



Marketing of Sabai Grass in Socio-Economic Development of Tribals in Mayurbhanj District, Orissa (India)

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Abstract

Socio-Economic development involves an increase in the material well being of the society. In a country like India, about 80 per cent of the population living in rural area and around 70 per cent of the population dependent on agriculture. Mayurbhanj is one of the richest districts in Orissa so far as forest and mineral wealth are concerned. Sabai grass industry plays a predominant role in shaping the economic destiny of the rural people in the district. The objective of this paper is to analyse the innovative schemes and the role of Sabai grass industry for the economic developments of growers of the district; Results show that the tribal of Mayurbhanj district generates the Sabai grass product marketing demand in national and international market so as to develop their economic status.

Keywords: Marketing Information System, Multiple Regression, ANOVA, Discriminant analysis, Rural Economic Development

1. Introduction

Mayurbhanj is said to be a land of tribals. Out of 62 tribal communities of Orissa, 45 communities are found in Mayurbhanj alone. The per capita income of Orissa as measured by net state domestic agricultural and forest product per head of population, was about 20 percent lower than the all India per capita income in 2008. It remained as much as 43 percent below that of national average in 2007-08. Thus it was intended to make all empirical investigation of rural income in Mayurbhanj district of Orissa in India and to assess the impact of agricultural and forest product marketing programmes initiated by the Government of Orissa over the years. In spite of rich natural and human resources it is a poor district more than 48 per cent of the rural area people live below the poverty line. Though majority of population are dependent on primary sector, the agriculture is undeveloped because the district is lacking in irrigation facilities. In agricultural sector there is hardly any marketable surplus production in the district except for Sabai grass. (Mohapatra P.C., Economic Dev. of Tribal.)

Sabai grass is practically considered to be "The Money Plant" which ensures cash receipt through out the year. The industry is associated with various activities of raising production of grass and processing of consumer goods such as ropes, mats, carpets, sofa sets, wall hangings and other sophisticated fashionable articles. The Sabai grass industry has tremendous export potential. Artistic designing Sabai products are very popular in foreign countries which earn precious foreign exchange for the country. The industry helps in the growth of entrepreneurship amongst the villagers. This ensures economic development through modernization and innovation of the industrial culture in rural areas.

2. Objectives

The main objectives of this paper are to (i) review the present growth of Sabai grass industry scenario of Orissa in comparison to other states in India ;(ii) find out the innovative marketing schemes and analyse the role of Sabai grass industry for the economic developments of the Mayurbhanj district; (iii) examine the various State Government plans, programmes and their implementation in the agricultural development of Sabai grass;(iv) identify various marketing problems faced by the Sabai grass industries and to suggest suitable measures for solving them;(v) explore the

involvement of existing agencies (NGO, Bank and Co-operative Society) for development by the way of education, training and their support in financing for improving the Sabai grass products and processes.

3. Data Sources

Mayurbhanj is a tribal dominated district having 26 blocks. The villages are selected on the basis of agricultural production of Sabai grass. The data are collected from the field sources by direct observation and interview to the persons associated with Sabai grass industry such as growers, processors, rope makers, entrepreneurs, traders and other intermediaries for the year 2007-2008. The questions were related to information regarding the size of the households and characteristic of household members such as age, sex, education, economic status & activities, income source and expenditure pattern, landed property, Government and NGOs support, marketing, packaging and transportation facility available etc.

A house to house survey were conducted to find out the economic development with the help of the questionnaire from 210 households in 18 selected villages of Mayurbhanj district of Orissa in India .

The secondary data were collected from various published sources of the Central and State Government such as the Census of India volumes, statistical abstract, selected socio-economic statistics, per capita Net State Domestic Product of States, Economic Survey, Central Government Publications, District Statistical Hand books and Indian Council of Marketing Research journals from 1999 to 2008 and have been used in this study.

4. Methodology

The data analysis is undertaken mostly with the help of marketing dynamics and computer based statistical analysis. The marketing dynamics includes: (1) the planning of organization for marketing of Sabai grass products;(2) diagnosis of the area sample formation in the Mayurbhanj district;(3) participative analysis of market chains;(4) creating and Implementing the concept of Sabai grass enterprise option;(5) identification of supply, demand and gaps in the local business development services by designing the strategy to strength the market decision and communication as shown in the model for enterprise development in the sample area of Mayurbhanj district.

