

A great disparity exists in human development among the 75 districts in Nepal

With the inception of national multi-year development plans in the 1950s, development received a focused national agenda in Nepal. Eight consecutive development plans stretching over the last 45 years have represented the guiding principles for developing various sectors in the country. During this time, hundreds of billions of rupees have been spent by the Government and through bilateral and multilateral agencies on various development programmes in Nepal.

The regional development strategies have been formulated to help minimize disparities among the population and enhance the pace of overall development. The 75 districts of the country have been the focal points for the allocation and mobilization of the resources. At the crossroads of the last 45 years of development efforts in Nepal, it is appropriate to ask: How much progress has been made in each district? and: How do the districts stand up against each other with regard to their respective levels of development?

The Human Development Index

"Development" is a composite concept. Hence it warrants multiple indicators to assess its impact. In 1990, the United Nations Development Programme (UNDP) proposed the "Human Development Index" (HDI) as a way to assess the relative position of each country with regard to three main dimensions of development: namely, longevity, knowledge and standard of living.

Longevity is measured by expectation of life at birth. Knowledge is measured by literacy and (since 1991) mean years of educational attainment. Standard of living is measured by purchasing power based on real gross domestic product (GDP) per capita adjusted for the local cost of living. The HDI is an unweighted average of the three measures. The index values for each dimension are expressed in terms of the relative distances between the lowest and highest observed values on each indicator, ranging from 0 to 1.

The HDI is based on the premise that human development is a "process of expanding choice". The index may thus be considered as a "measure of people's ability to live a long and healthy life, to communicate and to participate in the life of the community and to have sufficient resources to obtain a decent living" (UNDP, 1993). The three are assumed to be critical dimensions in that "if these choices are not available, many other opportunities remain inaccessible" (UNDP, 1990).

In its 1994 Report (UNDP, 1994), UNDP calculated the HDI on a different basis than in the previous years. Minimum and maximum values were fixed to calculate the index for each country. The fixed values were: for life expectancy, 25 and 85 years; for literacy, 0 and 100 per cent; for mean years of schooling, 0 and 15 years; and for income (real GDP per capita adjusted for the local cost of living), US \$200 and \$40,000.

The HDI overlaps with other indicators of development (cf. Hicks and Streeten, 1979; Baster, 1985). However, it differs from the "basic needs approach" in that it "moves away from a commodities-based approach" and instead focuses on the "issues of human choices" (UNDP, 1993).

Since the formulation of the concept, the HDI has received much attention worldwide, though not without some critical reviews. Research results have led some development economists to advise those applying the concept to "handle (HDI) with care" (Kelley, 1991), while others have warned that it may be "yet another redundant composite development indicator" (McGillivray, 1991). The HDI has also been criticized for its failure to incorporate the freedom dimension or human rights (Dasgupta, 1990). Still others have referred to it as "a new approach" or a "new development indicator" (Trabold-Nubler, 1991).

These debates clearly indicate that the HDI lacks (as yet, anyway) a consensus on its value among development economists. The index is most likely to receive continued rigorous scrutiny, empirically and conceptually. UNDP itself acknowledges the limitations of the HDI measure by commenting that it is a "constantly evolving measure", which may "never capture human development" (UNDP, 1993) in the fullest sense of the term. To put it another way, HDI is not and should not be considered the sum total of human development. Despite the on-going debate, the three dimensions included in the HDI are generally recognized to be much stronger indicators than a single measure. More importantly, the HDI is a highly useful measure to assess the relative position of, say, one region or district in comparison with another

region or district within a country. The present analysis builds upon the strength and utility of this measure of relative ranking within a country.

This article reports on the HDI for each of Nepal's 75 districts. Nepal ranked in the twenty-second and twenty-fifth position from the bottom of the list among 173 countries in UNDP's 1993 and 1994 assessments, respectively. Although the rankings are not strictly comparable owing to changes in some measures over the years, there seems to have been a gradual improvement in the ranking for Nepal since 1990 (UNDP, 1990).

Measurements and data

In computing the HDI for each of Nepal's 75 districts, the maximum and minimal values based on the data from Nepal are used in this analysis, not the "fixed values" as suggested in the 1994 Report. In this sense, the HDI index computed here is consistent with the approach taken in the reports preceding the 1994 Report.

The use of fixed values aims at assessing how far a country's or region's level of "human development" might be compared with the theoretically possible limits, whereas the original approach aims at assessing the relative differences between countries or regions given the currently observed minimum and maximum values. The latter may be considered to be a better measure for assessing intracountry variations and disparities.

The new additional measure, "mean years of schooling", has not been used. This measure was used in the 1994 Report because the literacy rate "failed to discriminate among industrial countries". However, literacy rate does have a discriminatory power for developing countries such as Nepal where the national literacy rate is only about 40 per cent and the mean years of schooling is low, i.e. less than three years. For this reason, the literacy rate may be considered as an "analytically appropriate" measure for Nepal. In fact, literacy has been suggested as the appropriate measure for countries with low development levels (UNDP, 1993).

Life expectancy and literacy data are based on the 1991 census. Life expectancy is calculated by using "life-table" techniques based on a 10 per cent sample of the census data. More specifically, the estimates are derived from the application of the South Asia model of "life-table" technique (United Nations, 1983 and 1988).

Literacy rate refers to the percentage of people six years and older who can read, write and count. Because literacy is self reported, it is possible that some who reported themselves to be literate may not be functionally literate. Some small-scale studies carried out in Nepal (Joshi, 1994) have found that up to 8 per cent among the self-reported cases may be functionally illiterate, but there is no way of knowing the magnitude of this problem at the district, regional or national levels. Therefore, the present analysis uses the data as reported in the census and makes no attempt to adjust the literacy rate.

Data on the third dimension of the HDI - income - are the most difficult to obtain for Nepal. This measure also happens to have received the most revision over time, and the difficulties with it appear far from being resolved (UNDP, 1993:106-107). The indicator used in the 1994 Report is real per capita GDP in United States dollars' purchasing power parity (PPP). Information on public investments and expenditures, private sector consumption and investments, exports and imports required to compute the GDP for each of the districts is unavailable.

Owing to the lack of information on GDP, this study uses data on total bank deposits and credits in each district, as reported by the commercial banks as of mid-1991 (Nepal Rastra Bank, n.d.). These data are converted into per capita values by using the data on population from the 1991 census (CBS, 1993). In this analysis, this measure is referred to as "resource access" per capita.

Although it is acknowledged that this is a poor substitute for the GDP measure, to the extent that the GDP per capita as used in the UNDP Report is purported to measure "the utility or the welfare-generating capacity of income", and that it is an indicator of "access to resources" to "obtain a decent living" (UNDP, 1993), bank deposits and credits comprise a useful indirect way to assess a particular district's accessibility to resources.

Districts with fewer banking facilities will obviously present fewer opportunities for people to deposit or borrow money. But this sort of problem also characterizes the measure of literacy rate: a district with a less well developed physical infrastructure and less human resources tends to have less opportunity to improve

on the literacy rate.

Ranking of the districts

Table 1 presents the minimum, maximum and average values of the three HDI indicators for the 75 districts in Nepal. The values for each district are provided in the appendix table on pages 12 and 13.

Life expectancy ranges from a low of 37 years (Mugu District) to a high of over 74 years (Kathmandu District), with the overall average being 55 years. Therefore, there is a total of 37 years of variation among the districts. The literacy rate is about 40 per cent nationally. It ranges from 21 per cent (Humla District) to 71 per cent in Kathmandu, indicating a wide variation of nearly 50 percentage points.

Similar variations are found with respect to resource access, also. While the national average is Rs. 2,590 per capita (US\$1.00 = average of 37.2 Rupees in 1991), resource access ranges from only Rs. 147 in Kalikot District to a high of over Rs. 47,000 in Kathmandu District. Kathmandu thus scores highest on all three indicators. The data clearly indicate wide disparities in human development among Nepal's 75 districts.

Table 1: Minimum, maximum and average values of the three HDI indicators, 75 districts, Nepal 1991

Life expectancy

	Life expectancy (years)	Literacy (%)	Resource access (per capita Rs.)
Minimum	37.4	20.9	146.9
Maximum	74.4	70.5	47,239.1
Average	55.0	39.5	2,590.0

The degrees of association (correlation) among the three HDI indicators are presented in table 2. The theoretical value of a correlation ranges from a low of 0 to a high of 1. A value closer to 1 indicates a very strong correlation, whereas a value closer to 0 indicates a very weak association. A positive or negative sign indicates the direction of association between the two variables considered.

The data from Nepal's 75 districts suggest a moderate degree of association among the three HDI indicators. The correlation between life expectancy and literacy is stronger than among other indicators. Overall, the data suggest that, while there is some overlap among the three indicators, none of them appears redundant. Each appears to represent some unique dimension not captured by the other indicators. However, it should be noted that the degree of district-level correlation among the HDI indicators for Nepal is considerably weaker than the correlations based on the cross-national data (UNDP, 1993:109).

Table 2: Correlation among the three HDI indicators, 75 districts, Nepal, 1991

Life expectancy Literacy Resource access

	Life expectancy	Literacy	Resource access
Life expectancy	1.00		
Literacy	.49	1.00	
Resource access	.30	.40	1.00

Note: All correlation coefficients are significant at $p < .01$.

Table 3 presents the HDI values and HDI rank for each of the 75 districts. Kathmandu ranks first and Mugu lowest. The differences between the two are vast: the former is 83 times better than the latter. The second best district is Lalitpur, but there is considerable disparity even between it and Kathmandu. Gorkha District, the hub of the making of modern Nepal, ranks in the thirty-second position. Chitwan, which is becoming one of the most prosperous districts, ranks in the eighth position. Nuwakot and Sindhupalchowk, two adjoining districts of Kathmandu in the north, rank fifty-first and fifty-fourth, respectively. Solukhumbu District, the home of Mt. Everest, ranks forty-third. Morang District, with the industrial city of Biratnagar, ranks fifth. Palpa District, which is famous for its traditional garments and brassware, lies in the seventeenth position. Kapilbastu, the birthplace of Buddha, ranks fifty-sixth.

Among all the districts, only five rank over 0.5. Fourteen districts have an HDI value between 0.4 and 0.5.

Thirty districts, the largest number, have HDI values between 0.3 and 0.4. Another 15 districts have HDI values between 0.2 and 0.3. Finally, 11 districts are the worst ones, with HDI values below 0.2.

Table 3: Human Development Index (HDI) values and HDI rank for the 75 districts, Nepal, 1991

District	HDI	HDI rank	District	HDI	HDI rank
Kathmandu	1.000	1	Mustang	0.331	39
Lalitpur	0.624	2	Manang	0.329	40
Kaski	0.535	3	Darchula	0.328	41
Bhaktapur	0.514	4	Kanchanpur	0.326	42
Morang	0.506	5	Solukhumbu	0.325	43
Tanahu	0.486	6	Siraha	0.323	44
Teharathum	0.478	7	Bara	0.322	45
Chitwan	0.474	8	Ilam	0.314	46
Jhapa	0.471	9	Sindhuli	0.310	47
Dhankuta	0.468	10	Mahotari	0.307	48
Syanja	0.465	11	Sarlahi	0.306	49
Parbat	0.451	12	Pyuthan	0.281	50
Bhojpur	0.432	13	Nuwakot	0.277	51
Lamjung	0.429	14	Rautahat	0.276	52
Sunsari	0.405	15	Dang	0.276	53
Rupandehi	0.404	16	Sindhupalchowk	0.272	54
Palpa	0.404	17	Bardiya	0.261	55
Arghakhachi	0.404	18	Kapilbastu	0.261	56
Baglung	0.401	19	Dadheldhura	0.243	57
Gulmi	0.399	20	Dhading	0.238	58
Sankhuwasawa	0.398	21	Kailali	0.231	59
Myagdi	0.396	22	Baitadi	0.229	60
Kavre	0.394	23	Humla	0.215	61
Panchthar	0.388	24	Doti	0.212	62
Dolkha	0.386	25	Rolpa	0.202	63
Okhaldunga	0.385	26	Salyan	0.200	64
Taplejung	0.382	27	Rukum	0.196	65
Parsa	0.369	28	Rasuwa	0.192	66
Saptari	0.362	29	Dailekh	0.191	67
Banke	0.362	30	Dolpa	0.186	68
Udayapur	0.360	31	Achham	0.184	69
Gorkha	0.352	32	Jumla	0.165	70
Surkhet	0.351	33	Bajhang	0.110	71
Khotang	0.345	34	Bajura	0.093	72
Ramechhap	0.345	35	Jajarkot	0.093	73
Nawalparasi	0.336	36	Kalikot	0.068	74
Makwanpur	0.333	37	Mugu	0.012	75
Dhanusha	0.333	38	All Nepal	0.334	

According to the classification proposed by UNDP, countries with an HDI below 0.5 are considered to have a low level of human development; those between 0.5 and 0.8, a medium level; and those above 0.8, a high level. If the same classification is followed for Nepal, there is only one district (Kathmandu) that has a high level of human development. Furthermore, only four districts (namely, Lalitpur, Kaski, Bhaktapur and Morang) have a medium level of human development. The vast majority, 70 districts, have a low level of human development. Many of the most deprived districts lie in the mountains and the hills of the mid- and far-western regions of the country.

