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## **Multidimensional Poverty in Rural Nagaland: A Micro-Level Analysis Using the Modified Alkire-Foster Method**

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Received: 14.05.2026; Accepted: 29.05.2026; Available online: 31.05.2026

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#### **Abstract**

*This study estimates the multidimensional poverty of two rural villages, Changdang and Lakhuni, of Mokokchung district of Nagaland using a modified Alkire-Foster (AF) methodology. The primary data on multidimensional poverty is collected through structured questionnaires from 50 households. It measures multidimensional poverty in three dimensions namely education, health and living standards using eleven indicators which are context specific to rural Nagaland. Multidimensionally poor was defined as households deprived in at least one-third of the weighted indicators. In Changdang 48 per cent of households were multidimensionally deprived and in Lakhuni 36 per cent. The combined Multidimensional Poverty Index (MPI) score was 0.183. The leading contributors to poverty were housing deprivation, poor sanitation, unsafe fuel for cooking and limited access to health care. The study also employed OLS regression analysis to investigate the relationship between education, occupation and multidimensional poverty. The results reveal that higher education and diversification of private and government employment mitigate multidimensional deprivation. Using Amartya Sen's Capability Approach, the paper argues that the poverty of rural Nagaland is not just a case of income deprivation but is characterised by the existence of multiple deficiencies in basic capabilities and living conditions. The findings underscore the need for tailored interventions in housing, sanitation, health, education and job creation to promote inclusive rural development.*

**Keywords:** Multidimensional Poverty Index (MPI), Rural Nagaland, Alkire-Foster Methodology, Capability Approach, Rural Development.

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#### **Introduction:**

Poverty continues to be one of the most stubborn development challenges worldwide. Traditional measures of poverty relying only on income or consumption do not capture the broader dimensions of human deprivation and social exclusion. To address these limitations, multidimensional approaches to poverty measurement have gained increasing importance in development literature and policy discourse (Ravallion, 2010). The Multidimensional Poverty Index (MPI) developed by the Oxford Poverty and Human Development Initiative (OPHI) and the United Nations Development Programme (UNDP) provides a more comprehensive framework by capturing simultaneous deprivations in education, health and living standards (Alkire & Santos, 2010).

The idea of multidimensional poverty is firmly grounded in the theoretical framework of Amartya Sen's Capability Approach and the wider Human Development paradigm. Sen (1999) argues that poverty is not just a lack of income, but a deprivation of the basic capabilities and substantive freedoms that are necessary for people to lead lives they have reason to value. From this perspective, the well-being of humans depends on the capacity of people to perform the essential functioning's such as being educated, healthy, adequately nourished and socially included. The Human Development framework is based on these ideas and stresses the importance of expanding human choices and quality of life beyond economic growth. The MPI implements these concepts by identifying deprivations that overlap for individuals and households at the same time.

In the Indian context, although the fall in monetary poverty has been observed over the years, a large proportion of the population remains multidimensionally deprived, especially in rural and geographically isolated areas. The northeastern states of India continue to face major developmental challenges due to difficult terrain, poor infrastructure, limited market integration and inadequate access to quality public services. These structural constraints have been captured in Nagaland to a great extent with rural settlements and hilly terrain. Despite several development interventions, the remote rural areas continue to face inequalities in housing quality, sanitation, access to healthcare and livelihood opportunities. Existing studies on multidimensional poverty in India and Northeast India have predominantly relied on secondary data sources such as NFHS and Census data and have primarily been focused on state or district level analysis. Empirical studies at the village level that document localised patterns of deprivation in Nagaland are extremely scarce. It is important to have micro-level investigations, as aggregate statistics often hide important intra-regional disparities and context-specific forms of deprivation.

Against this backdrop, the present study investigates multidimensional poverty in two rural villages namely, Changdang and Lakhuni, located in the Mokokchung district of Nagaland using a modified Alkire-Foster methodology. The study seeks to measure the incidence and intensity of multidimensional poverty at the household level and to analyse the impact of education and occupational structure on poverty outcomes. The present study attempts to contribute micro level evidence to better understand rural deprivation in Nagaland and to inform more inclusive and targeted policy interventions.