A marketing model based information system is a continuing and interacting structure of people, equipment, and procedures to collect, sort, analyze, evaluate and distribute pertinent, timely and accurate information for use by marketing decision makers in improve their marketing planning, implementation and control.

Insert Figure 1 here

The marketing model is extensively used to determine the Sabai grass product marketing demand in national and international market so as to develop the economic status of the cultivators. (Singh,Katar., "Sabaigrass processing and marketing").

The Computer based statistical analysis is carried out to identify the various economic factors impacting the Sabai grass production by applying the various statistical tools like Regression analysis and Analysis of Variance (ANOVA).

5. Analysis

Most of the Sabai Grass plantations are located in the Revenue Sub-division of Baripada and Kaptipada of Mayurbhanj District. Roughly the total area under Sabai Grass in district at present is about 22758 hectares Sabai Grass was in cultivation long since in the district, however, substantial extension of area was achieved during the 8th, 9th and 10th plan period. Up to the end of 7th plan the total area under Sabai Grass was estimated to be 9218 hectes.

Sabai Grass is cultivated mostly by poor marginal and small farmers on their degraded lands. It is also collected by them as well as by the landless poor from the common pool village lands where it grows naturally. The per acre cost of production of Sabai Grass in the initial year works to around Rs. 2, 200. The cost for the second year is roughly Rs.650 and from the third year to ten year Rs.1000 per year. The produce is finally harvested in the 11th and 12th years. In the last two years, no maintenance is required and hence no maintenance costs. Thus the total cost of production over a period of 12 year works out Rs.11500 per acre. (Barik."Performance of Sabai .," IJASVol. 68).

The returns are realized from the sale of dry Sabai Grass which has a good market in the Mayurbhanj district. The total yield per acre over a period of 12 years was about 96 quintals (qt). The gross returns from the sale of Sabai Grass were estimated at the 2008 market price of Rs.500 per quintal. The gross returns over a period of 12 years were estimated to be Rs.48, 000 per acre and net return to be Rs.35, 500. The average net return per acre per annum over the 12 year period was Rs.3041. This represents a significant income from (land) resources that is degraded and whose opportunity cost is almost zero.

Sabai Grass of the Mayurbhanj district of Orissa in India is of good quality and has been accepted widely in the Indian market. Most of the traders prefer the Ropes made out of the Sabai Grass of this region. A large number of people are involved in this cottage industry (harvesting and rope making) or as a trader sending the produce (ropes) to the urban areas, both near and distant.

The total harvesting area of the Mayurbhanj district is 4.47 lakh hector of which 43.70 percent is highland with very poor water retention capacity. The highlands are generally not suitable for harvesting of crops or orchards. But they are suitable for harvesting of Sabai Grass. The agro climatic conditions obtaining in the district are also suitable for Sabai Grass production. According to general estimate the total production of Sabai grass in Mayurbhanj district of the state is about 15000 to 20000 metric ton/per annum of which some 9000 to 12000 metric ton is converted into ropes and the remainder is used for other purposes. At an average/minimum price of Rs.10 per kg of ropes and Rs.5 per kg of grass the total value of the produce works to Rs.16 crore per annum which is quite a significant contribution to the economy of the Mayurbhanj district.

(a) Marketing Analysis

The marketing of Sabai Grass in Mayurbhanj district is analysed with the following points taken into consideration that, method of Marketing, Types of Market Place, Setting up Sabai grass enterprise, Marketing Agencies, Cooperative Societies, Market Yard Brokers, Price, Fixation of Price, Distress Sale, Problems of Marketing, Transportation, Storage, Supply of Agricultural Inputs Marketing Information and Role of Government in agricultural marketing.

Traditionally farmers have made decisions on what they should grow, what they should keep for home consumption, and what they are able to sell at the marketplace. In former times sales would have cantered on local markets and it would have been rare for a farmer to venture far a field in search of new market opportunities or to consider developing new, higher value to consider developing new, higher value products. This traditional form of agriculture starts to change as communities and nations begin to modernize. Through processes of urbanization, generally fostered by industrialization, demand for Sabai grass product from urban dwellers becomes dependent upon more sophisticated arrangements that require aggregation of farm produce, transportation, storage, wholesaling, processing and retailing. As cities expand, supply systems develop into increasingly longer and more complex market chains with many market channels and specialization of roles in the market chain based on product type, levels of added value and market segmentation.