How does the HDI correlate with other dimensions of development in Nepal? In other words, what other development factors may be associated with lower and higher levels of human development?

Table 4 presents the correlation of HDI with 12 other dimensions of development. The results show that HDI is strongly and positively related to other dimensions of development, such as communication, roads, urbanization, school enrolment, health service utilization, non-agriculture, industrialization, and toilet and piped water facilities. The results also indicate that population growth and infant mortality are considerably lower in districts with higher HDI values. Similarly, the proportion of females married in the age group 15-24 years is lower in districts with higher HDI values.

Overall, these results suggest that the level of human development is higher in districts where the levels of other dimensions of development are also higher. It may also be the case that the other developmental inputs are higher because the HDI level is higher. In this sense, the human development and other dimensions of development most probably have mutually reinforcing and synergistic effects.

Table 4: Correlation of HDI with other selected indicators of development, 75 districts, Nepal, 1991

Indicator Correlation

Indicator	Correlation with HDI	Indicator	Correlation with HDI
Communication	.69	Piped water facility	.44
Roads	.64	Toilet facility	.56
Urbanization	.66	Health services utilization	.70
Non-agriculture	.64	Population growth	-.68
Manufacturing	.68	Infant mortality	-.78
School enrolment	.66	Female married	-.44

Notes: All correlation coefficients are significant at $p < .001$.

Communication refers to total number of telephone lines, newspapers and number of airline flights per 1,000 population. Roads refer to length of roads (black-topped, graveled or earthen) in kilometre per 1,000 hectares of land area. Urbanization refers to percentage of population that lives in nationally defined urban areas. Non-agriculture refers to percentage of population engaged in non-agricultural occupation. Manufacturing refers to number of manufacturing industries employing at least 10 persons weighted by the number of employees. School enrolment refers to the averages of primary and secondary school gross enrolment ratios. Toilet facility refers to percentage of households with a flush, pan or pit toilet. Piped water refers to percentage of households with access to a piped water facility. Health services utilization refers to percentage of currently married women in reproductive age groups, 15-49, who have used various maternal and child health services. Population growth refers to annual number of births per 1,000 women in reproductive age groups, 15-49. Infant mortality refers to the average number of deaths under one year of age per 1,000 live births during a specific year. Female married refers to the percentage of females in the age group 15-24 who are married.

Source: The data are from multiple sources compiled by the author and archived in the Nepal Population and Health Data Bank, Family Health International/Nepal.

The challenge

The Human Development Index provides a portrait of the development status of each of Nepal's 75 districts. It does not, by any means, capture all the dimensions of development, but it is a better and more comprehensive indicator than that based on a single measure. The HDI may also be considered a yardstick for determining deprivation and disparity in that it indicates which districts in the country are relatively more disadvantaged than others.

The data analyzed here clearly indicate that a great disparity in human development exists among the districts of Nepal. They provide an objective assessment of which particular districts are lagging behind in human development in relation to other districts in the country and by how much. The data conceal variations that might exist among different population subgroups, such as males and females, or ethnic groups. To this end, it is hoped that the present analysis encourages further research in improving deficiencies and gaps in our understanding of the HDI for the districts in Nepal.

With the ushering in of a democratically governed political system in the country (1990-91), parliamentary representatives are expected to be more responsive to the needs of their constituents. The development portrait of disparity presents a great challenge to the vision and efforts of these policy- and law-makers. The effectiveness of their role will be evident only when the particular district they represent scores a higher

development level. The public, too, should play a more active role in setting priorities in programme intervention and resource allocation for human development in their districts. At the same time, the Government must show a real commitment, with specific strategies, to improving the overall "index" nationally and at the same time to reducing the large disparities among the districts. The donor community, too, should take into consideration the HDI ranking of the districts in its efforts to minimize the intracountry levels of deprivation and disparity in Nepal. This is the collective challenge.

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Appendix: Life expectancy, literacy rate and resource access, 75 districts, Nepal, 1991

District	Life expectancy (years)	Literacy (%)	Resource access (Rs per capita)
Kathmandu	74.4	70.5	47,239
Morang	71.3	48.5	2,356
Lalitpur	69.6	64.7	5,729
Ramechhap	68.2	30.8	320

Bhojpur	68.0	44.0	325
Okhaldunga	67.7	37.4	330
Dhankuta	67.4	49.4	1,019
Saptari	66.9	34.7	686
Dolkha	66.4	39.1	525
Kavre	66.4	40.3	568
Tanahu	66.1	54.3	659
Sarlahi	66.1	27.8	399
Siraha	66.0	30.3	492
Dhanusha	65.6	31.6	1,143
Kaski	65.5	59.7	3,099
Rupandehi	65.5	41.8	1,652
Mahotari	65.5	28.7	356
Banke	65.2	35.6	1,929
Teharathum	64.5	55.3	578
Rautahat	64.3	25.7	410
Udayapur	64.2	38.2	461
Bara	64.2	32.5	492
Parsa	64.1	35.5	4,435
Ilam	64.0	31.6	439
Myagdi	63.7	44.0	637
Syanja	63.4	54.8	598
Sunsari	63.4	44.7	1,665
Baglung	63.4	45.4	511
Parbat	63.0	53.1	636
Lamjung	62.8	50.2	583
Sindhuli	62.7	32.9	290
Bhaktapur	62.6	61.7	2,022
Chitwan	62.3	56.8	1,403
Panchthar	62.0	45.2	582
Arghakhachi	61.6	48.3	374
Jhapa	61.5	58.1	774
Humla	61.1	20.9	340
Khotang	61.0	40.4	422
Solukhumbu	60.6	37.5	772
Sankhuwasawa	60.4	49.0	454
Sindhupalchowk	60.2	30.7	358
Taplejung	60.0	47.2	343
Makwanpur	59.4	39.8	1,315
Nuwakot	59.4	32.4	337
Gulmi	59.3	50.5	537
Bardiya	58.9	30.7	425
Surkhet	58.5	44.5	475
Palpa	58.2	52.6	691
Gorkha	58.1	45.2	478
Nawalparasi	58.1	42.7	483
Darchula	58.0	41.9	377
Kapilvastu	57.5	32.4	541
Pyuthan	57.4	35.5	437
Kanchanpur	56.0	44.1	547
Rasuwa	55.3	25.3	240
Kailali	54.7	31.2	992

	54.7	25.0	236
Mustang	54.0	46.3	1,652
Doti	54.0	29.9	402
Dhading	53.9	34.2	230
Dolpa	53.6	26.5	427
Manang	53.0	47.9	1,101
Rolpa	52.9	30.1	183
Dang	51.6	42.4	684
Jumla	51.4	26.4	389
Rukum	51.3	31.3	254
Dadheldhura	50.8	38.9	339
Salyan	50.5	33.2	157
Dailekh	50.2	32.2	202
Baitadi	49.7	38.3	300
Kalikot	44.9	21.0	147
Jajarkot	44.8	24.7	180
Bajhang	44.7	27.5	194
Bajura	43.0	27.2	156
Mugu	37.4	22.5	313
All Nepal	55.0	39.5	2,590

Note: In this table, the districts are listed in descending order according to life expectancy values. Life expectancy for Mustang is based on averages of the Mountain region districts.

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A Comparative Study of the TCU 380A Versus TCU 200 IUDs in Nepal

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The cost-effectiveness and proven contraceptive efficacy of the TCU 380A should be considered when selecting a long-term, safe and effective, but reversible method

The intrauterine device (IUD) is a popular and highly tested method of contraception. Approximately 85 million women worldwide use IUDs, with the highest concentration of users being in China. In Viet Nam also, the IUD has the highest prevalence of use among reversible contraceptive methods.

The current generation of IUDs is safe for most women and about 99 per cent effective over one year of use (Chi, 1992; Farr and Amatya, 1994a and 1994b; Diaz and others, 1992; Mauldin and Segal, 1992; Sastrawinata and others, 1991; Sivin and Tatum, 1981; Sivin and Schmidt, 1987; Sivin and others, 1993; Sung and others, 1984; Tatum and others, 1989; Treiman and Kiskin, 1989; WHO, 1988 and 1990). The IUD is one of the more convenient methods of birth control because it does not require daily attention from the woman and it does not interfere with sexual activity. There are a variety of modern IUDs in many shapes and sizes available to women in developing countries. Copper was added to IUDs in the 1970s to improve their efficacy. The most effective copper IUD used today is the Copper T 380A (TCu 380A), which is being used in 70 countries around the world.

From 1985 through 1989, Family Health International (FHI) conducted a randomized clinical trial on IUDs in 23 developing countries. The trial focused primarily on the use of copper-bearing IUDs and was designed to establish the one-year efficacy of the then newly introduced TCU 380A IUD as compared with the IUD most commonly used at each study site. Additional study end-points included establishing one-year expulsion and removal rates. Safety data, such as insertion-related complaints and/or complications as well as post-insertion IUD-related complaints and adverse experiences, were also documented. Six IUDs were compared with the TCU 380A IUD in this series of studies. Five were copper-bearing: the Multiload Cu 250 IUD (MLCu 250), the Multiload Cu 375 IUD (MLCu 375), the Nova-T IUD, the Copper T 200 IUD (TCu 200) and the Copper T220 IUD (TCu 220). The sixth IUD was the non-medicated Lippes Loop IUD, a device that remains popular in some countries. This project was conducted from 1985 to 1989 and involved approximately 10,000 subjects.

As part of this multinational trial, a study to compare the safety and efficacy of the TCU 380A IUD with the locally used TCU 200 IUD was conducted at the Maternity Hospital in Thapathali, Kathmandu, Nepal. This clinical trial originally had been intended to continue through 36 months of subject follow-up; however, it was ended after the completion of 24 months of subject follow-up and before the completion of 36 months of subject follow-up on every active subject. This article reports the results of that study.

Materials and methods

Study design

FHI's Protection of Human Subjects Committee (PHSC) approved the protocol, fact sheet and informed-consent form used in the study before its initiation and served as the Institutional Review Board (IRB) in lieu of a local IRB.

TCu 380A or TCU 200 IUDs were randomly assigned to volunteer participants according to computer-generated sealed random allocation envelopes which were preprinted at FHI. At the time of each woman's admission to the study, the envelope corresponding to her assigned patient order number (PON) was opened, indicating which IUD was to be inserted. If a woman was admitted and was subsequently discovered to have an exclusion condition during the admission process, she was discontinued from the study and the PON was not reused. The next available PON was assigned to the next woman being

admitted, using the appropriate random allocation envelope. The subjects agreed to use the IUD assigned to them as their sole method of contraception during the study period and were followed up for a minimum of 24 months post-insertion.

All study subjects fit the following profile: they were healthy women who had no contraindications for IUD use, gave informed consent to participate in the study, were sexually active and between 18 and 40 years of age. IUD insertions were to be performed during the interval period (last pregnancy was to have ended at least 40 days prior to IUD insertion). Subjects were to return for follow-up at 1, 3, 6, 12, 24 and 36 months after insertion and at any other time if complications occurred. Physical and pelvic examinations were to be performed during each clinical contact with the subjects.

Information on selected socio-demographic characteristics, reproductive and contraceptive histories, and pre-existing medical conditions was obtained at the time of admission into the study. Events related to IUD insertion were recorded on the admission form, and the occurrence of subsequent pertinent events, such as accidental pregnancy, expulsion, removal, complications and complaints, were recorded on the case report forms (CRFs) during follow-up visits.

