IDENTIFICATION OF BASIC PLANNING UNITS IN VISAKHAPATNAM URBAN DEVELOPMENT AUTHORITY (VUDA) VILLAGES

K. D. Rama Rao, Visakhapatnam

ABSTRACT : In this paper 126 villages out of the 216 villages adopted by the VUDA are selected to determine the centrality of small and medium size centres by the surplus function method. This will help to identify the places which can serve as basic planning units.

INTRODUCTION :

The best method for our administrators and social workers to bring about integrated area development in rural areas is to introduce micro-level planning with the help of a growth centre approach. A central village among the constituent villages of a functional community will provide some of the higher order services needed by the people. A number of these functional communities will constitute a subregion which will have a focal point which can be called a service village. One can visualise several such subregions on a hierarchic scale, with progressively increasing population base and with service centres of increasing functional complexity which can serve as ' Growth centres '.

As funds earmarked for the various sectors are limited, it is necessary to be selective in allocating funds over a large area. Also, not all villages will be able to make use of a hospital, a high school or a rice mill. So the optimum location of development inputs and of services should be at specific places from which their benefits can filter down to the surrounding settlements.

The object of the present study is to identify growth centres, service centres and central villages in the VUDA area for the location of specific functional units and programmes.

Growth centres are central places which service a hinterland consisting of a number of villages. They provide optimal locations for selective investments in agricultural, industrial and social facilities which can be used by population in the complementary region. Since it is not possible to locate every function in every village, the priority must go to the growth Centre or a potential growth centre. There can be several levels of growth centres, depending on their centrality which indicates a measure of the importance of a place. Though planners have used several nomenclatures for indicating these levels, a five-fold division to describe the entire range of settlements based on their centrality score is considered in this paper. The five categories are : (i) dependent villages, (ii) central villages, (iii) services centres, (iv) Potential Growth Centres and (v) Growth Centres.

The magnitude of the surplus of commodities, services or functions offered by a place to its tributary area is attributed to be the centrality of any centre. The concept of centrality implies the extent, number, size, quality and quantity of the goods and services provided by the centre. It has been observed that no single method finds wide application for all categories of central places, as it depends on the nature of central places, the region to which they belong and the availability of data.

The region to which the centrality measure is applied consists of 126 VUDA villages of Visakhapatnam district with a population of area 1000. Most of these 126 villages out of a total of 216, qualified for central place status on account of the social services they provided for their sorrounding areas such as schooling, primary health, post and telegraph, bus stop, banks, etc. 16 central functions are selected for the study area and the data required for the analysis had been collected from the Block and Taluk offices.

TABLE I

Threshold of Population for different services in the VUDA villages :

Service	Threshold of Population
Primary School	1003
Upper Primary	1117
High School	1446
Junior College	2435
Technical Institute	5622
Health Centre	1097
Hospital	2711
Rural Livestock Unit	1120
Milk Centre	1003
Telephone	1051
Telegraph	1224
Post Office	1003
Bus & Train	1003
Fair Price Shop	1003
Social Welfare Centres	1097
Banks	1641

TABLE II

Number of Services in Settlements :

VUDA Villages :

Services	No. of services in the study area	No. of villages having the facility	% of villages having the facility
Primary School	122	118	94
Upper Primary	33	32	25
High School	18	17	14
Junior College	4	4	3
Technical Institute	3	2	2
Health Centre	107	93	74
Hospital	3	3	2
Rural Living Stock Unit	19	19	15
Milk Centre	49	49	39
Telephone	44	44	35
Telegraph	4	4	3
Post Office	92	92	74
Bus & Train	84	84	67
Fair Price Shop	117	117	94
Social Welfare Centres	166	86	69
Banks	37	27	22

Method used for determining centrality in the area : Surplus function method :

The basic principle in determining centrality is a measure of the surplus of functions at a central place (i.e.) the excess of functions over and above its own requirements for its population. The surplus of functions thus determined can conveniently be converted into ' centrality scores ' and used for determining the centrality of a place. To arrive at the surplus functional component at a cetre, one requires data for the population and functions of the central places and population of the area forming the universe. This method assumes two conditions to be satisfied which are largely valid, though not always ture. The same sixteen central functions mentioned in Table I were used to determine centrality.

The centrality of a place with N functions can be expressed as

$$C_A = C_X + C_Y + C_Z + \ldots + C_N \quad (1)$$

Where C_A = Centrality of a place A.

C_X, C_Y, C_N stands for centrality of a place A in terms of functions X, Y, ... N respectively.

