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Agricultural and Socio-Economic Development: A Geographical Analysis

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ABSTRACT

In India agriculture provides employment to a large numbers and fulfill the needs of food and raw materials. It also contributes to the national income. With the use of new technology high consumption of fertilizers, irrigation facilities and institutional factors the agriculture transform from subsistence to commercial one. The changes in cropping pattern raise the buffer stock of food grains and other cash crops. This trend of crop production affects the socio-economic condition of the people.

Key Words: Agriculture, national income, food grains, socio-economic condition.

INTRODUCTION

Agriculture in undoubtedly is one of the most important economic activity of man. It provides not only food but also industrial raw materials. The large population of India puts an ever-increasing pressure on agricultural resources. As a consequence of this rapid growth of population, the requirement of foodgrains is increasing. Although many concentrated effort have been made for the sustainability of agriculture but this still is a gamble of monsoon. Due to high pressure of population and adoption of new agricultural technique of the 'Green Revolution', the cultivated area is now on climax point and the production of foodgrains has been increased by 300 per cent. But this generates regional disparities in levels of agriculture development. Development is a dynamic concept. It is a multi-dimensional phenomenon which is governed by several factors. Agricultural development in a true sense denotes the quality of the agricultural system of a region in terms of productivity, diversification and commercialization consistent with a desired state of agrarian relations and ecological balance.

As a result of 60 years of planned development programme and policies, overall improvement in agriculture has taken place. The structure of crop's area and production has changed. With the use of technology production in agriculture and the social framework within which economic activities are conducted have substantially undergone change. The socio-economic condition of the masses has considerably improved. The literacy level, housing condition, quality of life have gone up. But the level of development has not been uniform at any level. Inter and intra-sectoral differences become more sharp and noticeable. Therefore, the Baghpat district has been taken up for the assessment the levels of development of agriculture and socio-economic condition in the study area.

Objectives :

The study has the following objectives –

(i) to assess the level of agricultural development in relation to the existence of physical, cultural and socio-economic factors.
(ii) to know the levels socio-economic development.

Study Area:

The study area is the most fertile part of the Upper Ganga-Yamuna Doab and lies between $28^0$47' to $29^0$17' north latitudes and $75^0$5' to $77^0$29' east longitudes. The district of Baghpat extended over an area of 1321 sq. km. and divided into 3 tehsils (Baraut, Baghpat and Binauli) and 6 development blocks. According to 2011 census, the total population of the district is 13,02,156 persons with an average density of 986 persons per sq. km.

