Mapping lifetime deficits in Nepal: A National Transfer Accounts Approach

Abstract

Nepal has been experiencing a demographic window of opportunity since 1992, which is expected to last until 2047. This golden period of 55 years holds significant potential for economic development. In this regard, understanding the economic lifecycle of individuals is crucial for designing policies that ensure sustainable economic growth and social welfare. Therefore, this study applies the National Transfer Accounts (NTA) framework to analyze Nepal's lifetime deficits. Using detailed data for the fiscal year 2021/22, we estimate total consumption at 4,088,266 million rupees, of which 10 percent is attributed to government consumption and the rest to private consumption. During the same period, a total of 2,561,047 million rupees were earned as labor income with 69 percent derived from wages and salaries while the rest from self-employment. As a result, life cycle deficit stands at 1,527,219 million rupees, reflecting the gap between consumption and labor earnings. Age-specific analysis reveals that individuals aged 27 to 46 experience a surplus, with the highest per capita surplus observed at age 33. In contrast, all other age groups experience a deficit, with the highest per capita deficit recorded at age 87. These findings highlight critical insights into the economic challenges posed by demographic shifts, particularly aging and youth dependency. By mapping lifetime deficits, this study provides valuable evidence for policymakers to design effective fiscal and social policies that address intergenerational resource allocation and economic sustainability in Nepal.

1. Introduction

According to the national population and housing census 2021, Nepal's working age (15–64 years) population growth rate is higher than that of total population (Table 1). This demographic structure is referred to as the demographic window of opportunity. The demographic window is considered a period of significant potential for economic growth. Nepal has been experiencing this type of demographic opportunity since 1992 and is expected to continue benefiting from it until 2047 (National Planning Commission, 2017). Out of this estimated 55-year window, 32 years have already passed, leaving only 23 years to leverage its advantages. According to the National Planning Commission (2017), the duration of the demographic window of opportunity was 60.5 years in Japan, 55 years in Malaysia, 51 years in Taiwan, and 50 years in both Hong Kong and South Korea. These countries achieved

remarkable economic prosperity by effectively utilizing their demographic opportunity to drive economic development during that period. Drawing lessons from these nations, Nepal also has substantial potential to maximize its demographic window for economic progress.

Another crucial aspect of demographic structure is the proportion of the working-age population within the total population. This group generates income, sustains dependents, and contributes to savings for future needs. The 2021 National Census reveals that 65 percent of Nepal's population falls within the working-age category, a proportion that has remained above 50 percent for the past seven decades (Table 1). This type of population structure also presents a significant opportunity for economic growth termed as demographic devidend but requires job creation and productivity enhancement.[1] If Nepal effectively utilizes its demographic dividend through human capital investment and job creation it can grow faster as well as maintain the economic stability.

Table 1: Population share and growth rates by broad age groups

Census year	Total p	Annual population growth rate	Working age population (15 to 64 yrs)	Annual growth rate of working age population (15 to 64 yrs)	Population of 0 to 14 yrs and 64 above	Growth rate of population of 0 to 14 yrs and 64 above	Proportion of working age population (15 to 64 yrs)
1952-54	8256625		4811358		3386187		58
1961	9412996	1.34	5369708	1.10	4011146	1.69	57
1971	11555983	2.05	6526932	1.95	5029051	2.26	56
1981	15022839	2.62	8220701	2.31	6701356	2.87	55
1991	18491097	2.08	10008214	1.97	8480360	2.35	54
2001	23151423	2.25	12831876	2.49	9905058	1.55	55
2011	26494504	1.35	15848675	2.11	10645829	0.72	60
2021	29164578	0.92	19027289	1.75	10137289	-0.47	65

Source: Population censuses, National Statistics Office

The relationship between demography and economics is vital. By analyzing variables such as consumption, income, transfers, and savings across different age groups, we can assess

[1] Demographic devidend as defined by the United Nations Population Fund (2016): The demographic dividend is the economic growth potential that can result from shifts in a population's age structure, mainly when the share of the working-age population (15 to 64) is larger than the non-working-age share of the population (14 and younger, and 65 and older)

"lifetime deficit" and "reallocation" processes. The National Transfer Accounts (NTA) framework facilitates this analysis, providing insights for policy formulation and advocacy. However, this paper limits its scope to estimate the lifecycle deficit.

Lifecycle deficit appears when consumption exceeds labor income. Labor income is directly related to the employment either self or wage and salary. Therefore, labor market is also one of the crucial components to be analysed in the context of National Transfer Accounts. In this context, the labor force participation data provides critical insights into economic dependency, intergenerational transfers, and fiscal sustainability, all of which are central to National Transfer Accounts. According to Table 2 Nepal's labor force participation rate stands at 38.5 percent. The employment-to-population ratio is highest among individuals aged 25-44, indicating that this group contributes the most to the economy. However, youth unemployment remains high at 12.7 percent, emphasizing the need for job creation policies and skill development programs to harness Nepal's demographic dividend. Another major concern is the aging population, as labor force participation drops significantly after age 55, with only 13.8 percent of those 65 and older engaged in economic activities.

Table 2 Labor force indicators

Labor force indicators	Aggregate	By sex		By age					
		male	female	15-24	25-34	35-44	45-54	55-64	65+
Employment-to-population ratio	34.2	48.3	22.9	22.5	46.1	49.1	42.1	27.2	13.4
Labor force participation rate	38.5	53.8	26.3	28.6	52.8	53.6	44.7	28.6	13.8
Unemployment rate	11.4	10.3	13.1	21.4	12.7	8.5	6	4.9	2.7

Source: Labor force survey, Nepal (2017/18), National Statistics Office

2. National Transfer Accounts

The National Transfer Accounts (NTA) framework is an internationally recognized methodology used to analyze economic flows across different demographic age groups (United Nations, 2013). It provides insights into the generational economy, helping to understand how resources are generated, consumed, and transferred within a society. NTA is crucial for addressing challenges related to aging populations, financial sustainability, and intergenerational equity. NTA primarily examines whether an individual's consumption expenditure is met by their labor income. Additionally, it assesses savings, expenditure from savings, family-based transfers, and public transfers, providing a macroeconomic overview of

financial flows. These insights guide policies on public transfers, social security, and sustainable economic planning.

Typically, children and elderly individuals experience a lifetime deficit, where their consumption exceeds their income, while the working-age population generates a lifetime surplus by earning more than they consume. The surplus from the working-age population is used for savings and to support dependent groups through family and public transfers. The NTA framework helps measure these flows and assists in designing effective policies to manage intergenerational economic support systems.

2.1 Global Context

The NTA initiative began in 2002 with participation from the United States, Taiwan, Japan, Indonesia, Brazil, Chile, and France. By 2025, the network expanded to 101 countries worldwide. In 2013, the United Nations developed the NTA Guidelines for measuring generational economies, incorporating experiences from 41 countries. In the Asia-Pacific region, Bangladesh, India, Pakistan, and Sri Lanka are among the 25 countries engaged in NTA research, with Maldives completing its first NTA in 2019. Nepal has recently initiated its first National Transfer Accounts estimation process. This paper is one of the product of the initiation on NTA in Nepal.

3. Objectives of Preliminary NTA Estiamation of Nepal

The preliminary NTA estimates is assumed to support in monitoring demographic dividends, guiding population policies, and evaluating economic sustainability. Additionally, NTA enables international comparative studies. Its advantages lie in providing life-cycle-based policy insights, integrating statistical and economic analysis, and enhancing long-term, evidence-driven planning.

The preliminary estimate of NTA Nepal aims to:

- Develop a system of economic accounts that quantifies age-specific and intergenerational financial flows,
- Estimate per capita labor income and consumption
- Estimate lifecycle deficit by age,
- Support policy improvements related to economic growth, healthcare, education, and fertility rates.