X_a = actual number of functional units of a function X at a place A.

X_e = the expected number of functional units of the function X at the place A.

X = Total number of functional units of X in the study area.

P = Population of a place A.

P_s = Population of the study area.

$f_x \dfrac{P_s}{X}$ = constant of functional maintenance(2)

Using this data, the centrality of a place A in term of function X can be obtained as

$$C_X = (X_a - X_e) f_x \qquad (3)$$

Similarly the centrality of place A with N function can be obtained from

$$C_A = \sum_{i = l}^{N} (X_i - X_i^i) f_i$$

X_i : Actual number of functional units of a function i at a place A.

X_i^i : Expected no. of units of function i at the place A.

f_i : Constant of functional maintenance.

Centrality score and population size :

The hypothesis is that the high centrality corresponds to the higher population size of a place. But the correlation analysis shows a poor relationship ($r = 0.35$), indicating that the rank-size relationship does not hold good in the study region. In figure–2, the population of the central places was plotted against their centrality score

RELATIONSHIP BETWEEN POPULATION & CENTRALITY SCORE

r = 0.35

Order :   Centres

I   : Pendurthi, Sabbavaram

II : Maruturu

III : Peda Gantyada, Kothavalasa, Saripalli

IV : Munagapaka, Gandigundam

V   : Rest of the Villages

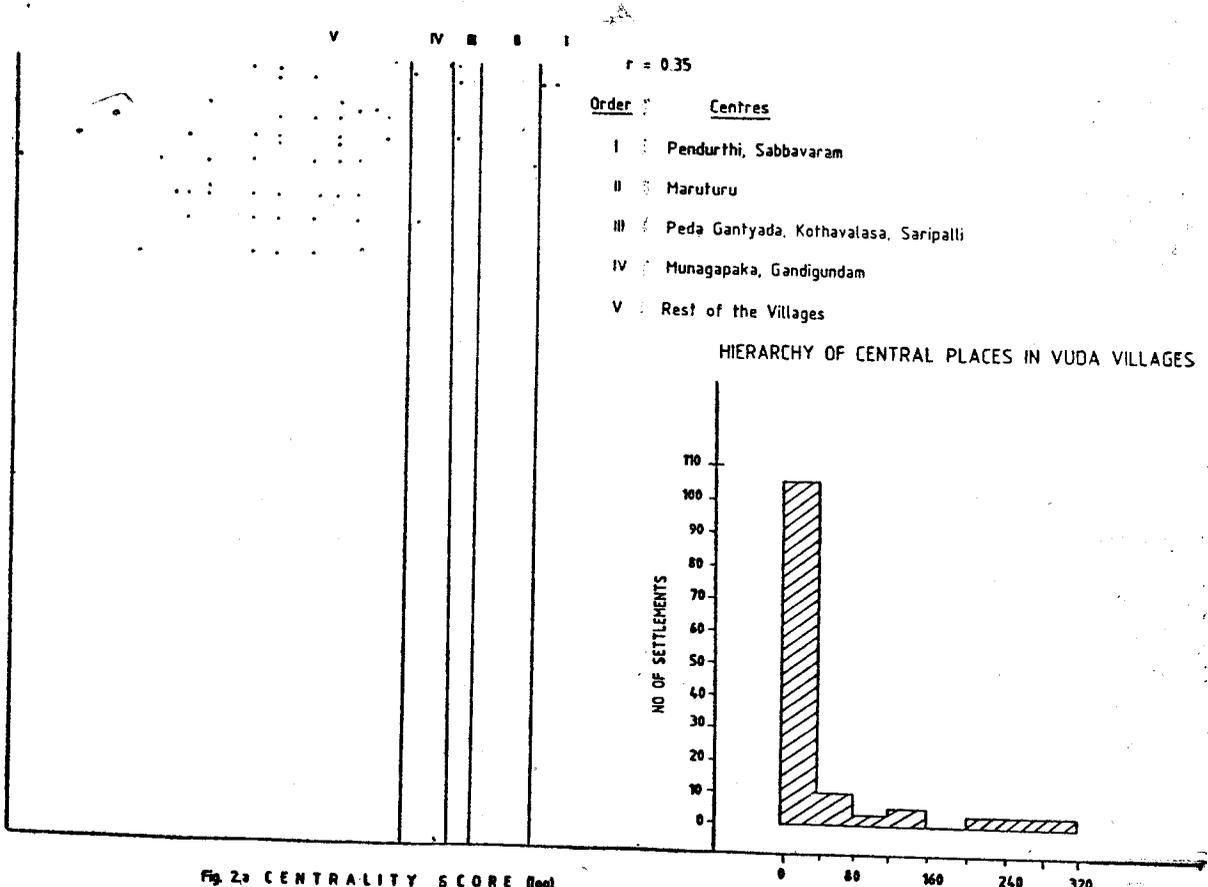HIERARCHY OF CENTRAL PLACES IN VUDA VILLAGES