Farmers must also provide products and services at a price that is competitive with rival suppliers and there is increasing social pressure to ensure that production systems are environmentally sustainable. To achieve desired levels of competitiveness, farmers and their service providers need to build strategies that incorporate the following elements:

- A clear market orientation, producing the right product for the right buyer at the right time and price.
- The establishment of production systems that makes efficient use of existing financial human and natural resources.
- The incorporation of necessary post harvest handling and processing techniques.
- Appropriate business and marketing skills and organizational schemes which lead to economies of scale by reducing costs and increasing marketable volumes of produce.
- Improved links among market chain actors and flows of both market based information and new production technologies.

The NTFP collection and marketing both private and collective domain are equally important. If one suppresses the other, it leads to exploitation of marginalized, inefficient management and non-realization of desired goal. In the first case, no importance was given to collective domain. As a result individuals continued to be exploited in one or other form in spite of corrective measures taken by government.

In the second case on Sabai grass cooperatives, collective domains did not ensure private growth through interdependent accountability. It only aimed at solving marketing problems. This was the case of collective suppressing private domain to a great or small extent. As a result individual producers became less accountable to the cooperatives. The Market value of Sabai rope at present is Rs.13.00 to Rs.16.00 per Kg. as per quality. The Sabai grass from the Forest Corporation and Soil Conservation department Depot is available at Rs.1150/qtl., compared to the rate of Rs.1300 to Rs.1700/quintal in the open market. So the regional income is estimated to be Rs.8.12 to 6.5 lakhs per week, depending on the seasons.

Therefore an attempt has been made to appreciate the importance of both private and collective domain through mutually interdependent growth sustenance cycle. Here individuals are encouraged to enhance their living standard through skill up gradation. Commons facilitate the individual growth and ensure most competitive market price. This makes private and common dependent on each other without intruding into others domain or suppressing individual's enterprising ability. However, as system it is of recent origin, one needs to wait and watch how it works in the long run.

The major functions are:

- Attending exhibitions at state, national and international level with rural ethnic products like Sabai grass, Jute products of Mayurbhanj.
- Organising Pallishree Mela and District Level Exhibition.

- Assisting DRDA in implementing SGSY scheme from planning to implementation stage.
- Preparation of model project report based on cluster approach under SGSY scheme.
- Formulation of unit cost under SGSY for individual and group finance.
- Developing two key products covering all aspects of micro enterprise right from market identification, technology transfer, improvement of productivity and quality, organizing skill development training, bank credit linkage and market tie-up.
- Organising training/workshop on related topics design development, product development, micro enterprise development etc for block level functionaries, bankers, NGOs, Integrated Community Development Society (ICDS) and for Swarojgaris.

(b) Statistical Analysis

The analysis reveals that the 1.0% of the respondents Sabai grass product are purchased by consumers, 3.0% by both consumers and middlemen, 15.0% by Government organization, 31.5% by non-government organization and 47.5% by co-operative enterprises. There are nearly 8000 SHG that have been formed over the years. Sabai Grass Development Corporation was set up in 1994 to provide improved varieties of Sabai seeds and implements to women engaged in cultivation and trade. The bank caters to the farm credit establishment of the farmers through its 15 branches and 52 affiliated LAMPS.

An analysis has been made to know the effect and significant contribution of indicators towards income from Sabai grass for economic development in the study area. For multiple regression analysis Independent variables taken are

In most variables the calculated value of the coefficient (Beta) in the regression equation is either negative or insignificantly different from zero.

$$Y = f(X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8),$$

Where Y = Income from Sabai grass and Total Income

Sale - X_1 , Market Trend - X_2

Land holding - X_3 , Transportation - X_4

Age - X_5 , Family size - X_6

Education - X_7 , Occupation - X_8

The form of equation fitted for production is given below linear model

$$Y = C_0 + C_1X_1 + C_2X_2 + C_3X_3 + C_4X_4 + C_5X_5 + C_6X_6 + C_7X_7 + C_8X_8$$

It shows that with increase in income from Sabai grass, the role of transportation (X_4) followed by sale (X_1) increases. Therefore the factor transportation (X_4) and sale (X_1) have more effect on the dependable variable (Y) i.e. income from Sabai grass than other factors. It is found that transportation and sale plays important role to increase income from Sabai grass in the study area. The factors like Market trend (X_2), Land holding (X_3), Age (X_5), Education (X_7) and Occupation (X_8) have negative impact on income from Sabai grass. It is also observed that the factor family size (X_6) has positive impact on income from Sabai grass.

