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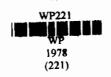
INDIAN INSTITUTE OF MANAGEMENT
AHMEDABAD

A FRAMEWORK OF
INFORMATION SYSTEM
FOR DEVELOPMENT PLANNING

by

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ABSTRACT

In the context of the recent emphasis on unit level planning, the need
for designing a Management Information System that would support the
planning process is discussed.

A framework for the MIS design is evolved which consists of the identi-
fication of key development indicators, analysis of information using
these indicators, and the structuring of information for regular and
meaningful use in the planning process. Some of the key indicators at
the village level that have been suggested are: the per capita wage
income, the value of agricultural produce per unit area, and the indica-
tors relating to the availability and capacity of infrastructural
facilities.

The entire framework is illustrated by using sample data that was
collected from 24 villages in Gujarat.

1.0.0 Development Planning and Need for Information

1.1.0 In spite of several years of decentralised planning at the district level, development of rural areas continues to be stagnant. Nearly 40% of India's population is classified to be poor and there are regions where 80% of the population lies below the poverty line.[1] In this context the district and block level planning is being strongly emphasized. The political will to tackle the problems of backwardness and poverty seems to be present. However, to translate the political will into concrete action the planning process at the district/taluka levels would have to be strengthened.

An analysis of the existing mechanism could be helpful in identify- ing the areas that need strengthening. In the planning mechanism so far we have been unable to formulate programmes and policies which would lead to the realisation of time bound goals.

1.2.0 Faulty planning methodology, problems of coordination and inadequate attention to the developmental programmes because of pressures of day to day work on development administrators have been cited as reasons for the above failures.

In terms of mechanics of planning these failures can be ascribed to:[2]

1   1   Formal mechanisms for identifying the real needs of districts, in particular the need of the more vulnerable sections, are absent. Consequently the specific characteristics of such districts and areas within the districts are not given due consideration when prioritizing programmes.

    2   Monitoring the implementation process in terms of time and costs in relation to the expectations has not been done.

    3   An evaluation of the end results vis-a-vis the planned goals with a view to remedying the shortfalls and further improving the formulation of the Schemes and their locales has been conspicuous by its absence.

Many of the above shortcomings in the planning methodology can be traced to the inadequacy of the existing information system. In formulation of schemes, in monitoring and implementation, and in evaluation of results, greater use can be made of relevant information.

1.3.0   The use of information for planning and monitoring, its sources, the way it needs to be analysed and processed to support planning activity has hitherto been neglected. In this paper we focus on different aspects of building up an information system that can be used for planning at the district/taluka level. We first identify the exact information that is needed at different stages in the planning. Next we propose a framework for analysing this data for the planning process and illustrate this framework through the use of a survey data on 24 villages. Various reports that could be generated by the analysis of data and their role in the planning process is identified. Finally we comment on the

organisation of this data at different levels, and the possible use of computers in building up a data base.

2.0.0   Need for MIS

The first task in planning is the identification of developmental needs which in turn depend upon the social and economic environment of a region. The development programs will aim at improving rural incomes, generating employment and in general improving the quality of life. This would depend on the extent to which existing activities could be improved, new activities started, and the extent to which the infrastructural facilities could be expanded. Identification and prioritisation of development programs will largely depend on availability of information on various important factors related to different geographical areas like village, taluka, district and the state. If planning has to be based on aggregate indicators, it may not be necessary to have information on situational indicators related to individual villages, taluka, district and the state. However, planning based on aggregate indicators has its limitations because there are tremendous variations in economic and social conditions of different regions. A lot of emphasis is therefore given now to unit level planning, which would relate to developing block/taluka level plans or even village level plans. In case the planning at unit level involving villages, talukas, and districts has to be meaningful, information on various indicators which will determine the various tasks to be performed will be essential for planning.

Given the number of villages, the information to be collected
will be enormous.

2.2.0   It is therefore necessary to identify some of the key indicators
for which information at the village level could be collected in
a structured manner which will help the planners for evolving
development plans for a particular village. Though a lot of
information is available at the village, taluka, district and
state levels, the information is not processed or analysed in a
structured manner on a continuous basis for meaningful use. It
will therefore be necessary that one develops an information
system which would structure the collection, processing and
analysis of information at various administrative levels. The
indicators which will affect the village level planning will
relate to environmental factors, economic factors, factors
relating to infrastructural facilities and the people residing
in the village. The variation in each of these indicators from
village to village being very large, the nature of developmental
task from village to village might vary considerably. Though
the general picture of economic development (like poverty, etc.)
of various geographical areas may generally be known, the
reasons behind that economic conditions and the measures to be
taken up for improvement will vary from village to village.
Therefore a careful analysis of the information on selected
indicators for various villages would help in identification
of development plans.