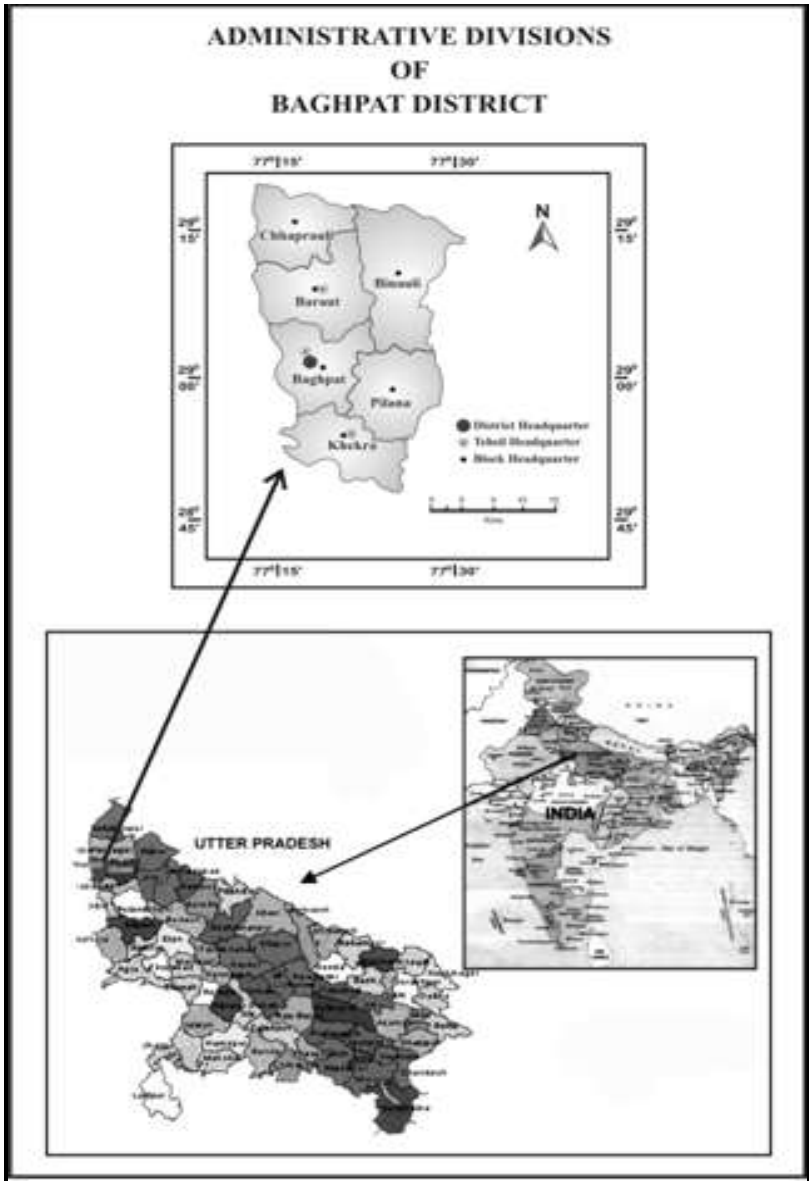

Fig 1

DATA- BASE AND METHODOLOGY:

The study is based on both of the primary as well as secondary data (2010-2011). In the present study a comprehensive hose hold survey of 12 villages was conducted through on random sampling. In order to find out regional variation and delineating the different levels of agricultural development, a set of indicator has been selected in four heads : agricultural condition, agricultural infrastructure – I & II and agricultural productivity based on Yang (1969) method. For socio-economic development another set of variable also taken to demarcates the regional variation. Data has been analysed by computing composite index of agricultural development. Firstly, all the indicators have been converted into comparable unit by standardizing them with the help of the following formula or 'z' score method known as 'Z' score :

$$Z_{ij} = \frac{X_{ij} - \overline{X}}{SD}$$

Where,

Z_{ij} – standard value of the indicator,
X_{ij} – value of X_j variable in the i^{th} observation,
X – mean value of X variable,
SD – standard deviation of X_j variable.

Computing 'Z' score of all indicators, standard values in a group have been added and divided by the number of variables in the group. The results thus obtained with regard to all four groups have been added up and divided by 4 in order to get an overall picture of the agricultural development.

AGRICULTURAL CONDITION

Agricultural condition reflects a proper assessment of the land as it is essential for a better understanding of the agricultural development. The variables of percentage of net sown area to the total, intensity of cropping, per hectare consumption of fertilizer, percentage of net irrigated area to net sown area, percentage of gross irrigated area to gross sown area have been included. On the basis of the results the region has been divided into three categories. High level of agricultural condition is extended in central part and comprises of Baraut, Baghpat, and Binauli blocks in the region. This area is noted for intense application of irrigation and mechanical devices and fertile loamy soil. Only Khekra block has moderate level of agricultural condition. In this block soil is rich in nutrients; percentage of net area irrigated to net sown area is about 16.67%. It has highest intensity of cropping. It also shows high consumption fertilizer but percentage of net sown in comparatively low. The region of low level comprises of 2 blocks, namely, Chhaprauli and Pilana. The nature of soils and net sown area is far below the region. However, fertilizer consumption is slightly high and net irrigated area is also high.

AGRICULTURAL INFRASTRUCTURE – I

To evaluate the level of agricultural infrastructure – I, variable such as number of tractors, energized pump sets, consumption of electricity and size of land holding have taken into consideration. The high level of agricultural infrastructure – I are found in the northern part and comprises 2 blocks of Chhaprauli and Baraut. Among these Baraut is the only block which has high level of agricultural condition too. Number of tractors per hectares of net sown area is highest in Chhaprauli and Baghpat and followed by Baghpat and Khekra. Similarly the energized pump sets is also very high in Baraut. Although, consumption of electricity per hectare of net sown area and size of land holding is almost similar.

