Analysis of Multidimensional Poverty Measurement

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Abstract
Poverty is a global development issue and practical problems. From the perspective of many studies, multidimensional measure of poverty is very important to promote the poverty alleviation work precision. Combined unidimensional and multidimensional poverty measurement is applied on sampling measurement of poverty situation of rural residents in Heilongjiang Province. From the multidimensional perspective, the poverty performance rate within aspect of health, housing, income, dressing, eating, education tends to decrease. More precisely, the poverty performance rate of income, eating, and dressing is fluctuated increasing, while the poverty performance rate of education, health and housing is fluctuated declining. Along with the increase of the dimension, county multidimensional poverty index gradually decreases, also the . From the unidimensional perspective, sampling area is mainly manifested in the dimension of poor health and housing. Based on this, according to the characteristics of Heilongjiang’s multidimensional poverty index, the article puts forward the poverty reduction strategies according to the degree of poverty and suggests the specific solution to each and every dimensions of poverty.

Keywords Multidimensional poverty; precise poverty alleviation; A - F method; Heilongjiang Province

1. INTRODUCTION
Poverty is a global development issue and a realistic problem. China's long-term urban-rural dual structures system and the weak rural economic and social foundation, resulted in a large number of rural poverty broadly distributed all over the country. After the founding of new China, China persisted in the government-led model and made a great contribution to the global poverty reduction. But now there are still more than 45 million rural poor population, including 14 concentrated special difficult areas, 592 key counties under national poverty alleviation and development, and 128 thousand poor villages. The poverty in these areas is not limited to the economic aspect, but to a large extent, it is reflected by the lack of public products or services. Even if income is the only mean to achieve the goal, but more attention should be paid on quality of basic necessities i.e. clothing, meal and housing.

Alkire argued that poverty should be measured in 8 dimensions: housing, drinking water, sanitation, electricity, assets, land, education and health insurance (Alkire S and Foster J, 2011; Garry F. Barrett, Stephen G. Donald and Yu-Chin Hsu, 2016). The result of this calculation is much higher than the poverty rate measured by the National Bureau of Statistics who used only income index. Some scholars have proposed that poverty should be analyzed in combination with space, which mean spatial interpolation is used to calculate the village multidimensional poverty result, which help to better grasp the problem of poverty (Belhadj B and Limam M, 2012; D.W. Divelbiss, D.L. Boccelli, P.A. Succop, and D.B. Oerther, 2013; Rupak Goswami and Saikat Majumdar, 2016). In addition, some scholars analyzed poverty in terms of education, health, sanitation, power resource for cooking and safety in using water (McNeil R, Guirguis-Younger M, Dilley LB, Turnbull J, and Hwang SW, 2013; L.E. Voth-Gaeddert, D.B. Oerther, 2015; Samuel D. Towne Jr. Janice C. Probst, James W. Hardin, Bethany A. Bell and Saundra Glover, 2013). The studies of these scholars, which have measured and analyzed the problem of poverty from different angles and sectors, have established a theoretical foundation for this article (Liu Yanhua and Xu Yong, 2016). However, there is still shortcoming in index selection work, and for the timeliness analysis and depth analysis work, there is still gap to be improved. In < China rural poverty alleviation and development program (2011-2020)> , there is poverty alleviation objective “two not-to-worries and three to-guarantees” which are “not-to-worry meal, not-to-worry clothing, guarantee compulsory education, basic medical care and housing”. The document has ascertained multidimensional view of poor people identification, but recently, few scholars who base on this to put forward the analysis indicators, mostly ignore the poverty problem of meal and clothing. Moreover, there are few articles about the poor households in Heilongjiang Province which is the traditional agricultural province, but still existing the natural environment and economic constraint which in long term affect its rural development. Large area of rural poverty, more poor populations, degree of poverty has not been fundamentally changed which cause the economic development to expose
problems such as hollowing out of rural areas, weakening of main body, disusing of village, environmental pollution and contiguous impoverishment.

Therefore, in order to be more objective and accurate in poor household identification and adopt specific measurements to help the poor, this article uses A-F poor identification method, combined with reality of China and the poverty alleviation objectives, re designs the index system, and uses the survey data in 2016, to analyze poverty status and degree of poverty in Heilongjiang province, a large agricultural province in cold temperate zone, to discover the poverty characteristics of rural poor population, and provide reference for the precisely development of poverty alleviation in Heilongjiang province.