Fig. 2a CENTRALITY SCORE (log)

Fig. 2(b) Centrality Score

and the scatter diagram does not indicate that the centrality score increased with the population of a place. In many cases the higher order central places had a population less than the lower order centres. Some of the centres with high population do not have the expected number of functions resulting in a lower centrality score.

Hierarchical Pattern :

The Z–value of centrality score (standardised central score) for each place is calculated. The classification of centres in a heirarchical order is worked out with the variation of Z–value from the mean centrality score of the centres. This method gave a five order central place heirarchy, composed of 2 first order, 1 second order, 3 third order, 2 fourth order and 118 fifth order central places. The grouping is formed with a class internal of +1 Z–value and it extends from below +1 Z–value to above +5 Z–value.

TABLE IV

Hierarchical Pattern of Central Places :

Order	Z-Value	Range of centrality score	No. of Centres
I.	Above + 5	Above 255.77	2
II.	+3 to + 5	165.27 to 210.52	1
III.	+2 to + 3	120.02 to 165.26	3
IV.	+1 to + 2	74.77 to 120.01	2
V.	Less than 1	less than 74.77	118

Number of functions in a central place are plotted against centrality score (Fig. 3) and the resulting scatter diagram indicates the increasing functional magnitude in higher order centres. There appears to exist a positiver elation between number of central functions and centrality

Ist order centres :

At the apex of the hierarchical class stands Pendurti village with a population of 5622 and having the highest centrality score of 364.54. It is closely followed by Sabbavaram, with a population of 6228 and a centrality score of 270.81. Though the latter settlement has a higher population, it has a lower centrality score than Pendurti which has an extra service function; the Technical Institute. The variety of functions at these two centres include higher education, medical facilities, banks, postal and telegraph services, transport and communications besides social welfare services. These centres can be considered as ' Growth Centres '.

IInd order centres :

Meruturu, belonging to Anakapalli mandal (Sabbavaram taluk), with a population of 2435 has a centrality score of 239.09. This is the only centre of the second order. It has twelve of the sixteen functions considered. This settlement has higher education, medical, health, postal and communications facilities. Moruturu can be categoried as a potential growth centre.

IIIrd order centres :

Of the three third order centres, Pedagantyada, Kothavalasa and Saripalli, Pedagantyada has the highest population with 18,582 people, while Saripalli has 2711 and Kothavalasa 7658 people. But the centrality score of Saripalli is the highest with 129.84, while that of Gantyada and Kothavalasa are 122.67 and 120.80 respectively. The educational facilities at Kothavalasa are better with a Junior College which is not available at the other two centres. Medical facilities appear to be better at Saripalli which has a hospital though it has only a Primary School. Banking facilities are good at Pedagantyada. All these three centres belong to the category of ' service centres '.

IVth order centres :