The correlation between a set of obtained scores and same score obtained from the multiple regression equation is called coefficient of multiple correlation. It is designated by 'R'.

Karl Pearson's Coefficient of Correlation (R) =

$$R = \frac{N \sum XY - \sum X \cdot \sum Y}{\sqrt{N \sum X^2 - (\sum X)^2} \cdot \sqrt{N \sum Y^2 - (\sum Y)^2}}$$

X = given, or reduced values of the first variable

Y = given, or reduced value of the second variable, and

N = number of pairs of observations of X and Y.

The value of 'R' lies between ± 1 .

Thus the correlation between Income from Sabai grass and other eight independent factors is 0.586. It means that scores in income from Sabai grass predicted from a multiple regression equation containing independent factors $X_1, X_2, X_3, X_4, X_5, X_6, X_7$ & X_8 correlate 0.59 with scores obtained in dependent factor Income from Sabai grass (Y). Here R^2 is 0.343; this shows 34% of the total variance of dependent income from Sabai grass is associated with the independent factors.

The t-statistic for each C_i

$$t = \frac{\hat{C}_i - C_i}{S.E.(\hat{C}_i)}$$

which follows t-distribution with (n-1) degrees of freedom.

Thus, greater the value of t the stronger the evidence that C_i is statistically significant. Tabulated value of t-test for transportation (X4) and sale (X1) are more significant and have significant contribution towards income from Sabai grass.

The multiple correlations between Total Income and other eight independent factors is 0.562. It means that scores in Total income predicted from a multiple regression equation containing factors $X_1, X_2, X_3, X_4, X_5, X_6, X_7$ & X_8 correlate 0.56 with scores obtained in factor Total Income (Y). Here R^2 is 0.316; this shows 32% of the total variance of income from Sabai grass is associated with the independent factors.

Tabulated value of t-test shows that the Land holding (X_3) is more significant and has significant contribution towards Total Income in the study area.

Analysis of Variance test

Analysis of Variance (ANOVA) for the factors in case of Income from Sabai grass:

F-Statistics is computed as

$$F = \frac{\text{Mean sum of square of explained sum square}}{\text{Mean sum of square of residual sum square}} = \frac{\sum y_i^2 / k - 1}{\sum e_i^2 / n - k}$$

since our model consists of five explanatory variable

$$\text{so, } F = \frac{\sum y_i^2 / 4 - 1}{\sum e_i^2 / n - 4} = \frac{\hat{C}^2 \sum x_i^2}{\sum e_i^2 / n - 4}$$

The null hypothesis H_0 is $C_i = 0$. If calculated $F >$ tabulated F with (k-1) and (n-k) degrees of freedom with chosen level of significance, hence reject the null hypothesis and accept that the data is significant. If calculated $F <$ tabulated F , then accept the null hypothesis and conclude that data is not significant. (ANOVA Table-I)

Tabulated value of F-test at 5% level of significance for (8,209) degree of freedom = 1.9384 and tabulated value of F-test at 1% level of significance for (8,209) degree of freedom = 2.5113. In case of the above table only between the indicators (column) is significant. The calculated value is 156.2920. This shows calculated 'F' value is more than tabulated 'F' value both at 5% and 1% level of significance. (ANOVA Table-II)

Tabulated value of F-test at 5% level of significance for (8,209) degree of freedom = 1.9384 and tabulated value of F-test at 1% level of significance for (8,209) degree of freedom = 2.5113.