3.0.0   MIS Design

3.1.0   The design of management information system for development

planning would therefore involve :

    a   Identification of key indicators relating to planning
at the village level.

    b   Analysis of the information on these key indicators in
relation to standards for understanding reasons of
deviations. This would help in identification of
alternate choices of programs needed.

    c   Structuring of information, collection, processing,
analysis and reporting.

3.2.0   One of the important considerations in designing the information

system is to ensure quality and usefulness of the information,

which in turn will depend on the level of detail in which the

data is collected. Whereas working on information based on

aggregate factors may not be useful, collecting data to the

minute details in a village could also be an expensive and

fruitless task. The level of detail upto which one can obtain

data will have to be carefully determined.

3.3.0   The indicators on which the information has to be collected

should therefore be general in nature and common to most of the

villages and their relative importance will depend on the econo-

mic and social conditions of a village. While the information

system may not help in determining the ultimate action that one

has to take for a particular village, it would help in under-

standing the nature of actions which may have to be taken.

could also help in evaluating the alterna⁺

3.4.0   If the planning exercise at the taluka/village level has to be meaningful, the functionaries at the taluka level have to be involved in the planning exercise. At the same time it is very difficult to find the expertise and the required facilities for analysing data at the taluka level. Therefore, it would be necessary that the state level and district level machinery help the taluka level functionaries in determination of alternate development schemes. This is possible only if at the state level the right kind of village level information and the necessary equipment for analysis is available. Therefore, the proposed MIS would help the state level functionaries to analyse data in a meaningful manner and provide the feedback to village level functionaries.

In the following paragraphs we would like to explain the various steps involved in MIS design mentioned above, with the help of sample data collected from the 24 villages. Using these data we have tried to identify some key indicators used for planning and explained some of the analysis which could be performed using these indicators.

4.0.0   Identification of Key Development Indicators

4.1.0   Income Related Indicators

The first indicator used in development planning would relate to the economic level of people living in a village. These indicators can be percapita income and value of per capita consumption

at local market price. The planners would be interested in the aggregate measures of income and consumption for a village (per capita income, value of consumption at local market prices) and not the income and consumption of an individual. However, we should classify these indicators of income and consumption into various income classes such as :

a   Land-owning farmers

b   Marginal and small farmers

c   Landless workers

The objective of planning is to ensure a minimum level of consumption. The capacity to consume is related to the income and prices of essential commodities. Since the capacity to consume is being defined for a village (at the aggregate level) and not the individual it would have to be recognized that the consumption capacity of land owning farmer, small and marginal farmer and the landless worker is substantially different. In fact it is the landless worker that the planners are most interested in providing for.

The income of the landed farmer comes mainly from the value of the produce on his fields. The income of the small and marginal farmer comes from the value of the produce and wage income from employment. The income of the landless worker comes mainly from the wage income from the wages received from agricultural labour. The agricultural income is still the dominant source of income for the rural people.[3]

4.1.1   Per capita income therefore is the first key development indica-
tor. In the case of landless workers the only income they derive
is through the agricultural wages. Therefore, the per capita in-
come for this class will depend on the wage rate and the time
period of employment. As the agricultural activities are seasonal
in nature, unemployment periods for the agricultural workers can
be very large. The second important indicator related to income
is therefore the period of unemployment per worker. This indica-
tor will help us in understanding the extent of employment to be
generated from non-agricultural activities.

4.2.0   Indicators Relating to Economic Activities

The second set of indicators would relate to the economic acti-
vities in the villages which are the main sources of the income
and employment position of the people. These economic activities
could be agricultural production, small scale industries, Khadi
and Village industries and other developmental activities. It
would be necessary to identify for any given region the indicators
which would help in understanding the actual level of economic
activities and their productivity. The example of the indicators
as far as agricultural production is concerned could be the total
area under cultivation and the value of agricultural produce per
acre. These indicators will help the planners to compare the
value of agricultural produce per acre across villages and will
help in developing the measures to improve the value of agricul-
tural produce.