Table – 1: Index Value of Selected Variables

Category	Agricultural Condition		Agricultural Infrastructure – I		Agricultural Infrastructure - II		Agricultural Productivity		Agricultural Development	
	No. of Blocks	Percentage to total	No. of Blocks	Percentage to total	No. of Blocks	Percentage to total	No. of Blocks	Percentage to total	No. of Blocks	Percentage to total
High	3	50.00	2	33.33	1	16.67	2	33.33	2	33.33
Medium	1	16.67	2	33.33	3	50.00	2	33.33	1	16.67
Low	2	33.33	2	33.33	2	33.33	2	33.33	3	50.00
Total	6	100.00	6	100.00	6	100.00	6	100.00	6	100.00

Two blocks belong to the medium level of agricultural infrastructure-I with regards to tractors and pump sets. Baghpat and Khekra are in better position, while Saroorpur and Khekra have comparatively high tractors. Low level of blocks is found in the eastern part of the region. Binauli and Pilana form a patch of low level. In these blocks tube well is a main source of irrigation, energized pump sets are more than the region.

AGRICULTURAL INFRASTRUCTURE – II

The above discussion has dealt with important indicators of agricultural infrastructural. However, few more need to mention and hence infrastructure – II is incorporated. It is entirely different in nature and character. It includes number of cold storages, agricultural marketing centres, number of primary agricultural cooperative societies and banks, number of land development banks. On the basis of the results the study area has been divided into three categories. The blocks of high level of agricultural infrastructure – II form one patch, in the west part and comprises of Baraut block in the region. It has the highest number of cold storages. Primary agricultural societies and regulated markets is also high. Medium level of agricultural infrastructure – II includes 3 blocks. These blocks are mainly concentrated in the north and the western part; where agricultural condition is moderate and agricultural infrastructure is high. The low level of blocks is found in western part of the region and comprises of Baghpat and Khekra blocks. It recorded lowest number of primary agricultural society, regulated market, cold storage and land development banks.

AGRICULTURAL PRODUCTIVITY

The spatial variations in the levels of agricultural productivity have been calculated by Yang's 'Crop Yield Index' method. One the basis of indices the region may be categorized into three groups. It is clear from the table 1.1 that two blocks fall in high agricultural productivity region. In this region average productivity is about 100.78 per cent. It is highest is Baghpat (101.27%) and Baraut (100.67%). The main crops grown in these blocks are sugarcane, wheat and rice. Superior technology, irrigation facilities, large amount of inputs used per hectare and agro-based industries account for the high level of production. Medium

level of agricultural productivity comprises of 2 blocks, namely Chhaprauli and Binauli blocks in the region.. The agricultural productivity ranges from 99.37 to 99.87 per cent. The region of low productivity also includes 2 blocks, which is 33.33% of total. These blocks form a patch in the south. The productivity index is below 99 per cent. This region has large area under wheat. Mainly low value and low yield crops are grown here. Intensity of cropping is also low.

LEVELS OF AGRICULTURAL DEVELOPMENT

The above four groups and the indicators included therein are of varied and different nature and character, their aggregation in order to get over all level of agricultural development is not possible. Hence a composite index of agricultural development has been worked out. On the basis of the results obtained, the blocks have been grouped into three categories. The regional pattern of agricultural development reveals that there is one pocket in the western part of the region, where level of agricultural development is high. It comprises of Baraut and Baghpat blocks. Its high level owes to high intensity of cropping, irrigation and very high per hectare consumption of fertilizers. This belt is highly mechanized as indicated by large number of tractors, pump set, thresher etc. Agricultural productivity is high in this region. Farmers are practicing commercial farming. They produce a variety of crops.