Subjects were discontinued from the study if pregnancy occurred, if their IUD was partially or totally expelled, or if their IUD was removed for any reason. IUDs that were expelled, displaced or removed after insertion were not reused. Depending upon the investigator's judgement, a subject's IUD could be left in place at the end of the study period in accordance with the approved life-span for the IUD. Subjects who elected to continue using their study IUDs would be subsequently followed up according to standard medical practices at the hospital.

Study products

The TCu 380A IUD is T-shaped and made of polyethylene with barium sulphate added for x-ray detectability. It has a solid copper sleeve on each of its two transverse arms (33 mm² surface area each) and copper wire of 314 mm² surface area wound tightly around its vertical stem. The device is 32 mm wide and 36 mm long with a plastic ball at the bottom of the vertical stem to guard against cervical penetration. A clear or colourless polyethylene filament is tied in a knot through the ball to provide two marker threads.

The copper surface area on the TCu 380A IUD is the largest of any commercially available copper IUD; this increased surface area has been demonstrated to improve the contraceptive efficacy of the TCu 380A IUD over that of the standard TCu 200 IUD (Sivin and others, 1993). At the time of this study, the life-span of the TCu 380A IUD as approved by the United States Food and Drug Administration (FDA) was four years. However, subsequent studies conducted by the Population Council demonstrated a life-span of 10 years or more; in 1994 the United States FDA extended the life-span to 10 years.

The TCu 200 IUD, which is also T-shaped, made of polyethylene and contains barium sulphate for x-ray detectability, is likewise 32 mm wide and 36 mm long. The vertical stem is wound with copper wire to provide a total surface area of 200 mm² of copper; this IUD also has two clear or colourless polyethylene marker threads attached at its end. This IUD was approved for use by the FDA in 1976; at the time of this study, it had an approved life-span of four years (Treiman and Liskin, 1988).

Data analysis

Clinical information on the safety and efficacy of the IUDs was recorded on CRFs by study staff and sent to FHI headquarters for processing and analysis. Comparisons between the two groups were made on the basis of discontinuation for one of the following reasons: accidental pregnancy, IUD expulsion/displacement, IUD removal because of bleeding or pain, other medical reasons, personal reasons, or because the woman was planning to become pregnant. IUD removals for other medical reasons were based on decisions made by either the investigator or the subject; some medical removals may not have been related to use of the IUD. Removals for other personal reasons were based on the request of the subject (e.g. moving her place of residence, being no longer sexually active, disapproval of spouse); an exception was requests for removal for the purpose of becoming pregnant.

A discontinuing subject was permitted to state only one reason for discontinuing participation in the study; competing reasons for discontinuation could not be entered into the database. If both an accidental pregnancy and an IUD expulsion were reported for the same subject, that woman was categorized by the investigator as having discontinued from the study for only one of these two reasons. The estimated date of discontinuation for unnoticed IUD expulsions, whether complete or partial, was calculated as the midpoint

date between the dates of the last follow-up clinic visit at which the IUD was in situ and the visit at which the IUD expulsion was reported.

At 12 and 24 months, subject status was classified as (a) discontinued, (b) continuing, or (c) lost to follow-up. To assess a participant's status, she was considered as "discontinued" if she became pregnant, her IUD was expelled or displaced, or her IUD was removed for any reason. In the calculation of gross cumulative life-table discontinuation event rates, subjects classified as lost to follow-up contributed to the study until the date of their last clinic visit (Teitze and Lewit, 1970).

Fisher's Exact Test was used to compare the incidence of complications and complaints ever reported during the 24-month follow-up period. The gross cumulative life-table method was used to calculate all discontinuation event rates. The Z Test was used to make comparisons of the gross cumulative life-table rates at 24 months. Statistical significance was set at $p > 0.05$ for comparing complications and complaints and discontinuation event rates.

Results

Study population

Two hundred subjects were enrolled in the study over a seven-month enrolment period beginning in November 1987. By random allocation, 100 subjects received the TCu 380A IUD and 100 subjects received the TCu 200 IUD. All subjects had their IUDs inserted six weeks or more after the end of their last pregnancy. There was one protocol violation in which one subject in the TCu 200 IUD group was over 40 years old; the specific violation was not considered clinically relevant and therefore she was permitted to continue in the study.

Baseline characteristics

Table 1 summarizes subject characteristics and reproductive history at admission. The mean age was 23.1 years for the TCu 380A IUD group and 23.5 years for the TCu 200 IUD group. All subjects in each IUD study group had at least one live birth prior to admission into the study and the overall mean was similar for both study groups. Less than 10 per cent of the subjects in each IUD study group reported having used a contraceptive method in the month prior to study enrolment. At least 88 per cent of the subjects in each study group were breast-feeding, with over one half of the women in both study groups breast-feeding with no supplementation. These measures were found to be similar between the two IUD study groups.

Table 1: Baseline characteristics of women using the TCu 380A or the TCu 200 IUD

Characteristic	TCu 380A IUD (N=100)	TCu 200 IUD (N=100)
Mean age (years)	23.1	23.5
Mean live births (number)	1.7	1.9
Breast-feeding status		
No lactation (%)	8.0	12.0
Full lactation (%)	59.0	54.0
Partial lactation (%)	33.0	34.0
Contraceptive method used in month prior to IUD insertion		
Yes (%)	5.0	7.0

Insertion status

Complications or complaints reported at the time of IUD insertion were few in number (data not shown). One subject in the TCu 200 IUD group reported having had intermenstrual pain prior to IUD insertion; this event did not interfere with the insertion. The only insertion-related complaint reported was mild pelvic pain: e.g. in 16.0 per cent of the women receiving the TCu 380A and 19.0 per cent of those receiving the TCu 200; this difference was not statistically significant.

Adverse experiences reported during follow-up

Table 2 summarizes complications and complaints ever reported during follow-up visits. Since the number

of subjects in each IUD study group was 100, the percentage of subjects ever reporting any complications or complaints is equal to the number of subjects in that group.

No hospitalizations were reported during this study. Reports of menstrual complaints during follow-up were few in number. There were no reports of dysmenorrhoea; however, menorrhagia was reported by some subjects in both the TCu 380A and TCu 200 IUD groups (3 per cent and 5 per cent, respectively). Intermenstrual pelvic pain, spotting and bleeding were also reported, although the proportion of subjects in either study group experiencing these complaints did not exceed 7 per cent. None of these differences was statistically significant.

Table 2 also summarizes the occurrence of inflammations or infections during follow-up. One case of pelvic inflammatory disease (PID), i.e. endometritis, in a TCu 200 IUD user was reported, but no cases were reported among TCu 380A users. One case of a mucoid vaginal discharge was reported in each IUD study group. No uterine perforations were reported during follow-up.

Table 2: Women ever reporting complications or complaints during follow-up * (per cent)

Complications/complaints	TCu 380A IUD (N=100)	TCu 200 IUD (N=100)
Menstrual problems		
Intermenstrual pelvic pain	5.0	7.0
Intermenstrual bleeding	4.0	7.0
Intermenstrual spotting	4.0	1.0
Menorrhagia	3.0	5.0
Unspecified menstrual complaint	0.0	1.0
Pelvic inflammatory disease (PID)		
Confined to uterus	0.0	1.0
Inflammations/infections		
Mucoid vaginal discharge	1.0	1.0
Other IUD-related findings		
Unspecified IUD problems	1.0	2.0

* Note: None of the complications/complaints was significantly different (Fisher's Exact Test: $p < 0.05$).

Continuation status at 24 months

Gross cumulative life-table discontinuation event rates are presented in table 3. Significantly more TCu 200 IUD users ($p=0.02$) experienced removal of their IUD during the 24-month follow-up period for personal reasons than did TCu 380A IUD users (6.7 and 1.2 per 100 women, respectively; $p=0.02$). Other 24-month discontinuation rates were statistically similar for both IUD groups, including those for accidental pregnancy, the primary outcome variable of interest. The overall continuation rate at 24 months was higher for TCu 380A IUD users than for TCu 200 IUD users (82.8 and 74.9 per 100 women, respectively), although this difference was not statistically significant ($p=0.18$). Owing to use of "motivators" who conducted home visits during the course of the study, loss to follow-up was low.

Table 3: Gross cumulative 12-month and 24-month life-table event rates^a

Event and time period	TCu 380A IUD (N=100)		TCu 200 IUD (N=100)		p value ^b
	Rate	S.E.	Rate	S.E.	
Accidental pregnancy					
12 months	0.0	0.0	0.0	0.0	
24 months	0.0	0.0	2.5	1.7	0.14
IUD expulsion					
12 months	8.2	2.8	10.3	3.1	
24 months	8.2	2.8	11.4	3.2	0.45
Bleeding/pain					
12 months	3.2	1.8	0.0	0.0	

24 months	3.2	1.8	0.0	0.0	0.08
Other medical reason					
12 months	1.0	1.0	0.0	0.0	
24 months	1.0	1.0	0.0	0.0	0.32
Planning pregnancy					
12 months	1.0	1.0	2.2	1.5	
24 months	4.6	2.3	7.1	2.8	0.48
Personal reasons					
12 months	0.0	0.0	4.3	2.1	
24 months	1.2	1.2	6.7	2.7	0.02
Continuation rate ^c					
12 months	87.0	3.4	84.0	3.7	
24 months	82.8	3.8	74.9	4.3	0.18

Notes: a per 100 women; b The Z-test was used to assess comparisons between gross cumulative life-table rates at a fixed point in time (24 months); and c Continuation rate is calculated by subtracting the total discontinuation rate (for all reasons) from 100.

Discussion

The major objective of this trial was to compare and evaluate the use of the TCu 380A IUD and the TCu 200 IUD among a population of women recruited at the Maternity Hospital in Thapathali. Study participants used one of the two IUDs for a period of 24 months as their sole means of contraception.

Mild pelvic pain was the only complication during IUD insertion reported among both study groups. There were few reports of complications and complaints during follow-up (less than 7 per cent of the subjects in either IUD study group reported any one complication or complaint), and most of those were related to menstrual disturbances. Such complaints are not uncommon among IUD users in the first months following insertion; generally they did not lead to IUD removals (only three TCu 380A IUD and no TCu 200 IUD removals were due to bleeding/pain).

An overwhelming majority (88 per cent or more) of the women in both study groups were actively breast-feeding and many were not using contraception at the time of admission into the study. Data were not collected as to the timing when breast-feeding ceased among these women. Although it is possible that the very high number of breast-feeding subjects may have contributed to the fact that there were no accidental pregnancies reported during the first 12 months post-insertion (owing to lactational amenorrhoea), we do not have the data to determine if this was indeed the case. Overall, only two accidental pregnancies were reported during the study, both occurring among TCu 200 IUD users during the second 12 months of IUD use.

While the difference in the IUD removal rates for bleeding and/or pain was not statistically significant, there were no IUD removals for this reason in the TCu 200 IUD group (life-table rate of 0.0 per 100 women) compared with a removal rate of 3.2 per 100 women in the TCu 380A IUD group. This finding was somewhat unexpected since there was no statistically significant post-insertion increase in the incidence of menstrual complaints among TCu 380A IUD users compared with TCu 200 IUD users. Since the TCu 380A IUD was being introduced in Nepal at the time this study was conducted, it is possible that some TCu 380A IUD users complaining of menstrual problems had the IUD removed as a precaution: this group of women comprised the first ones with whom the physicians and paramedical staff performing the insertions had experience in dealing with this device. However, this cannot be determined with certainty given these data. No additional removals for bleeding and/or pain occurred in the TCu 380A IUD group from months 12 to 24.

IUD removal rates for personal reasons were significantly higher among users of the TCu 200 IUD than among users of the TCu 380A. This is in contrast with removal rates for personal reasons in a pooled analysis for similar study sites (Farr and Amatya, 1994a). Most of the removals during the study were a result of the spouse's disapproval; however, a satisfactory explanation of why there should be a difference in the incidence of removals for this reason cannot be determined.

It is important to note that expulsion rates and removal rates for bleeding and pain or for other medical reasons were low for both study groups, and are similar to those reported from other regions of the world.

Concern with unsubstantiated evidence that women in the Asia-Pacific region may not be ideal candidates for currently available standard T-shaped IUDs, particularly the TCu 380A device, has contributed to lower than expected prevalence rates. Some physicians and family planning providers in Asian countries have expressed concern that these devices may be too large for most Asian women, thereby resulting in a higher rate of morbidity and a correspondingly higher rate of removal if inserted. However, the results from this study indicate that the Nepalese women in this clinic population had a good experience using these IUDs over a two-year period. While attending physicians must ensure that a woman is an appropriate candidate for an IUD, these data suggest that Asian women can use the TCu 380A and other T-shaped copper-releasing devices without major complications.