2. DATA AND METHODOLOGY

2.1 Research area situation

There are 28 poverty-stricken counties in Heilongjiang Province, with an area of 109.8 thousand square kilometers, accounting for 21.21% of the total 132 counties, cities and districts in the province. Including 14 key counties for national poverty alleviation and development (shorter form “ national poor county”), which covers 58.3 thousand square kilometers which account for 12.39% of total area of Heilongjiang province and 14 counties for provincial poverty development ( shorter form “ Provincial poor county”), which covers 51.5 thousand square kilometers which account for 10.95% of Heilongjiang total area. In addition, there are 5 national poor counties, 6 provincial poor counties located in the south of Greater Khingan Range poverty area, which cover a total of 37.6 thousand square km, accounting for 34.21% of the impoverished county area, and 7.89% of the total area of province. This study randomly selected 5 counties, Gannan County, Yanshou County, Huanan County, Lindian County, Lanxi County to carry out on-the-spot investigation for nearly two months. The spatial distribution of sample points is shown as follows:

![Figure 1. Spatial distribution of research area](image)

2.2 Data resources

The data in this study are first-hand data obtained through field surveys conducted in poor areas. The research targets include the village cadres, poor households and off-poor households; the survey content includes the impoverished village economic development level, poor recognition accuracy etc. A total of 28 poor villages and 919 households were investigated by random sampling in 5 poverty-stricken counties on the spot, among them, 714 were the poor. The following measures of poverty analysis are based on the data of poor households’ survey.

<table>
<thead>
<tr>
<th>Sample counties</th>
<th>Poor villages</th>
<th>The farmers surveyed</th>
<th>The poor surveyed</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yanshou</td>
<td>5</td>
<td>166</td>
<td>114</td>
<td>86.75</td>
</tr>
<tr>
<td>Gannan</td>
<td>6</td>
<td>145</td>
<td>121</td>
<td>83.45</td>
</tr>
<tr>
<td>Huanan</td>
<td>7</td>
<td>276</td>
<td>213</td>
<td>77.17</td>
</tr>
<tr>
<td>Lindian</td>
<td>5</td>
<td>160</td>
<td>133</td>
<td>83.13</td>
</tr>
<tr>
<td>Lanxi</td>
<td>5</td>
<td>172</td>
<td>133</td>
<td>77.33</td>
</tr>
<tr>
<td>Heilongjiang Province</td>
<td>28</td>
<td>919</td>
<td>714</td>
<td>77.69</td>
</tr>
</tbody>
</table>
2.3 Data resources
Theory of poverty from the original Booth and Rowntree put forward that poverty is a kind of "welfare" is missing, then, Sen put forward capability poverty theory, claimed that poverty refers to do not have the ability to get the lowest life guarantee need. With the continuous progress and transformation of human concept, poverty has been transformed from a simple economic problem into a complicated social problem. Human poverty index (HPI) established by the United Nations development programme (UNDP) in 2000, and in 2010, the 20th human development report proposed the multidimensional poverty index MPI, more and more number of indicators, which are not economic indicators have been used to measure poverty. This study USES the multidimensional poverty measurement proposed by Sabina Alkire and James Foster of the Oxford poverty and human development center (OPHI), based on Sen's basic practical deprivation theory. This method is effective to compensate for the limitation of traditional method and deficiency, can be more comprehensive to cope with the complexity of the poor and with nature, form a new poverty research paradigm, get general recognition of the domestic and international experts and scholars.

1) Single dimension poverty measure method
The single-dimensional poverty measure method, proposed by Atkinson in 1987, is a method to measure the poverty of resident income as a single index. Element \( x_i \) represents the income of the \( i \) person, \( D \) means the one-dimensional vector of the income of the residents, then \( x_i \in D \). Assuming that there is a single dimension of the deprivation critical value \( Z \), we can define the deprivation matrix \( g^0 = [g^0] \):

\[
[g^0] = \begin{cases} 
Z - X_i > 0, & g^0 = 1 \\
Z - X_i < 0, & g^0 = 0 
\end{cases}
\]

In the type , \( g^0 = 1 \) it means that income \( x_i \) is poor , \( g^0 = 0 \) it means that income \( x_i \) is non-poverty. According to the income characteristics of the county poor households, the deprivation threshold of the single dimension is \( Z = 2800.00 \) yuan.

