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Income, Public Social Services, and Capability Development: A Cross-district Analysis of Pakistan

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ABSTRACT

Is household income enough for human development or should government direct resources towards the provision of social services to improve capabilities of individuals? The former is emphasised by the World Bank, and the latter by the United Nation Development Programme (UNDP). This paper tests both sides of the question by estimating a basic needs policy model for Pakistan, using cross-district data for the year 1998-99. The results are consistent with the view that government provision of social services affects human capabilities significantly. However, the ultimate constraints on the sustainable capability development are the availability of material resources.

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I. INTRODUCTION

Like many other developing countries, lack of opportunities has been an acute socio-economic problem of Pakistan. In 1970, about 25 million people lived in income poverty whereas 42 million suffered from the poverty of basic human opportunities in health, education and material well-being. Over the years its acuteness in relation to the other variables has accentuated despite significant economic growth and generous foreign assistance[1] [UNDP (1999), Hussain (2003)]. However, wide variation across regions of Pakistan can be observed from district level statistics of Pakistan. It shows that some areas have achieved the level of developed countries but some areas lagged far behind. For instance, infant mortality rate (IMR) [a measure of aggregate capabilities which shows satisfaction of four basic needs Goldstein (1985) and Hicks (1979)] was 32 per thousand live births in Islamabad compared to 98 per 1000 live births in Sargodha, in 1998-99. Similarly, the literacy rate was very high in Islamabad, 91.3 percent and very low in Layyah, 20 percent. Layyah is also very poor in terms of income poverty with 91 percent of its population consuming less than the income required to fulfil their basic needs. In this situation, there is an urgent need to find effective remedial measures to build the basic human capabilities to bring districts with poor performance closer to the level of the districts with extremely good ones. In this situation, the critical question is: how Pakistan can achieve the goal of human development and bring poor districts closer to the rich ones: through growth-oriented policies or through public provision of social services? The rout may vary by district due to difference in level of the development in base year and variation in socio-economic indicators.

Among various approaches, the 'Basic Need' approach is seen as a more direct route to raising the capabilities of the poor. The approach defines deprivation not in terms of income but in terms of inability to meet certain basic human needs that are defined by hunger and malnutrition, ill health, lack of education, safe drinking water, sanitation facilities, and decent housing[2] [Goldstein (1985) and Hicks (1979)].

In the literature, two approaches the income growth and the public provision of social services particularly basic health and education in the development of human capabilities are widely discussed.[3] The former is

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[1]During the last twenty years, government expenditure on education and health varies between 1 to 4 percent of GDP.

[2]Housing means decent shelter, which have sanitation facilities and safe drinking water.

[3]Hanmer, *et al.* (2003), White (1999), UNDP (1996), Siddiqui (1995), World Bank (1995) and (1990), Griffin and McKinley (1994), Annand and Ravallion (1993), Kanbur (1987), Hicks (1979), etc.

emphasised by the World Bank[4] and the latter by the UNDP. The World Bank emphasises on maximisation of production with a view that a large volume of output per head increases capabilities of the people and enhances human well being as the people in rich regions have more access to the basic health and education facilities and more choices to lead a full and productive life compared to the people living in the poor region. South Korea is a good example of these policies. The UNDP emphasises on the public provision of social services and sees it as a direct attack on human poverty. The proponents of this approach [Sachs (2004), UNDP (1996, 1999)] give a number of reasons to follow this approach. First, people are not sufficiently knowledgeable about their health and nutrition and therefore do not spend incremental income wisely. Second, there is a serious skewed distribution of incomes within a household, which could be overcome only through the direct provision of goods and services. For example, female education can be increased by constructing more public girls' schools near their houses. Third, some basic need can only be met through public provisions such as sanitation facilities and to some extent safe drinking water. Fourth, the public provision of these facilities are expected to help all people equally, while focusing on the growth-oriented policies such as increasing labour skill and their productivity or employment opportunities benefit only a certain group of people. A comparison of socio-economic indicators of the developing countries showed that government programmes had played a pivotal role in the improvement in infant mortality rate (IMR). For instance, in Sri Lanka half of the reduction in the IMR is due to the anti malaria programme of the government [Hanmer, *et al.* (2003)]. However, nobody (including World Bank and UNDP) deny the importance of economic growth[5] as resource constraint has been a major reason for the low public investment in social sectors in developing countries.

Before exploring the role of household income and public provision of social service in capability development, understanding the poverty creating mechanism is necessary in order to devise an effective solution at the district level. Therefore, the objective of the study is twofold. First, using micro household survey data for the year 1998-99, the study calculates various indicators namely head count ratio of poverty, Gini coefficient for inequality, literacy rates and a number of indices as proxies for public investment in provision of social services at the district level. These indicators help us to understand the reasons why a district has achieved the level of a developed country while the others are lagging behind. In what ways do certain districts with exceptionally good human

[4]See Christiaensen, *et al.* (2002), Alwang, *et al.* (2002), World Bank (1990).

[5]In Zimbabwe, it is found that individuals invested in human capital but the economy did not create the types and quantities of jobs to reward this investment. Resultantly, returns to human capital declined substantially and cannot reduce poverty. On the other hand, the relationship between ownership of physical assets and well being remained constant [Alwang, *et al.* (2002)]. Whereas, case of Sri Lanka's indicates that progress in human development can be achieved through government intervention independent of economic growth [Anand and Ravallion (1993)].

development contrast with those with exceptionally bad ones, etc. Second, it develops a simple basic need policy model. The model is estimated with two stage least square method using cross-districts data for the year 1998-99 to explore the routes to capabilities development by region. The results of the study can be used to develop effective anti-poverty strategies.

The plan of the study is as follows. Section II describes data sources and methodology used in the development of various indicators at the district level and a basic need policy model. Major findings based on descriptive statistics and estimated model are reported in two subsections—a and b—of Section III. The final section concludes the paper by identifying the need at the district level.