Although this study population was not large enough to have high power in detecting differences between the two IUD groups, a pooled analysis of data from six other FHI-sponsored clinical trials comparing the TCu 380A IUD to the TCu 200 IUD over 12 months of use in five countries (Cameroon, Chile, El Salvador, Mexico and Pakistan; N=1,631) using a similar protocol had considerably higher power (Farr and Amatya, 1994). In that pooled analysis, the TCu 380A IUD was found to be significantly more effective in preventing pregnancy than the TCu 200 IUD (12-month gross cumulative life-table pregnancy rates were 0.5 and 2.6 per 100 women, respectively; $p < 0.01$). That study also showed that IUD discontinuation rates, i.e. IUD expulsions or displacements and removals due to bleeding/ pain, personal reasons, medical reasons or planning pregnancy, were similar for both types of IUD. The incidence of other clinical events, such as intermenstrual bleeding and/or pain, inflammations/infections and insertion-related problems, did not differ between TCu 380A and TCu 200 IUD users, although TCu 200 IUD users had fewer reports of dysmenorrhoea. Taking the findings from the larger study into perspective, the trend in the discontinuation rates reported in the Nepal study are slightly lower, but in the same direction between the two IUD user groups. This suggests that the TCu 380A is possibly more effective in preventing accidental pregnancy, which is among the many aspects of this contraceptive device holding implications for large-scale family planning and birth-spacing programmes.

There are several other policy and programme implications. The extended life-span of the TCu 380A IUD allows for longer contraceptive protection, a reduction in risks associated with insertion of a new IUD, a reduction in the number of abortions due to contraceptive failure of many compliance-based methods. Further, it is potentially more cost-effective on a national scale owing to a reduced need for more frequent re-insertions associated with IUDs having shorter effective life-spans. The non-abortifacient effect of the TCu 380A and other copper-bearing devices is another important factor. These are clinically and programmatically important considerations when costs of providing family planning on a national basis continue to rise in the developing world, especially in those countries where other long-term reversible options are limited. Therefore, the cost-effectiveness and proven contraceptive efficacy of the TCu 380A IUD should be considered by family planning practitioners when selecting an IUD for women who want a long-term, safe and effective, but reversible, method of contraception.

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Promoting Small Towns for Rural Development: A View from Nepal

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A multifaceted approach incorporating complementary investments in the small towns and hinterland villages could provide the basis for rural development

The proponents of small town development see an important role for small towns in improving the conditions of the rural poor in developing countries. Firstly, an argument for promoting small towns is that they provide markets for urban consumer goods from higher-level towns and act as trading centres for agricultural goods from rural areas (Rondinelli, 1984; Gaile, 1992). It is believed that urban population growth and agglomeration in small towns creates increased demand for agricultural products from nearby rural areas. Secondly, small towns are seen as possible locations for providing non-farm employment for the growing rural populace in hinterland villages (Gaile, 1992; Leinbach, 1992). With expansion of employment in small towns, they can act as alternate destinations for potential migrants to large cities (Mathur, 1982). The rapid growth of large cities often results in greater regional inequalities, problems of governance and environmental sustainability, all of which call for greater attention to smaller towns from equity considerations as well (ESCAP, 1991; Jones, 1991). Thirdly, proponents of small towns consider them appropriate locations for concentrating public services, such as agricultural development services, health services and educational facilities, for reaching a larger rural populace (Taylor, 1981). It is assumed that the provision of agricultural credit and inputs at the small town level can introduce farming innovations at the lowest level, rather than allowing them to filter inefficiently down the hierarchy of urban centres and transportation routes causing time- and distance-delay effects.

These propositions, nevertheless, have been tested in areas with particular geographic and socio-economic characteristics. Most past studies on small towns from other developing countries have focused on areas where agriculture has moved beyond the subsistence level (Hardoy and Satterthwaite, 1986; Titus, 1991). In contrast, the people in the hills of Nepal are engaged predominantly in subsistence agriculture, although there is increasing integration of the hills with the larger national economy. In addition, while previous studies have dealt with relatively plain areas, the terrain in Nepal is largely undulating and there exists a diversity of ethnic/caste groups.

Thus, this article attempts to understand the role of small towns in rural development within the context of an area with hilly terrain, severe resource constraints and ethnic diversity. It focuses on the three primary functions of such towns: (a) as market centres, (b) as employment centres and (c) as service centres.

Small towns have been defined as nucleated settlements with between 5,000 and 20,000 inhabitants (Hardoy and Satterthwaite, 1986). In the case of the hills of Nepal, where the population is scattered, even a central place with a population of fewer than 5,000 people can be considered a small town. For the purposes of this article, small towns in the hills are all assumed to be central places providing vital urban functions such as retail services, administrative services, agricultural inputs services and employment opportunities to the rural hinterland population. This definition would generally include towns of between 2,000 and 20,000 population.

The article first discusses the processes pertaining to the growth of small towns in the hill areas of Nepal. Past studies on small towns are then examined as a background for the study. The next section discusses the findings of a case study of a Nepalese town and its surrounding villages, with respect to the three aforementioned functions and linkages of small towns. Constraints of small towns in promoting rural development are identified. An outline for a strategy of small town development in Nepal is then proposed based on the current theoretical debate on the topic and the findings of the study.

Growth of hill towns in Nepal

Nepal is one of the least urbanized countries in the world, with only about 10 per cent of its population living in officially defined urban areas. Published data on urban areas are available only for those towns with municipal status (with a population of 9,000 or more). Since the census estimate of the urban population does not consider smaller towns that do not have municipal status, many small towns in the hills which are playing an important role as market/service centres in the area are altogether excluded from the

urban definition. Hill towns are both few in number and small in size compared with towns in the Kathmandu Valley and the Terai. There are only nine hill towns with municipal status and their populations vary between 9,000 and 21,000 (except Pokhara). The hill towns with municipal status are Ilam, Dhankuta, Bidur, Banepa, Dhulikhel, Pokhara, Byas (Damauli), Tansen and Dipayal. Many other smaller hill towns which do not have municipal status have populations of fewer than 9,000 people. A list of market towns in the Nepal District Profile gives a tentative estimate of the number of small towns in the 32 hill districts as 166, an average of five market towns per district (Nepal District Profiles, 1982; cf. CEDA, 1989).

Many hill towns trace their origin to acting as administrative centres or military outposts. Another impetus for hill town growth was from the movement of Newar traders from the Kathmandu Valley to exploit the limited demand for trading activities in the hills. Most of the small towns grew along major trail routes leading to the Kathmandu Valley.

In the present context, expansion of the central bureaucracy, development of motorized transport and increase in trading activities in the hills have contributed to the development of many hill towns. Some hill towns, which are administrative centres, grew with cash flows from the national government for the maintenance of local bureaucracy and expansion of education, health and banking facilities. The increase in administrative activities at district centres has contributed to the increased opportunities for commerce in these towns to serve the civil servants and people using the administrative services.

With the development of highways, some towns along the highways have gained in importance, whereas others by-passed by such roads have declined. With the removal of protectionist trade policies, there has been increased trading of imported goods in these hill towns. Commerce is the major economic activity in towns along the highways, with few agro-processing and transport-related industries. These towns also have become the new gateways to serve the hinterland, roads from where food-grains, kerosene and salt are distributed to rural hinterland areas and locations where villagers come in search of work (Blaikie and others, 1980). Some towns have become points where travellers stop for meals and overnight accommodation and where tourists disembark for trekking. Most of the hill towns are thus engaged in tertiary activities such as commerce or administrative work.

Historically, subsistence-level agriculture, difficult terrain, limited development of hill trails and exploitative state policies, all have acted as constraints to the development of hill towns. The hill areas had fragmented "pocket economies" with subsistence agriculture and limited economic exchange between different areas in undulating terrain. The hill trails were the major link between different pockets of settlements, which were primarily suitable for local movement of people and goods in small geographic areas, thus limiting greater economic interaction (Shrestha, 1990).

As part of an integrated rural development strategy for the hills of Nepal, the Nepalese Government, in its successive development plans, has suggested the need to promote small towns in the hills. The Government stressed the development of small towns in appropriate locations in the hill and mountain regions so that they could "act as intervening points for migration, development and diffusion of socio-economic activities in the lagging region" (NPC, 1975). Recently, the Government proposed that "rural-urban linkages will be promoted through the development of small town/market centres" (NPC, 1992). However, many of the urban development projects implemented by the Government have focused primarily on the improvement of town infrastructure, preparation of land use plans for the towns and financial assessment for all municipalities, without much emphasis being given to issues of rural-urban linkages.

After the 1991 census, the Government introduced a new municipal act according to which a town can gain municipal status only if it has a population of 20,000 and minimum yearly income of 100,000 rupees (US\$1.00 = Rs. 37.2 in 1991). Although this new classification will not apply to existing towns, this type of policy measure will make it unlikely that any new towns from the hills will attain municipal status in the near future, unless political pressure is applied to make exceptions to the rules. Population thresholds for municipal status should be lower for hill districts considering the small size of towns there.

Previous studies on small towns in Nepal

A review of past studies on small towns in Nepal reveals the diverse nature of work done on the topic, as well as the research gap in the area. There are four types of study on the subject. The first type refers to research conducted primarily by anthropologists (Mikesell, 1988; Messerschmidt, 1980; Caplan, 1975), usually a detailed study of a particular town with focus on its economy and polity. Mikesell's study (1988) uses the dependency perspective to examine the historic growth of a market town in the Western Region of Nepal. Messerschmidt's study (1980) shows how a new town along a road developed while an old town declined after being by-passed by the same road. Another anthropologist, Caplan (1975) examined an administrative centre in the Far Western Region of Nepal and showed the dependence of its economy and

politics on the infusion of cash from the central Government.

The second type of research on small towns includes studies carried out by geographers which are oriented towards functional analysis of a group of towns in a particular district or region (New Era, 1986; GIC, 1984). The New Era study (1986) found that hill towns acted merely as distribution points for agricultural and industrial products from the Terai and India. The other study (GIC, 1984) contends that, while small towns in the resource-poor hills are not growing, the Terai's more productive agricultural sector has contributed significantly towards the growth of urban centres in the plains.

The third group of studies examines all major towns in Nepal, providing a comprehensive picture of different levels of towns and their hierarchy (Sharma, 1989; CEDA, 1989; K.C. and others, 1991). CEDA's report indicates that hill towns are in the lower tier of the urban hierarchy as compared with Terai towns and that the former are more important as administrative centres. Both Sharma (1989) and K.C. and his colleagues (1991) comprehensively review the migration and urbanization pattern in Nepal.

Besides these three types of study, there are other miscellaneous types of papers dealing with small towns and urban-rural relations (Erthur, 1994; INFRAS, 1991; ICIMOD, 1986; RTI, 1989). Most of these studies advocate the promotion of small towns. ICIMOD's report suggests the need for developing market towns in order to generate off-farm employment in the hills in the context of the increasing inability of farm-based activities to absorb the growing labour force in rural areas. Likewise, Erthur (1994) recently suggested the need to develop a national urbanization policy with a framework of management of small towns and middle-sized cities to maximize the country's rural development potential.

Past studies on small towns in Nepal have all highlighted the importance of small towns and contributed towards understanding the internal structure of small towns and the differences between small towns in the hills and Terai. However, most studies have not made an in-depth assessment of the towns' relationships with surrounding villages in terms of the use of urban services, marketing and creation of off-farm employment. No attempt has been made to study the hinterland villages of small towns, which could better identify the constraints of small towns in promoting rural development. Many past studies are concerned with the small town's role in rural development, but they ignore the importance of hinterland villages in the growth of small towns as well as linkages between small and large towns. These are some of the issues this article attempts to address while examining a small town in the study area.

For the purpose of this case study, fieldwork was conducted in the small town of Banepa and two of its hinterland villages (Opi and Devitar) to attain an in-depth understanding of the nature of urban-rural linkages in the hill area. The linkages between the town and villages were considered from both the town-level perspective and the viewpoint of the villagers. Banepa was chosen because it had many rural development functions suggested in the small town literature. The case study approach has often been criticized on the ground that it is difficult to make generalizations based on a single case. But as Yin (1984) argues, a case study can make generalizations based on a comprehensive understanding of the phenomenon rather than merely focusing on some notion of representativeness. Likewise, Chapman and Prothero (1983:607) believe that "findings from the case studies may be generalized to other cases for which the same contextual conditions hold".