Similarly the indicators on performance relating to other activities would be investment, profit or benefits and the employment generated.

.3.0   In summary the key planning indicator relating to income of landless worker are :

1   Per capita wage income

2   Per capita employment days.

The other key indicators related to the production activities are:

1   Level of activity (e.g. land under cultivation)

2   Production efficiency (e.g. per aore value of produce).

It can be argued that if larger incomes are generated from increasing production efficiency, some of these could be passed on to the landless worker in the form of increased wages.[4]

4.4.0   <u>Indicators Relating to Infrastructural Facilities</u>

The third set of indicators which would be helpful in deciding development activities for a particular village would be in terms of infrastructural facilities available in the village. These infrastructural facilities are :

1   Health

2   Communication (roads/rail/water transport)

3   Water Supply

4   Electricity

5   Education

6   Banks, Cooperatives, etc.

In determining the infrastructural facilities it would be neces-
sary to keep in mind the minimum or essential level of facilities
needed in each of these categories. After having determined the
essential facilities needed one would have to find out the
availability and actual capacity of these facilities within the
area. Availability can be measured in relation to average dis-
tance a villager will have to travel to avail of the facility.
In each of these categories we can group the facilities as
"very essential", "essential", and "desirable" on the basis of
their contribution to the quality of life, and their effect on
the productivity and development. For each category, the
availability is to be defined. For example, the facility avail-
able (a) within 5 kms, (b) within 10 kms, and (c) accessible by
road or within 15 kms, etc. The key development indicators,
therefore, would relate to measurement of "availability" and
"capacity" of various facilities. For example the measurement
related to health services would be the availability of PHC
Sub-Centre or PHC Main Centre within 5 kms of the village.
The available number of beds and doctors as a percentage of the
total population will give an idea as to the capacity of health
services.

5.0.0   Analysis of Information Using Key Development Indicators

5.1.0   Analysis of Wage Income

As the first indicator of performance is the per capita income
which is related to the wage rate and the employment days of

workers, it would be useful to study the impact of the actual mandays employed per worker and the actual wage rate per day. Table-1 gives the data for five sample villages (out of 24 villages for which the data was analysed) on mandays employed and the actual wage rate. It can be seen that the wage income per worker for the total year varies from Rs.79 to Rs.247. This is because of large Variations in the employment days from village to village and wage rate variation between Rs.2.00 to Rs.3.75. Per worker wage income, therefore, gives an idea of the level of activities needed to improve the wage income in a particular village. Column No.5 of the table gives the duration of unemployment on the assumption of 250 days being regarded as full employment per worker. This figure varies from 229 to 160 days. The developmental activities, therefore, have to aim at providing employment to village workers for the uncovered employment days. A part of it, probably, could be covered by improving the agricultural activities itself.

Table-1 : Analysis of Wage Income

Village	Per Worker Actual Mandays employed in the year (Nos)	Actual Wage Rate per Day (Rs.)	Per Worker Wage Income (Rs.)	Uncovered Unemployment days* (Nos)
(1)	(2)	(3)	(4)	(5)
1	21	3.75	79	229
2	90	3.00	271	160
3	19	2.00	38	231
4	51	3.00	153	199
5	73	3.40	247	177

* Computed on the basis of 250 days of employment per year.

5.1.1   An understanding of the impact of wage rate and mandays employed
on actual income would give an important insight in identifying
development schemes. For example, if wage rate is very low com-
pared to the standard wage rate, efforts will have to be made
either through governmental regulations or through other means
to improve the wage rate of all landless workers in a particular
village. However, if the number of unemployed days is very high
(as is the case in Table-1), schemes to create more employment
would be more relevant. This will be clear only when we can see
relative importance of each of these factors on the actual income.

5.2.0   Analysis of Value of Agricultural Produce

We have analysed the indicators relating to agricultural produc-
tion to understand in general the analysis related to key deve-
lopment indicators of economic activities. The key development
indicator regarding agricultural production would be the per acre
value of agricultural produce. It is, therefore, important to
understand the extent to which the value of agricultural produce
can be increased in a particular region. To understand this, it
would be necessary to compare the actual value of the produce
with the standard value (the value of produce which could be
expected from this area).

5.2.1   Table-2 gives the data on per acre value of produce, and the
difference from standard value for 5 sample villages.