4. Methodology

The preliminary NTA estimates follow the NTA framework as guided by the NTA manual developed by United Nations, (2013). As per the guideline, the flow identity in NTA is:

$$\text{inflows} = \text{outflows}, \quad (1)$$

where,

inflows = labor income (YL) + asset income (YA) + transfer inflows (TI) and

outflows = consumption (C) + savings (S) + transfer outflows (TO).

Therefore,

labor income + asset income + transfer inflows = consumption + savings + transfer outflows

or,

consumption - labor income = assest income - savings + transfer inflows – transfers outflows

or,

$$\text{lifecycle deficit} = \text{asset based reallocation} + \text{net transfer}, \quad (2)$$

where,

lifecycle deficit = consumption (C) - labor income (YL),

asset based reallocation = assest income (YA) – savings (S), and

net transfer = transfer inflows (TI) – transfers outflows (TO).

Lifecycle deficit is the key variable analysed in this report that constitute two main components: consumption and labor income. Consumption is further disaggreated to public and private consumption. Public consumption includes public health consumption, public education consumption and public other consumption. Similarly, private consumption also includes private health consumption, private education consumption and private other consumption. On the other, labor income is further diaggreagated to labor earnings (wage and salary) and self employment labor income. All these variables are analysed to estimate the per capita lifecycle deficit by age (see detail methodology in Annex 2). Per capita lifecycle deficit is:

$$\text{per capita lifecycle deficit} = \text{per capita consumption} - \text{per capita labor income}. \quad (3)$$

Smoothig age profile is carried out by *sysmoother* using STATA computer software.

5. Data Source

National Accounts Estimates of Nepal provides the macro controls for most the variables used in the NTA estimation. In addition, data from central bank released as balance of payment provides macro control for some variables. In order to assign the macro controls to individual age, Nepal Living Standsard Survey 2022/23 is primarily used. Nationa Population and Housing Census 2021 provide the population age profile. Similarly, annual reports of health and educaiton sector provides the data required to distribute the respective macro controls among different age groups. Key data sources used to estiamte preliminary NTA of Nepal are:

- National Census 2021: population age profile (single year population)
- Nepal Living Standards Survey 2023: age wise private consumption and labor income
- National Accounts Estimates 2022/23: macro controls
- Balance of Payments Data 2022/23: net compensation of employee from rest of the world (RoW)
- Annual Health Report 2021/22: number of patients by broad age groups
- Education Sector Reports 2021/22: number of students by level

6. Macro Controls and Scaling of NTA Age Profiles

Macro controls or control totals in NTA are the aggregate measure of economic flows such as consumption, income which are mostly presented in the National Accounts Statistics (NAS). The control totals are the figures used to scale NTA age profile to maintain the consistency in NAS published data and NTA results. In this regard, NTA framework is inline with the SNA concepts however, some control totals are further adjusted to meet the NTA priniciples. For instance, private final consumption in NAS is presented in purchaser's price while in NTA, indirect taxes on products are subtracted to ensure the exact private consuption.

On the other, there is statistical discrepancy between production approach NAS and expenditure aproach NAS. For the purpose of NTA, the discrepancy is distributed among the relevant components of expenditure approach Gross Domestic Product (GDP): private final consumption, NPISH final consumption, private gross fixed capital formation, and change in stock. The discrepancies are not distributed to the government final consumption, public enterprises final consumption and their gross fixed capital formation since they are estimated

from the administrative records having no error at all. It is also assumed that expenditure approach GDP is under estimated as compared to the production approach GDP since production approach GDP is widely used as economic size of Nepal.

The first preliminary NTA report is prepared for the fiscal year 2021/22. This year is selected because there is population and housing census in 2021, Nepal Living Standar Survey in 2022/23 and obviously, NAS are availabe for each year.

Table 3 presents macro controls on consumption and labor income for the fiscal year 2021/22. Total consumption amounts to 4,088,266 million rupees, with public consumption contributing 10 percent and private consumption contributing 90 percent. Among public consumption, health and education represent 14 percent and 23, respectively, while other public consumption makes up 63 percent. Similarly, within private consumption, health accounts for only one percent, education for seven percent, and other private expenditures remarkably dominate at 93 percent. On the income side, total labor income stands at 2,561,047 million rupees, with wage labor earnings contributing 69 percent and self-employment income 31 percent. The lifecycle deficit, calculated as total consumption minus total labor income amounts to 1,527,219 million rupees, indicating a significant shortfall between earned labor income and overall consumption, which needs to be covered through transfers, asset-based reallocations, or other means.

Table 3 Macro controls of NTA 2021/22

NTA Variables	Code	In million rupees	Percentage
Public health consumption	HG	57706	14
Public education consumption	EH	95975	23
Public other consumption	XG	264974	63
Public Consumption	**CG**	**418656**	**10**
Private health consumption	HF	31412	1
Private education consumption	EF	241829	7
Private other consumption	XF	3396369	93
Private Consumption	**CF**	**3669610**	**90**
Total Consumption	**C**	**4088266**	
Labor earnings	YLE	1761977	69
Self-Employment Labor Income	YLS	799071	31
Labor income	**YL**	**2561047**	
Lifecycle deficit	**C – YL**	**1527219**	

Source: National Accounts Statistics of Nepal 2021/21, NTA 2021/22 calculation

LCU = Local currency unit, Nepalse rupees.

Scaling the survey data is done with the adjustment factor calculated as:

$$\text{adjustment factor} = \frac{macro\ control}{survey\ total} \quad (4)$$

The age profile for each NTA variables are multiplied by repective adjustment factor to get the adjusted age profile.

7. Results

Table 4 and Table 5 respectively presents life cycle accounts for per capita and aggregate numbers for the year 2021/22. These tables summarizes the account items by broad age groups: 0 to 24 years, 25 to 64 years and 65 years and above representing respectively young, adults, and the elderly population. The minimum lifecycle deficit is marked for the adults aged 25 to 64 years, however, this group also lacking to make surplus. The highest per capita deficit is estimated for the population age 65 years and above while in aggreate term the highest deficit is accounted to 0 to 24 years population. Per capita consumption is highest for the age group 25 to 64 years and lowest for the 0 to 24 years. Segregating public and private consumption, per capita private consumption is enoumously larger than that of public consumption. However, per capita consumption in health is dominantly contributed by public consumption that surpass per capita private consumption by 902 units. Government consumption in health is higher for all age groups as comparted to the per capita private health consumption. Nevertheless, per capita public consumption in education is remarkably lower than that of the private education consumption. It indicates that public efforts toward human capital development should be further strengthened.

Overall per capita labor income stands at 87814 rupees in 2021/22, 69 percent contributed by salary and wage income while 31 percent by self employment. In the broad age group, 25 to 64 years population witnessed the highest proportion of salary and wage income (71%) while 65 years and above the lowest (35%).

Comparatively, there is big gap between consumption and labor inome. Labor income is relatively lower than consumption that results lifecycle deficit of 1527219 million rupees in the fiscal year 2021/22. One major reason for labor income being relatively lower than consumption is unemployment that stands at 11.4 percent in 2017/18 (Table 2).