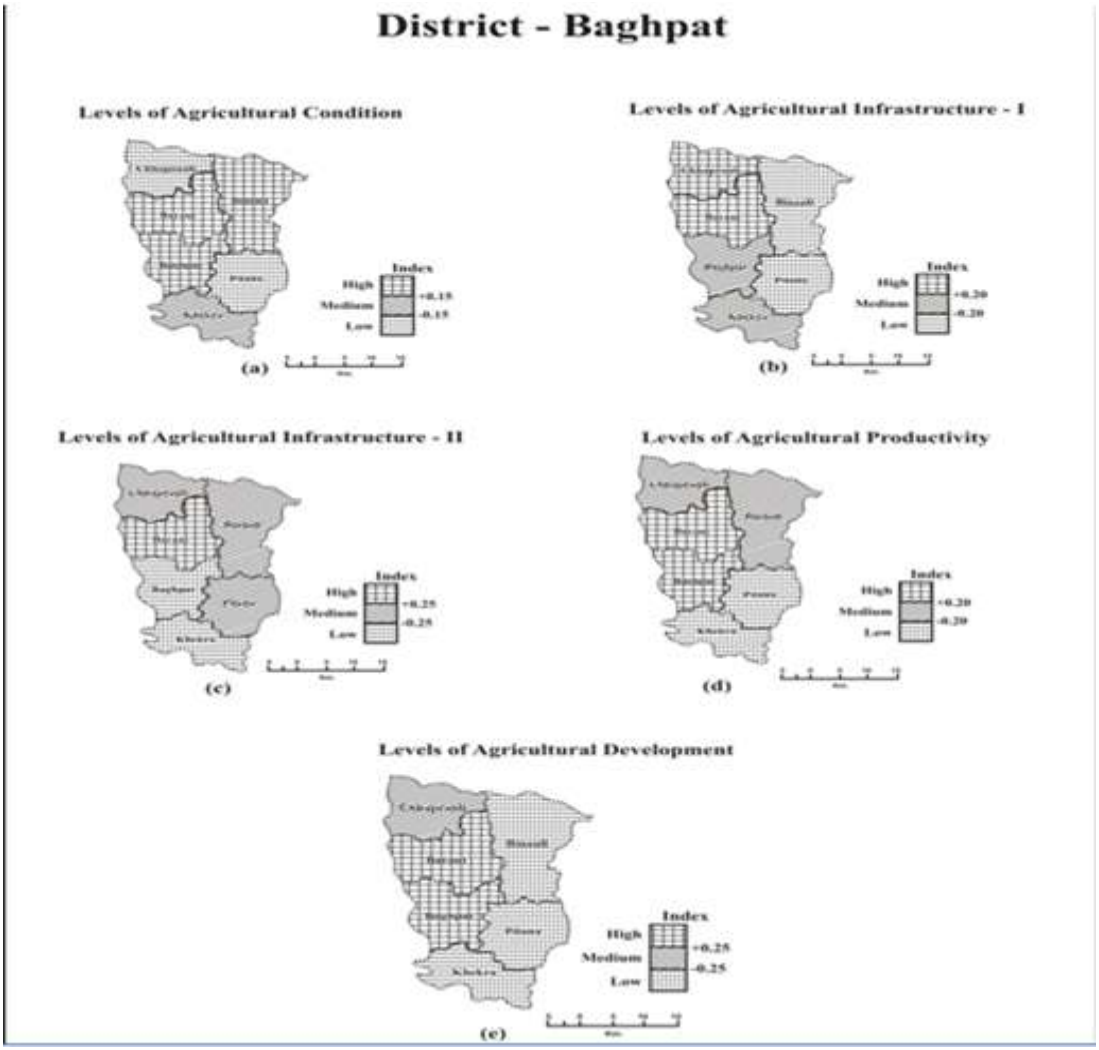

Fig 2

Medium level of agricultural development occupies only one block (Chhaprauli), which is16.67% of the total. This block forms a patch in the northern part of the study area. The medium level of agricultural development can be explained by a set of indicators. Average yield of foodgrains, consumption of fertilizers and net irrigated area are comparatively moderate. The region of low level of agricultural development is located in eastern part of the region including the blocks of Binauli, Pilana and Khekra. Agricultural condition in these blocks is very poor. Infrastructure facilities are not well developed. Agricultural productivity is also low. A large number of indicators selected to assess the levels of agricultural development indicate low levels in these blocks. It is concluded that the levels of agricultural development clearly show that there is a lot of variation in it which needs much more attention to be taken of while formulating development policies. The blocks with low level of agricultural development should be given top priority so that they may come up at par with developed areas.

SOCIO-ECONOMIC DEVELOPMENT

The average value of the selected variables in the sample villages has been taken to determine the socio-economic development in the region. The average value of the block shows that those blocks having 0.01 and above fall under high, where as the blocks having values between 0.10 to -0.01 fall in medium and those having values below -0.01 categorized as low socio-economically developed region.

HIGH LEVEL OF SOCIO-ECONOMIC DEVELOPMENT

It is clear from table 2 shows that the high level of socio-economic development is occur in Khekra (0.03) and Baraut (0.02) in Baghpat district. It is to be pointed out that those blocks which fall in high level of agricultural development not necessarily show high level of socio-economic development and vice-versa. The agricultural development and socio-economic development is found in Baraut block. Socio-economic development is governed by religion, caste, culture and traditions, education, income sanitation, consumption of power supply. Similarly in the study area many blocks show high level of agricultural development but a low level of socio-economic development.

