considerations, the proper allocation of funds call for the market study to determine whether conditions of saturation level have reached. Bangladesh, India, Indonesia are the countries showing increase in the number of acceptors per dollar spent. It is seen that for these countries the saturation level is far away and they are better candidates for receiving family planning funds from International agencies. The model discussed above can fruitfully be employed for optimal allocation of funds between the countries.

6.6.6 Development of the Modified Model :

The basic model explained above assumes different response patterns for existing and new facilities. The performance of the existing & centres since their establish-

ment can be determined by past records. It is likely that the response rates of existing centres vary among themselves due to the difference in the time of their establishment. To account for this factor the number of years passed since the establishment of the facilities should be incorporated in the model.

Let the response function in the first year of establishment be denoted as A_{11} . Using equation (6.4)

$$A_{11} = \bar{A} (1 - e^{-X_1}) \quad (6.11)$$

where i refers to the facilities established in a particular year.

X_1 funds allocated for that facility
parameter

\bar{A} Saturation level of the market served by the facility.

In the succeeding year after the establishment of the facility the response function is modified as

$$A_{12} = h_1 A_{11} \quad (6.12)$$

This relationship is based on the assumption that the performance of the facility in the second year A_{12} is influenced by the performance in the first year and is modified by the factor h .

The factor h is determined by the budget allocated (X_1) to the facility. The variation of h with respect to X_1 can be assumed in a similar manner done in the basic model.

$$\text{Let } h = \dots + (\dots - \alpha) (1 - e^{-rX_1}) \quad (6.13)$$

Thus for the case of existing facilities the function can be written taking into account the number of years passed since their establishment.

In the first year

$$A_{11} = \bar{A} (1 - e^{-X_1})$$

In the second year

$$A_{12} = h_1 A_{11}$$

In the n th year

$$A_{1n} = h_{n-1} A_{1,n-2} \quad (6.14)$$

The product acceptance pattern in the case of family planning service exhibits two salient characteristics.

1. The clients accepting the methods require a minimum period of interaction with the service facility to continue in the programme. Consequently those who

have not crossed the threshold level are to be provided with the service on first priority. Otherwise they tend to dropout from the programme and consequently the previous effort expended on this group is wasted and is a loss for the programme.

2. Secondly, if a client remains in the programme for K periods, he/she continues to be an acceptor without any additional programme effort.

These two features can be explicitly incorporated in the model in the following manner.

For the clients who have not crossed the threshold level a minimum budget should be allocated. So the modified value of h is

$$h = \text{maximum of } \left[\beta + (\beta - \alpha) (1 - e^{-rX_1}) \right] \text{ or } h_{\min} \quad (6.15)$$

The impact of programme effort on clients over time in moving them towards a condition of permanent clients (loyal customers) can be modelled by assuming that β varies with time.

This modification results in the following expressions.

$$h_1 = \lambda_1 + (\beta_1 - \lambda_1) (1 - e^{-\lambda_1 X_1})$$

$$h_2 = \lambda_2 + (\beta_2 - \lambda_2) (1 - e^{-\lambda_2 X_2})$$

$$h_n = \lambda_n + (\beta_n - \lambda_n) (1 - e^{-\lambda_n X_n}) \quad (6.16)$$

As stated earlier, the clients who remain in the programme for K years become permanent clients.

i.e. λ_k becomes equal to the saturation level for h.

The modified model presented above provides a conceptual framework for including additional constraints for the allocation problem. The study of this model in more detail is suggested for future work.

6.7 Conclusions :

In the previous chapter a number of decision problem areas of management interest associated with family planning programme were discussed. In this chapter the major problem of increasing the effectiveness of the on going programme are discussed from the system's point of view. A sub-problem of facility redesign is taken up for further analysis.