In case of the above table only between the indicators (column) is significant. The calculated value is 156.2920. This shows calculated 'F' value is more than tabulated 'F' value both at 5% and 1% level of significance. In order to know the effect of different factors, viz. (i) fertilizer consumption per hectre of gross cropped area in kgs of nutrients (ii) actual rainfall (in mm) received during the period of cropping (iii) area under Sabai grass crop in hectre a time series analysis has been carried out with the use of a multiple linear regression model. The analysis considers the relevant secondary data of Mayurbhanj District for a period of 5 years i.e. from 2003-04 to 2007-08 being collected for the season of Kharif and Rabi. The analysis has been made for Kharif (Autumn & Winter) season over a period of 5 years taking variable $Y =$ Production in quintals, $X_1 =$ Area in hectare, $X_2 =$ fertilizer consumption per hectare of gross cropped in Kgs of nutrients, $X_3 =$ Annual rainfall in mm. and also the analysis has been made for Rabi taking into consideration the above variables. It should be mentioned here that the data on fertilizer consumption have been collected in the form of total consumption of fertilizer per hectare of gross cropped area for each period of cropping i.e. Kharif and Rabi. The analysis was carried out with the total consumption of fertilizer.

Table -A shows linear form for kharif season. From the analysis, it is found that intercept value $C_0 = 80904.922$, area $C_1 = -454.962$, co-efficient of fertilizer consumption X_2 (C_2) = 11.246 and rainfall X_3 (C_3) = -11.101. Table-B

shows linear form for Rabi season, it is found that D-W statistic = 2.464 and $F = 2.850$. Further, it is found that the intercept value $C_0 = 5007.695$, HYV area $C_1 (X_1) = -57.489$, local area $C_2 (X_2) = 0.235$ and rainfall $C_3 (X_3) = 1.323$.

Tabulated value of F-test at 5% level of significance for (3, 5) degree of freedom = 5.4095 and tabulated value of F-test at 1% level of significance for (3,5) degree of freedom = 12.060. Similarly, tabulated value of t-test at 5% level of significance = 2.776 and for 1% level of significance = 4.604, where degree of freedom. = 4.

The Table-A (Linear form) shows the analysis for Kharif season.

Note: 1)The value given in () is the value of standard error and the value given in [] is the value of 't'. statistic.

- 2) * represents the significant of the co-efficient at 5% level of significance.
- 3) ** represents the significance of the co-efficient at 1% level of significance.

The Table-B(Linear form) shows the analysis for Rabi season.

Note: 1)The value given in () is the value of standard error and the value given in [] is the value of 't'. Statistic.

- 2) * represents the significant of the co-efficient at 5% level of significance.
- 3) ** represents the significance of the co-efficient at 1% level of significance.

From the analysis table-A, it is found that F-statistics is significant both at 5% and 1% level of significance, where tabulated value is more than calculated value and R^2 is more than 0.5 for the Sabai grass crop (Kharif season). It indicates strong relationship between dependant and independent variables. Here, the t-statistic for fertilizer is significant only at 5% level of significance and the corresponding regression co-efficient is significant. Also, the corresponding standard error is significant. It is observed that only in case of fertilizer the t-statistic tabulated value is close to calculated value at 5% level of significance which shows fertilizer only provides contribution to the production of Sabai grass. The use of Durbin-Watson d-statistics shows that no auto correlation is present.

From the table-B, it is observed that that calculated $F >$ tabulated F both at 5% and 1% level of significance. It indicates strong relationship between dependant and independent variables, which shows each variable, provides more or less contribution to the production of the Sabai grass. Here use of Durbin-Watson, d-statistics show that no autocorrelation is present.

For Kharif season fertilizer consumption have more contribution towards the production of Sabai grass, For Rabi season it is observed that all the variables have more or less impact on production of Sabai grass in the study area. Computation of Durbin-Watson, d-statistic shows that no autocorrelation is present.

Discriminant Analysis.

Discriminant analysis is a method of distinguishing between classes of objects. The values of various attributes of an object are measured and a rule (function) is applied that assigns a classification to that object. The discriminant function arrives at coefficients, which set the highest possible ratio. (Satpathy, M. D. & Sahoo, Bivariate Discriminant Vol. 1, No.2, PP 13-21).