II. DATA AND METHODOLOGY

The data for the year 1998-99 is assembled at the district[6] level for the four provinces of Pakistan—Punjab, Sindh, NWFP, and Balochistan. The distinction among districts located in the rural and urban areas is also made to capture the rural/urban differences. Initially we have 107 districts from four provinces of Pakistan. Some districts are excluded from the analysis due to data limitation. The present analysis is based on 78 districts (distinguished by rural and urban), 39 from the urban (24 from Punjab, 5 from Sindh, 7 from NWFP, 3 from Balochistan) and 39 from the rural (24 from Punjab, 6 from Sindh, 7 from NWFP, 2 from Balochistan). The sample is dominated by Punjab [being the largest province] and more districts from the provinces other than Punjab are dropped due to unavailability of consistent data set and due to data problems such as misreporting. Various sources have been used to gather data at the district level, i.e., Pakistan Socio Economic Survey[7] (PSES) [Pakistan (1999)], Pakistan Integrated Household Survey-(PIHS) [Pakistan (1999)]. The socio-economic indicators of provinces are taken from Census data-1998 [Pakistan (2002a, b, c, d) and Mahmood (2003)].

Government expenditures on public provision of education, health services, water supply, and sanitation facilities at the district level are not easily available. In order to get an idea of public provision of social services at the district level, input indicators called public policy indicators (PPI) have been developed to portray the level of public provision of social services; education, health, water and sanitation facilities. This information is not available from PSES. It has been taken from HIES-1998-99 [Pakistan (1999)] for the rural areas and from socio-

[6]When district level data is not available, we used stratum—which include more than one district. However, variables are defined on per capita basis.

[7]PSES is conducted by Federal Bureau of Statistics (FBS) in 1998-99 under MIMAP project of Pakistan Institute of Development Economics. It consists of all urban and rural areas of the four provinces of Pakistan. The sampled households covered during 1998-99 are 3564 (2268 rural and 1296 urban). It provides information on income, consumption, labour force, education, and health etc. To keep consistency in variables, majority of variables are taken from PSES.

economic indicators[8] [Pakistan (2001)] for Pakistan. Using these two sources of data, information for urban areas has been extracted. Infant mortality rates at the district level are taken from a study by Mahmood (2003). He has estimated IMR from Population Census conducted in March 1998 at the districts level in the rural and the urban areas of Pakistan.

(a) Monetary Variables

Monetary variables can be expressed in terms of monetary unit—in rupees term or estimated with reference to monetary variable.

(1) *Households' income per capita (Y_{PCH}).* Y_{PCH} is total household income of a district divided by its population.

(2) *Poverty (POV)*: Poverty is perceived in terms of income. It is measured by head count ratio using basic need poverty line i.e., percentage of population consuming less than income required to satisfy their basic needs.

(3) *Basic Need Poverty Line*: Poverty lines for the rural and the urban areas for the year 1989-90 are taken from Siddiqui and Kemal[9] (2006) and updated for the year 1998-99 by adjusting for inflation. Poverty lines are Rs 8464 and Rs 7017 per year per person for the urban and the rural areas,[10] respectively.

(4) *Inequality (Gini)*: Differences in income measure difference in opportunities for reducing poverty. Gini coefficients measure inequality within a specific region. Poverty and inequality is calculated on the basis of PSES-1999 using DAD programme [Duclos (2001)].

(b) Non-monetary Variables

The non-monetary variables are variables which are not measured in terms of monetary units. They are characterised as qualitative variables or in terms of quantity. Two non-monetary variables, infant mortality rate (IMR) and literacy rate (LR), are used to reflect aggregates of individual capabilities.

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[8]Socio-economic indicators at the district level are developed by Federal Bureau of Statistics and Provincial Bureau of Statistics jointly. This is the first attempt of compilation of socio-economic indicators at the district level.

[9]For detailed methodology to estimate poverty line [see Siddiqui and Kemal (2006)].

[10]Ideally poverty line should be adjusted for various regions to reduce regional bias due to variation in prices across the region. And also because people living in mountain areas need more calories from food and use more fuel to cope with the cold temperature. Thus using same poverty line for all areas may over estimate or under estimate poverty [Chakrabarty (2003)]. The use of poverty line estimated on the basis of the averages for the rural and urban areas may under estimate incidence of poverty.

(5) *Infant Mortality Rate (IMR)* is defined as the infant death rate per 1000 live births. It reflects satisfaction of at least four basic needs and is considered the best indicator to measure capabilities development [Goldstein (1985)].

(6) *Literacy Rate (LR)*: It measures educational status (stock) of a district. It is defined as the ratio of literate persons to the population of 10 years and above.

Both IMR and LR are bounded variables. Once a direction of the relationship is established, beyond some point they become indeterminate. For example, LR cannot go beyond 100 percent. In the model it is assumed that targeted values of IMR and LR are 5 per thousand live births (minimum level of IMR a country has achieved) and 100 percent, respectively. A non-linear transformation of the infant mortality rate—log (IMR-5)—measures the proportionate gap between the actual and the desired level of capabilities. Similarly, log (100-LR) measures the proportionate gap between the target of 100 percent literacy rate and the actual literacy rate in a district.

(7) *Female Education*: Female literacy rate and mothers education in number of years of schooling are also calculated from PSES-survey [Pakistan and PIDE (1999)] and included among other explanatory variables. The empirical literature suggest that mother's education and infant mortality rate are negatively associated [Sathar (1987), Shehzad (2003)]. However, there is some evidence that this variable is not significant for the countries where females are less empowered [Kabeer (2003)]. It is included among other explanatory variables to evaluate its impact on capability development in case of Pakistan.

(8) *Public Policy Indicators (PPI)*: Three input indicators have been developed to portray the level of public provision of social services; 'education', 'health', and 'water and sanitation' facilities. They measure the level of public investment in education, health units, supply of clean water, and sanitation facilities. A brief description of these indicators is given below.