Table 4 Life cycle accounts, annual per capita flows, Nepal 2021/22 (NPR*)

Variables	All	0 to 24 years	25 to 64 years	65+ years
Lifecycle defict	52366	93348	724	110468
Consumption	140179	120895	159355	146488
Private consumption	125824	104510	147225	131450
Education	8292	16734	738	0
Health	1077	263	1598	3240
Others	116455	87513	144888	128210
Public consumption	14355	16385	12131	15038
Education	3291	6817	110	0
Health	1979	483	2936	5953
Others	9085	9085	9085	9085
Labor income	87814	27548	158631	36020
Salary and wage	60415	17452	112585	12428
Self-employment	27399	10096	46046	23592

Source: NTA estimation 2021/22, National Statistics Office

*NPR: Nepalese rupees

Table 5 Life cycle accounts, annual aggregate flows, Nepal 2021/22 (million NPR)

Variables	All	0 to 24 years	25 to 64 years	65+ years
Lifecycle defict	1527219	1294269	9614	223335
Consumption	4088266	1676217	2115891	296157
Private consumption	3669610	1449033	1954822	265755
Education	241829	232024	9805	0
Health	31412	3643	21218	6551
Others	3396369	1213366	1923800	259204
Public consumption	418656	227184	161069	30403
Education	95975	94521	1454	0
Health	57706	6693	38979	12034
Others	264974	125971	120636	18368
Labor income	2561047	381948	2106277	72822
Salary and wage	1761977	241968	1494883	25125
Self-employment	799071	139980	611394	47697

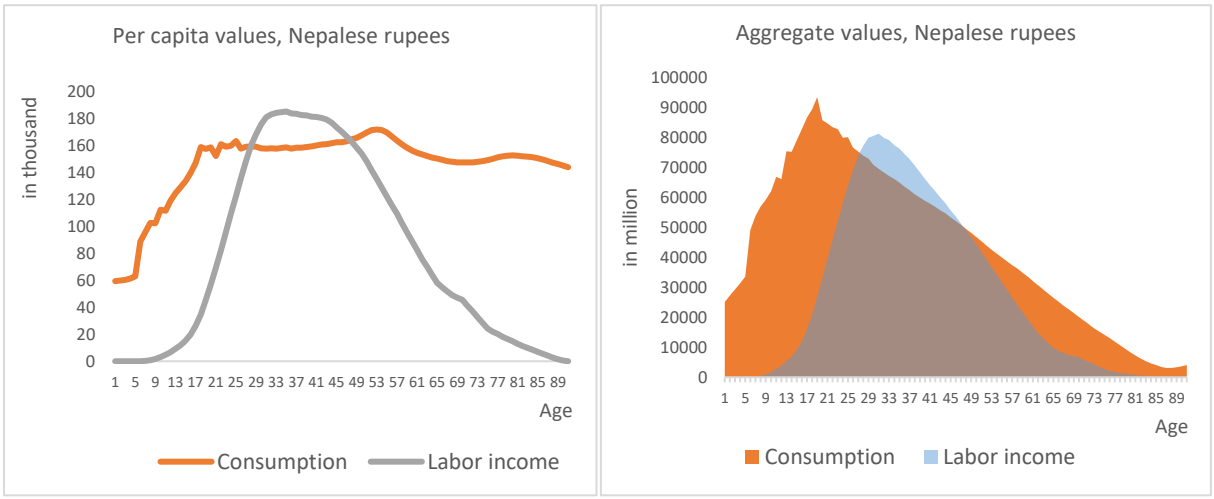
Source: NTA estimation 2021/22, National Statistics Office

As presented in the Annex 1 the single year age account, individuals aged 27 to 46 experience a surplus, with the highest per capita surplus observed at age 33. In contrast, all other age groups experience a deficit, with the highest per capita deficit recorded at age 87.

8. Graphical Presentation of NTA Nepal

This section provides key NTA estimates for Nepal in 2021/22. For each graph, per capita values by age are presented to the left and aggregate values by age to the right.

Figure 1 Consumption and labour income by age, 2021/22

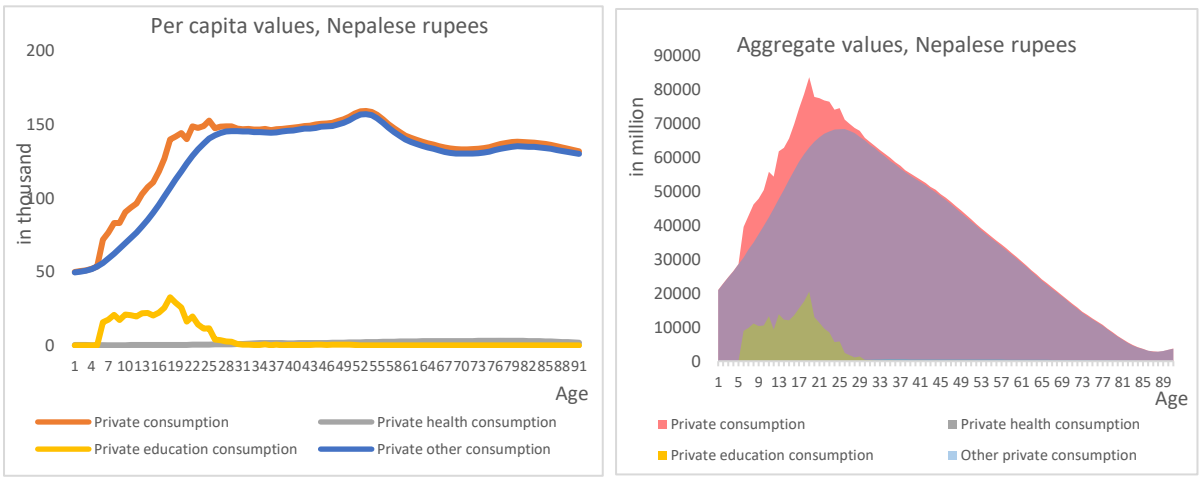


Note: Per capita values (left) in thousands of rupees. Aggregate values (right) in million of rupees

The graphical representation of lifetime deficit and surplus (Figure 1) shows:

- Deficit until age 26 (consumption exceeds income).
- Surplus from ages 27–46 (income exceeds consumption).
- Deficit resumes after age 47, necessitating economic reallocation strategies.

Figure 2 Private consumption and its components by age, 2021/22

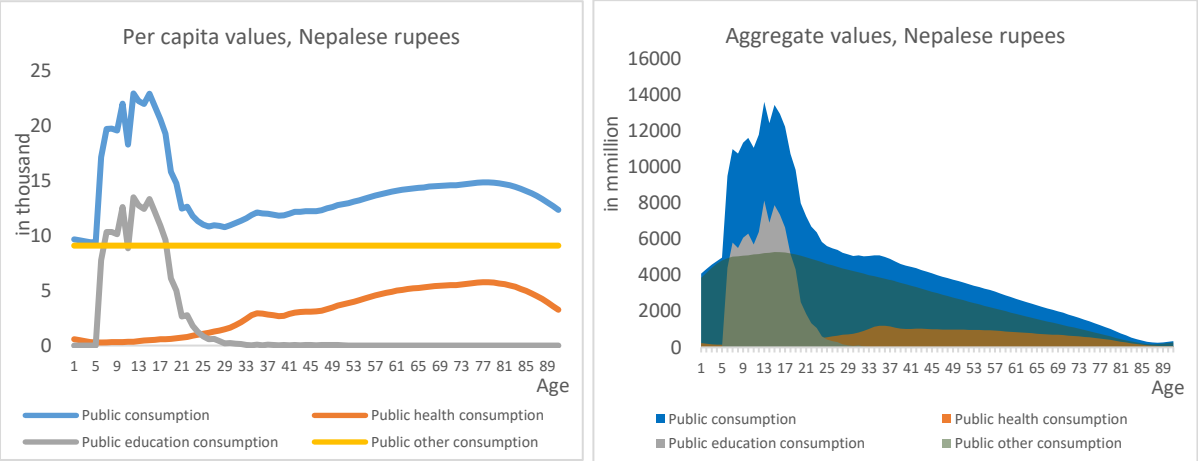


Note: Per capita values (left) in thousands of rupees. Aggregate values (right) in million of rupees

The graphical representation of private consumption and its components by age (Figure 2) shows:

- **Private Health Consumption**: Private spending on health is relatively low across all age groups. It increases slightly for older populations, indicating higher medical needs in later years. However, overall, private health expenses remain minimal compared to other components.
- **Private Education Consumption**: Private education spending is concentrated in the younger age groups, peaking during school and university years. This suggests significant household investment in education, highlighting the importance of private financing in Nepal's education system.
- **Private Other Consumption**: The majority of private consumption falls under this category, covering food, housing, transportation, and miscellaneous expenses. It remains consistently high across all ages, reflecting the essential nature of these expenditures in daily life.