### **Review Of the Literature:**

A large body of research has shown the limitations of income-based poverty measures and has promoted the Multidimensional Poverty Index (MPI) as a more comprehensive measure. Using the Alkire-Foster method on India's BPL and NFHS data, Alkire and Seth (2009) found that conventional poverty measures misclassify 12% of the poor and 33% of the extreme poor. Similarly, Ashraf and Usman (2012) developed an MPI for Punjab using MICS data, classifying districts into low, medium and high deprivation zones, thereby providing a more nuanced understanding of regional poverty.

Alkire and Housseini (2014) analysed MPI trends in Sub-Saharan Africa and introduced the concept of destitution, identifying extremely deprived groups according to severe indicators, such as malnutrition and child mortality. Bagli (2015) computed MPI using 2011 Census data for Northeast India and found that Meghalaya and Arunachal Pradesh were among the most deprived states with Kurung Kumey being the poorest district. Dehury and Mohanty (2015) used IHDS data to decompose MPI across 84 natural regions of India

and found that nearly half the population was multidimensionally poor, with significant regional disparities. Deka (2018) studied the slum areas of Guwahati and found occupation, education and asset ownership as the major determinants of MPI. He argued for interventions in education and sanitation, and income. Bagli (2019) found that the tribal communities and poor sanitation were the major contributing factors to multidimensional poverty in Purulia, West Bengal. Tripathi and Yenneti (2019) analysed state-level MPI and found that rural poverty reduced more than urban poverty, and deprivation in education and standard of living were the key drivers. Using NFHS data, Konwar (2020) examined the trend in Northeast India and found that Assam and Meghalaya were the most vulnerable in a decade. Mothkoo and Badgaiyan (2021) studied the changes in MPI due to income shocks from COVID-19 and highlighted the rise in poverty levels in rural India and the need for strong public health infrastructure. Seth and Alkire (2021) studied the evolution of MPI with economic growth and discovered that the progress was uneven among Indian states. Bamel et al. (2022) and Jagadeshwaran et al. (2022) have used NFHS data to study intra-state and inter-district disparities and have proposed customised policies to address deprivation in nutrition, sanitation and schooling. Pradhan et al. (2022) focused on social group inequalities and found that Scheduled Tribes and Scheduled Castes are disproportionately impacted by the MPI burdens.

Several studies have dealt with multidimensional poverty in India and Northeast India using national data but there is very little micro level village specific analysis in Nagaland. Previous research has relied on secondary datasets and has failed to capture localised patterns of deprivation in remote rural communities. The current study attempts to address this gap through primary household-level investigation.

### **Research Methodology:**

The present study adopts the cross-sectional survey method with primary data from two villages namely Changdang and Lakhuni in Mokokchung district of Nagaland. Structured questionnaires were used to interview 50 households (25 households in each village). Simple random sampling. The sample size is small, but it provides rich micro-level insights, appropriate for exploratory analysis at the village level. The study used the modified Alkire-Foster (AF) methodology based on a dual cut off to determine multidimensionally poor households based on eleven indicators in health, education and living standards. A household was classified as multidimensionally poor if it experienced deprivation in one-third or more of the weighted indicators ( $k \geq 0.33$ ). The framework was adapted to the socio-economic situation of rural Nagaland. The global MPI developed by OPHI and UNDP is based on a set of indicators that are globally comparable. In contrast, this study includes eleven indicators in education, health and living standards to better capture the context-specific deprivations that are more prevalent in remote rural communities. Indicators like health insurance and access to healthcare reflect the huge challenges that households in remote villages continue to face where institutional health facilities remain limited. Similarly, housing quality, sanitation, cooking fuel and asset ownership were kept because they are strongly relevant to rural living conditions and well-being. Although the general dimensional structure of the global MPI has been preserved, some changes have been made in the composition and weighting of the indicators to improve local applicability and the sensitivity of the analysis. The weighting scheme was designed to balance the three core dimensions and to ensure adequate

representation of indicators representing critical capability deprivations in the domain of the study area. OLS regression was applied to analyse the effect of education and occupational structure on MPI. For the regression analysis dummy variables were created for education and occupation (both categorical variables). In the education category, the reference group was illiterate households, while in the occupational category, the reference group was farming households.