The Table –C shows the Standardized Classification Discriminant Function Coefficients (As in case of Income from Sabai grass)

Discriminant analysis is useful for situations where one need to build a predictive model of group membership based on observed characteristics of each case. The procedure generates a discriminant function (or, for more than two groups, a set of discriminant functions) based on linear combinations of the predictor variables that provide the best discrimination between the groups. The functions are generated from a sample of cases for which group membership is known; the functions can then be applied to new cases with measurements for the predictor variables but unknown group membership. On average, people in family size & health play more roles for economic development in case of income from Sabai grass. A researcher wants to combine this information in a function to determine how well an individual can discriminate between the two groups. (Overall and Klett, J. C. (1972), Applied Multivariate PP 243-279.)

The Table –D shows the Standardized Classification Discriminant Function Coefficients (As in case of Total Income from Sabai grass)

The procedure generates a discriminant function (or, for more than two groups, a set of discriminant functions) based on linear combinations of the predictor variables that provide the best discrimination between the groups. The functions are generated from a sample of cases for which group membership is known; the functions can then be applied to new cases with measurements for the predictor variables but unknown group membership. On average, people in family size play more roles for economic development in case of total income. The researcher found that population size and economic information are important. Discriminant analysis allows estimating coefficients of the linear discriminant function,

which looks like the right-hand side of a multiple linear regression equation. (Joshi, Vidyut, Tribals Situation in India-Issues in Development).

6. Conclusion

The result summaries the tribals of Mayurbhanj district of Orissa in India confronts many problems like, education, income source and expenditure pattern, landed property, Government and NGOs support, marketing, packaging and transportation. The bank caters to the farm credit establishment of the farmers through its branches and affiliated LAMPS. Most of the people live in small family and very less still maintains their traditional joint family. . The cultivation of Sabai grass is second main occupation of the tribals and few are engaged in Government service. The source of income from Sabai grass is maximum from the primary source and very less from the secondary sources .The packaging and grading are the most important aspect of marketing any product. The maximum villagers are depends on the local market and only few of them use themselves to grade and pack their finished product of Sabai grass for transporting to different market. For marketing of the product of the rural people the organization has established marketing channel with ORUPA (Orissa Rural & Urban Producers Association) and other enterprises. The Mayurbhanj Sabai Processing and Marketing Co-operative Society were established at the behest of the Government of Orissa with the main objective of improving the economic well-being of Sabai grass growers in the district. ORMAS, an apex State Level Marketing Organisation was established with a mandate to provide non-credit inputs like procurement / purchase of raw materials. District Supply and Marketing Society is engaged in market promotion and facilitating marketing of Swarnajayanti Gram Swarojgar Yojna (SGSY) and Self Help Group (SHG) products. Due to changes in professional status it has impact on the income. It is also found that changes in age, family size and education do not change the total income in same direction. The land holding and transportation are important factor and have significant contribution to increase total income and economic development of the district.

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ANOVA Table-I. Analysis of Variance (ANOVA) for the factors in case of Income from Sabai grass

Source of variation	Sum of Square	Degree of Freedom	Mean Square	F-statistic (Calculated)
Between Row	4035.4979	209	19.3134	1.1322
Between Row & Column	49851.5556	1680	29.5735	1.7336
Between Column	21329.2392	8	2666.1549	156.2920**
Residual (error)	28522.3164	1672	17.0588	
Total	53888.0534	1889	28.5273	

ANOVA Table-II. Analysis of Variance (ANOVA) for the factors in case of Total Income

Source of variation	Sum of Square	Degree of Freedom	Mean Square	F-statistic (Calculated)
Between Row	4102.3328	209	19.6284	1.1505
Between Row & Column	49554.0000	1680	29.4964	1.7289
Between Column	21027.8042	8	2628.4755	154.0623
Residual (error)	28526.1958	1672	17.0611	
Total	53656.3328	1889	28.4046	

Analysis Table-A. (Linear Form) for Kharif Season

Crop	Intercept 'C ₀ '	C ₁	C ₂	C ₃	R ²	Adj R ²	D-W statistic	F-statistic
(Sabai grass)								
Kharif	80904.922 (14254.836) [5.676]	-454.962 (121.907) [-3.732]	11.246 (3.839) [2.929*]	-11.101 (3.847) [-2.886]	0.968	0.870	3.181	9.939