Figure 3 Public consumption and its components by age, 2021/22



Note: Per capita values (left) in thousands of rupees. Aggregate values (right) in million of rupees

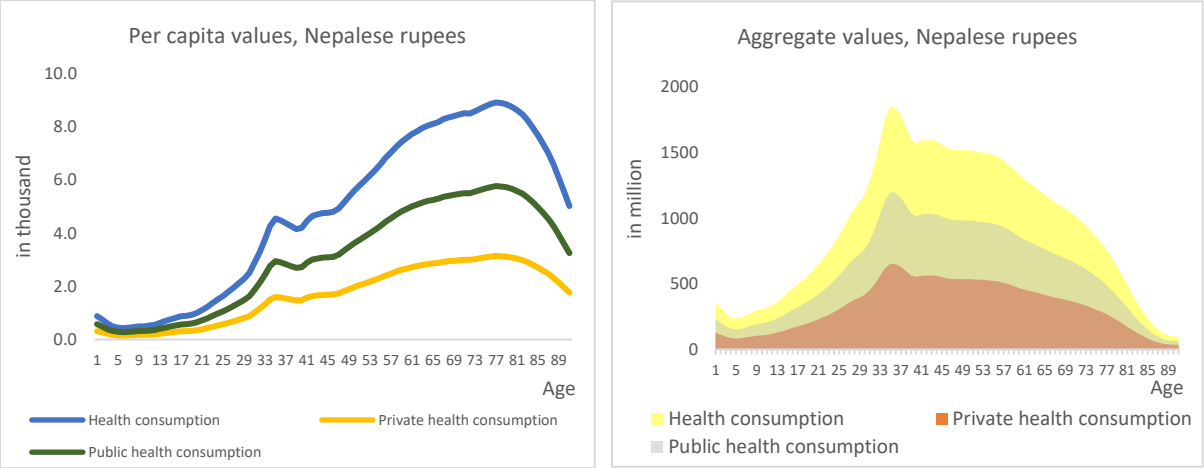
The graphical representation of public consumption and its components by age (Figure 3) shows:

- **Public Health Consumption:** Government spending on health is relatively low in early years but increases significantly in old age, reflecting higher healthcare needs for the elderly. This indicates a focus on providing medical support for aging populations.
- **Public Education Consumption:** Public spending on education is concentrated in the younger age groups, peaking during school and university years. However, it is lower

compared to private education consumption, suggesting a significant role of private investment in education.

- **Other Public Consumption:** This category covers general public services, infrastructure, and social welfare programs. It is distributed more evenly across all age groups, ensuring public service availability for all, regardless of economic activity status.

Figure 4 Health consumption and its components by age, 2021/22

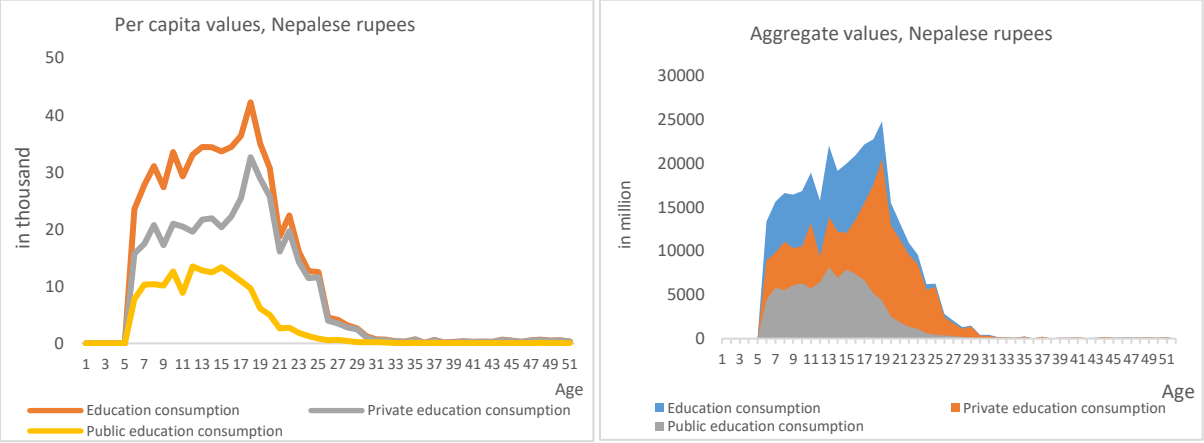


Note: Per capita values (left) in thousands of rupees. Aggregate values (right) in million of rupees

The graphical representation of health consumption and its components by age (Figure 4) shows:

- **Public Health Consumption**: Government health spending is higher than private health consumption across all age groups. Per capita health consumption peaks in old age, reflecting increased public investment in elderly healthcare.
- **Private Health Consumption**: Household spending on health remains relatively low compared to public health consumption. It gradually increases with age but does not rise as sharply as public spending.
- **Age-Based Trend**: Both public and private health consumption are minimal in childhood and early adulthood but rise significantly in later years, highlighting greater healthcare needs among the elderly.

Figure 5 Education consumption and its components by age, 2021/22



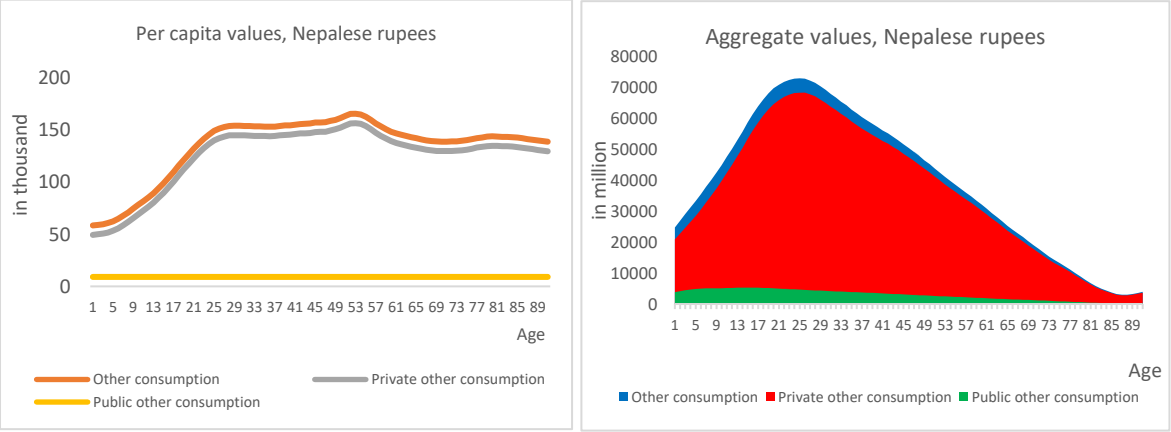
Notes:

- Per capita values (left) in thousands of rupees. Aggregate values (right) in million of rupees.
- NLSS survey provides only education consumption for 5 years and above.
- Education consumption by age 50 above is excluded

The graphical representation of education consumption and its components by age (Figure 5) shows:

- **Public Education Consumption**: Government spending on education is concentrated in younger age groups, particularly during school and university years.
- **Private Education Consumption**: Household spending on education is significantly higher than public spending, showing a strong reliance on private financing for schooling and higher education. This suggests that families bear a substantial share of education costs.
- **Age-Based Trend**: Both public and private education consumption peak in childhood and decline sharply after the typical schooling years, reflecting the age-specific nature of education expenditures.