### Results And Discussion:

Demographic and socio-economic profile of households of Changdang and Lakhuni villages are given in Table 1. The table contains data on the sex structure, age structure, family size, education level, monthly income and occupational distribution of respondents. It indicates that the majority of the population in both villages were male (76% in Changdang and 68% in Lakhuni), with an overall male population of 72%. A large proportion of respondents were 60 years and above, especially in Changdang (64%) and the combined total (54%) indicating an ageing rural population. Family size also varies. Smaller families (1-3 members) are more common in Lakhuni (68%) than in Changdang (36%). Regarding education, a majority of the respondents had only primary level education, particularly in Changdang (72%), whereas Lakhuni had comparatively higher levels of high school and higher secondary education. Both the villages had low levels of monthly income. A large number of households had income less than ₹ 20,000. Major occupations were farming and private employment with private employment being highest in Lakhuni (44%) with Changdang having equal number of private jobs and farming.

**Table 1. Demographic and Socio-Economic Profile of the Study Area**

Particulars	Changdang (%)	Lakhuni (%)	Combined (%)
<b>Sex</b>			
Male	76	68	72
Female	24	32	28
<b>Age Group</b>			
Below 40	12	12	12
40-50	8	28	18
50-60	16	16	16
60 and above	64	44	54
<b>Family Size</b>			
1-3 members	36	68	52
4-6 members	64	32	48
<b>Education Level</b>			
Primary school	72	36	54
High school	16	40	28
Higher secondary	4	12	8
Graduate and above	4	8	6
Illiterate	4	4	4
<b>Monthly Income (₹)</b>			
Below 10,000	44	28	36
10,000-20,000	44	24	34
20,000-30,000	4	24	14

30,000–40,000	4	20	12
40,000–50,000	0	0	0
Above 50,000	4	4	4
<b>Occupation</b>			
Government employee	28	24	26
Farmer	36	32	34
Private employee	36	44	40

Source: Field survey 2024

### Multidimensional Poverty Index (MPI) Analysis:

The Multidimensional Poverty Index (MPI) was calculated for the two villages: Changdang and Lakhuni using a modified Alkire-Foster methodology which includes three critical dimensions: education, health and living standards. Each dimension has specific indicators that are relevant to rural deprivation. In Changdang, 12 out of 25 households surveyed (48%) were found to be multidimensionally poor. The intensity of poverty of these households was estimated to be 0.445 resulting in an MPI score of 0.213 ( $MPI = H \times A = 0.48 \times 0.445$ ). In Lakhuni, 9 households (36%) were multidimensionally poor with an intensity score of 0.42. The MPI was 0.152. When data from the two villages were pooled, 21 out of the 50 households (42%) were found to be multidimensionally poor.

The average intensity of deprivation was 0.434, and the combined MPI was estimated at 0.183. The results reveal that poverty is much more widespread than income-based measures suggest, especially in terms of access to basic amenities and services. The higher MPI in Changdang indicates a greater degree of structural deprivation, particularly concerning access to housing and healthcare.

### Decomposition of MPI Indicators:

Decomposition of MPI across the three dimensions shows that the most important dimension of deprivation was living standards. Housing was the most deprived indicator, with 78 per cent of households living in substandard (kutcha) dwellings. This was followed by poor sanitation (58%) and unsafe cooking fuel (40%). Also, 18 per cent of households lacked access to basic assets and clean drinking water. The results are in line with previous studies in rural India that have consistently identified housing and sanitation as the main drivers of multidimensional poverty (Alkire & Seth, 2015; Chakravarty & D'Ambrosio, 2013).

In the health dimension, 50% of the households especially from Changdang were deprived of access to basic health care services. Moreover, 24 percent suffered from nutritional deprivation and 10 percent lacked health insurance. This persistent gap in access to healthcare is in consonance with the findings of Mishra and Ray (2019 who found healthcare inaccessibility as a persistent determinant of multidimensional poverty in the tribal and remote areas. Of the households, only 4% were educationally deprived, indicating that access to basic education was more prevalent. This could be due to greater policy attention to primary education through schemes like SSA and Mid-Day Meal programs (Kingdon, 2007).

### Regression Results: The Impact of Education and Occupation on MPI:

The results of the OLS regression to examine the effect of education and occupational structure on the multidimensional poverty of households in the villages of Changdang and Lakhuni are presented in Table 2. The dependent variable in the model is the MPI score. The reference categories are illiterate households and farming households.