(8a) *Public Provision of Education*: The paper focuses on primary education only because the study assumes that basic education is a necessary condition for the development of human capabilities.[11] Budget allocation among various sectors is important as well as budget within the sector is important in determining the development of human capabilities of the poor. If a large portion of the budget for education is allocated to tertiary or university education rather than primary education, that pattern is likely to be biased against the poorer sections of the population. Therefore, primary enrolment and number of

[11]Thus primary education is primarily focused.

primary schools are taken as indicators of the public provision of basic education.

The number of public/primary schools in a district determines the level of government investment in primary education in absolute terms. While, primary school age population per school in a district determines the size of public investment in primary school relative to their needs. To some extent it also indicates the quality of education, as population per school rises, the standard of education is expected to decline.

(8b) *Public Provision of Health Facilities (PPH)*: Population per health units and population per bed are used as proxies to measure the size of health facilities per district provided by the government. The indicators are constructed by giving different weights to various health facilities, highest to hospital and lowest to other health units. The ratio of population to aggregate number of health facilities determines the population per unit of health facilities.

(8c) *Public Provision of Water Supply and Sanitation Facilities (PPWS):* Three indicators for public provision of water and sanitation facilities are constructed: (1) availability of tap water (PPTW), (2) availability of two types of sanitation facilities, covered (CSEW) and open (OSEW), (3) availability of government services to collect garbage.

First, a dummy variable "D" is defined as D=1 if facility exists in a district then weighted by the percentage of population using that facility. Primarily, separate indicators for each facility are developed by measuring percentage of population using the facility. Then indicators have been integrated to develop a composite indicator by taking the average of PPTW, CSEW, OSEW.

Three variables described in the sections, 8a to 8c determine policies adopted by the government at the district level. Each index is divided by their respective highest value and multiplied by 100. The ratio varies between '0' and '100'. It provides a measure of disparities across the district. The closer the value of index to '100' the minimum is the disparity from the developed district. However, a large disparity in income and in public provision across the districts is evident from the data. The under investment in social services translates into lower welfare indicators such as IMR and literacy rate.

(c) Basic Needs Policy Model

The satisfaction of basic needs reflects [in aggregates] individual capabilities such as long and healthy life, acquire knowledge, have enough resources to buy food and other necessities. Empirical studies measure individual's capabilities by various indicators such as infant mortality rate (IMR), life expectancy (LE) and literacy rate (LR) etc. [Goldstein (1985), Annand and Ravallion (1993), Kanbur (1987), Hicks (1979), Hanmer, ***et al.*** (2003)].

Let a set of capabilities 'B' defined over capability indicators IMR, LE, and LR.

$B = [IMR, LE, LR]$

First indicator—infant mortality rate (IMR)—is considered the best to measure aggregates of capabilities and welfare among others. Because it measures the availability of at least four basic needs [Goldstein (1985)] i.e., an outcome variable of inputs—health and nutrition. Infants are very sensitive to water borne diseases. Thus, IMR is also a good indicator of availability of clean water too. The second capability development indicator is the literacy rate (LR). It indicates accumulation of knowledge. The third indicator is life expectancy, which is highly correlated with IMR. The decline in infant death rate is accompanied by an increase in life expectancy at birth. Due to unavailability of data, it is dropped from the set of capabilities development indicators.[12]

The next question is which route should be followed for capabilities development, growth proposed by the World Bank or the public provision of social services proposed by the UNDP. Both of them do not deny the importance of the other as income is one of the many options that people would like to have to buy basic necessities.

First we assume that satisfaction of basic needs or capability development is a function of income, an equation is defined in log form as follows.

$$Log\,(Bi) = \alpha + \beta\, Log\,(Y_{HPCi}) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

Here Bis measured in terms of gap between actual and desired level of capability indicators such as IMR and LR, Y_{HPC} *= household per capita income, i = Districts.*

A negative sign of β indicates that economic growth expands human capabilities directly. It increases the individual's command over goods and services such as food, health, and education that ultimately reduce IMR—an indication of development of individuals' capabilities. This view is based on the assumption of equal distribution of income. At the second stage, this assumption is dropped and income distribution variable—GINI-coefficient—is included in the equation based on the view that not only growth but growth with equal distribution is important.

$$Log(Bi) = \alpha \; + \beta Log(Y_{HPC\,i}) + \delta GINI \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

Another view is that relationship between income per capita and capability development is steepest at low income and flat beyond some point [Annand and Ravallion (1993)]. This suggests that social outcomes can only be improved significantly if income poverty is reduced. Therefore, they suggest

[12]The conclusion about life expectancy can be drawn on the basis of the results for IMR.

that the relationship between income and capability development should be tested empirically after controlling for incidence of absolute poverty measured by the head count ratio.[13] Thus Equation (1) is extended by including poverty estimates measured by percentage of the population consuming less than the income required for satisfaction of the basic needs.

$$Log(Bi) = \alpha + \beta Log(Y_{HPCi}) + \gamma Log(POV_i) \quad \ldots \quad \ldots \quad \ldots \quad (3)$$

Where POV stands for FGT index of poverty—head count ratio

If β ceases to be significantly different from zero and γ turns out to be statistically significant, then it can be concluded that it is not growth in income that is important but reduction in poverty helps to achieve the goal of capabilities development.

The model is further extended by including public provision of social services to explore the answer to the crucial question: Does the relationship between income and IMR or poverty and IMR coexist with public provision of social services? This hypothesis is tested by re-estimating the Equation (1). It includes indicators of public provision of social services such as population per health unit, the number of schools, primary enrolment, and the provisions of sanitation and supply of clean water facilities. Here the model postulates that *Bi* depends not only on individual's command over the goods measured in terms of per capita income (Y_{PCH}), poverty reduction, but also on the public provision of social services (PPI_j). The relationship is tested estimating the following equation.

$$Log(Bi) = \alpha_i + \beta_1 Log(Y_{HPCi}) + \beta_2 Log(POV_i) + \beta_{4i} \sum_{j=1}^{3} Log(PPI_j) \quad \ldots \quad (4)$$

Where PPI = Public Policy Index for Government provided social services, and *i* stands for districts and *j* stands for various indicators for Public provision of social services, education, health, sanitation facilities and clean water supply.