Table-2 : Variance Analysis of Per Acre Value of Agricultural Produce

Village No.	Actual Per Acre Value of Produce (Rs)	Standard Per Acre Value of Produce (Rs)	Differ- ence in Value of Produce (Rs)	Cropmix Variance (Rs)	Yield Variance (Rs)
1	180	649	− 469	− 256	− 213
2	776	649	+ 127	− 87	+ 214
3	401	649	− 248	− 34	− 214
4	710	649	+ 61	+ 111	− 50
5	1283	649	+ 634	+ 192	+ 442

The standard value of produce has been computed as an average value from the total of 24 villages. As the villages taken in the example are from the same area, it was assumed that the nature of the land and irrigation facilities, etc. are similar in these villages. The value of per acre produce is also computed on a standard market price for various crops sown in these villages. The standard market price is computed as an average of the 24 villages. As can be seen from Table-2, the variation in produce from the standard value is from +34 to −469 rupees. The difference in produce could be because of the following reasons :

1   Choice of Cropmix − difference in percentage of total
      area under cultivation for each of the crops sown.

2   The yield per acre obtained from various crops in
      different villages.

Therefore, it will be necessary to understand the difference in

produce with respect to these two factors, i.e. cropmix and the

yield. Table-2 shows the extent of difference in value because of variation in cropmix and the yield in these 5 villages. From the table it can be seen that in village 1, the large difference between standard and actual produce is because of variation in cropmix chosen and because of very low yield obtained from the cropmix. While in village 5 the actual per acre value of produce is nearly two times the standard value. This can be attributed to the positive gain of Rs.192 from the cropmix chosen and a positive gain of Rs.442 from the yield. It can also bo seen that very large effort has to be put to improve the yield in villages 1 and 3. In villages 1 and 2, effort will have to be made to improve the cropmix.

5.2.2   Along with the changes in cropmix and yield, the per acre value of produce will also change because of the variation in the market price of various crops in different villages. The variance computed earlier were on the basis of standard prices We have also tried to compute the per acre value of produce at local market price in different villages. This would help in studying the impact on per acre value of produce because of the price change, in addition to the influence of cropmix and yield. This is explained in Table-3.

While in village-1 (Table-2) the difference in value of produce was shown as Rs.469 on a standard market price, it has actually reduced to Rs.272 when computing on the actual market prices.

Therefore, the market prices of the crops produced in this village are higher than the average market prices across the villages. In this village the landless workers are not only affected because of the low yield and unfavourable choice of cropmix but are also affected by the high market price of the essential consumption items.

Table-3 : Additional Effect of Price Variance

Village No.	Actual Per Acre Value of Produce (Rs.)	Std. value of Produce (Rs.)	Difference in value of Produce (Rs.)	Cropmix Variance (Rs.)	Yield Variance (Rs.)	Price Variance (Rs.)
1	377	649	− 272	− 256	− 213	+ 197
2	537	649	− 112	− 87	+ 214	− 239
3	249	649	− 376	− 34	− 214	− 128
4	856	649	+ 107	+ 111	− 50	+ 146
5	1138	649	+ 531	+ 192	+ 442	− 103

One can see from the above analysis that the knowledge of difference between actual value of produce and standard value is not enough. It has to be analysed on the basis of factors mentioned above so that the extent of difference accounted by each of these factors can clearly be identified. This would help in designing developmental schemes aimed at improving performance in relation to these factors. If the variance on account of yield is quite significant, the schemes would have to be developed to improve the yield. For example, irrigation may have to be developed or the distribution

of pesticides and fertilizers improved. In case the variation
on account of choice of cropmix is very high, efforts will have
to be made to explain to the farmers the extent to which the
agricultural produce can be improved by suitably changing the
cropmix.

5.2.4   In addition to the above analysis a study of the variations in
total area sown, the yield, market price for major crops across
villages would be revealing. Table-4 gives the average and
standard deviations for area under each crop, yield for each
crop, and the market prices.

Table-4 : Variations in Cropmix, Yield, and Prices

Crops	Percentage Area		Yield (Kg/Acre)		Price (Rs./Kg)	
	Average	Standard Deviation	Average	Standard Deviation	Average	Standard Dev.
Rice	35.300	21.893822	466.875	229.600189	2.021	.976059
Nagli	35.599	13.289011	313.958	108.886230	1.399	.269933
Vari	7.555	8.381386	202.292	128.711395	1.298	.444824
Kodra	2.514	3.477751	135.833	150.994415	.712	.152378
Adad	11.431	8.797804	167.083	90.426285	1.611	.325131
Tur	7.601	6.161376	156.417	74.290497	2.455	.681061

5.0   Analysis of Availability of Infrastructural Facilities

As explained earlier the third set of key development indicators
relate to the availability and capacity of infrastructural

facilities. Table-5 shows the data on availability of health and
educational facilities in five sample villages. As the data on
available capacity was not collected it has not been presented in
the table.