The regression coefficients indicate that the multidimensional poverty is negatively associated with educational attainment. Households with primary education have a coefficient of  $-0.058$  which means that they are associated with lower MPI scores than illiterate households. The result is statistically significant at the 10 per cent level ( $p < 0.10$ ) and shows that even basic education helps to reduce multidimensional deprivation. Similarly, the coefficients for households with high school education ( $-0.007$ ) and higher secondary education ( $-0.001$ ) were negative but these relationships were not statistically significant.

Also the occupational structure shows the inverse relationship of multidimensional poverty. The coefficient for households engaged in private employment was  $-0.114$ , which indicated lesser levels of deprivation in comparison to households engaged in agriculture. Government employment was also negatively associated ( $-0.051$ ) which reflects relatively better living conditions and access to basic services among formally employed households. However, neither of the occupational variables was statistically significant, perhaps due to the small sample size and lack of variation across the households.

The adjusted  $R^2$  value of 0.792 indicates that the explanatory variables in the model explain about 79.2 percent of the variation in MPI scores. The relatively high explanatory power may be explained by the limited sample size and the strong association between occupation, education and deprivation indicators in the selected villages. Overall, the results suggest the importance of educational attainment and diversification from traditional farming occupations in reducing multidimensional poverty in rural Nagaland.

**Table 2. Occupational Structure and Education on Multidimensionally Poor (OLS estimation)**

Variables	Coefficient	Std. Error	t-value	p-value
Constant	0.050	0.033	1.515	0.136
<b>Education</b>				
Primary	-0.058	0.030	-1.933	0.060*
High school	-0.007	0.010	-0.700	0.487
Higher secondary	-0.001	0.027	-0.037	0.970
<b>Occupation</b>				
Private employment	-0.114	0.070	-1.629	0.110
Government employment	-0.051	0.110	-0.464	0.645

Notes: Dependent variable = MPI score. Reference categories are illiterate households (education) and farming households (occupation). N = 50. Adjusted  $R^2 = 0.792$ . \* $p < 0.10$ .

Source: Field Survey, 2024

### Theoretical Interpretation of Findings: A Perspective of Capability Approach:

The theoretical framework of the Capability Approach, pioneered by Amartya Sen (1999) and later operationalised by Nussbaum (2000) and others, provides a deeper meaning to the empirical findings of this study. The Capability Approach is that poverty is fundamentally the deprivation of substantive freedoms or capabilities that people have

reason to value. Income and consumption (and other monetary measures) are instrumentally important but poor proxies for human well-being in the sense that they do not capture whether people are able actually to convert resources into meaningful functionings. The case of Changdang and Lakhuni is a powerful instance of this theoretical insight. Thus, a household that earns a modest living from subsistence farming is at the same time denied adequate shelter, access to health care, clean cooking fuel and nutritional security, each of which is a distinct capability failure rather than simply a shortfall in monetary terms.

This approach directly associates the three dimensions of the MPI – education, health and living standards – with core human capabilities. The most basic are the right to health and adequate nutrition, the right to education and to participate in social and productive life, and the right to adequate shelter and a clean environment. The decomposition results indicate a high concentration of deprivations in living standards (housing 78 per cent, sanitation 58 per cent, unsafe cooking fuel 40 per cent) and health (access to health care 50 per cent, nutritional deprivation 24 per cent). These are not discrete material shortages they are compounded capability failures. For example, the use of biomass and dirty cooking fuels leads to indoor air pollution to which women and children are more exposed than other household members, directly compromising their health capabilities and perpetuating gender-based asymmetries in household burden. In addition, a kutcha house offers little protection against the severity of the monsoon climate of Nagaland and hence adds to the burden of water-borne and vector-borne diseases, which reduces the health capacities of all the members of a household. This is exactly the set of deprivations that the Alkire-Foster dual cutoff method is designed to capture. The results here suggest how multiple capability failures are mutually reinforcing in a self-sustaining cycle of deprivation.