If the relationship between IMR and income or/and IMR and poverty vanishes in the presence of public provision of the social services that suggests that public provision of the health services is the main force behind capability development.

However, the importance of income cannot be denied as income plays an important role in the development of individuals' capabilities. Growth not only raises household income but also increase government revenue. Public provision of social services depends on the available resources. The link between

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[13]Head count Ratio is defined as number of population below poverty line and define as; $p^a = 1/N \sum_{i-1}^{n} (Z - Y_i)^a$ where '*Z*' is poverty line, *y* is income and α=0̃ for head count ratio [for detail see Foster, *et al*. (1988)].

government provided social services and income per capita rests largely on the assumption that increase in income of a district contributes to GDP growth, which provides resources for social expenditure. An equation for public provision of social services at the district level is defined as a function of per capita income of the district to test the hypotheses that income is a necessary if not sufficient condition for capabilities development.

$$Log(PPI_{ik}) = C_0 + C_1 Log(Y_{HPC}) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (5)$$

k = Education, health, water and sanitation facilities

The primary enrolment and the number of primary schools in a region are included as indicators of public provision of basic education. Population per health unit are used to measure health facilities at the district level. Separate equations are estimated for health and education services as a function of income per capita. Lastly an equation for safe drinking water and sanitation facilities is also estimated.

In the literature, education is the most important single variable. Evidence from the empirical studies reveals that social returns from female education are higher in terms of reduced fertility, reduced infant mortality, lower school dropout rates or high literacy rates, [Sathar (1987)] etc. Here, mothers' literacy rate/mothers' education measured in number of years of schooling are also included among other explanatory variables. Other variables such as quality of public provision measured by primary school age population per primary school, the ratio of female literacy to male literacy rates have been included in the model during the estimation procedure.

Next it is assumed that not only income but capabilities development also work to reduce income poverty.[14] Lower capabilities cause higher poverty and vice versa. Therefore, a poverty equation is defined as follows.

$$Log(POV_i) = P_0 + P_1 Log Y_{HPC_i} + P_2 Log(IMR_i - 5) \quad \ldots \quad \ldots \quad (6)$$

The model is estimated by two-stage least square (2SLS) method with monetary and non-monetary variables as inputs.

III. RESULTS

The socio-economic status of districts is discussed first. The variation in socio-economic indicators across the district within a province and differences across the provinces is an indicative of regional disparities in the quality of life. The second section focuses on the regression results of the model.

[14]Income poverty and 'how can it be reduced in the country where 32 percent population, about 45 million people, do not have enough income to satisfy their basic needs has been the focus of many development policies of the country.

(a) Socio-economic Indicators, by District

The ranking of districts in each province with respect to socio-economic indicators is given in ascending order in Table 1 Appendix I. The results in the table reveal that some districts have achieved high level of capabilities reflected in low mortality rate and high literacy rate accompanied by very low income poverty [see Table 1 in Appendix I]. These districts also have large public facilities. For instance, 'Islamabad', the capital of Pakistan, which comes at rank 1 with respect to IMR and at rank 2 with respect to income poverty. Other indicators of public provision of social services also show that Islamabad ranks very high with respect to public provision of social services such as tap water, health and sewerage facilities. It is ranked 1 with 91.3 percent literacy rate (93 and 90.4 percent literacy rate for male and female, respectively). On the other hand, some districts have been left far behind such as 'Layyah' and Vehari—the poorest districts in both the rural and the urban areas of Punjab (Table 1 in Appendix I).

A comparison across the districts of Punjab reveals wide disparity in aggregates of individual capabilities and income poverty. Table 1 in Appendix I reveals that the status of Rawalpindi is ranked very high with respect to all indicators. Vehari has a very low status with very high IMR and low per capita income. However, the literacy rate is not very low and this can be attributed to larger facilities of public provision of education in the urban areas. On the other hand, Layyah has larger public investment but low capabilities of individual's i.e, IMR is very high and the literacy rate is very low. Layyah is the poorest area of Punjab. Here, despite public facilities of education, the literacy rate is low. The reason is that a large proportion of population; about 90 percent, is below the poverty line. The parents may prefer to send their children to earn money instead of sending them to school. In these areas, the only constraint to their capabilities development is income. Increase in employment opportunities via growth enhancing policies would help to improve the standard of living.

In the urban areas of Sindh, Dadu, Karachi and Hyderabad are in the upper group, while Khairpur and Nawabshah are in the lower group based on all indicators except income inequality. Income inequality is highest in Karachi.

The urban area of NWFP shows that the infant mortality rate is not very high in any district. This can be attributed to availability of clean water from natural resources.[15] However, income poverty is high in a majority of districts in NWFP, highest in Lower Dir and relatively low in Dera Ismail Khan and Peshawar. Other indicators also reflect the same status [Table 1 in Appendix I].

Kalat a district in Balochistan shows a very low mortality rate with low income per capita and high incidence of poverty. Here, low IMR can be attributed to provision of public health facilities.[16]

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[15]This is area where clean water availability is high from natural resources.

[16]In the absence of enough representation, results for Balochistan may be biased.

The overall results for urban areas show that the highest incidence of poverty in terms of income is in NWFP, 58.7 percent population below the poverty line. But capability aggregates (IMR) shows that poverty is highest in Punjab, 90 infant deaths per thousand live births in Vehari. With reference to the literacy rate, it is lowest in Sindh with 67.9 percent literacy rate and highest in one district of Balochistan with only 41.9 percent literate population (Table 2 in Appendix II).

In the rural areas, districts Sheikhupura, Peshawar, and Sibi show achievements level equal to the urban areas. But the results are hard to explain. First two districts show low per capita income, high absolute poverty, and poor public provisions. This may be due to availability of clean water from natural resources in NWFP.