Banepa, a small town and its two hinterland villages

Banepa is an historical market town in Kavre District with a population of 12,537 in 1991. Situated along the Arniko Highway linking Kathmandu with the Chinese border area, this town is only about 26 kilometres (km) east of Kathmandu City (a one-hour bus ride from Kathmandu bus park). The opening of the Lamosangu-Jiri Road in 1984 has enhanced Banepa's access to the eastern hills. The service area of Banepa includes four districts in the area, namely: Kavre, Sindhupalchowk, Dolkha and Ramechhap.

Two major activities dominate Banepa's economy. Firstly, Banepa continues its historic importance as the major wholesale centre for daily essential goods such as rice, salt, kerosene and clothes, catering to people from the eastern hills. Secondly, the various cottage industries, such as handloom, sweater-weaving, carpet-making, rice-milling and dairy industries, generate non-farm employment for the townsfolk and surrounding villages. Recently, an activity which has increasingly gained in importance is transport-related businesses, taking advantage of Banepa's important access to the eastern hills. Many of the well-off businessmen own buses and minibuses running along the local regional routes including the Arniko Highway and the Lamosangu-Jiri Road.

While the town is inhabited largely by the Newar ethnic group, the surrounding villages have two major ethnic groups, namely: (a) Brahmins and Chhetris and (b) Tamangs. Between the two villages chosen for examining the rural perspective on the town, Opi (250 households) is primarily a Brahmin and Chhetri

village, whereas Devitar (323 households) is a Tamang-dominated village. Both villages are within walking distance (less than 2.5 hours) of Banepa and are located in undulating terrain. People from both villages are living on subsistence agriculture, growing mainly grains. Some villagers have diversified their agriculture by growing potatoes, yams and fruit for marketing purposes. The proximity of the study area to Kathmandu has facilitated the development of a dairy industry in Banepa to fulfil the increasing demand for milk in urban Kathmandu. People from both villages walk along the hill trails to come to Banepa for marketing as well as accessing other services there.

Among the Brahmin and Chhetri villagers from Opi, there is an increasing shift towards service occupations (guards, gardeners and general labour) and administrative jobs. The range of occupations and distances travelled vary, but clearly the geographic mobility of these people is greater than that of Tamang households. Another important characteristic of Brahmin and Chhetri households is their higher literacy levels as compared with Tamangs. Some of the poorer Tamang households are also increasingly involved in wage labour such as the carpet industry and in brick kilns at Kathmandu.

Functions and linkages

Role of a small town as market centre

Banepa is the principal distribution centre for food-grains and cloth in Kavre District. Owing to the general lack of purchasing power of the rural households, the range of urban consumer goods sold in small towns primarily cater to the residents of the towns themselves. Based on a study of items sold by the wholesale and retail shops, it has been found that most of the items sold in Banepa's market are not produced or processed locally but are brought from outside the area. The majority of wholesalers in Banepa deal with food-grains and food products for the hinterland villages. The wholesalers get most of the grains directly from the Terai owing to the demand for large quantities of food-grains in remote hill and mountain regions along the Arniko Highway and Lamosangu-Jiri Road. This finding is different from the findings of studies in other developing countries with more dynamic and productive agricultural regions where the rural landlords and newly emerging urban merchants in small towns make huge profits by buying the agricultural produce from the hinterland villages and transferring such produce to large cities (Douglass, 1981; Harris, 1984).

In Banepa, the market is characterized by the predominance of retail establishments whose volume of transactions is low. With a heavy dependence on goods produced outside the area, the market is oriented towards the consumption of goods from outside rather than linked to local production. Thus, Banepa's merchants make their profits by trading in imported goods rather than selling locally produced goods.

Although the literature on small towns suggests that their development is linked to agricultural growth in the rural regions, in the context of Nepal, a small town such as Banepa grows not because of the agricultural potential of the rural hinterland, but because of the town's strategic location as a gateway to the rural hinterland with good transportation access, making it an attractive location as a break-of-bulk point and distribution centre for daily essential goods and services such as credit and agricultural inputs. Other contributing factors for the small towns' growth are the presence of local entrepreneurs and linkages with a large urban area (Kathmandu).

Banepa does not act as a collection centre for local produce as significantly as it does as a distribution centre for urban consumer goods. Only small rice mills collect rice and maize from nearby villages (larger rice mills obtain their inputs directly from the Terai). The retail fruit and vegetable market in Banepa often gets its supply from the Kathmandu wholesale market owing to the irregularity in the supply of vegetables from surrounding villages. Large surpluses of rice, potatoes and fruit belonging to rich farmers from surrounding villages often go directly to Kathmandu, by-passing the small town. In contrast, the small farmers often sell their limited produce directly to the retail establishments in Banepa to pay for items such as salt, kerosene and other daily necessities.

Although the villages of Opi and Devitar are in close proximity to Banepa and Kathmandu, as yet there has been no significant commercialization of agriculture. Most villages grow food-grain crops such as maize and rice. There is little attempt to diversify into vegetables and fruit crops. Most villagers plant small quantities of vegetables such as string-beans, cucumbers and radishes, essentially for home consumption only. A large number of households even have to purchase food-grains from Banepa owing to the small size of landholdings. The average size of cultivated landholdings is about 0.75 hectare (ha) and about 60 per cent of the households in both villages have less than 0.75 ha of land. According to one estimate, the minimum land required for the subsistence of a Nepali hill family with four members is 0.75 ha (Blaikie and others, 1980).

Maize and potatoes are two important items sold from the village. But in Opi village, only 20 per cent of the sample households sell maize, which is the most important crop in the hills. The value of the amounts sold by households ranges from Rs. 300 to Rs. 4,500 per year (average Rs. 1,548 among those who sell), indicating a relatively small volume of these crops for sale. Among those who sell potatoes, the average amount sold ranges from Rs. 150 to Rs. 10,000 per year. The situation in Devitar is not much better, with similar low levels of agricultural produce being marketed. Owing to limited agricultural surpluses, villagers sell their produce directly to retail shops in Banepa. Often the farmers sell the produce on an individual basis, and thus are not in a position to bargain for better prices. Although chemical fertilizer is widely used in the area, the use of pesticides and improved varieties of seed for higher production is limited.

The constraints on Banepa acting as a collection centre for agricultural produce have roots in the small size of landholdings and limited diversification of agriculture in the hinterland villages. The problems are further compounded by the difficult terrain, which limits the amount of cultivable land, and the lack of rural infrastructure (such as irrigation facilities, feeder roads to the village). Also, a marketing culture and entrepreneurial skills among the villagers are not well developed, which further constrains their ability to diversify agricultural production for sale.

Role of a small town in providing employment

In order to examine whether small towns such as Banepa provide an important source of employment for the hinterland population (as suggested by the proponents of small town development), the employment structure of Banepa has been analyzed both in terms of types of job created and the beneficiaries of the jobs. Banepa provides employment for the people in the area through about 55 cottage/household industries, 438 commercial establishments and 13 government/semi-government institutions.

Industries in Banepa are dominated by craft/household industries (e.g. cotton fabric, carpet- and sweater-making) and primary agro-processing (e.g. rice milling and vegetable oil production). Aggregating the employment data of industries in Banepa, it was found that 49 per cent of the employees are from Banepa itself, whereas people from surrounding villages and distant villages constitute only 38 per cent and 13 per cent, respectively, of the work force. In terms of ethnic status, it was found that Newars constitute 80 per cent of employees in the industries, followed by Brahmins and Chhetris (10 per cent), Tamangs (8 per cent) and other groups (2 per cent). While enterprises such as rice mills and furniture industries employ mainly family labour, other industries such as handloom, carpet- and sweater-weaving industries have a much higher proportion of hired labour. The largest handloom industry employs as many as 80 workers from surrounding villages who often weave fabrics at home and are lowly paid on a piece-rate basis.

A review of the employment records of offices in Banepa indicates that, of about 495 people employed in service-sector jobs, 49 per cent are from Banepa town itself, followed by 31 per cent from surrounding villages and 20 per cent from other areas. Often, higher-level jobs are handled by the town dwellers, while people from surrounding villages have lower-level jobs. Newars account for 60 per cent of employees, followed by Brahmins and Chhetris (34 per cent). Tamangs have less than 2 per cent representation in employment in the small town's offices, although they comprise 32 per cent of the population of the district.

When the above employment data are compared with town-level and district-level population data, the under-representation of people from surrounding villages in jobs available in the small town becomes evident. Banepa's population (12,537) constitutes only 3.9 per cent of the Kavre District population (324,329), but about half of the employees in Banepa's industries and institutions are residents of Banepa. Similarly, the local Newars dominate virtually all the jobs in the small town. Thus, while proponents of small towns argue that these towns generate jobs for people in the surrounding villages, there are clear ethnic and spatial biases in the employment pattern in Banepa, favouring the town residents.

The dairy industry is probably the only exception as it does not generate much employment in Banepa itself, but it provides income-earning opportunities in surrounding villages. Banepa's milk industry has created the backward linkage of buffalo raising which provides opportunities to sell milk to about 600 villagers. This dairy industry in Banepa benefits the surrounding villages more than Banepa itself and this has major implications in terms of the small town's ability to generate income opportunities in surrounding villages.

Decline of old and emergence of new industries in Banepa

Two new industries which have grown recently in Banepa are the carpet- and sweater-weaving industries, both of which operate on a subcontracting system from Kathmandu-based business establishments. Part of the reason for the growing carpet industry in small towns like Banepa is the increasing government

restrictions on carpet industries in Kathmandu and search for alternate locations with less scrutiny from the Government.

In contrast with the growth of industries operating under the subcontracting system (carpet- and sweater-weaving industries), other industries such as handloom industries, which produce goods that have to compete with mass-manufactured products from larger industries in Kathmandu and foreign countries, have generally declined. These findings about declining old industries and emerging new ones imply the need for selective promotion of certain types of industries in small towns such as Banepa where industries have some chance of success.

Certain industries which have linkages with villages in terms of procurement of raw materials and linkage with larger towns for final output/processing also have potential for growth in small towns. The contribution of the dairy industry in generating non-farm cash income for villagers selling milk is a case in point. In fact, the dairy industry is one of the few industries in Banepa which has largely benefitted the villages rather than the town.

Off-farm employment in villages

There are limited opportunities for off-farm employment in the villages. Most people with small land holdings are involved in wage labour during agricultural seasons for about three months. A few families from the villages go to work in brick kilns and carpet industries in Kathmandu; a greater number of Brahmins and Chhetris from the villages are engaged in service employment in Banepa and Kathmandu. In comparison, the number of Tamangs from Devitar village holding administrative/service employment is almost insignificant. About 30-40 people from the villages have skills in carpentry and masonry and they are engaged in building construction in the villages. But very few of them work in construction work in Banepa and Kathmandu owing to their low levels of those skills.

Surveys in the villages showed that many villagers want to own a buffalo so that they will be able to sell its milk. There are milk collection centres both in Opi and Devitar and they are providing important sources of income for the villagers. Some villagers even rent cows and buffaloes from others and sell milk as a source of cash income. However, owning buffaloes is an expensive proposition for the majority of villagers.

Role of a small town in providing urban services

Urban services in small towns can be divided into two categories: (a) town-serving functions used primarily by town residents and (b) region-serving functions catering to the benefit of surrounding villages as well. The schools in Banepa primarily cater to the residents of the town, in spite of the fact that educational facilities in the villages are quite poor. A survey of two schools in Banepa reveals that 88 per cent of all the students studying in these schools are from Banepa alone while the remaining 12 per cent are from hinterland villages (Bajracharya, 1994). About 71 per cent of the students are Newars and another 24 per cent are Brahmins and Chhetris. Tamangs and other ethnic groups account for only 5 per cent of the students. Literacy data from village household surveys have shown that the illiteracy rate in the Tamang village (78 per cent) was much higher than in the Chhetri village (53 per cent).

Agricultural inputs and credit services in the small town are found to be largely region-serving functions benefitting hinterland villages. Interviews with owners of two chemical fertilizer shops in Banepa indicated that about 65 per cent of their customers are from the villages, and 35 per cent of them are from Banepa town, which demonstrates the rural bias in the use of this service. Villagers agree that there has been increased use of fertilizers in the villages since these products became available in Banepa. The use of fertilizers has increased agricultural production compared with the time when such fertilizers were not used. However, much of the gain in production has been more than offset by the consumption of the growing village population.