2) Multidimensional poverty measure method
Multidimensional poverty measurement is based on the comprehensive measure of the qualitative data and continuous quantitative data of the discrete type to explore the poverty level of the rural households. The multidimensional poverty measurement is more elastic than the one-dimensional poverty measurement, which mainly includes the selection of the poverty dimension, the definition of the critical value of the dimension and the distribution of the weight of each dimension.

a. Multidimensional value
Building a multidimensional poverty indicator system can transform abstract propositions into an index system that can be measured, which can help to identify poverty, increase poverty and break down poverty from a quantitative perspective. According to the United Nations Millennium Development Goals (MDG) and "13th Five-Year Plan" requirements of the "Two don't worry, Three guarantees" target, the establishment of the following table shows poverty population multi-dimensional measurement index system which base on the six indicators of income, eating, dressing, education, health and housing to identify and analyze the poverty level and formation mechanism of the poor. For multidimensional \( x_g \), the matrix \( D \) can be defined \( D = [x_i]_{nm} \):

\[
D = \begin{bmatrix}
x_{i1} & x_{i2} & \ldots & x_{in} \\
x_{j1} & x_{j2} & \ldots & x_{jn} \\
\ldots & \ldots & \ldots & \ldots \\
x_{m1} & x_{m2} & \ldots & x_{mn} 
\end{bmatrix}
\]

In the formula, \( x_{ij} \) represents the original value of \( j \) in the dimension \( j \), the row vector \( X_j = [x_{1j}, x_{2j}, \ldots, x_{nj}] \) represents all of the values of the sample \( m \) in the dimension \( j \), column vector \( X_j = [x_{i0}, x_{i2}, \ldots, x_{in}] \) represents all of the values of the sample \( n \) in the dimension \( j \).

b. Identification of poverty
If there is a poverty threshold \( Z \), \( Z \) represents the critical value of the deprivation of the \( j \) dimension, thus the deprivation matrix of the multidimensional index matrix \( g^s = [g^s] \), if \( Z - X_i > 0 \), then \( g^s = 1 \), it means that \( x_i \) is in poverty, if \( Z - X_i < 0 \), then \( g^s = 0 \), it means that \( x_i \) is non-poverty.

\[
[g^s] = \begin{cases} 
Z - X_i > 0, & g^s = 1 \\
Z - X_i < 0, & g^s = 0 
\end{cases}
\]

For poverty threshold \( Z \), it can be assigned according to the national standard. Among them, the threshold of income dimension is determined according to national standard. Another five indicators based on "Two don't worry, Three guarantees", the specific content of the eating, clothing deprived threshold based on yong-fu liu,
director of the office of the state council, who stated "do not worry about food and clothing" in press conference held by the state council information office on May 10, 2016., (TABLE II).

<table>
<thead>
<tr>
<th>Poor dimension</th>
<th>Index content</th>
<th>Deprivation threshold and assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td>Rural per capita net income</td>
<td>The annual per capita net income is below the national poverty level and assigns a value of 1</td>
</tr>
<tr>
<td>Eating</td>
<td>Farmers rations supply</td>
<td>Insufficient ration of food, or no proper meat and egg milk except for rations, assigned a value of 1</td>
</tr>
<tr>
<td>Dressing</td>
<td>Clothing for farmers</td>
<td>No change of clothes, or a single clothing, cotton clothing one season below three sets, assigned a value of 1</td>
</tr>
<tr>
<td>Education</td>
<td>Education for children</td>
<td>In the nine-year compulsory education range, children in the range of children are in school difficulties, and the assigned value is 1</td>
</tr>
<tr>
<td>Health</td>
<td>Farmers’ health status effectively</td>
<td>Some of the family members suffer from serious illness, venereal disease, disability, or someone who has not taken part in any medical insurance, and is assigned 1</td>
</tr>
<tr>
<td>Housing</td>
<td>Housing security, housing structure</td>
<td>No housing, no housing security, or a housing structure for a bamboo hut, a bad house, assigned a value of 1</td>
</tr>
</tbody>
</table>