The facility redesign problem arises when the growth of the programme efforts are directed towards new segments. Typically National Family Planning Programmes

have started with nucleus centres mostly in urban areas, and as the scope of the programme efforts are spread to rural areas and to the remote corners of the country. In the process of spreading the programme management is faced with the problem of resource allocation between existing centres and the new centres to be established. Such a situation calls for a systematic analysis of the various factors influencing the allocation decision. One of the main determinants influencing the decision is the response function for the two types of facilities. In this chapter a marketing model to describe the response patterns of the two types of market segments covered by the facilities is suggested. Using the response behavior of the two segments an optimizing model for resource allocation is developed for a given budget. The promotional component of the programme activities is treated as external. The parameters of the response functions are influenced by the level of promotional activities. The saturation level for the market segments will get shifted as the composition of the segment is changed over the years with new people entering the potential target group and current members leaving the group due to old age and other factors.

A suggestion is made here for keeping alert to the situation of reaching market saturation. If this

aspect is overlooked more and more funds will be invested in the existing facilities in the hope of improved response from the market segment that has reached near the saturation point. Untapped new segments may offer an opportunity for better resource utilisation. The initial investment needed to start a new facility normally acts as a deterrent and blinds the opportunity the new market can offer.

Using the above concept of facility client relationship and taking into consideration the time dimension a modified model is proposed for future work.

Consumer behavior is treated in an aggregate manner at the level of the two segments. This approach is more suitable for managerial decision making. The facility redesign problem deals with the operational objective of the family planning programme rather than the ultimate goal of the programme. The basic model presented in this chapter is amenable for application at various levels of decision making.

CHAPTER - 7

CONCLUSIONS

CONCLUSIONS

In this thesis an attempt is made to identify the various managerial issues involved in family planning programme management. These issues are of complex nature and the need for a systematic study is well established in literature. The programme objective of bringing in a change in the pattern of social norms and behavior of people to achieve a better living standard~~s~~ is a challenging one. A study of problems associated in this task calls for knowledge in many fields of science. A collection of concepts, theories and models relevant to this area are presented here. From the study of these it is concluded that the family planning programme management can be highly benefitted from the progress achieved in these subjects. The empirical studies conducted in many countries pointout the large scope, marketing approach can contributed~~d~~ to the success of family planning programmes.

To study the family planning system a simple macro model of the system is developed. This helped in building up a large model to represent the family planning management system model. This model is used to delineate problem areas that are to be understood.

While the study of the system brought out a large number of problem areas, for a detailed study a critical area is taken up.

The family planning programme management establishes and operates the service facility. It also is involved in promoting the idea of family planning among the target population.

For the detailed study in this work problem associated with providing service facility is considered. The major problem faced by management in improving the effectiveness of the programme is dealt through the study of facility design. It is concluded that the problem of resource allocation in providing the service facilities is an important component of the above.

A model is developed for optimising the allocation of resources to the facilities. The problem arises during the growth stage of the family planning programme. Decisions are required while enlarging the scope of the programmes to market segments which may pose ticklish problem of resource use. The total available resources are to be shared by the existing facilities and the new facilities to be created. The facility redesign model developed in this work tries to answer the question of optimal

allocation between existing and new facilities. This model focuses the need for knowledge of the marketing process by the decision makers. A marketing model is utilised to predict the response behavior of the population to the family planning services.

The response behavior of different segments vary with many socio-economic variables and the nature and magnitude of marketing effort put in by the programme agency. An analysis from published data of the influence of socio-economic variables, with the acceptance of programme is done. Comparison of data from different countries for this relationship proved that socio-economic variables may not completely describe the acceptance pattern for the programme. An analysis of data from different Indian states also point out the inadequacy of relationship of these variables with family planning programme acceptance.

Analysis of data for different Indian states show that reduction in death rate over a thirty year period *in these* states is correlated with family planning acceptance level. *It is concluded that the* impact of reduction in death rate which is identified with creating population problem has also contributed to acceptance of family planning ideas. Only there is a time lag

involved in the population comprehending the knowledge of better survival prospects. It is concluded that the facility redesign model though not providing a universal solution for all situation, can profitably be used at micro level as well as for distribution of funds at state level and also for the proper allocation of funds by the international agencies for different countries. The model forces the decision maker to estimate the market response of different segment and be aware of near saturation levels reached by existing facilities. A modified model for facility redesign at micro level taking into consideration additional constraints is suggested for further work.

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