In the rural areas of Punjab, Sargodha shows a very high mortality rate. Here, sewerage and tap water facilities seem to be the major problem. High mortality rate in Muzzaffargarh and Bahawalnagar can be explained by a number of factors such as very low per capita income, very high absolute poverty and very poor water supply and sewerage system. On the other hand, Sheikhupura and Gujranwala have high per capita income, but poor public provision of social services. High IMR can be attributed to poor public services.

In the rural areas of Sindh, Shikarpur shows very low IMR but very high income poverty. On the other hand, Hyderabad shows highest IMR but lowest income poverty within rural areas of Sindh. Both districts show very poor public provision of social services, but the literacy rate is higher in the former than in the latter. In the rural areas of NWFP, the rank of sewerage system shows poor quality of services, Peshawar shows lowest IMR and income poverty, whereas Dera Ismail Khan shows highest IMR and highest income poverty. Other socio-economic indicator such as literacy rate also confirms their position in NWFP. Peshawar shows better public provision and literacy rate than Dera Ismail Khan.

It can be seen from Table 1 in Appendix I that in the rural areas of Balochistan. Sibi is relatively in a better position than Kalat. The ranking of these two districts remains the same based on all socio-economic indicators. However, this needs to be explored further as we have only two districts from rural areas of Balochistan.

The overall results show, in rural areas, the sewerage system is very poor after that availability tap water seems to be the problem. Other indicators of public provision of social services also reveal low level of public investment. But some districts in rural areas have achieved the level of urban districts. However, some groups of population especially living in remote areas have been left far behind. But it is found that public provision of social services [education and health] can play an important role to help the households in those areas.

Table 2 in Appendix II reports descriptive statistics of various indicators such as infant mortality rate, literacy rate (total), female literacy rate, mother's education, poverty and inequality along with various measures of public provision of social services for rural and urban areas. The table reveals considerable variation within and across provinces. The results show that larger income as well as capability inequality occurs in Punjab in both rural and urban areas. The highest income inequality exists in districts of Punjab in both rural and urban areas, 0.9 and 0.6, respectively. The highest and lowest literacy rates are also in the districts in urban areas of Punjab, whereas in rural areas highest literacy rate is in Punjab and lowest in NWFP, 76.5 and 12.9 percent, respectively. A large disparity in the area of health exists in urban areas of Sindh and NWFP. The composite index of supply of tap water, garbage collection and sanitation facilities are lowest in Balochistan. The largest disparity in public provision of tap water and sanitation facilities is also in Balochistan and reflected in standard deviation of this index.

The overall results indicate wider inequality with respect to poverty and inequality in terms of income as well as in terms of capabilities occurs in districts of Punjab. But inequality in public provision of water and sanitation facilities is higher in Balochistan and rural areas of Sindh. Inequality in public provision of health services is higher among the districts of rural NWFP. From this the government can deduce the targeted areas for specific investment such as in health, education and sanitation facilities and develop an effective poverty reduction strategy.

Fig. 1. Income Poverty vs. Capability Aggregates

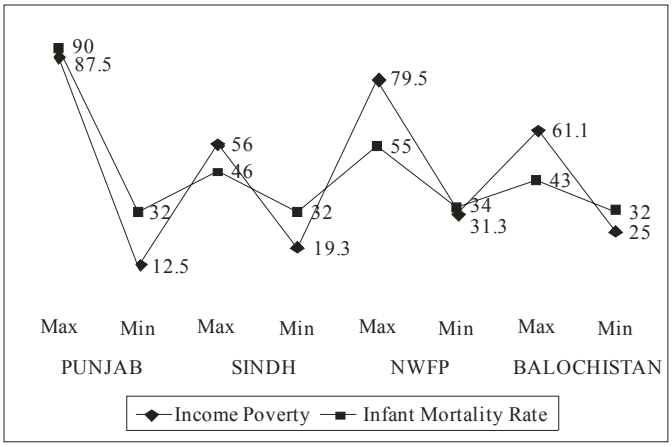

Figure 1 shows that both variables, aggregate of human capabilities (IMR) and income poverty move together. But this is not clear from Figure 1 what is cause and what is effect. The answers to this question comes in the next section.

(b) Results of the Basic Needs Model

A non-linear transformation of IMR–log (IMR-5), a measure of the proportionate gap between the actual and the desired level—is regressed against the log of mean income of districts. The results show that a one percent rise in the per capita income of households reduces the gap between the actual and targeted value of IMR by 0.6 percent. The result suggests that higher the per capita income of a district, the more likely it is that its population would be healthy and able to enjoy a full, long, and healthy life. This result indicates that the constraints on mortality decline are those of material resources. It suggests that economic growth, a key to human development, should be focused to promote human development in poor districts of Pakistan. But the question is: does the relationship co-exist with poverty and public provision variables?

At the next stage, the relationship between income and capability development is empirically tested controlling either for the incidence of absolute poverty measured by the head count ratio or by the public provision of social services. First, Equation (1) is extended by including log of poverty index (head count ratio) on the right hand side. The results reveal that the relationship between per capita income and capabilities development vanishes when we control for poverty (see results in column 2 of Table 1). The coefficient of log (Y_{PCH}), in fact reverses the sign and it cease to be significantly different from zero. Thus, it is concluded that it is not growth in income but reduction in poverty that should be focused to achieve the goal of capabilities development. It suggests that social out come can only be improved significantly if income poverty is reduced.

The next question is: Does the relationship persist after the inclusion of public provision of social services? The model is extended to explore the answer to this crucial question by including indicators developed in the previous section for public provision of social services; population per health units. After inclusion of this variable, the relationship between 'IMR and income' and 'IMR and poverty' vanishes. The results of this equation suggest that the public provision is the main force behind capability development in Pakistan.[17] Sri Lanka is a good example of it, which has followed this rout and achieved remarkable improvement in social outcome [Annad and Ravallion (1993)]. At the second stage other indices of public provision such as covered sanitation facilities and availability of tap water are also included in the equation. The results show that as percentage of population using covered sanitation facilities rises, the infant mortality rate falls. This again indicates the importance of public provision in the satisfaction of basic needs. The role of female education is often found to be a significant variable to raise the welfare of households. Boehmer and Williamson (1996) showed that female status measured by their 'control over resources' is a significant mediating

[17]Some countries like Sri Lanka has followed this rout and achieved remarkable improvement in social outcome [Annad and Ravallion (1993)].

