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PREPARATION OF DEVELOPMENT PLAN FOR MEHERPUR ZILLA

REPORT ON ASSIGNMENT-1

Analysis on Demography (Population Projection) of Meherpur District

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Population Projection of the 3 Upazilas of Meherpur District

The cohort-component method is a widely used approach for projecting population growth and demographic changes over time. This method leverages demographic data, including birth rates, mortality rates, and migration patterns, to estimate future population sizes and structures. By analyzing population dynamics through age and gender cohorts, the cohort-component method provides a comprehensive framework to predict demographic shifts at both national and sub-national levels. The method's ability to incorporate various components of population change, such as births, deaths, and net migration, allows for consistent and easily updatable projections. Its outputs include key demographic indicators, such as population size, age distribution, dependency ratios, and rates of population growth, making it an essential tool for policymakers, urban planners, and researchers studying population trends. In this study, the cohort-component method will be utilized to forecast population changes, providing valuable insights into future demographic patterns and helping to inform decision-making processes. The population projection is done based on the cohort component method for Meherpur District. The procedure is given below:

Cohort component method

The cohort-component method is a commonly used and straightforward approach for population projection. It leverages available data and theoretical insights into population dynamics, considering both causal factors and compositional elements as its core components. This method enables the creation of consistent and comparable projections at both national and sub-national levels, which can be easily updated. It involves a thorough analysis and the development of assumptions for each component of change. Given these advantages, this study adopts the cohort-component method. The summary equation for the population at time (t+n) is defined as follows:

$$P_{t+n} = S[t, t+n] + B[t, t+n] + NM[t, t+n],$$

where $S[t, t+n]$ is the survived population at time t+n, $B[t, t+n]$ is the number of births observed in the period $[t, t+n]$ and $NM[t, t+n]$ is the net migration observed in the period $[t, t+n]$. To project the total population size, and the number of males and females by 5-year age groups, this study found the number of people who survive or are expected to be alive in the future. Then the survived population number, the number of births that took place and the number of net migrants is added.

Inputs and Outputs of the Cohort Component Method

To apply cohort component method, we need base year population by age, assumptions on birth; assumptions on mortality: survival ratios by age; net migration rates. We expect to get a number of outputs from a population projection using cohort component method: age structure of the population; population aggregates: population size, population in selected broad age groups, mid-interval population size, number of person years lived, population growth, births, deaths, net change due to migration, indicators of the population structure: proportions by broad age groups, dependency ratios, median age of the population, proportion of women in childbearing ages, sex ratio of the population; indicators of the population distribution

(national; if urban and rural populations are being projected): proportion urban, proportion rural; rates of population change: crude birth rate, crude death rate, rate of natural increase, crude net migration rates, rate of population growth etc.

To apply the cohort-component method, we need base year population data by age also by sex, along with assumptions regarding birth rates, mortality (expressed as survival ratios by age), and net migration rates. This method allows us to produce a range of outputs, including the age structure of the population and various population aggregates, such as total population size, population in broad age groups, mid-interval population size, and the number of person-years lived. We also obtain indicators of population structure, like dependency ratios, median age, the proportion of women of childbearing age, and the sex ratio. Additionally, the method provides insights into population distribution, such as the proportion of urban versus rural, crude birth rate, crude death rate, rate of natural increase, crude net migration rate, and overall population growth rate.

Steps of the Cohort Component Method

The cohort component method consists of a number of steps, which are described below:

Step 1- Collecting Information: The cohort component method requires information from both the most recent and the prior census. Information on the number of death rate is also required. Ideally the total death is calculated from the information on death rate of the particular place or from the documented death certificates. But the local level data is unavailable, so that the divisional death rate has been used for the calculation. These rates are used to project the total number of deaths that occur during the particular year. A life table or calculated survival population are also needed to calculate the mortality rates in the projected years. For this the existing population has been calculated by subtracting death from the present population then multiply it to the survival rate.

Existing Population = $\text{Population}_{t+n} - \text{Death}$

Survived Population = Existing Population X Survival rate

For the calculation of the Survived Population of Meherpur, the assumed survival rate is 1.

Step 2- Calculation of Birth: Information on the number of birth rate is also required. Ideally the total birth is calculated from the information on birth rate of the particular place. But the local level data is unavailable, so that the divisional birth rate has been used for the calculation. These rates are used to project the number of births that occur during the projection period.

Step 3- Calculation of Net Migrants: For the calculation of net migrants the following calculation has been used

Net Migrants = $(\text{Population}_{t+n} - \text{Population}_t) - (\text{Births} - \text{Deaths})$

Step 4- Calculation of Projected Population: By adding the above calculations the projected population is calculated for each particular year for an area.