Regarding agricultural credit facilities, a study of loan patterns (for 1989-1990) from the Agricultural Credit Bank located in Banepa indicates that it primarily caters to residents of the villages rather than the small town. About 73 per cent of loan takers were from the surrounding villages, while another 24 per cent were from distant villages (Bajracharya, 1994). Only 3 per cent of loan takers were from Banepa. Longitudinal data on loans taken from the Bank in different time periods indicate some gradual increase in loan investments in marketable products and livestock development. Thus, Banepa's agricultural credit facilities have to some extent contributed to the diversification of agriculture, horticulture and livestock development in the surrounding villages.

In the past, many villagers used to grow millet and wheat in the winter. In the last decade, there has been a

rise in the number of families growing potatoes instead of wheat, the former having a higher market value. Likewise, there has been a greater use of improved varieties of potatoes for increasing production. According to the villagers interviewed, currently more than 80 per cent of the potatoes grown are produced for the market and only 20 per cent for self-consumption.

However, even among region-serving functions, there are some spatial, ethnic and economic class biases. Villages close to the town have availed themselves of the services more than the distant villages. With regard to credit facilities, there is a linkage between types of loan taken and distance from the town. People from surrounding villages borrow money to grow cash crops (such as potatoes and fruits), whereas those from distant villages took loans primarily to grow subsistence crops such as maize. The major beneficiaries of agriculture-related services are large-farmers with financial resources to present collateral, pay for fertilizer and improved seeds, and obtain access to knowledge concerning the use of services. In this respect, ethnically, Brahmins and Chhetris are the largest beneficiaries of the Bank. People from occupational castes such as Sarkis and Damais, and ethnic groups such as Tamangs have not been able to take advantage of the credit services in Banepa. While the truly needy small-scale farmers cannot obtain loans owing to their lack of collateral, some influential farmers get larger loans than necessary. Many villagers do not have the perseverance and time to go constantly to Banepa to follow up the loan process, which could take months. Also, many villagers often need credit for social purposes such as a marriage or festival, for which the Bank does not provide loans; thus, they have to depend on the local money lenders in the village for such purposes.

With respect to hospital services, Banepa's hospital has been found to have a region-serving function in terms of its use by patients. Hospital records show that, while the staff of the hospital are predominantly from Banepa itself, the patients are largely from surrounding villages and nearby smaller towns, which are within walking distance of Banepa. Household interviews in the villages indicate that the people use the hospital as a last resort. Most villagers have a sequential way of getting treatment, progressing from a local faith healer to a local health worker in the village to private pharmacies in Banepa, finally to the hospital when all other avenues have been exhausted. Owing to the lack of transport, relatives of the ill often find it convenient to go to pharmacies in Banepa, describe the patient's problem or symptoms to the store owner, and purchase medicine without bringing in the patient. The hospital, on the other hand, dispenses medicine only after examining the patient. Therefore, many villagers depend on alternative treatment methods including traditional faith healers.

In other words, while both the Agricultural Credit Bank and hospital have region-serving functions, the schools are primarily fulfilling a town-serving function. If investments are made in region-serving functions, there is a greater potential for these services to benefit the people from hinterland areas rather than those from the town only.

Constraints of small towns in promoting rural development

It is clear from the above empirical findings that Banepa's present status does not match exactly with the rosy picture of small towns as assumed by their advocates. Several interconnected factors account for this divergence of actual and expected roles of small towns. Firstly, at the town level, the local government in Banepa lacks decision-making power, technical expertise and financial resources to play a greater role in encouraging a larger and more diversified economic base of the town and its hinterland. With the centralization of power and resources in the Kathmandu Valley, much of the development budget of line agencies is dictated primarily by the head offices in the capital, without much input from the local area. There is little articulation of the needs and priorities of local people in such centralized decision-making processes where most of the resources also go to larger cities.

The industries in the small town have limited backward and forward linkages with the villages. Currently there is very little processing of local products in Banepa. Except for small rice mills, most larger rice mills in the small town obtain their grain directly from the Terai, thus eliminating backward linkages with the surrounding villages. The dairy industry, which is still in its nascent stage in the small town, is probably one of the few industries which have backward linkages with the surrounding villages. Most industrial and commercial firms have few downward linkages, but they have more linkages with the larger towns in Kathmandu and the Terai for the supply of raw materials and destination of their finished products. Because the productive base of small towns is limited, there is penetration of the local market by outside industries with greater economies of scale, which contributes to a further decline in the cottage/household industries in the region. The existing administrative machinery provides little scope for planning for urban-rural linkages between the small town and surrounding hinterland villages. The local municipality government often does not consult with villagers to identify projects with complementary benefits. The town often plans its development activities without taking the surrounding villages into consideration.

Turning to the village level, the low purchasing power of the rural people prevents the villages from acting as markets for industries in small towns. Small landholdings coupled with limited resources, organization and information constrain the possibility of agricultural marketing through the wider introduction of vegetable and fruit production. The majority of farmers in the villages near Banepa have small landholdings (less than 0.75 ha in size) which are not large enough to support their families using traditional subsistence agricultural practices. With increasing population pressure being put on the limited resources of the hill economy, villagers have to depend increasingly on outside non-farm employment (such as casual labour) to make ends meet. But because of the lack of adequate skills in urban household industries (e.g. weaving, knitting), the lack of education to qualify for administrative jobs, and the limited number of jobs available in small towns, many villagers find it difficult to obtain work even in a small town such as Banepa. There is also a lack of financial capital for starting up rural industries. The poor spatial linkage between the town and surrounding rural areas inhibits rural residents from availing themselves of agricultural inputs such as fertilizers as well as from transporting their products to the town.

The Government's policy to concentrate infrastructural investments in a few larger towns of the Kathmandu Valley and the Terai is having an adverse impact on small hill towns. Likewise, there is an urban bias in many sectoral policies of the Government and these favour the capital city. The low prices for agricultural produce and lack of investment in improving village agriculture, or agricultural credit and marketing, all contribute to the depression of rural areas. Lack of adequate services such as educational facilities in the villages make the villagers less able to compete for urban jobs. The levels of investment in infrastructure and services in the hill area's small towns and villages are significantly less than in the capital city and the Terai.

Generalizations based on the case study

The general findings which have emerged from the case study of Banepa and two villages are as follows:

1. In the context of subsistence agriculture, a small town plays an important role as a service centre for the distribution of basic essential goods (such as food-grains, salt, kerosene and fabrics) for the hill and mountain areas, but it plays a limited role as market centre for rural produce from local areas and as an employment centre for rural people. A small town in a resource-poor area is less diversified than a town in regions with agricultural surpluses. The hill town has more consumptive functions than productive functions.
2. Limited arable land and lower levels of production in the hill areas of Nepal have an adverse impact in the growth of both the rural areas as well as the towns located in the rural areas. Difficult terrain and lack of access to roads in many villages constrain the movement of people, goods and services in the hills.
3. Nepal's rural society is culturally heterogenous with many different ethnic/caste groups. This study found that ethnicity and place of residence of people are important variables in the access to off-farm jobs and services available in the small towns.

Strategy for small town development in the Nepalese hills

Two major approaches to small-town development have emerged in the literature on this topic and the article discusses each of them briefly to determine their applicability in the context of Nepal (Dixon, 1987; Hinderick and Titus, 1988; Unwin, 1989).

The first approach, called "market-oriented regional development", argues for a greater role of the private sector in the development of small towns and considers the need for local authorities to be more entrepreneurial rather than mere service providers (Gaile, 1992). The focus of the strategy is government investment in infrastructure (power, roads etc.) to enhance the small town's role in agricultural marketing from the hinterland villages as well as to improve the marketing system by skill development, and access to credit for farmers to produce crops for sale on the market. This strategy parallels the earlier approach of "urban functions in rural development" (UFRD) which argues for integrating small towns with the interlinked hierarchy of urban centres for facilitating the efficient exchange of goods and services between rural areas and urban centres (Rondinelli, 1984). The primary focus of both the "market-based regional development" and "urban functions in rural development" approaches is to bring about improvements in the physical access to services and markets for the rural people, without suggesting any changes in the political economy of the rural areas for the benefit of the rural poor.

The other approach of territorial development assumes that small towns within a self-reliant territorial unit can promote rural development through greater local control over resources, complementary urban-rural

linkages and decision-making at the local level. The approach suggests measures such as rural industrialization, diversification of agriculture, retention of surpluses at the local level and land reform (Friedman and Douglass, 1978). Linked to the idea of territorial development is the concept of "selective spatial closure" of rural areas to check the leakages from rural to urban areas and encourage greater investment of rural resources in the local economy. Recently, Douglass proposed a "regional network model" in which he argues that a territorial unit with a network of towns and their hinterland rural areas provides a larger diversified regional economy which could be a strong alternative to a conventional, single growth centre founded on urban-based manufacturing (Douglass, 1992). He also highlighted the importance of the region-serving functions of small towns.

The basic difference between the two approaches is that, while the former approach emphasizes the need for market orientation/integration, the latter approach highlights the need for decentralization of power at the local level. These two approaches need not be mutually exclusive; rather they can complement each other. Integration of small towns and rural areas with the larger economy without political and institutional support to the former can work to the disadvantage of small towns and rural areas, with leakages of local resources to the outside. That is why the territorial development approach's suggestion to retain surpluses in the local area is relevant in developing countries. What is advocated in this study is market-oriented territorial development as part of a strategy for hill area development, drawing from both approaches.

The key elements of the strategy are: (a) market integration of hill economies, (b) decentralized planning in small territorial units which include both small towns and groups of villages, (c) institutional support for the rural poor, (d) expansion of off-farm employment and (e) investing in region-serving functions of small towns.

Market integration of hill economies

Since agriculture is the mainstay of the villages, any programme concerning small town development has to take into consideration agricultural development in the rural areas. In the context of Nepal's hill areas, concepts such as "selective spatial closure" cannot be pursued since the local economy cannot sustain itself by being isolated. As Banskota (1989) argues, hill agriculture needs to be integrated into the larger economy for increasing production, selling the produce in the market and increasing opportunities for off-farm employment. Attempts have to be made to diversify subsistence agriculture to include (high-value) cash crops based on local comparative advantage suitable for hill climate and terrain rather than limiting production to subsistence grain crops. Small farmers need to be encouraged to set aside a certain percentage of land for cash crops (such as potatoes, vegetables or fruits) for selling in the market and generating cash income. To facilitate direct marketing by the villagers, the Government could promote the development of periodic and permanent farmers' markets through the provision of market space and paved areas, weighing/grading facilities and overnight storage facilities.

Instead of merely marketing agricultural produce, the processing of these at the village level offers greater potential for adding value from processing which can be retained at the village-level. Potential industries in the small town could enter into direct contracts with groups of farmers to ensure a regular supply of raw material for the industries. These measures would contribute not only towards improving the local economy by providing marketing avenues for rural products, but also towards providing additional off-farm employment opportunities for the local people.

Decentralized planning in small territorial units

The degree of decentralization of power and resources by the central Government largely determines the role of local people in decision-making. This situation also affects the development of small towns since they are often the local nodes in the rural areas where government investments are decentralized at the local level. In a situation where the different line agencies in Kathmandu largely determine the nature of government investments at the local level, small towns have not been particularly instrumental in encouraging greater involvement of local people nor in coordinating the work of line agencies at the local level. Local government needs more power and resources with further delegation of financial and administrative authority at the local level to stimulate production in small towns and hinterland areas. Such a development would have better chances of success in mobilizing resources and involving people for locally prioritized development.

Under Nepal's "District Development Plan", the basic territorial unit for plan formulation and implementation is the district. But with the present districts spread over a large territories and in mountainous areas, there are difficulties in coordinating district-level activities. In the context of undulating terrain and scattered settlements, a more appropriate strategy would be to divide the district into smaller subdistrict territorial units with at least a small town and a small group of villages having economic, spatial

or social linkages to it. Although the service centre concept (with division of the district into nine areas) was proposed during the early 1980s, such service centres were conceived primarily to distribute government-sponsored services to the villages. The division of the district was often done arbitrarily without consideration of the social and spatial linkages between the villages and the service centre. They were not designed particularly to help commercialize agriculture, create non-farm jobs at the service centre level, or to harness the potential of the service centre with private sector efforts.