Munagapaka belonging to the same mandal and Gandigundam of Anandapuram mandal have populations of 8777 and 1224 with a centrality scores of 87.6and 100.4 respectively. Though the population and the number of central functions of Munagapaka are higher
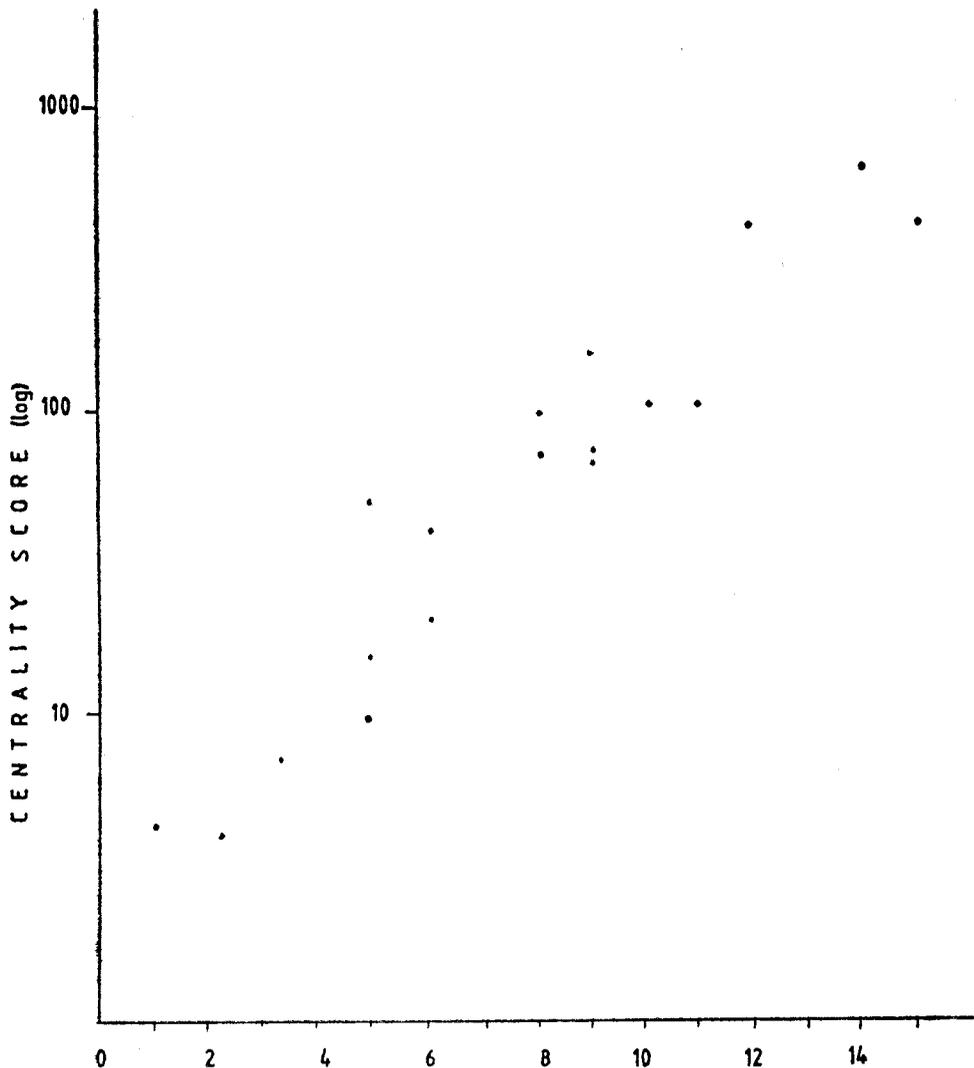
CENTRALITY SCORE AND CENTRAL FUNCTIONS

Fig. 3. C E N T R A L   F U N C T I O N S

than that of Gandigundam, the relative centrality score of the former has gone down since it does not have the expected number of facilities required for its population and hence is not in a position to serve its neighbourhood with certain functions. Both centres have educational, health, postal, communication and welfare facilities, so these centres have emerged as 'central villages'.

Vth order centres :

All the remaining 117 villages with a centrality score of less than 74.77, with fewer facilities can be classified as dependent villages. The range of centrality varies from 1.5 to 75.94% of the villages belong to this category. 50% of these villages have less than the average number of facilities possessed by the central villages of the

region. About 25 villages have only two or three services.

Very few centres of the fourth order have higher eduction and medical facilities. Only 3% of the centres have the facility of a Junior College, while 2% have hospital facility. It is discouraging to note that a mere 25% of the villages have upper primary education facility. Excluding postal services, tele-phone and telegraph facilities are also low. While one settlement, Mettapalem with a population of 697 is an exception. It has two technical institutes while other villages with higher populations and higher centrality scores have no such facility.

The growth centres, service centres and central villages and their dependent villages have been identified objectively with the aim to delineate the basic planning units and to identify settlements in these units for locating new investments in agricultural, industrial and social facilities. The smaller planning unit consists of the central village and its hinterland. The service and growth centres have larger hinterlands as they are on different levels of the functional hierarchy. The nature of investments that can be put in them also varies. The central villages should be up graded with the provision of more facilities and the dependent villages should have proper linkages with them to sterngthen the spatial interaction which already exist. As the level of development is low in the study area, a few dependent villages and their central village have to be considered as centres for planning agricultural infrastructure and social facilities. Such a unit will be called a 'cluster'. Hence the smallest unit, the cluster will be the most important starting point for planning from the bottom of the hierarchy.

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Address of the Author

K. D. Rama Rao,
Institue for Coastal and Offshore Research
(INCOR), Andhra University Campus,
Visakhapatham–530 003.