Analysis Table-B. (Linear Form) for Rabi Season

Crop (Sabai grass)	Intercept 'C ₀ '	C ₁	C ₂	C ₃	R ²	Adj R ²	D-W statistic	F-statistic
Rabi	5007.695 (1995.389) [2.510]	-57.489 (72.387) [-0.794]	0.235 (1.124) [0.209]	1.323 (0.651) [2.032]	0.895	0.581	2.464	2.850

Table C. Standardized Classification Discriminant Function Coefficients [In case of Income from Sabai grass]

Factors	Income from Sabi Grass				
	1	2	3	4	5
Sale	1.960	1.994	2.336	2.739	2.724
Market Trend	5.741	5.139	5.033	5.005	5.168
Land Holding	0.357	0.283	0.250	0.183	0.198
Transportation	0.052	0.080	0.150	0.143	0.158
AGE	2.974	3.048	3.121	2.428	2.201
Family Size	9.334	9.794	9.616	10.351	10.273
Education	-0.363	-0.523	-0.478	-0.478	-0.498
Occupation	9.358	9.215	8.208	7.450	7.488
Constant	-55.217	-52.905	-47.792	-43.667	-43.881

Table D. Standardized Classification Discriminant Function Coefficients [In case of Total Income]

Factors	Total Income				
	1	2	3	4	5
Sale	2.508	2.579	2.715	2.270	2.846
Market Trend	4.884	4.873	5.043	4.468	4.881
Land Holding	-0.029	-0.097	-0.007	0.125	0.097
Transportation	0.096	0.158	0.173	0.142	0.184
AGE	2.245	2.675	2.671	3.413	2.445
Family Size	10.375	11.022	11.054	11.952	10.312
Education	-0.342	-0.414	-0.490	-0.334	-0.455
Occupation	9.545	9.507	8.513	8.145	7.558
Constant	-53.604	-55.584	-50.302	-51.096	-43.702

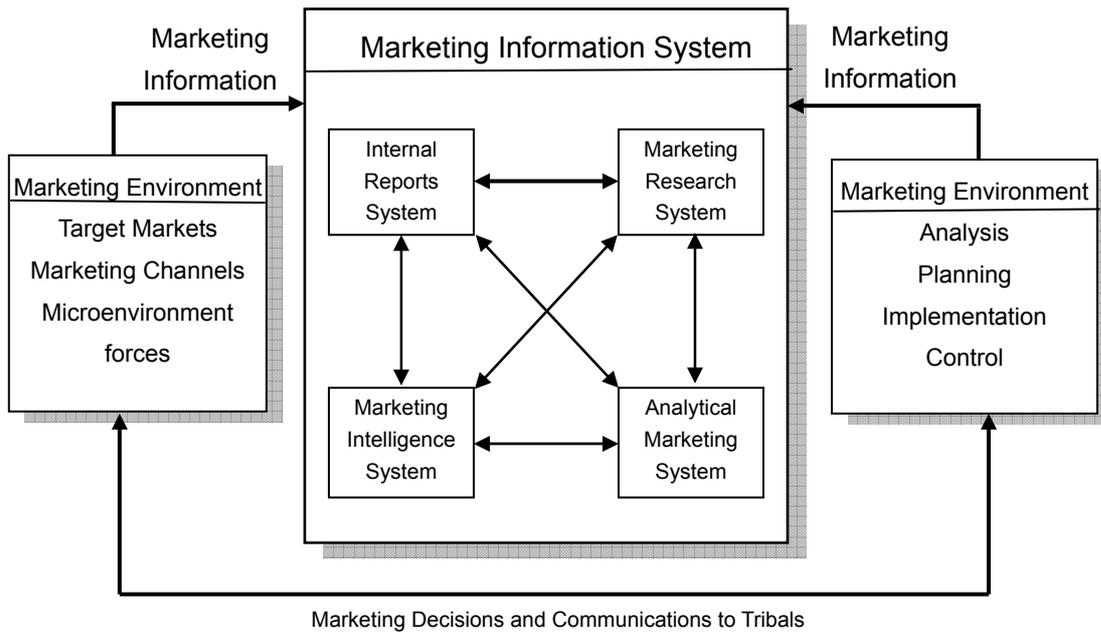


Figure 1. The Marketing Model Based Information System