**c. Multidimensional poverty**

Deprived of the elements in the matrix $g^i$ represent different family situation and on different dimensions to measure multidimensional poverty level of farm households, we'll need to set a determine the depth of poverty indicators, namely deprived dimension number $k$, then $f_k$ represents the function of poverty in $k$ dimensions:

$$f_k = \begin{cases} 1, & c_i \geq k \\ 0, & c_i < k \end{cases}$$

In the formula, $c_i$ is used to represent the total dimensions of the deprivation of each individual or family, and $k$ represents the number of dimensions of poverty, $k = 1, 2, \ldots, 6$. When an individual or family $i$ is deprived of the total number of dimensions $c_i$ is greater than or equal to $k$, $f_k = 1$, indicates that individual or family $i$ is in poverty; when the total dimension of the deprivation of the individual or family $i$ is less than or equal to $k$, $f_k = 0$, indicates that an individual or family $i$ is in a non-poverty state.

**d. The addition of multidimensional poverty**

The simplest measure of poverty is the ratio of the number of poor families with the total number of families in a $k$ dimension, that is, the incidence of Multidimensional Poverty ($H$):

$$H = q/m$$

In the formula, $q$ means that there is a dimension of poverty in the population or number of households, $m$ is the total population or number of households.

However, the incidence of multidimensional poverty is not sufficiently sensitive to the depth and intensity of poverty, so Alkire and Foster have proposed an average disenfranchised share $A$ by modifying the FGT method:

$$A = \frac{k(\bar{k})}{qn}$$

In the formula, $c(\bar{k})$ represents the sum of the number of deprived dimensions of the $i$ individual or family in the lower bound of the $k$ dimension, and $n$ represents the maximum dimension. The multidimensional poverty index (MPI) was corrected by means of the average deprivation share $A$ to the multidimensional poverty rate ($H$):

$$MPI = HA = H \frac{k(\bar{k})}{qn}$$

In the formula, $H$ is the adjusted multidimensional poverty index, $H$ is the incidence of multidimensional poverty, and $A$ is the average disenfranchised share.

**e. Decomposition of poverty**

Multidimensional poverty index MPI can be decomposed in different groups, such as time, region and dimension, and by means of poverty decomposition, it can calculate the contribution rate of grouping elements to multidimensional poverty. If the dimension is decomposed, the contribution rate of each dimension is:

$$G_j = w_j \cdot CH_j \cdot MPI$$

In the formula, $G_j$ represents the contribution rate of the first dimension, and $w_j$ represents the weight of the first dimension. $CH_j$ represents the proportion of the population that was deprived of the first dimension, and MPI is the adjusted multidimensional poverty index. This paper uses the equal weight method to measure the
difference of each dimension, which means that each index assigns the same weight.

3. MEASUREMENT RESULT ANALYSIS

3.1 Multidimensional poverty result

The results of the poverty measure in Heilongjiang province show that the incidence of multidimensional poverty and poverty index gradually decrease with the increase of dimensionality, and the average disenfranchised share gradually increases.

From the point of incidence of multidimensional poverty, there are at least dimension of a poor family as much as 97.90%, there are at least two dimensions poor families accounted for 81.65%, there are at least three dimensions of poverty family nearly half of total number (TABLE III). It means that Heilongjiang province rural poverty is complex and diverse, different category of rural poverty, most of the poor not only facing the traditional sense of poverty as low income, there are other dimensions of poverty. Although there are no poor families who consist the six dimension poverty indexes, but 5.32 per cent of the poor families with five poverty dimensions.

Table 3. Studies the results of multidimensional poverty measurement in the area

<table>
<thead>
<tr>
<th>K</th>
<th>MPI</th>
<th>A</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>42.44%</td>
<td>43.35%</td>
<td>97.90%</td>
</tr>
<tr>
<td>2</td>
<td>39.73%</td>
<td>48.66%</td>
<td>81.65%</td>
</tr>
<tr>
<td>3</td>
<td>28.48%</td>
<td>59.45%</td>
<td>47.90%</td>
</tr>
<tr>
<td>4</td>
<td>15.45%</td>
<td>70.73%</td>
<td>21.85%</td>
</tr>
<tr>
<td>5</td>
<td>4.43%</td>
<td>83.33%</td>
<td>5.32%</td>
</tr>
<tr>
<td>6</td>
<td>-</td>
<td>-</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

In addition, as the poverty dimension rises, the number of people living in more dimensions is decreasing and poverty is declining, but their poverty intensity is gradually increasing. Also, farmers who are in multiple dimensions of poverty are less capable, more difficult, and more vulnerable to poverty trap. Therefore, multidimensional poverty rate cannot fully reflect the poverty of the poor in Heilongjiang province, it still need to be combined with the intensity and extent of deprivation of poor households and a depth analysis of multidimensional poverty index, to specify solutions to different types of poverty problem.