Figure 6 Other consumption and its components by age, 2021/22

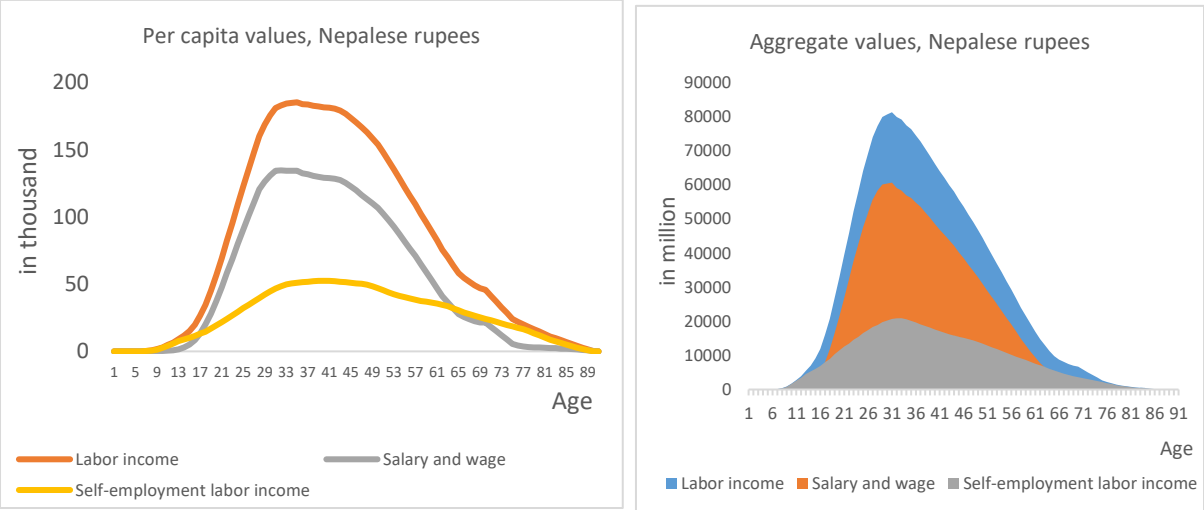


Note: Per capita values (left) in thousands of rupees. Aggregate values (right) in million of rupees

The graphical representation of other consumption and its components by age (Figure 6) shows:

- **Public Other Consumption**: Government spending on general public services, infrastructure, and welfare programs is evenly distributed across all age groups, ensuring continuous support for the entire population.
- **Private Other Consumption**: Household spending on goods and services such as food, housing, and transportation dominates total consumption and remains consistently high across all age groups.
- **Age-Based Trend**: While both public and private other consumption are present across all ages, private spending is significantly higher, indicating that households primarily finance their daily living expenses.

Figure 7 Labour income and its components by age, 2021/22



Note: Per capita values (left) in thousands of rupees. Aggregate values (right) in million of rupees

The graphical representation of Labour income and its components by age (Figure 7) shows:

- **Wage Earnings**: Salary and wage income constitute the major portion of labor income, peaking in the working-age years (25–64). This reflects the importance of formal employment in income generation.
- **Self-Employment Income**: Earnings from self-employment contribute significantly to labor income but are lower than wage earnings. This component remains more stable across different age groups, indicating the presence of informal and entrepreneurial activities.
- **Age-Based Trend**: Labor income is minimal during childhood, increases sharply in early adulthood, peaks in mid-life, and then declines, reflecting decreasing workforce participation in old age.

9. Key Findings

- **Demographic Window of Opportunity:** Nepal's working-age population (15-64 years) constitutes 65% of the total population, presenting a potential economic advantage. However, effective utilization requires strategic policy interventions.
- **Labor Market Dynamics:** The labor force participation rate is 38.5%, with a high youth unemployment rate of 12.7%. This suggests the need for job creation and skill development programs.
- **Consumption and Income Disparities:** Total consumption is significantly higher than labor income, leading to a lifecycle deficit. Public consumption education remains lower than private consumption, indicating the need for increased government investment.
- **Aging Population Concerns:** Labor force participation drops significantly after age 55, necessitating policies on retirement security, healthcare financing, and social protection for the elderly.

10. Policy Recommendations

- **Enhancing Employment Opportunities:**
  - ✓ Implement job creation programs, particularly for youth, through skill-based training and entrepreneurship promotion.
  - ✓ Strengthen labor market policies to increase workforce participation.
- **Strengthening Social Protection Systems:**
  - ✓ Expand pension schemes and healthcare support for the aging population.
  - ✓ Improve intergenerational economic transfers through fiscal policies.
- **Investing in Human Capital Development:**
  - ✓ Increase public spending on education and vocational training.
  - ✓ Improve healthcare infrastructure to support an aging population.
- **Fiscal and Economic Reforms:**
  - ✓ Enhance tax policies to finance social security systems.

✓ Encourage savings and asset-based reallocations to reduce future economic dependency.

11. Way Forward

- **Develop Comprehensive NTA Estimates:** Future estimates should integrate asset-based reallocations and inter-household transfers to provide a holistic picture of economic flows.
- **Strengthen Data Collection and Integration:** Improving the availability and consistency of data sources, such as labor market statistics and expenditure surveys, will enhance the accuracy of NTA estimates.
- **Expand Public Investment in Social Sectors:** Increasing government expenditure on education, healthcare, and employment programs will help address the challenges associated with demographic shifts.
- **Promote Financial Inclusion and Savings Culture:** Encouraging savings and investment among working-age individuals will support financial sustainability during old age.

12. Challenges

- **High Youth Unemployment:** Despite a large working-age population, limited job opportunities and skill mismatches hinder economic gains.
- **Low Public Investment in Education:** The reliance on private sector spending for essential services creates disparities in access and affordability.
- **Aging Population and Social Security Burden:** The increasing proportion of elderly individuals demands sustainable pension and healthcare policies.
- **Data Gaps and Methodological Constraints:** The accuracy of NTA estimates depends on comprehensive and high-quality data, which is currently limited. Main data limitation includes estimating **mixed income, capital depreciation, and indirect taxes**, requiring alternative methodologies and long-term data system enhancements.
- **Economic and Fiscal Constraints:** Financing social protection and employment programs requires strong fiscal management and revenue generation strategies.

13. Conclusion

The preliminary National Transfer Accounts estimation for Nepal in 2021/22 highlights the economic implications of demographic changes, particularly the country's ongoing demographic window of opportunity. The findings show that individuals aged 27 to 46 experience a surplus, while younger and older age groups face lifetime deficits, with the highest per capita deficit at age 87. The total lifecycle deficit stands at 1,527,219 million rupees, indicating a significant gap between labor income and consumption. The study underscores the importance of leveraging Nepal's working-age population through enhanced labor market participation, skill development, and social protection mechanisms to ensure intergenerational economic sustainability.