Table – 2: Levels of Socio-Economic Development

Category	Variance	No. of Blocks	Percentage to total
High	>0.01	2	33.33
Medium	-0.01-10.01	2	33.33
Low	<-0.01	2	33.33
Total		6	100.00

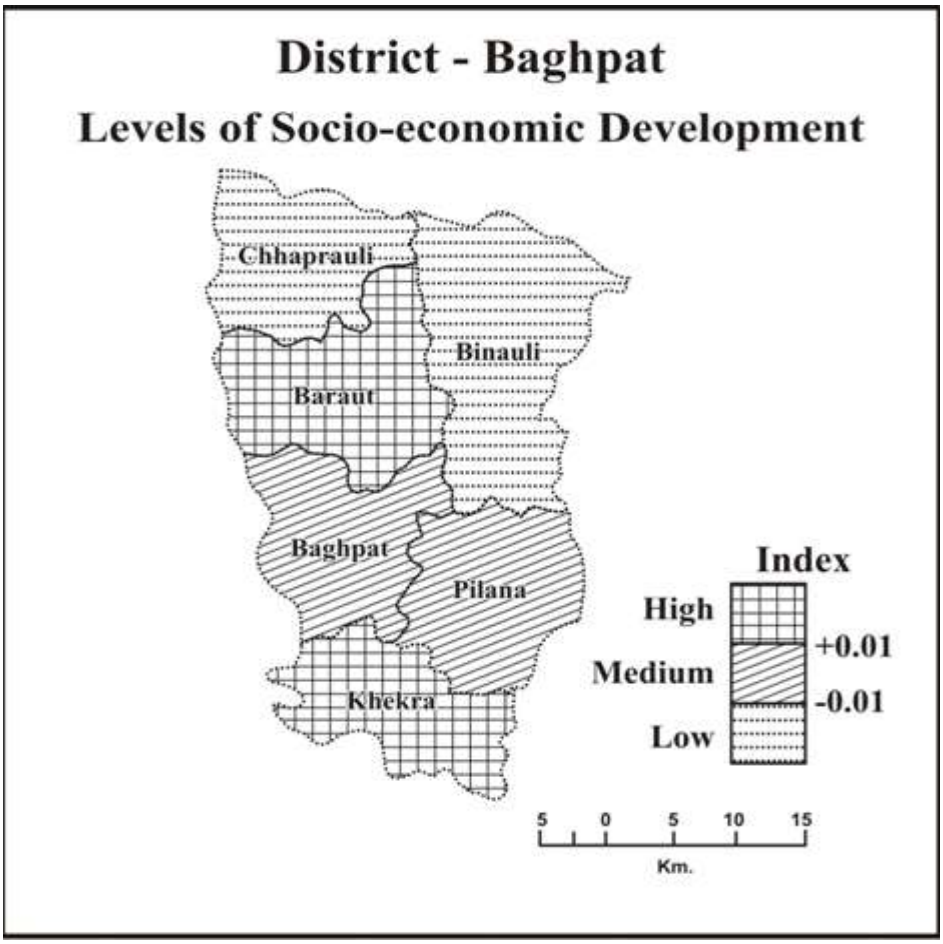

Fig 3

MEDIUM LEVEL OF SOCIO-ECONOMIC DEVELOPMENT

Medium level of socio-economic development is found in 2 blocks of Baghpat and Pilana. It is also concluded that the central part of the study area has medium level of socio-economic development. This part also shows a medium level of agricultural

development. It is mainly due to soil characteristics, which is less fertile, poor level of mobility of transport, lack of education facilities and low income are the major factors.

LOW LEVEL OF SOCIO-ECONOMIC DEVELOPMENT

Low levels of socio-economic development have seen identified in the region. Binauli (-0.02) and Chhaprauli (-0.02) blocks form a patch in the north. This area is mainly influence by the rivers of the Ganga, the Yamuna and the Hindon. It is noted that Chhaprauli shows medium level of agricultural development. An improvement in crop productivity is found but no concrete measures have taken to improve the socio-economic conditions. Education, lack of transport and communication facilities, limited agro-based industries, ignorance of the villagers, problem of sanitation and power supply are some of the factors responsible for the low levels of socio-economic development. Soil fertility water logging and flood as well as traditional undiversified farming economy are responsible for low levels of socio-economic development.