3.2 Multidimensional poverty index decomposition

According to the results of multidimensional poverty index decomposition, it can be seen that the contribution rate of each index under different dimensions, health, housing, income, dressing, eating, education basic present decreasing trend. The contribution rate of the income, eating, dressing fluctuated increases, while the contribution rate of education, health, housing fluctuated decreases.

Table 4. Contribution rate of each dimension of different K

<table>
<thead>
<tr>
<th>K</th>
<th>Income</th>
<th>Eating</th>
<th>Dressing</th>
<th>Education</th>
<th>Health</th>
<th>Housing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15.79%</td>
<td>10.12%</td>
<td>10.83%</td>
<td>4.23%</td>
<td>35.09%</td>
<td>23.94%</td>
</tr>
<tr>
<td>2</td>
<td>15.75%</td>
<td>10.75%</td>
<td>11.57%</td>
<td>4.35%</td>
<td>32.79%</td>
<td>24.79%</td>
</tr>
<tr>
<td>3</td>
<td>15.82%</td>
<td>14.84%</td>
<td>15.49%</td>
<td>4.18%</td>
<td>27.46%</td>
<td>22.21%</td>
</tr>
<tr>
<td>4</td>
<td>11.32%</td>
<td>20.85%</td>
<td>21.30%</td>
<td>2.87%</td>
<td>23.27%</td>
<td>20.39%</td>
</tr>
<tr>
<td>5</td>
<td>18.42%</td>
<td>20.00%</td>
<td>19.47%</td>
<td>2.11%</td>
<td>20.00%</td>
<td>20.00%</td>
</tr>
<tr>
<td>6</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

From the perspective of 1, 2 and 3, the contribution rate of health and housing to multidimensional poverty is the highest, and the two indicators of health and housing have a significant impact on the multidimensional poverty of the poor households in Heilongjiang province. Affected by the environmental climate, the farmers in Heilongjiang province have less winter sports and prefer eating oily and salty food, so the proportion of chronic diseases is extremely high, and the long-term high medical costs are difficult to bear. The poor family’s house mostly was constructed long time ago, and only 29.63% of the houses were built after 2000. Because houses are consumables, resistant structures built decades ago, is now mostly become worn out of the rain of air leak leakage building and even dangerous house, great effects on the poor life and the personal safety and other underlying trouble.

From the perspective of 4 and 5, the impact of food and clothing indicators on multidimensional poverty is significantly great. As the poverty level deepens, the causes of poverty are becoming more and more complicated, and it is becoming more and more difficult to get out of poverty. The contribution of income as the indicator of dimensional poverty is not high; this shows that lower income is not the reason of poverty of Heilongjiang province. Even the level of income is conventionally used to justify rich of poor family, but comparing to this "absolute poverty" perceptions such low income, capital shortage, the new phenomenon of "relative poverty" characterized by great expense on illness, medical care, household, keep warmth, education has caused larger
proportion of abnormal consumption expenditure. Therefore, the “relative poverty” situation is basically the below average household who adopt the irrational family expenditure structure.

Table 5. Comparison of multidimensional poverty index in different counties

<table>
<thead>
<tr>
<th>K</th>
<th>Yanshou</th>
<th>Gannan</th>
<th>Huanan</th>
<th>Lindian</th>
<th>Lanxi</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>36.11%</td>
<td>61.16%</td>
<td>41.24%</td>
<td>36.34%</td>
<td>38.85%</td>
</tr>
<tr>
<td>2</td>
<td>32.75%</td>
<td>60.88%</td>
<td>37.87%</td>
<td>33.83%</td>
<td>35.34%</td>
</tr>
<tr>
<td>3</td>
<td>20.47%</td>
<td>58.68%</td>
<td>26.60%</td>
<td>18.30%</td>
<td>21.05%</td>
</tr>
<tr>
<td>4</td>
<td>4.24%</td>
<td>45.45%</td>
<td>14.87%</td>
<td>3.26%</td>
<td>10.90%</td>
</tr>
<tr>
<td>5</td>
<td>0.73%</td>
<td>9.64%</td>
<td>7.04%</td>
<td>1.25%</td>
<td>1.88%</td>
</tr>
<tr>
<td>6</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Comparing the multidimensional poverty index of different county regions, it can be seen that the multidimensional poverty index of county regions is different in each dimension condition, and the county multidimensional poverty index decreases with the increase of the dimension. The lower dimensions of poverty have a wide range of poverty. As the work of poverty alleviation proceeds, the poorer households of the lower dimensions will be first to be lifted out of poverty, and the poverty level will become smaller and smaller, but the poverty level will become more and more profound.