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Annex 1: NTA age profile per capita flows, 2021/22 (NPR)

Age	Population	Per capita education consumption	Per capita health consumption	Per capita other consumption	Per capita total consumption	Per capita labor earning	Per capita lifecycle deficit
0	411159	0	881	58535	59415	0	59415
1	450469	0	741	59141	59882	0	59882
2	510855	0	602	59747	60349	0	60349
3	531295	0	496	60784	61280	0	61280
4	535505	0	447	62438	62885	0	62885
5	568365	23509	428	64822	88759	0	88759
6	562745	27736	449	67834	96019	305	95715
7	534278	31031	468	71139	102638	765	101873
8	599728	27349	496	74611	102457	1666	100791
9	501311	33537	497	78260	112294	3024	109270
10	646772	29268	524	81805	111597	4774	106823
11	475016	33050	550	85512	119112	6610	112502
12	638817	34432	622	89582	124636	9208	115428
13	556890	34339	691	94143	129174	11790	117384
14	592370	33645	761	98989	133394	15146	118248
15	607128	34383	815	104386	139585	19853	119731
16	608979	36364	877	109944	147185	26477	120708
17	537901	42214	887	115797	158898	34689	124208
18	708386	34971	922	121474	157366	45044	112322
19	504010	30705	1003	126954	158662	56794	101868
20	704630	18694	1103	132425	152222	69453	82769
21	487099	22383	1220	137475	161077	82468	78608
22	596573	16031	1366	141820	159217	95418	63800
23	490146	12656	1498	145813	159966	109398	50568
24	504612	12458	1637	149297	163392	122651	40741
25	621333	4511	1787	151530	157827	135590	22238
26	499807	4116	1948	153068	159132	148376	10755
27	410888	3183	2114	154039	159336	160039	-703
28	571114	2627	2272	154314	159213	168574	-9361
29	356207	1192	2500	154185	157877	175506	-17629
30	645215	697	2878	154135	157710	180999	-23289
31	307222	650	3294	153996	157940	183057	-25117
32	452204	347	3758	153645	157750	184304	-26554
33	391194	317	4263	153550	158129	184807	-26678
34	351877	718	4544	153438	158701	185304	-26603
35	618195	68	4472	153284	157823	183933	-26109
36	385964	591	4360	153453	158404	183610	-25206
37	300741	127	4255	154103	158485	182602	-24116
38	448956	253	4145	154503	158902	182327	-23426
39	287636	379	4191	154761	159331	181514	-22183
40	621284	260	4446	155371	160077	181239	-21162
41	235550	326	4635	155904	160865	180577	-19712
42	363738	274	4691	156025	160991	179223	-18233
43	288324	632	4746	156472	161850	176848	-14998

44	238936	462	4757	157272	162491	173726	-11235
45	465773	277	4788	157444	162509	170411	-7902
46	260568	520	4906	157683	163109	166678	-3568
47	195764	663	5128	158814	164605	162854	1752
48	308758	480	5352	159967	165799	158459	7340
49	205177	551	5588	161531	167670	153869	13801
50	499602	332	5774	163755	169862	148063	21798
51	202968	0	5964	165590	171554	141686	29868
52	270951	0	6161	165766	171928	135224	36703
53	231221	0	6354	165109	171464	128564	42900
54	209110	0	6585	163017	169602	121829	47773
55	336733	0	6820	159988	166808	115659	51149
56	212738	0	7028	156567	163595	109416	54179
57	154189	0	7229	153629	160858	102181	58677
58	221728	0	7412	150985	158397	95778	62619
59	150556	0	7562	148613	156175	89166	67009
60	359659	0	7715	146889	154603	82343	72260
61	136482	0	7822	145686	153508	75587	77921
62	178068	0	7933	144385	152318	70097	82221
63	150089	0	8025	143146	151172	63913	87258
64	131306	0	8094	142242	150336	58093	92244
65	246944	0	8155	141239	149395	54658	94737
66	133073	0	8277	140228	148505	51690	96815
67	116934	0	8334	139586	147920	49037	98883
68	158096	0	8383	139179	147562	46955	100606
69	116571	0	8444	139007	147451	45703	101748
70	220685	0	8484	138972	147455	41180	106276
71	101019	0	8483	139118	147601	37007	110593
72	121570	0	8559	139388	147947	32685	115262
73	89967	0	8658	139760	148418	28532	119886
74	76129	0	8754	140398	149152	24137	125015
75	120603	0	8833	141379	150212	21985	128227
76	71787	0	8893	142378	151270	20183	131088
77	69471	0	8872	143073	151945	18199	133746
78	61504	0	8824	143712	152536	16425	136110
79	29838	0	8728	144062	152790	14813	137977
80	62234	0	8612	143936	152547	12963	139585
81	24549	0	8451	143651	152101	11106	140995
82	28369	0	8240	143574	151813	9759	142054
83	24653	0	7966	143289	151256	8320	142935
84	21751	0	7663	142857	150521	7019	143502
85	25043	0	7337	142256	149593	5569	144024
86	14508	0	6975	141537	148511	4034	144477
87	12336	0	6556	140822	147378	2685	144693
88	17925	0	6064	140147	146210	1552	144659
89	8515	0	5533	139499	145032	425	144607
90	47640	0	5002	138852	143853	0	143853

Source: NTA estimation, 2021/22, National Statistics Office, Nepal

Annex 2 Methodology for National Transfer Accounts

1. Introduction

Nepal’s economy has experienced significant variations in growth and has maintained an average growth rate of around 4 percent over the past decade. During this period, the country's population has also increased from 26.4 million in the Population and Housing Census, 2011 to 29.2 million in 2021 Census, reflecting an annual growth rate of 0.92 percent. This population growth has been driven by natural increase and migration, which continue to shape Nepal's demographic and economic landscape. Changes in the population's age structure happen due to shifts in birth rates, death rates, and migration. These changes are important because they influence how people earn and spend money at different stages of life, such as childhood, working years, and old age.

To better understand economic dynamics, it is essential to analyze the interactions between various economic actors and the population. The National Transfer Accounts framework helps measure age-specific economic behaviors, focusing on income generation, intergenerational redistribution, consumption, and savings patterns.

The National Statistics Office (NSO) Nepal, in collaboration with the United Nations Population Fund (UNFPA), has developed Nepal's National Transfer Accounts (NTA). This initiative is based on data from Nepal Living Standard Survey – IV (NLSS-IV), 2022- 23, the National Account Statistics of Nepal and Population and Housing Census of Nepal 2021.

NTA consists of three main accounts. The economic life cycle account provides insights into how individuals at different ages support their material needs through labour income and consumption, highlighting the life cycle deficit or surplus. Nepal’s first NTA results are based on this life cycle account.

The technical methods of NTA are well explained in international manuals and research. However, this report focuses on the data preparation and methods used in Nepal.

2. Data Preparation for National Transfer Accounts (NTA) in Nepal

To construct the National Transfer Accounts (NTA) for Nepal, Data were collected from various agencies for the fiscal year 2021/22.

- The National Accounts Statistics of Nepal, published by the National Statistics Office Nepal, was used for the macro control.

- The Nepal Living Standards Survey (NLSS-IV) 2022/23, published by NSO, provided estimates for private consumption and labour income including self-employment.
- Administrative data are used as:
    a. Public consumption expenditure in health, education, and other sectors was taken from Financial Comptroller General Office (FCGO).
    b. School attendance by age, obtained from the Ministry of Education, Science, and Technology, was used to estimate age-wise consumption in education.
    c. Data on health facility utilization by age, based on service records from the Health Management Information System (HMIS) of the Department of Health Services, was used to distribute health consumption by single-year age groups.

This report also uses the same codes used in the NTA manual for different variables in the life cycle deficit age profiles as follows:

Main codes for NTA age profiles

Life cycle deficit age profiles – consumption

C	Consumption
CF	Private consumption
CG	Public consumption
CFE	Private consumption, education
CFH	Private consumption, health
CFX	Private consumption other than health and education
CGE	Public consumption, education
CGH	Public consumption, health
CGX	Public consumption other than health and education

Life cycle deficit age profiles- labour income

YL	Labour income
YLE	Labout earning, including fringe benefit
YLS	Self-employment labour income

The NTA age profiles were constructed using both survey and administrative data, which help estimate private and public consumption. These consumption estimates are classified into three categories: education, health, and other consumption.