The current practice of small-town planning, without giving adequate attention to hinterland villages, needs to be changed, too. The services in small towns are not only for the towns alone, but for the hinterland villages as well. Hence, while demarcating territorial units for planning, small towns need to be seen as a part of their hinterland service area. Each of these towns and their hinterland villages, instead of being seen in isolation, need to be viewed together while developing district-level development plans and policies.

Institutional support for the rural poor

In view of the small size of surpluses, support needs to be given to encourage group marketing of hill produce at larger urban centres. Group marketing could be encouraged through a "small farmer development project" which could provide group loans to people for growing a particular crop and marketing it together (for example, for renting farm implements, providing marketing information, helping to negotiate with outside parties, teaching modern methods of grading, weighing, cleaning, storing, packaging and transporting). Group transport would also bring down the cost of transport. Farmers who have a disincentive to produce marketable items owing to inadequate returns and the necessity for individual transport may be more inclined to produce for more distant markets that provide better prices if group marketing and transport are made available. In this way, they would also be in a better bargaining position with regard to the pricing of their products.

The people from surrounding villages often lack adequate skills and education to get jobs in urban areas. Job training and skill development of villagers should be an integral part of the strategy for small town development. Vocational training and adult literacy programmes in the village could facilitate those disadvantaged groups to enter the job market outside the villages. Thus, local governments would need to organize necessary training in production and marketing.

Expansion of off-farm employment

Off-farm employment opportunities in small towns and hinterland villages need to be expanded. For this, the comparative advantages of individual small towns need to be identified. For example, Banepa's comparative advantages - excellent location with easy transportation access to Kathmandu and the eastern hills, the availability of local entrepreneurs and cheap labour - make the town a potential area for expanding export-oriented carpet and garment industries. Such a development could considerably increase employment opportunities in such a small town. Also, owing to the small town's proximity to surrounding villages, the people in the area, instead of relocating to the town, could commute to work from their villages.

The small cities may be encouraged to develop goods and personal services for local consumption as well as to produce intermediate goods for larger industries in the bigger cities. Some of the potential industries for promotion at small urban centres may be the production of household items, handicrafts for export and similar businesses. As the Banepa case study shows, those industries in small towns which compete directly with industries in large towns are in a general state of decline, but other industries such as sweater weaving and carpet manufacture are doing relatively well. Therefore, it would be more prudent to encourage the formation of industries in small towns which would have higher chances of succeeding by working in cooperation with larger industries in Kathmandu or other large towns than by competing with them.

Priority also has to be given to industries which can generate employment for villagers as well as for urban residents. The dairy industry is a good example. Since the dairy industry benefits many villagers, additional efforts need to be made in livestock development by encouraging the raising of animals that yield higher quantities of milk, for example, as well as by providing small farmers with better animal health services, fodder and credit.

Investing in region-serving functions of small towns

The Government needs to invest in region-serving functions rather than town-serving functions while investing in small towns so that the surrounding villages can also benefit from investments in the town.

Since there are ethnic and spatial biases in the use of services, greater attention must be paid to reaching disadvantaged groups in the use of services through small farmer development programmes, and minority group economic development programmes.

This study found that, although fertilizers are widely used, the use of pesticides and improved varieties of seed is quite low, partly owing to a lack of information and knowledge about their effective use. In order to diffuse agricultural innovation, there is a great need for agricultural extension services. The extension service could include advice on marketable products and crops, information on market prices, advice on how, when and where to sell agricultural products, the promotion of group marketing activities and facilitating production and marketing arrangements between farmers and mill owners and traders etc.

Conclusion

In order to promote small towns for rural development, a small number of towns in each district which have a potential for developing region-serving functions to the hinterland villages could first be identified. The selection of small towns for further investment needs to be based on such criteria as their capability for agricultural diversification, centrality in serving a larger population, availability of rural infrastructure such as spatial links to villages, potential for processing industries, and scope for creating off-farm employment.

Local area development plans could be formulated, based on the understanding of urban-rural linkages between the small town and its hinterland villages, which later could be part of overall district development plans. These development plans could identify the constraints to marketing, service provision and non-farm employment, for which an appropriate package of investments could be suggested. These could take many forms, such as building town-to-village trails, developing a regular or weekly producers' market in the town, provision of agricultural credit, input and extension, skill training for certain jobs and the development of processing industries based on local comparative advantage. Such a multifaceted approach could provide a useful basis for integrated urban-rural area development for the benefit of rural areas in Nepal.

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Fertility in Bangladesh is high even by the standards of developing countries. Recent evidence suggests that fertility has started to decline in Bangladesh (Amin and others, 1993). The total fertility rate has declined from nearly seven births per woman in 1975 to about five births per women in 1989 and by 1990 this rate was well below five births (Cleland and others, 1994; Caldwell and Caldwell, 1992). A number of demographers have argued that the mechanism of this steep fertility decline was the consequence of a recent increase in contraceptive prevalence within marriage (Amin and others, 1990; Cleland and others, 1994; Cleland, 1993). In Indonesia, research suggests that fertility decline resulted mainly from a high rate of increased use of contraception which was induced primarily through economic development and an increasing rate of female education as well as greater work force participation (Gertler and Molyneaux, 1994). It is of great concern to policy makers to know the reasons why other socio-economic, demographic and cultural variables do not seem to contribute to a decline in fertility in Bangladesh. Such variables are important for a study of fertility; investigations are needed in order to produce findings. Reliable information about the factors influencing fertility is indispensable in the process of planning for the overall socio-economic development of a developing country such as Bangladesh. Human fertility is the outcome of the function of a number of variables within a complex process. The mechanism of factors affecting fertility is that intermediate variables influence fertility directly, while socio-economic and environmental variables affect fertility indirectly through intermediate variables (see, for example, Davis and Blake, 1956; Bongaarts, 1978; Bongaarts and others, 1984). This study is an initial framework for the classification of variables to be analysed using the path analytical approach. In the context of Bangladesh, only a few studies, not all of them nationally representative, have been carried out to examine the effects of various factors on fertility (Ahmed, 1981; Rob and Kabir, 1988; Islam and Khan, 1991). These studies provide very useful information. Ahmed's study was based on national data of the 1975 Bangladesh Fertility Survey and two other studies based on a micro-level study.

The second national Bangladesh Fertility Survey was conducted in 1989 and its data are available for analysis, the results of which may provide new knowledge useful for national population policy-making. Therefore, the purpose of the present paper is to study the direct, indirect and joint influences of various socio-economic and demographic factors on fertility in Bangladesh, employing the technique of path analysis.

Materials and methods

Data

The data used in this study are from the 1989 Bangladesh Fertility Survey (1989 BFS), which was conducted on behalf of the Government of Bangladesh by the National Institute of Population Research and Training (NIPORT) during the period December 1988 to April 1989. A two-stage probability sample design was used for the survey. At the first stage, a sample of areas was drawn and all households in each of the selected areas were listed. A sample of households in each of the selected areas was drawn at the second stage and finally a total of 11,905 ever-married women below 50 years of age belonging to the selected households were successfully interviewed. A detailed description of the methodology of data collection including sample design for the survey can be found elsewhere (Huq and Cleland, 1990).

Selected variables

In the 1989 BFS a number of socio-economic, demographic and cultural variables are available. Among them, nine variables have been taken into consideration in the present study in order to construct a path model. Table 1 gives a detailed description of the variables. Respondent's education, religion, place of residence and possession of modern objects in the family are considered as the socio-economic and background variables, while the demographic as well as intermediate variables regarded in this study are age at first marriage, contraceptive use, duration of breast-feeding, and fetal loss. Finally, the number of children ever born to each woman is used here as a measure of fertility. It has been assumed here that these selected variables affect fertility behaviour of women according to the theoretical framework of Bongaarts and others (1984:515).

Table 1: Description of variables

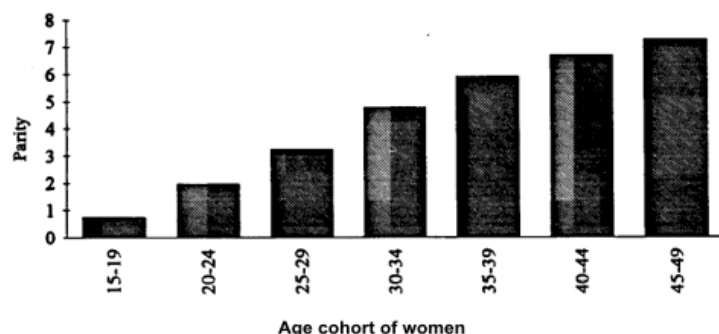
Variable	Abbreviation	Measurement
Wife's education (X1)	REDU	1 = No schooling 2 = Lower primary 3 = Upper primary 4 = Higher

Religion (X2)	REL	1 = Muslim 0 = Other
Place of residence (X3)	PR	1 = Rural 0 = Other
Possession of modern objects (X4)	PMO	Number of household possessions
Age at first marriage (X5)	AFM	Completed years
Contraceptive use (X6)	CU	1 = Ever use 0 = Never use
Duration of breast-feeding in last closed birth interval (X7)	DBF	Completed months
Fetal loss (X8)	FL	Number of wasted pregnancies
Children ever born (X9)	CEB	Number of live births

Analytical method

The technique employed in this study to examine the effects of various factors on fertility is path analysis. This technique has been used by many social scientists in various fields of enquiry for quantifying and interpreting causal linear models (Ahmed, 1981; Duncan, 1966; Loebner and Driver, 1973; Shin, 1977; Balakrishnan and others, 1980; Miller and Stokes, 1985; Tan, 1987). One of the main tasks in path analysis is to construct a path diagram in which variables are arranged in a meaningful manner per se; the direction of influences is shown by arrows. The path diagrams (figures 4 and 5) represent the hypothetical causal model of relationships between fertility and some of its determinants. The model considered here is the recursive type in which each variable is assumed to be dependent upon all prior causal variables. As can be seen from the schematic diagram, variables REDU, REL, PR, PRO have effects on fertility, i.e. children ever born (CEB), through AFM, CU, DBF and FL.

Figure 1: Distribution of parity according to age cohort of women



The system of equations for the model considered may be written as below, which will provide information on the estimation of influences of variables:

$$x_5 = p_{54}x_4 + p_{53}x_3 + p_{52}x_2 + p_{51}x_1 + p_{5u}e_u$$

$$x_6 = p_{65}x_5 + p_{64}x_4 + p_{63}x_3 + p_{62}x_2 + p_{61}x_1 + p_{6v}e_v$$

$$x_7 = p_{75}x_5 + p_{74}x_4 + p_{73}x_3 + p_{72}x_2 + p_{71}x_1 + p_{7w}e_w$$

$$x_8 = p_{85}x_5 + p_{84}x_4 + p_{83}x_3 + p_{82}x_2 + p_{81}x_1 + p_{8x}e_x$$

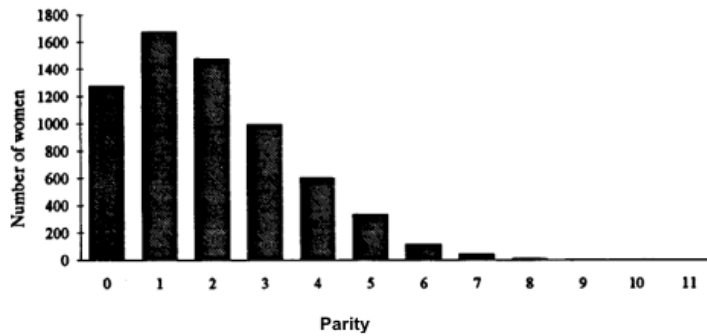
$$x_9 = p_{98}x_8 + p_{97}x_7 + p_{96}x_6 + p_{95}x_5 + p_{94}x_4 + p_{93}x_3 + p_{92}x_2 + p_{91}x_1 + p_{9y}e_y$$

where p_{ji} values are path coefficients from standardised variables x_i to x_j , and e_u , e_v , e_w , e_x and e_y are random disturbance terms.

Path analysis permits one to estimate the direct, indirect and joint effects of predetermined variables on the dependent variable by decomposing the correlation coefficient between the dependent variable and any predetermined variable according to the following fundamental theorem:

$$r_{ji} = \sum_q p_{jq} r_{iq}$$

Figure 2: Distribution of women aged below 30 years



where j and i are two variables and q runs over all the variables that have direct paths to variable j (e.g. Duncan, 1966; Shin, 1977).