The very low rate of educational deprivation (4%) requires careful theoretical consideration. On one level this is a positive development and suggests that the villagers have been given access to basic education through national schemes such as the Sarva Shiksha Abhiyan. But within the Capability Approach, access to schooling and the capability to benefit from education are different. This is where Sen's distinction between formal entitlements and substantive freedoms is important. When households can access primary schools but the quality of teaching is poor; when children go to school but are malnourished due to nutritional deprivation; or when families cannot afford to undertake secondary education due to income constraints, the translation of school access into real educational capability is severely compromised. Here the idea of 'conversion factors' in the Capability Approach is especially useful. 'Conversion factors' are the personal, social and environmental factors interceding between resources and capabilities. Negative conversion factors that hinder the translation of formal school attendance into meaningful educational achievement are geographic isolation, absence of trained teachers, language problems and the competing demands of agricultural work. Regression results reveal that even primary education greatly diminishes MPI and therefore, the depth of educational capability gaps that are masked by enrolment figures could be underestimated.

The occupational dimension of the regression findings also requires further theoretical engagement. The strong poverty reducing effect of private and government employment relative to farming as the baseline is consistent with what sociologists have called the "structural vulnerability" of subsistence agriculture in remote highland economies. In

terms of capabilities, farming in these villages is not only a low income occupation. It is an occupation that has high exposure to climate shocks, low integration with formal social protection systems and limited access to credit, insurance and market networks. These are structural conditions that simultaneously limit the possibilities of farming households in several dimensions. In contrast, formal employment, whether in government or the private sector, generally provides not just a more regular and predictable income but also access to Employees' State Insurance (ESI), Provident Fund contributions and, in many cases, employer-subsidised housing. These interrelated entitlements directly affect deprivations in health insurance and asset ownership, two of the indicators included in the MPI. Interestingly the magnitude of the regression coefficient for private employment ( $-0.114$ ) is greater than that for government employment ( $-0.051$ ). This may be related to the younger age profile and higher educational attainment of those in private sector employment in Lakhuni where private employment is more common (44%) consistent with the broader demographic pattern that Lakhuni shows higher proportions of households in the 40-50 age bracket and higher secondary or graduate level education.

Another area of theory for future research is the spatial concentration of deprivation, as shown by the MPI gap between Changdang (0.213) and Lakhuni (0.152) in this study. Despite the two villages being in the same district, the intra-village disparity emphasises the importance of place-based factors in determining capability sets. This is also where the concept of "adaptive preferences" in capability theory, first suggested by Elster (1983) and critically engaged by Sen and Nussbaum, is introduced. Adaptive preferences refer to the phenomenon that deprivation over the long term may result in lowered aspirations and perceived needs. Standard survey instruments may not capture the full extent of subjective deprivation. In a village such as Changdang where 64% of respondents are 60 years old and above and kutcha housing may be the only housing experience, elderly respondents might not feel housing as a felt deprivation even though it is objectively inadequate. This indicates that MPIs, despite being an advance on income-only measures, are further improved by the use of complementary qualitative methods, such as participatory rural appraisal or focus group discussion, to reveal aspects of deprivation that households may have come to accept as normal. Such mixed-method approaches would be useful for future micro-level research in Nagaland to avoid the systematic under-estimation of deprivation that adaptive preferences can produce.

Finally, the ageing demographic profile of both villages, with 54% of the combined respondents aged 60 and above, has important theoretical implications for poverty dynamics that deserve explicit discussion. Older people often suffer from a mixture of capability deficits. Physical functioning declines, income earning capacity are reduced, health care needs increase, and the likelihood of benefiting from education or work-related interventions decreases. Age is an important personal conversion factor in the Capability Approach, mediating the relationship between resources and achieved functioning. An old farming household may own land and basic assets in name but may not be able to cultivate them effectively or may not be able to access credit or may not be able to claim welfare entitlements because of lack of bodily capability, social networks or institutional connections. This demographic fact implies that poverty reduction strategies in these villages cannot be solely dependent on supply side interventions in education and formal employment, especially among the older population, where the reach may be limited.

Instead, core capability-expanding instruments for the most structurally vulnerable segment of the population need to be positioned as targeted social protection instruments such as old-age pensions, health insurance schemes under Ayushman Bharat and community-based care networks.