Table 1

Results of the 'Basic Needs Policy Model'

Variables	Ln(IMR-5) Equation 1	Ln(IMR-5) Equation 2	Ln(IMR-5) Equation 3	Ln(IMR-5) Equation 4	Ln(IMR-5) Equation 5	Ln(100-LR) Equation 6	Ln(100-LR) Equation 7	Ln(Population /Health Unit) Equation 8	Ln (No. of Primary Schools) Equation 9	Ln(POV) Equation 10
Constant	9.51	0.22	–5.08	3.80	1.82	21.32	6.2	42.4	–7.92	6.50
	(5.01)	(0.11)	(0.48)	(4.07)	(2.74)	(4.81)	(4.89)	(4.32)	(2.11)	(7.71)
Ln(Y_{HPC})	-0.62	0.14	0.58	–0.07		–1.95	–0.09	–3.64	1.49	–0.4
	(2.90)	(0.98)	(0.66)	(–0.71)		(4.44)	(0.59)	(3.33)	(3.56)	(5.09)
Ln(Pov)		0.61	0.72		0.33					
		(3.07)	(1.10)		(2.37)					
Ln (No. of Primary Schools)							-0.49			
							(3.79)			
Ln(POP/ School)							-0.22			
							(3.0)			
Ln(POP/ Health Unit)			0.08	0.07	0.06					
			(2.35)	(2.22)	(2.07)					
CSEWI				–0.004	0.004					
				(2.26)	(0.8)					
Ln(Female Literacy Rate)				–0.04	0.05					
				(0.76)	(0.96)					
Ln (IMR)							0.20			0.33
							(1.4)			(3.63)
Ln(Mothers Education)										–0.19
										(3.14)
F-Statistic	8.7	8.08	6.11	5.7	7.6	16.11	9.84	11.06	12.67	31.94
R^2	0.09	0.16	0.16	0.20	0.26	0.16	0.31	0.12	0.13	0.55

- Head count.
- Value in Parentheses are *t*-statistics.
- CSEWI Index for covered sewerage system.

variable. However, in this study, female education comes out insignificant. It is an indication of disempowerment and low status of women in Pakistan. Hobcraft, *et al*. (1984, 1985) and recent work by Desai and Alva (1998) also found that this variable is significant only for a few countries. However, this needs to be explored further.

A similar test is applied to other indicators of human development—literacy rate [LR]. The results are similar to the results with IMR. The results again suggest that income per capita affects the literacy rate very significantly in the absence of the indicator of social services; i.e., one percent increase in mean income of district reduce the proportionate gap between desired literacy rate (100 percent) and the actual literacy rate by two percent. But after inclusion of quantity and quality variables of public provision measured by number of primary schools and primary school age population per schools, respectively, the relationship between LR and per capita income of district disappears. The coefficients of quantity (number of primary schools) as well as quality variables (primary school age population per schools) are significantly different from zero (Table 1). The results again confirm that public provision is the main force behind capability development in Pakistan. Here, mother's education is found to affect the literacy rate significantly which can be attributed to the fact that the literacy rate also includes educated women. All these results show that the direct impact of income on human development disappears in the presence of the public provision of social services. Should we conclude that growth does not play any role in capability development? Before concluding this, the study explores the answer to the question: Are the provision of social services sustainable in the absence of growth? The case of Sri Lanka shows that it is not sustainable without growth, while South Korea is a good example of growth-oriented policies. In this study this is tested by estimating more equations. Assuming that higher income per capita of a district implies that it contributes more to overall growth of the country; indices for public provisions are regressed on per capita income of districts. The results suggest that income does affect human development through an indirect channel, affecting public provisioning of social services positively. For a sustainable development, growth is a necessary condition to provide resources for investment in social sector. Earlier results [Equations 1 to Equation 7] suggest that public assistance promotes human development, independent of what is happening to incomes. But the results of Equations 8 and 9 confirm the presence of the indirect impact of income on capabilities development. It provides resources to government for investment. From this we can conclude that growth is necessary, if not a sufficient condition for capabilities development.

The last equation is estimated to show the route to reduce income poverty in Pakistan. The equation is estimated with poverty as a dependent variable and capabilities development indicators (IMR), income per capita and mothers'

education as explanatory variables. The coefficient of income per capita is very strong leading to the view that increase in income per capita leads to lower absolute poverty. Capability development also affects poverty negatively and significantly. Earlier results show that the relationship between IMR and poverty vanishes in the presence of public provision indicators. From this it can be concluded that human poverty (or capability Poverty) is a cause of income poverty not the result. Hence, the country should focus on development of human capability first, which help also to reduce income poverty. This result confirms Hicks (1979) argument that satisfaction of basic needs raises productivity.

IV. CONCLUSIONS

The study shows that aggregate statistics hides region specific reasons of poverty and inequalities. The analysis reveals that some areas—districts/strata—have achieved high levels of development with very low mortality rates, high literacy rates and low income poverty with large public provision of social services such as Islamabad—the capital of Pakistan. But some districts have been left far behind such as Layyah—a district in rural Punjab. The variations in these indicators across the districts within a province and across the provinces are indicative of the regional needs where improvement can be made. It can be in terms of health facilities, education, tap water or sanitation to improve the quality of life. The results show that inequality in public provision of water and sanitation facilities is higher in Balochistan and in the rural areas of Sindh. Inequality in the public provision of health services is higher among the districts of rural NWFP. The analysis can help us to devise capabilities development strategy at the district level. For instance, the government should give preference to invest in water and sanitation facilities in Balochistan and Sindh, whereas the NWFP needs an increase in health facilities to improve their condition.