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Appendix – I: Selected Indicators of Socio-Economic Development in Baghpat District

Variable	Description of variable
X_1	Number of persons per household
X_2	Number of male per household
X_3	Number of female per household
X_4	Number of senile per household (0-14)
X_5	Number of workforce per household (15-62)
X_6	Number of dependent per household (63 & above)
X_7	Number of uneducated persons per household
X_8	Number of primary literates per household (1-5th)
X_9	Number of middle school literates per household (6th – 8th)
X_{10}	Number of secondary & senior secondary literates per household (9th – 12th)
X_{11}	Number of graduates & above per household
X_{12}	Income per household in Rs. per month
X_{13}	Percentage of Level and means of mobility
X_{14}	Percentage of cemented houses to total household
X_{15}	Percentage of households having separate kitchen to total household
X_{16}	Percentage of households having toilet facility to total household
X_{17}	Percentage of households having bathroom facility to total household
X_{18}	Percentage of households having own hand pump to total household
X_{19}	Percentage of households using electricity to total household

Appendix – II

Composite Z-Score of the Levels of Socio-Economic Development in Baghpat

Tehsil	Village	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}	X_{16}	X_{17}	X_{18}	X_{19}	Composite Mean	Average Value
Chhaprauli	Rathoda	0.02	-0.45	0.59	-1.82	0.96	-0.91	-0.80	0.19	0.00	0.00	2.42	1.88	-0.17	1.59	-0.03	-0.07	0.15	0.52	1.49	-0.02	-0.02
	Luhara	-0.67	-0.79	-0.52	-0.68	-0.22	-1.36	-1.05	-0.48	0.01	0.95	-0.05	-1.09	-0.67	-0.44	0.56	-0.53	-0.31	0.52	0.37	-0.02	
Baraut	Kotana	-0.84	-1.14	-0.52	-1.14	-0.41	-0.45	-0.78	-0.24	-0.01	-0.48	1.00	-0.16	0.25	1.59	-0.62	-0.07	0.15	0.52	0.37	0.03	0.02
	Gurana	-0.33	-0.45	-0.15	-0.23	-0.41	0.45	-0.87	0.00	0.00	0.71	1.26	0.54	0.00	1.59	-0.03	0.39	0.61	0.24	0.20	0.02	
Baghpat	Goripur	-1.36	-1.48	-1.26	-0.68	-1.29	0.00	-1.24	0.00	0.01	-0.95	-0.05	1.43	2.93	1.59	1.15	1.30	1.54	0.52	0.37	0.01	0.01
	Tatiri	-1.02	-1.14	-0.89	-0.45	-1.10	0.45	-0.89	0.33	0.00	-0.24	-0.58	2.00	0.32	1.59	-0.62	0.84	0.15	-0.24	-0.20	0.01	
Pilana	Dholla	-0.67	-0.79	-0.52	0.00	-0.90	0.45	-0.80	0.57	0.00	-0.24	-0.32	0.26	0.21	0.24	-0.03	0.39	-0.31	-0.24	0.37	0.01	0.01
	Dhikoli	-0.24	-0.45	0.04	-0.23	1.08	3.09	-1.15	0.48	0.01	0.57	0.84	-0.16	2.01	0.24	-0.03	0.39	0.15	0.52	-0.20	0.02	
Khekra	Pavala	0.19	-0.10	0.59	0.45	-0.12	0.45	-0.78	-0.29	0.01	0.76	0.63	0.34	0.82	0.91	0.56	0.84	0.61	0.52	-0.76	0.03	0.03
	Sankrod	-0.57	-0.59	-0.52	-0.14	-0.57	-0.27	-0.95	0.95	0.01	0.10	-0.95	0.64	-0.27	-0.44	-0.62	-0.53	-0.78	-2.53	-0.20	0.04	
Binauli	Paldi	-0.16	-0.28	0.04	-1.82	0.67	-0.45	-0.47	0.71	-0.01	-0.10	1.00	1.23	1.69	1.59	1.15	1.30	1.54	1.28	0.37	-0.03	-0.02
	Titroda	-0.50	-0.45	-0.52	1.59	-1.39	0.45	-0.27	0.00	0.00	-0.48	0.32	1.13	0.04	-0.44	0.56	0.39	0.61	0.52	0.93	-0.01	