**Recommendations:**

1. Improving Housing and Sanitation Facilities: 78% of households are living in substandard housing and 58% households are without adequate sanitation. It is suggested that government schemes such as Pradhan Mantri Awas Yojana- Gramin (PMAY-G) and Swachh Bharat Abhiyan should be implemented well with community participation and regular monitoring in remote villages.
2. Improve Rural Health Services: With 50% of households without any access to healthcare, mobile health units, trained community health workers and upgraded primary health centres are critical to improve the delivery of medical services especially in geographically isolated areas such as Changdang.
3. Invest in Education and Employment Linkages: Higher levels of education and formal employment reduce MPI considerably. Local vocational training, entrepreneurship programs and scholarship schemes should be enhanced to provide youth with skills that match market demands and reduce intergenerational poverty.
4. Strengthening of Village Development Boards (VDBs) for Integrated Rural Development: VDBs can be strengthened as convergence platforms for rural development schemes leading to targeted poverty reduction in Nagaland. By incorporating MPI data at the village level in VDB planning, the planning will be able to prioritise housing, sanitation, health and livelihood interventions in remote areas.

**Conclusion:**

The present study is an attempt to analyse multidimensional poverty at micro level in two rural villages of Mokokchung district of Nagaland by using modified Alkire-Foster methodology. The results reveal a high incidence of multidimensional poverty, with 48% and 36% of households being multidimensionally poor in Changdang and Lakhuni respectively and an overall MPI value of 0.183. The most significant drivers of deprivation are substandard accommodation, absence of sanitation, limited access to health services and reliance on hazardous cooking fuels, underscoring the inability of traditional income-based measures of poverty to fully capture the scale of deprivation in very remote areas. Regression analysis confirms that both level of education and occupational composition exert a significant impact on levels of poverty. Lower MPI scores were associated with primary and high school education levels, and a strong negative association with poverty was found for employment in private and government sectors. These results highlight the importance of human capital development and the diversification of employment for rural poverty alleviation.

The results also provide further support for the Capability Approach by showing that poverty in rural Nagaland is a multidimensional phenomenon, extending beyond income deprivation to overlapping deprivations in access to healthcare, housing quality, sanitation and livelihood security. Thus, the study highlights the importance of capability-enhancing interventions to achieve inclusive rural development.

**Study Limitations:**

Nevertheless, this study provides micro-level insights but has some limitations. The findings of the study cannot be generalised to the whole of Nagaland due to the small sample size and the fact that the study was limited to only two villages. Furthermore, the cross-sectional nature of the study captures deprivation at one point in time and may not be able to reflect the dynamics of seasonal or long-term poverty. Future studies may use larger samples and mixed-method approaches to attain a more comprehensive and richer understanding of multidimensional poverty in rural Nagaland.

Overall, the study adds to the growing empirical literature that supports localised, multidimensional poverty measurement as a necessary foundation for the design of targeted and effective poverty reduction strategies. Policy interventions for the upliftment of the marginalised communities in Nagaland should focus on the structural deficits in basic services and inclusive human development.

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## Appendix A: Tools and Formulae Used:

The study utilised the modified Alkire-Foster (AF) methodology to compute the Multidimensional Poverty Index (MPI) and OLS regression to analyse the influence of education and occupation on MPI.

### A.1 Alkire-Foster (AF) Methodology

The MPI is calculated using the dual-cutoff method, which includes the following steps:

#### 1. Headcount Ratio (H):

$H = q / n$ , where  $q$  = number of multidimensionally poor,  $n$  = total population.

#### 2. Intensity of Poverty (A):

$$A = (\sum ci(k)) / q$$

Where  $ci(k)$  = deprivation score for individual  $i$ ,  $q$  = number of poor individuals.

3. MPI Calculation:

$$MPI = H \times A$$

Where  $H$  = incidence of poverty,  $A$  = intensity of poverty.

**A.2. To measure the MPI, three dimensions that are education, living standards, and Health have been taken into consideration with 11 indicators.**

Dimensions	Indicators	Weightage
Education	Year of schooling	1/6
	School Attendance	1/6
Living Standards	Cooking fuel	1/18
	Sanitation	1/18
	Drinking water	1/18
	Housing	1/18
	Electricity	1/18
	Assets	1/18
Health	Health Insurance	1/9
	Health Care	1/9
	Nutrition	1/9