The results of the basic needs policy model suggests that public provision of social services play an important role in capabilities development that lead to decline in income poverty. Therefore, it is concluded that public spending directed to social sector programmes would help to reduce poverty effectively. The government should design its anti poverty strategy taking full consideration of region specific deprivations. Otherwise, poverty will continue to linger, if not worsen. The study concludes that the major constraint on the capability development is resource availability. Therefore, growth is necessary, but it may not be sufficient to achieve the goals of human development without directing the increased resources towards the social sector.

Appendix I

Appendix Table 1

Ranking of Different Socio-economic Indicators in Pakistan, by District

Districts	Poverty	IMR	GINI	Mean Income	Literacy	Female Literacy	Population per Health Unit	Population per School	Sewerage	Tap Water
Punjab Urban										
Islamabad	2	1	26	7	1	1	10	33	1	1
Rawalpindi	3	2	10	9	3	3	26	33	6	4
Sahiwal	20	9	14	22	18	21	20	5	10	26
Attock	1	11	5	6	4	6	15	22	5	1
Lahore	7	12	3	4	2	2	30	41	3	2
Mianwali	43	16	2	41	44	63	17	12	9	21
D. G. Khan	67	17	21	66	5	4	13	19	50	17
Faisalabad	11	19	32	5	33	27	38	38	25	36
Muzaffargarh	21	19	19	33	23	33	27	26	4	58
Gujrat	8	20	26	3	12	8	19	23	50	52
Multan	35	21	9	30	51	29	32	35	8	38
Kasur	25	23	21	29	27	25	28	25	24	37
Bahawalpur	31	23	13	24	10	7	36	13	11	58
Rajanpur	37	24	4	27	9	18	8	1	50	47
Bahkar	63	25	12	60	35	57	18	8	31	58
Toba Tek Singh	23	26	25	11	26	13	2	17	26	7
Jehlum	56	27	34	34	17	22	16	18	27	11
Khushab	26	29	25	43	22	26	14	30	34	6
Sialkot	15	30	22	16	7	5	24	27	22	15
Gujranwala	24	31	3	28	19	10	42	36	17	48

Continued—

Appendix Table 1—(*Continued*)

RahimYarKhan	66	32	15	67	32	24	23	29	14	27
Layyah	67	37	8	44	73	77	7	7	33	40
Sheikhupura	46	41	21	31	23	17	22	31	20	24
Vehari	59	50	9	63	30	31	6	21	16	19
Punjab Rural										
Islamabad	41	15	20	61	8	14	46	48	25	58
Rawalpindi	39	20	24	54	25	30	48	68	41	28
D. G. Khan	69	27	12	76	39	39	61	61	50	50
Faisalabad	52	28	21	58	55	48	76	57	49	45
Attock	40	31	17	51	38	43	65	73	50	58
Lahore	41	33	37	10	49	46	52	64	50	34
Jhang	47	34	30	53	61	62	75	54	46	44
Gujrat	50	35	27	71	37	33	62	76	48	58
Sialkot	32	36	18	47	28	23	71	74	50	53
Kasur	54	37	27	62	46	47	58	59	50	58
Jehlum	58	38	31	64	24	32	54	58	38	29
Sahiwal	65	39	40	1	60	51	60	72	47	46
Bahawalpur	33	40	19	48	63	49	70	60	50	55
Layyah	71	42	13	77	62	58	50	65	50	12
Multan	41	43	39	2	57	56	56	63	42	49
Khushab	41	44	9	45	58	53	59	53	50	18
RahimYar Khan	56	44	23	68	65	59	74	62	39	39
Bahkar	21	50	11	49	41	65	72	39	50	58
Gujranwala	53	50	36	25	47	36	67	77	43	56
Vehari	51	50	27	55	56	52	68	66	36	54
Sheikhupura	38	51	28	36	58	50	53	55	37	43

Continued—

Appendix Table 1—(*Continued*)

Muzaffargarh	68	51	16	73	69	69	78	56	45	51
Bahawalnagar	49	52	13	69	64	42	64	71	50	32
Sargodha	22	53	38	52	48	41	51	51	50	35
Sindh Urban										
Dadu	18	1	7	19	6	16	31	9	2	13
Karachi all	4	5	17	8	11	9	69	40	1	3
Hyderabad	5	6	1	15	15	11	43	24	7	5
Khairpur	30	7	7	37	16	19	33	15	19	42
Nawabshaw	12	13	3	23	20	28	34	14	21	22
Sindh Rural										
Shikarpur	60	1	12	59	31	40	57	52	50	57
Thatta	27	3	22	26	43	60	44	45	32	58
Badin	14	7	14	38	68	70	66	50	50	51
Karachi all	16	8	20	14	52	61	29	37	15	9
Nawabshah	19	10	17	39	74	75	47	46	50	58
Hyderabad	13	14	6	32	72	67	55	47	50	58
NWFP Urban										
D. I. Khan	9	2	13	17	21	20	9	2	18	23
Mansehra	45	3	18	35	13	15	3	4	12	14
Swat	34	4	12	42	40	34	12	16	28	25
Peshawar	29	5	23	21	34	45	21	32	30	16
Abbottabad	17	10	13	20	14	12	11	11	13	8
Mardan	61	10	10	56	36	44	25	28	50	33
Bannu	42	21	30	57	45	37	35	3	23	1
Lower Dir	57	27	36	50	66	72	63	69	50	10

Continued—

Appendix Table 1—(*Continued*)

NWFP Rural										
Peshawar	48	1	21	65	59	64	73	75	50	41
Mardan	64	7	39	40	42	38	49	67	50	32
Kohat	55	18	33	78	71	73	45	49	50	20
Kark	56	20	29	75	54	54	39	42	50	18
Swat	62	22	35	70	50	55	77	70	44	30
D. I. Khan	70	28	16	74	76	76	41	34	50	1
Balochistan Urban										
Sibi	10	1	29	12	29	35	1	6	35	1
Kalat	36	1	23	46	53	68	4	20	50	58
Makran	6	10	18	13	67	66	5	10	29	1
Balochistan Rural										
Sibi	28	1	16	18	70	71	37	43	40	31
Kalat	44	43	23	72	75	74	40	44	50	44