Table-5 : Availability of Essential Infrastructual Facilities
(Example)

Village No.	Population	Health Services			Education	
		PHC Main Centre	PHC Sub- Centre	Free Disp- ensary	Primary Schools	Second- ary Schools
1	483	C	B	B	A	C
2	646	B	A	A	A	B
3	178	C	C	C	A	C
4	911	B	A	A	A	B
5	1795	B	B	B	A	B

A = Less than 5 Kilometres

B = More than 5 kilometres but less than 10 kilometres

C = More than 10 kilometres

It can be seen from the table that the village number 5 having a
population of 1795 does not have any health services within 5
kilometres of the village. At the same time village 2 which as a
population of 646 has two of the essential health services within
5 km of reach. Village 3 having a population of 178 does not
have any of the health services within 10 km. Thus there is
considerable variation from village to village in the availability

of services. Therefore, in developing the schemes relating to
the infrastructural facilities, these variations have to be
clearly analysed so that one can identify the type of infra-
structural facilities that need to be developed and the villages
where these should be located.

,0.0 Structuring of Information

,1.0 Most of the data required for the analysis discussed above is
easily available with the Village Talati or in the records at
Taluka level. The data elements for each village that were used
in the analysis are given below :

1 Total population.

2 Number of workers.

3 Wage rate.

4 Cropwise area under cultivation and yield.

5 Price of major crops.

This data was obtained from the Village Talati. It is suggested
that this data be collected from the village level regularly.
Since the major data is on crop area and yield, it would be
advisable to collect the data immediately after a cropping season.
This would be particularly useful in getting accurate estimates
of yield which are otherwise difficult to obtain. A simple
format can be designed to collect this data and the village talati
can be assigned the responsibility of forwarding this data at the
end of each cropping season.

6.2.0 It can be seen that the analysis performed on the data is not very complex. However, since the number of villages would be very large, the total amount of processing required would be substantial. It is, therefore, suggested that this processing can be done at the state level to begin with, until such time that the data processing facilities are available within each district. Presently many State Governments have computing facilities available at the State level which could be used for processing of the data without any difficulty. In addition to the reports that we discussed earlier, a comprehensive report for each village could be developed. The format of the report is shown in Table-6.

Table-6 : Key Development Indicator for a Village

VILLAGE NO: 1				
Population		Per Capita Income (Year)		Per Worker Unemployment Days (Year)
483		Rs.79/-		229 days
Per Acre Value of Produce (Rs.)	Difference in Value of Produce from Standards (Rs.)	Crop-mix Variance (Rs.)	Yield Variance (Rs.)	Price Variance (Rs.)
377	- 272	- 256	- 213	+ 197
AVAILABILITY OF INFRASTRUCTURAL FACILITIES				
Health Services			Education	
PHC Main Centre	PHC Sub-Centre	Free Dispensary	Primary Schools	Secondary Schools
More than 10 km	Between 5 to 10 km	Between 5 to 10 km	Less than 5 km	More than 10 km

6.3.0 In the analysis discussed earlier, in several tables actual per-
formance had to be compared with standards. These standards
could be evolved in several different ways. As stated earlier,
we have used the average values over the 24 villages as standards.
However, as more intimate knowledge of each region is available,
standards could be developed specifically for the region. For
example, standards on yield would perhaps depend on the quality
of soil, the availability of irrigation facilities, and the amount
of rainfall. Since considerable variations could be expected in
these factors over different villages, the standard yield figure
could be worked out for each village.

.4.0 In conclusion it has been shown that with the very limited set of
data, meaningful analysis can be performed to identify the areas
which need improvement and the type of schemes which can be devised.
If the data is collected over time and structured as a data base,
it could prove useful in several other ways. For example, at the
end of the cropping season this data base could be used to provide
very quick estimates of the expected agricultural production from
each region. This would help in planning procurement and
marketing support. In addition, a study of trends over time for
each village could in itself provide valuable insights to the
planners.

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