Projected Population = Survived Population + Birth + Net Migrants

Survived Population of the Upazilas:

		Gangni				Meherpur Sadar				Mujibnagar			
Age	Death Rate	Population 2022	Death *	Existing Population	**Survived Population	Population 2022	Death*	Existing Population	**Survived Population	Population 2022	Death *	Existing Population	**Survived Population
00-04	1.12	24041	27	24014	24014	20629	23	20606	20606	7879	9	7870	7870
05-09	0.58	23686	14	23673	23673	20325	12	20313	20313	7762	5	7758	7758
10-14	0.6	28462	17	28445	28445	24423	15	24408	24408	9327	6	9322	9322
15-19	0.94	30043	28	30015	30015	25780	24	25755	25755	9846	9	9836	9836
20-24	0.92	25106	23	25083	25083	21543	20	21523	21523	8228	8	8220	8220
25-29	0.77	23848	18	23829	23829	20463	16	20447	20447	7815	6	7809	7809
30-34	1.1	23041	25	23016	23016	19771	22	19749	19749	7551	8	7542	7542
35-39	1.29	27430	35	27394	27394	23537	30	23506	23506	8989	12	8977	8977
40-44	2.8	24654	69	24585	24585	21155	59	21096	21096	8079	23	8057	8057
45-49	4.54	20717	94	20623	20623	17777	81	17696	17696	6789	31	6758	6758
50-54	7.47	20040	150	19890	19890	17196	128	17067	17067	6567	49	6518	6518
55-59	13.83	14973	207	14766	14766	12848	178	12671	12671	4907	68	4839	4839
60-64	15.89	13908	221	13687	13687	11935	190	11745	11745	4558	72	4485	4485
65-69	24.65	9423	232	9191	9191	8086	199	7886	7886	3088	76	3012	3012
70-74	34.83	6519	227	6292	6292	5593	195	5399	5399	2136	74	2062	2062
75-79	61.31	2807	172	2635	2635	2409	148	2261	2261	920	56	864	864
80-84	79.47	2227	177	2050	2050	1911	152	1759	1759	730	58	672	672
85-89	117.39	807	95	712	712	692	81	611	611	264	31	233	233
90+	117.4	968	114	854	854	831	98	733	733	317	37	280	280
		322701	1946	320755	320755	276903	1670	275233	275233	105752	638	105114	105114

*Death= population X Death rate of Khulna Division

**Survival Rate=1

Note:

Total Population 2022: 705330

Total Population 2011: 655392

Projected Population in Cohort Method:

Upazila	Year					
	2024	2026	2031	2036	2041	2046
Gangni	345940	371125	396311	421496	446681	471866
Meherpur Sadar	293933	315988	338043	360099	382154	404209
Mujibnagar	112409	119703	126997	134291	141586	148880
Projected Population	752282	806816	861351	915886	970420	1024955

		Gangni	Meherpur Sadar	Mujibnagar
Number of Birth	13119	6002	5150	1967
Number of Death	4572	2091	1794	685
Net Migrants	41391	19183	16905	5327

Population Projection of Meherpur Paurashava in Cohort Method Based on Population 2011:

	Population 2011	Population 2001	Survived Population	Number of Birth	Number of Death	Net Migrants
Ward 1	6236	4873	6193	116	43	1289
Ward 2	4136	3594	4108	77	28	493
Ward 3	3350	3443	3327	62	23	-133
Ward 4	6156	4324	6114	115	42	1760
Ward 5	3860	3037	3834	72	26	778
Ward 6	3511	3140	3487	65	24	330
Ward 7	6140	4890	6098	114	42	1178
Ward 8	4114	3897	4086	77	28	169
Ward 9	5640	3426	5602	105	39	2148
	43144	34624	42849	802	295	8012

Projected Population:

Ward	Year					
	2024	2026	2031	2036	2041	2046
Ward 1	7599	9004	10409	11815	13220	14626
Ward 2	4678	5249	5819	6390	6960	7530
Ward 3	3256	3186	3115	3045	2975	2904
Ward 4	7988	9863	11737	13611	15485	17360
Ward 5	4683	5533	6382	7232	8081	8931
Ward 6	3883	4278	4674	5069	5465	5860
Ward 7	7390	8682	8724	8766	8808	8850
Ward 8	4331	4576	4618	4660	4702	4744
Ward 9	7855	10107	10149	10191	10233	10275
Total	51663	60478	65629	70780	75930	81081