Appendix II

Appendix Table 2

Regional Differences in Selected Socio-economic Indicators

	Urban Province															
	PUNJAB				SINDH				NWFP				BALOCHISTAN			
Count	Max	Min	Med	Std.Dev	Max	Min	Med	Std.Dev	Max	Min	Med	Std.Dev	Max	Min	Med	Std.Dev
Poverty	87.5()	12.5	53.8	22.7	56.0	19.3	35.7	14.9	79.5	31.3	58.7	16.4	61.1	25.0	34.5	18.7
Income per Capita	20151.2	5322.6	8527.3	4668.5	16093.5	7675.7	9482.0	3267.6	10504.6	5705.4	7905.4	1876.7	13622.8	6833.0	13170.4	3796.2
Infant Mortality Rate	90.0	32.0	58.0	13.7	46.0	32.0	39.0	5.0	55.0	34.0	38.0	7.1	43.0	32.0	32.0	6.4
Literacy Rate of District	91.3	20.0	64.7	15.9	78.0	65.9	67.9	4.9	71.2	45.5	51.5	10.8	54.2	28.0	41.9	13.1
Father Education	10.8	1.6	5.7	2.4	10.2	5.8	6.5	1.8	6.2	3.2	5.1	1.0	4.9	0.3	1.3	2.4
Mother Education	9.0	0.0	4.0	2.3	6.8	2.5	5.4	1.6	5.3	1.7	2.9	1.3	2.7	1.0	1.0	1.0
GINI	0.6	0.2	0.4	0.1	0.4	0.2	0.3	0.1	0.5	0.3	0.3	0.1	0.5	0.4	0.4	0.1
Population	3087.1	34.1	251.7	748.2	4227.9	131.9	360.7	1740.7	841.0	29.5	83.1	289.5	96.2	67.0	84.2	14.6
Population per Health Units*	2249.0	217.7	746.0	454.0	3018.4	376.0	741.3	1057.1	989.0	79.1	292.4	301.9	1711.7	456.5	1019.2	628.7
Population per Bed*	30.20	0.94	4.67	6.9	82.60	103.1	16.6	30.1	17.9	0.98	2.8	5.8	1.7	0.63	1.62	0.58
Tapwater	101.0	0.0	60.4	35.9	97.7	22.4	82.9	30.9	100.0	40.6	76.5	20.2	100.0	0.0	100.0	57.7
Garbage Collection	101.0	13.7	75.5	28.7	101.0	48.2	78.6	22.3	94.2	24.9	64.9	23.9	80.8	4.7	40.6	38.1
Covered Sanitation	100.0	0.0	39.3	32.0	101.0	32.5	81.2	32.2	65.1	1.0	28.3	21.7	24.5	1.0	12.6	11.8
Composite Public Policy Index for Water and Sanitation Facilities	101.0	10.2	59.9	20.0	94.0	51.3	87.2	20.1	76.8	36.6	61.4	14.6	73.7	0.0	59.0	38.4
Poverty	91.4	50.0	70.0	10.8	78.9	36.4	45.4	16.1	89.4	69.5	75.5	6.5	67.8	55.0	61.4	9.1
Income per Capita	43832.7	3583.3	6243.2	8628.4	11147.7	5634.2	7799.3	1814.8	7405.4	3448.1	5149.5	1399.9	9793.0	4826.8	7309.9	3511.6
Infant Mortality Rate	98.0	49.0	78.5	13.0	47.0	32.0	40.5	5.3	64.0	32.0	54.0	11.8	88.0	32.0	60.0	39.6

Continued—

Appendix Table 2—(*Continued*)

Literacy Rate of District	76.5	24.1	41.2	10.8	53.1	16.3	33.7	14.9	47.2	12.9	38.3	12.1	23.9	15.3	19.6	6.1
Father Education	6.8	1.8	3.4	1.3	4.4	1.3	2.6	1.5	3.8	1.3	2.8	1.0	2.8	0.0	1.9	1.3
Mother Education	3.6	0.0	1.8	0.7	1.7	1.1	1.4	0.3	2.3	0.0	1.4	0.4	1.1	0.0	1.1	0.1
GINI	0.9	0.3	0.4	0.2	0.4	0.3	0.4	0.1	0.7	0.4	0.6	0.1	0.4	0.4	0.4	0.0
Population*	2771.6	115.6	1326.5	682.3	1231.1	165.6	516.9	356.3	2084.2	169.0	1126.0	728.4	616.9	615.9	616.4	0.7
Population per Health Units*	255.0	46.0	64.3	44.5	73.1	8.3	53.1	22.9	154.8	23.7	53.0	49.6	25.9	18.7	22.3	5.1
Population per Bed	29.0	2.5	7.9	5.7	25.0	1.3	10.3	8.6	1732.0	6.2	115.8	686.8	4.8	3.5	4.2	0.93
Tapwater	83.1	0.0	13.0	22.8	89.1	0.0	2.1	35.3	101.0	25.8	64.9	26.3	45.3	17.7	31.5	19.5
Garbage Collection	18.6	0.0	0.0	5.7	60.8	0.0	7.9	23.4	85.2	0.0	19.7	30.0	1.0	1.0	1.0	0.0
Covered Sanitation	26.0	0.0	2.0	5.8	50.8	0.0	0.0	20.0	3.6	0.0	0.0	0.0	8.7	0.0	4.9	5.4
Composite Public Policy Index for Water and Sanitation Facilities	29.1	0.0	13.0	7.0	49.2	0.0	10.5	17.7	39.1	20.0	30.4	6.9	18.3	6.6	12.5	8.3

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