2.1 Population Estimates

The population age profiles used in the National Transfer Accounts for Nepal are based on the National Population and Housing Census 2021, published by the National Statistics Office (NSO) Nepal. The report provides age profiles for total resident population (including both Nepalese citizens and foreign residents)

The Population Census Report provides data for single-year ages up to 99+ years. However, for the National Transfer Accounts (NTA), the age structure and population estimates are considered only up to 90 years. All individuals aged 90 and above are grouped into a single age category (90+ years), making 90 years the uppermost age limit in the NTA analysis.

2.2 National Transfer Accounts and Macro Controls

The National Transfer Accounts and the System of National Accounts serve different purposes and conceptual frameworks. While many NTA flows are either identical to or derived from SNA data, there are key differences between the two. One of the most significant differences lies in their units of analysis and sector classifications. The NTA framework records transactions between individuals, whereas SNA focuses on institutional units (such as households, businesses, and the government). In NTA, the government acts as an intermediary in income redistribution. Additionally, flows to and from the rest of the world (ROW) are considered to construct a complete set of accounts.

A key concept in NTA is the life cycle deficit (LCD), which is calculated as the difference between consumption and labour income. This variable has no direct counterpart in SNA. However, other components of life cycle flows are derived from SNA data, with necessary adjustments.

Both public and private consumptions in NTA are based on final consumption expenditure data from SNA. Labour income, which represents the return to labour, does not have a direct equivalent in SNA. Additionally, SNA does not account for self-employment income and unpaid family labour, requiring NTA-specific adjustments. To address this, NTA assigns a value for self-employment using mixed income estimates.

The NTA aggregated flows are constructed using data from the National Accounts Statistics of Nepal, which serves as a macro control for scaling NTA age profiles.

The NTA flow identity summed across all ages provides the aggregate values for each economic flow:

$$Y^L(x) + Y^K(x) + Y^P(x) + \tau(x) = C(x) + S(x)$$

Where:

- $Y^L(x)$ represents **labour income** of age group x,
- $Y^K(x)$ represents **capital income**,
- $Y^P(x)$ represents **property income**, and
- $\tau(x)$ represents **net transfers** (transfer inflows minus transfer outflows).
- $C(x)$ represents **consumption** of age group x
- $S(x)$ represents **saving** of age group x

To derive the given formula, the following information from National Accounts Statistics has been used:

- GDP by expenditure approach (includes final consumption expenditure, capital formation and net export), in current prices and in million NPR.
- GDP by income approach (includes compensation of employees, operating surplus/mixed income, in current prices and in million NPR.
- Final consumption expenditures of private and Non-Profit Institution Serving Household (NPISH) in current prices and in million NPR.
- Government final consumption expenditure (Collective and individual), in current prices and in million NPR.

Table 1 Key information from the National Accounts Statistics of Nepal, 2021/22

National Accounts Statistics Detail	In Current prices (in million NPR)
Production/Income Approach GDP, 2021/22	4976557.69
Taxes less subsidies on products	720573.06
Compensation of employees	1729330.66
Gross Operating Surplus/Mixed income	2524482.19
Taxes less subsidies on production and products	722744.83
Expenditure Approach GDP, 2021/22	4752190.41
Final Consumption Expenditure	4648915.46
Government Consumption	418655.96
Private Consumption	4141515.68
Nonprofit institutions serving households (NPISH)	88743.81
Gross Capital Formation	1873367.82
Gross Fixed Capital Formation (GFCF)	1442210.15
Change in Stock	431157.67
Net Exports of Goods and Services	-1770092.88
Imports	2103641.23
Exports	333548.34
Government Final Consumption Expenditure, 2021/22	418655.97
Education	95975.18
Health	57706.38
Others, N.E.C.	264974.40
Private and NPISH Final Consumption Expenditure, 2021/22	4230259.49
Education	301081.89
Health	286122.98
Others, N.E.C.	3643054.61

National accounts data was then used to construct NTA aggregate controls. These are used to scale NTA age profiles. For some of the aggregated NTA values, they are the same as those from the National Accounts Statistics table, while in other cases, aggregate control specific to NTA controls has been created.

The steps that have been followed to construct the macro controls for NTA aggregates are as follows:

1. Add taxes less subsidies due to labour - Labour income is an estimate of the value of the return to labour and it has no direct counterpart in SNA. SNA does have some estimates for the return to labour except that levied taxes has been removed already which again gets included for NTA purpose. SNA does not report the value of labour income for self-employment, but for NTA purpose this has been estimated using mixed income.

   Since Nepal does not have an estimate for mixed income (included as part of GOS), its share has been estimated using the ratio of mixed income to gross operating surplus. This ratio is derived from countries with similar economic activities and income levels as Nepal.

   In the next step, self-employment of labour income was calculated as 2/3 of Mixed Income[2] plus tax less subsidies on production due to Mixed Income. Since there is no personal income tax in Nepal, all taxes on production were assumed to be on returns to capital (i.e. on GOS and net property income). Labour income was derived as the total of earning and self-employment labour income.

2. Remove taxes less subsidies from consumption- NTA divides taxes on products and production less subsidies into: taxes less subsidies on labour income, taxes less subsidies on capital income and taxes less subsidies on consumption. While labour income and capital income in NTA are adjusted upward to value labour and capital income, consumption is adjusted downward to exclude taxes less subsidies on products. Value Added Tax (VAT) on expenditure items is not part of consumed value and are therefore removed to calculate the value of consumption. The tax less subsidy for private final consumption expenditure was adjusted in this way by subtracting taxes on products by less subsidies on products assuming that only private consumption is taxed in the country.

   Adjustment was brought to private consumption where tax less subsidy amount is subtracted from private final consumption expenditure. Also, the adjustment of statistical discrepancies in income and expenditure approach GDP is used to adjust the private consumption expenditure.

[2] This is best available evidence given in NTA manual based on (Lee, Lee, et al., 2008)

3. Since government consumption expenditure on education and health is derived from FCGO data for estimating national accounts statistics, there are no taxes less subsidies on products applied to government final consumption expenditure. As a result, it remains unchanged from the SNA values.
4. Total consumption is derived by summing private and public consumption.
5. Disaggregation of Aggregates

   Since the National Accounts Statistics of Nepal does not provide a detailed breakdown of education expenditure by level. The data from the Ministry of Education, Science, and Technology's Education Management Information System (EMIS) Flash I and Flash II reports were used to determine the proportion of public expenditure allocated to each education level. Based on these proportions, the expenditure was categorized into pre-primary, primary/basic, secondary, and tertiary levels.

   Similarly, for the disaggregation of health expenditure by age group, data on service recipients from the Ministry of Health and Population's Health Management Information System (HMIS) was used. This data provides information on the utilization of healthcare services across different age groups, helping to estimate the distribution of public health expenditure among various age categories. By using HMIS data, health expenditures were allocated proportionally to different age groups based on their share of healthcare service usage.

   Public other consumption expenditure, excluding health and education, is equally distributed across all age groups from 0 to 90+ years due to the absence of age-specific data. This ensures a consistent and fair allocation for every individual.