It is well documented that the current age of women has a high correlation with their fertility, and fertility variations may be observed due to characteristics of women between these two age cohorts. Figure 1 reveals that fertility increases with higher order cohorts of women. On the other hand, split data for women aged below 30 years and women 30 years or older show different types of distribution. The former (figure 2) shows a skewed distribution; however, the later (figure 3) shows more or less symmetric distribution. The average parity is seen to be merely two per woman aged below 30 years, whereas it is about six per woman aged 30 years or older (see table 2). Thus, the path model has been applied separately to two age cohorts of women: (a) the cohort aged below 30 years at the time of interview (younger cohort) and (b) the cohort aged 30 years or older at the time of interview (older cohort). Table 2 presents the means (X) and standard deviation ($S.D.$) of the variables included in this study for the two age cohorts of women.

Figure 3: Distribution of women aged 30+ years

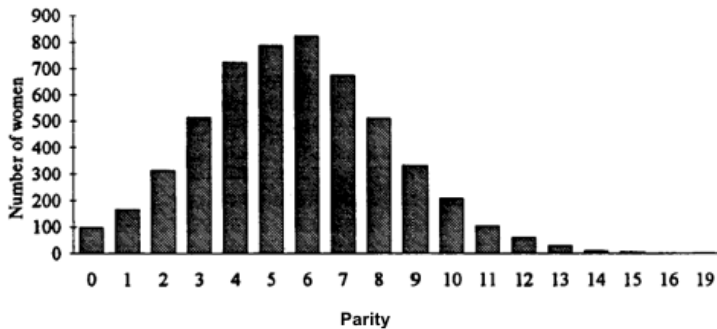


Table 2: Number of women (N), means (X) and standard deviation ($S.D.$) of variables

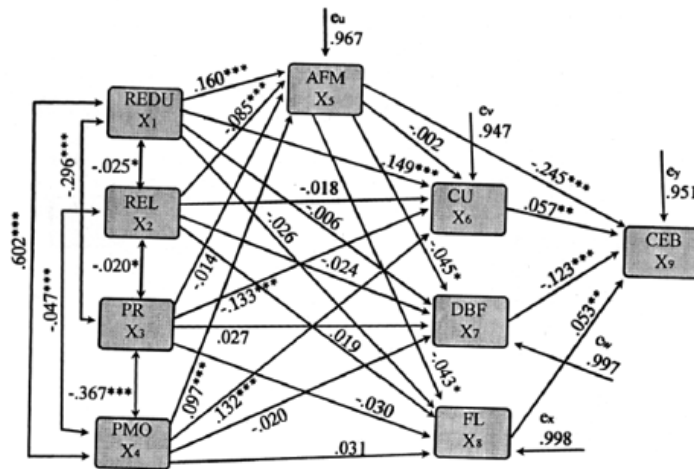
Variable	Women aged below 30 years			Women aged 30 years or older		
	N	X	S.D.	N	X	S.D.
REDU	6,536	1.846	1.167	5,369	1.604	1.02
REL	6,536	0.874	0.331	5,369	0.847	0.359
PR	6,536	0.716	0.450	5,369	0.705	0.456
PMO	6,536	3.595	2.225	5,369	3.657	2.216
AFM	6,536	15.053	2.324	5,369	14.501	2.535
CU	6,536	0.453	0.498	5,369	0.534	0.499
DBF	2,670	17.587	10.381	1,289	18.097	9.699
FL	6,536	0.219	0.634	5,369	0.520	1.044
CEB	6,536	1.965	1.604	5,369	5.691	2.633

Note: See table 1 for abbreviations.

Results

Various path coefficients are shown in figure 4 for the cohorts of women aged below 30 years and in figure 5 for the cohorts of women aged 30 years and older. Out of 23 hypothesised paths, 12 and 10 paths are found to be statistically significant for the younger and older cohorts, respectively. The direct, implied, indirect and joint effects of each of the selected explanatory variables are presented in table 3 for the cohort aged less than 30 years and in table 4 for the cohort aged 30 years or older. For both the cohorts, age at first marriage and duration of breast-feeding are found to have significant direct negative effects while the number of fetal losses has a significant direct positive effect on the number of children ever born. Compared with the younger cohort, both the direct influence of age at marriage and duration of breast-feeding on fertility are observed to be higher for the older cohort. The direct influence of the number of wasted pregnancies on the number of children ever born is found to be higher and significant for women aged below 30 years than for those aged 30 years or older; however, their signs are in expected directions.

Figure 4: Path diagram showing the influence of various factors on fertility for women aged below 30 years

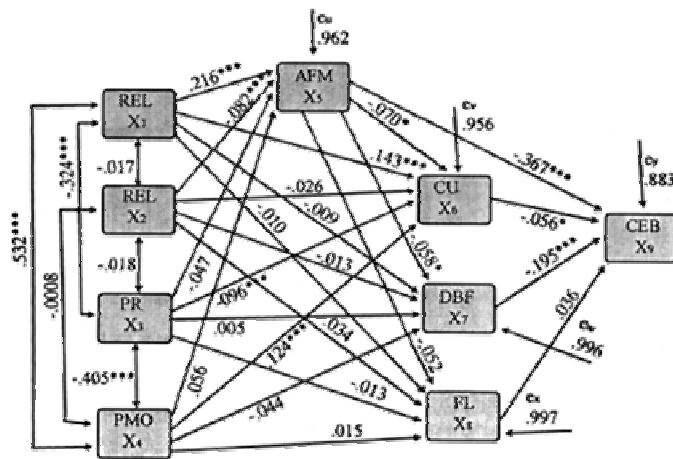


Notes: Significant *p<0.05, **p<0.01, ***p<0.001; see table 1 for abbreviations.

Total effects of respondents' education and possession of modern objects on fertility are negative while those of religion and place of residence are positive for both cohorts. This indicates that women with more education and possessing more modern objects in the family to which they belong have fewer children ever born to them as compared with those having less education and fewer modern objects, whereas Muslim women and rural women have more children ever born to them as compared with their non-Muslim and urban counterparts.

The total effect of the respondent's education on fertility is found to be more pronounced among women belonging to the older cohort than to the younger cohort. Of the total effect, -0.177 of respondent's education on fertility (X9) for women aged 30 or older, -0.102 (57 per cent) is transmitted through its implied effect (p91), -0.0793 (45 per cent) through its indirect effect via age at marriage (X5) in the same direction, while 0.0092 (5 per cent) is transmitted through joint association in the opposite direction. Other indirect effects of the respondent's education via X6, X7 and X8 and via second order interactions X5X6, X5X7, X5X8 on X9 are negligible. Although the indirect effect of REDU on CEB transmitted through contraceptive use is negative (-0.0080) in the case of women belonging to the older cohort, the indirect effect (0.0085) of REDU acts through increasing contraceptive use that consequently decreases fertility among women belonging to the younger cohort.

Figure 5: Path diagram showing the influence of various factors on fertility for women aged 30-49 years



Notes: Significant *p<0.05, **p<0.01, ***p<0.001; see table 1 for abbreviations.

Higher total positive influences of religion on fertility and of place of residence on fertility are observed among women aged 30 years or older than those below 30 years. This indicates that fertility among older Muslim women and older rural women is higher than among their non-Muslim and urban counterparts, respectively. It should be noted that the implied effect (p92) of religion has contributed about 58 per cent of its total effect on fertility, while implied effect (p93) of place of residence has contributed about 69 per cent of its total influence on fertility among women aged 30-49 years.

For both age cohorts, fertility, as expected, is found to be lower among women belonging to the households possessing more modern objects. However, the implied effect of the possession of modern objects on fertility is not in the expected direction in the case of both cohorts; the bivariate analysis shows its significant negative effects on fertility. Explanations can be given likewise to multicollinearity among variables, although for the regression, it is not found to be serious. Further research is needed to investigate this situation in order to clarify this interpretation.

Ideally, a zero-order correlation coefficient between CEB and any predetermined variable should be the same as the total effect of that predetermined variable on CEB. A closer look at tables 3 and 4 reveal that, with few exceptions, the zero-order correlation coefficients between CEB and each of the selected predetermined variables generally do not differ much from their corresponding total effects. It should be pointed out that about 10 per cent and 22 per cent of variances of fertility for women belonging to the younger and older cohorts, respectively, have explained the selected predetermined variables which are significant at the 0.001 level. These low proportions of explained variance may be attributed to the following: (a) there might be more explanatory variables that could not be included in the model and (b) individual rather than aggregate data have been employed in this study.

Conclusion and policy implications

Some findings of this study deserve consideration from the viewpoint of their policy implications. It has been found that female age at marriage has a significant direct negative influence on fertility. Thus, raising the age at marriage by implementing a minimum-age marriage law is likely to lower fertility on a national scale. Duration of breast-feeding is also found to have a significant direct negative effect on fertility. Encouraging women to breast-feed their children for a relatively longer duration may also contribute to a reduction in fertility. Fetal loss appears to have a significant direct positive effect on fertility in Bangladesh, which means that mothers who have experienced fetal loss are found to have higher fertility. Mothers always try to replace their dead child as early as possible. Such behaviour is a result of social fear about the survival of children. Maternal mortality is also high in Bangladesh. Therefore, it is essential to provide primary health care, particularly maternal and child health care, for surviving children.

The total effect of female education on fertility is found to be negative. Education may provide better employment opportunities outside the home and age at marriage can be raised by providing education to females, especially at the secondary and higher levels. Based on the findings of this study, it may be suggested that attention should be focused on the need for providing educational facilities, particularly for Muslim women in rural areas in order to depress the level of fertility in Bangladesh.

Household possession of modern objects has a negative influence on fertility. This finding reveals that, if women have access to modern objects in the house such as radio and television, their fertility is likely to be lower than those who do not have these modern objects. Most women in Bangladesh work at home as housewives, for example, cooking, maintaining the home, taking care of children and so on. They rarely go outside the home. If they have at least a radio, they can hear population programmes, gain knowledge of population issues and learn about family planning, since it is through this mass medium that many family planning messages and related health information

are transmitted. Women can gain great advantage from such modern objects. In a study of five African countries, Kojima (1993) suggested that socio-economic development policies and family planning programmes giving special emphasis to the mass media, especially radio, may produce significant desired effects with regard to fertility control.

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Table 3: Effects of variables used in the path model for explaining fertility of ever married women (under 30 years)

Dependent variable	Predetermined variable	Direct effect	Implied effect	Joint association	Indirect effects through								Total Zero order effect correlation	
					X5	X6	X7	X8	X5X6	X5X7	X5X8			
X9	X1		-0.078	-0.0157	0.0392	0.0085	0.0007	-	-	0.0008	-	0.0003	0.124	-0.118

X2	0.031	0.0034	0.0208	0.0010	0.0029	0.0010	0.0000	0.0004	0.0001	0.058	0.159
X3	0.067	0.018	0.0034	0.0075	0.0033	0.0014	0.0000	0.0000	0.0000	0.079	0.044
X4	0.027	-0.0395	0.0237	0.0075	0.0024	0.0016	0.0000	0.0005	0.0002	0.024	-0.081
X5	-0.245			0.0001	0.0055	0.0022				0.242	-0.291
X6	0.057									0.057	0.181
X7	-0.123									0.123	-0.109
X8	0.053									0.053	0.124

Table 4: Effects of variables used in the path model for explaining fertility of ever married women (30+ years)

Dependent variable	Predetermined variable	Direct effect	Implied effect	Joint association	Indirect effects through							Total effect	Zero order correlation
					X5	X6	X7	X8	X5X6	X5X7	X5X8		
X9	X1	-0.102	0.0092		0.0793	0.0080	0.0017	0.0003	-0.0008	0.0024	0.0004	0.177	-0.198
	X2	0.049	0.0004		0.0301	0.0014	0.0025	0.0012	0.0003	0.0009	0.0001	0.084	0.115
	X3	0.089	0.0191		0.0172	0.0054	0.0009	0.0004	0.0001	0.0005	0.0000	0.129	0.137
	X4	0.039	-0.0895		0.0205	0.0069	0.0086	0.0005	-0.0002	0.0006	0.0001	0.027	-0.078
	X5	-0.367				0.0039	0.0113	0.0018				0.361	-0.269
	X6	-0.056										0.056	-0.047
	X7	-0.195										0.195	-0.164
	X8	0.036										0.036	0.052