Table 2 The final aggregate for the NTA macro control

Code	Description	NPR (in million)
LCD	Lifecycle Deficit	1527218.52
C	Consumption	4088265.62
CF	Private Consumption	3669609.65
CFE	Education	241828.65
CFH	Health	31411.56
CFX	Others, N.E.C.	3396369.43
CG	Public Consumption	418655.96
CGE	Education	95975.18
CGH	Health	57706.38

CGX	Others, N.E.C.	264974.40
YL	Labour income	2561047.10
YLE	Labour arnings	1761976.57
YLS	Self-employment labour income	799070.52

2.3 Construction of Private Consumption Variables

Private consumption expenditure is primarily based on household surveys. In Nepal, the Nepal Living Standards Survey-IV (NLSS-IV) 2022–23 serving as the main data source. The NLSS-IV is representative at the province level and includes a sufficiently large sample for this analysis. The survey provides age-specific consumption profiles from ages 0 to 99+. However, for National Transfer Accounts (NTA) purposes, the age limit was set to 90+ years, so individuals aged 90 and above are grouped together in the 90+ age category.

The NLSS-IV provides data on both income and consumption expenditure at the individual and household levels. For the construction of age profiles in National Transfer Accounts (NTA), the focus is on individuals rather than households. Since the primary institutions in NTA are the different generations, it is necessary to have estimates based on individuals. For this purpose, individual level data from NLSS-IV is used. In cases where individual-level data is not available in the NLSS, individual consumption is estimated by applying appropriate weights to compute consumption at the individual level.

2.3.1 Education Consumption Expenditure

The Nepal Living Standards Survey-IV (NLSS-IV) 2022–23 provides the detailed information on education expenses at the individual and household level. This includes admission, tuition fees, exam fee and uniform, textbook, private tuition fee and other educational costs, recorded for the past 12 months, for the education level early childhood development/basic level, secondary level, vocational/technical education and higher education. The school-attending population was considered to be those aged 5 to 50 years, as NLSS-IV and population census data showed that very few individuals continued education beyond this age. Therefore, education expenses were capped at age 50. The expenditure is distributed among the school attending age group by using proportion of school attending population between 5 to 50. Then calculate the age specific per capita private education consumption expenditure.

2.3.2 Private Health Expenditure

The NLSS-IV provides detailed information on health expenses at both the household and individual levels. The data was collected on preventive healthcare expenses, such as regular check-ups, including full-body check-ups, and treatment costs, including hospital admissions, medical check-ups, and medicines. At the individual and household level, the survey recorded 12 months of health expenses for non-communicable diseases and 30 days of treatment expenses for communicable diseases. For National Transfer Accounts (NTA) purposes, private health expenses were disaggregated across age groups from 0 to 90+ years using proportion of these information. Then calculate the age specific per capita private health consumption expenditure.

2.3.3 Private Other Consumption Expenditure

The NLSS-IV provides detailed information on household level other consumption expenditure that includes both the foods and non-food consumption expenditure other than health and education for the last 12 months. In food consumption, the consumption expenditure on all types of food item such as cereal grains, pulses, vegetables, meat, fish, egg, dairy products, beverages etc. were collected. In non-food consumption expenditure, the information on all types of non-food items such as housing and utilities, clothing and footwear, transportation and communication, household durables and furnishings etc. were included.

For other consumption expenditures, the age profile varies across different age groups. Based on international studies, consumption is generally lower for children and the elderly, while it tends to be higher among the working-age population. To estimate age-specific consumption, an equivalence scale was applied. Following international recommendations, all other household consumption in Nepal was allocated to individuals using this equivalence scale. In this scale, a weight of 0.4 was assigned to individuals aged 4 or younger, with the weight increasing linearly from age 4 to 20, and reaching 1 for adults aged 20 and older.

The following formula, as outlined in the NTA manual, was used to perform this allocation:

$$\alpha(a) = 1 - 0.6 * D(4 < a < 20) * ((20 - a)/16) - 0.6 * D(a \leq 4)$$

To distribute other consumption expenditure, the model divided each individual's weighted equivalence scale value by the total household weighted consumption. This proportion was

then multiplied by the total other consumption expenditure to determine each individual's share. Then compute the per capita private other consumption for each age group.

2.3.4 Smoothing of Age Profiles

The age-specific estimates derived from the survey show significant variations across different age groups. To address that, smoothing is applied to minimize random fluctuations in the estimates without eliminating the true variations between ages. This ensures a more reliable and consistent representation of age-specific consumption patterns.

The data on all the consumption expenditure and labour income were smoothed to reduce the noise in the data separately including age specific population except for the education expenditure. As recommended by NTA manual, Friedman's SuperSmoother was used which is a non-parametric regression estimator. Using SuperSmoother may result in negative values for age profiles that are very close to zero. To address this, special care was taken to replace negative smoothed values with zeros.

Care was taken to avoid double smoothing; therefore, no additional smoothing was applied to the age profile of the life cycle deficit, which is calculated as the difference between consumption and labor income. This was necessary because the original age profiles for health and education had already been smoothed and adjusted to match macro control values.

2.3.5 Labour Income

Labor income comprises two main components. The first component includes wages and salaries of employees, along with the monetary value of non-cash benefits provided by employers, such as health insurance, paid time off, retirement plans, and employee discounts. This essentially captures the total financial benefits an employee receives in addition to their regular salary. The second component encompasses the income earned by self-employed individuals, which is estimated based on the earnings generated from their own businesses or household activities. Age-specific labor income profiles are derived from the NLSS-IV, as this survey provides relevant data on income sources for individuals aged 10 and above.

Using NLSS-IV data, age-specific per capita salary income was estimated in the first step. In the second step, per capita labor income from self-employment was separately estimated for the agriculture sector and the non-agriculture sectors. Subsequently, by aggregating these three

components of labor income, the age specific total per capita labor income was estimated. For the age-specific labor income distribution, the age profile from the population census was utilized.

2.3.6 Adjusting Private Consumption for NTA Macro Controls

The age profiles derived from survey data often do not align with aggregate macroeconomic controls. To ensure that the estimated allocations for each age group match the total National Transfer Accounts macro control, a scaling factor is applied to each category, including education, health, and other private consumption.

The adjustment process begins by calculating a scaling factor for each service. This is done by dividing the macro control for each service by the unadjusted total value derived from survey data. The unadjusted total is calculated by multiplying the estimated allocation for each age group by the age-specific population from the 2021 Population Census and summing the values. Once the scaling factor is determined, per capita spending for each service is adjusted by multiplying the survey-based allocation for each age by the scaling factor.

2.4 Creating Public Consumption Variables

Similar to private consumption, public final consumption expenditure is also categorized into three main components: education, health, and public consumption other than education and health. Data on public consumption are sourced from administrative records, government reports, and similar sources. The following section outlines the methodology used to construct each of these variables.

2.4.1 Public Education Consumption

The total public education consumption expenditure of Nepal is obtained from the administrative data of FCGO that includes administrative and other expenses in education sector by government. To estimate the age profiles for school enrollment, data was obtained from the Ministry of Education, Science and Technology's EMIS flash I and flash II data on the current school-attending population.

2.4.2 Public Health Consumption

The total public health consumption expenditure of Nepal is obtained from the administrative record of FCGO that includes administrative and other expenses in health sector by government. To estimate the age specific public heath consumption expenditure the proportion of population receiving health service from the public health organization data obtained from HMIS of Ministry of Health and Population.

2.4.3 Public Other Consumption Expenditure

The remaining public final consumption, which includes expenditures other than education and health, is treated as a single category. Following the guidelines in the NTA manual, the per capita age profile of this "other" public consumption is assumed to be constant, meaning these goods and services are distributed equally among all individuals in the population.

3. Creating Life Cycle Deficit Variables

The Life Cycle Deficit (LCD) is the difference between consumption and income, where a negative LCD is referred to as a Life Cycle Surplus. Total consumption consists of both private and public consumption, while income is the sum of earnings and self-employment labor income. Together, these components determine whether an individual or economy experiences a deficit or surplus over their life cycle.