3.3 Analysis of poverty results in single dimension

From the analysis of single-dimensional poverty results, the poverty households in the sample area were mainly reflected in the poverty of health and housing dimensions, and the poverty incidence rate was 89.36% and 60.92% respectively (TABLE VI).

Table 6. The incidence of poverty in each dimension of the study area

<table>
<thead>
<tr>
<th>Poor dimension</th>
<th>Poor households</th>
<th>Total sample</th>
<th>Poverty rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td>287</td>
<td>714</td>
<td>40.20</td>
</tr>
<tr>
<td>Eating</td>
<td>184</td>
<td>714</td>
<td>25.77</td>
</tr>
<tr>
<td>Dressing</td>
<td>197</td>
<td>714</td>
<td>27.59</td>
</tr>
<tr>
<td>Education</td>
<td>77</td>
<td>714</td>
<td>10.78</td>
</tr>
<tr>
<td>Health</td>
<td>638</td>
<td>714</td>
<td>89.36</td>
</tr>
<tr>
<td>Housing</td>
<td>435</td>
<td>714</td>
<td>60.92</td>
</tr>
</tbody>
</table>

From the perspective of income, the poverty rate in Heilongjiang province is 40.20%, and this poverty has two characteristics: "relative poverty" and "spending poverty". Because the sample average per capita net income of 3685 yuan, is higher than the national poverty line of 2800 yuan, and low per capita net income of the poor of Heilongjiang province is mainly caused by excessive spending per capita net income, not due to less income poverty. This is related to the long winter and cold natural geographical environment of Heilongjiang province, and most of the areas are more than six months, resulting in heating costs of up to 500 yuan per household. And the poor who possess less land, less crop straw, nor farm machinery to collect straw back home, they mainly depend on coal to get warm; heating costs is higher than the general farmers, so they spend more. Moreover, the cost of clothing for farmers in Heilongjiang province is significantly higher than in other provinces. Therefore, the cost of livelihood villages of impoverished households in Heilongjiang province is much higher than the national average, and the high expenditure and livelihood costs have the characteristics of "spending poverty".

From the analysis of meal dimensions, Heilongjiang province is a major agricultural province, the per capita arable land area is the first in the country, the agricultural population per capita grain yield is the first, so the impoverished Heilongjiang province grain shortage is less, but there are still 25.77% poor households without proper meat and milk, this part of the poor basic distribution in Gannan county, this is related to the natural conditions of the area of Gannan County in Heilongjiang Province, they are in low rainfall areas, located in the south of Da Hinggan Mountains and Songnen Plain transition zone, belongs to agricultural and pastoral counties,
so the grain self-sufficiency should be slightly worse than in other areas of Heilongjiang province.

From the aspect of clothing, the cost of dressing in Heilongjiang province is higher than that of other provinces. Throughout the year in Heilongjiang Province, there are at least three different quaternary thick clothes to cope with seasonal changes. Facing the cold winter, people need to keep warm, and winter clothes cost more than other seasonal clothes, so due to the special climate, resulting in Heilongjiang Province farmers generally spend more on dressing. Throughout the survey sample, 27.59% of the poor households were in the clothing dimension, and the incidence of poverty was close to the eating dimension, and the poverty samples were similar, and the incidence of poverty in Gannan was the highest.

From the education dimension, the poverty population in Heilongjiang province is generally low, mainly are in the elementary level of education. But, because the country is implementing the free compulsory education system, so poor children are relatively optimistic to have equally opportunity to receive education. In addition, government has set up financial aid, to help poor students to complete the nine-year compulsory education policy. With the help of national policies, the poverty rate of the poverty-stricken households in the education dimension is significantly lower than that of other dimensions, and the poverty rate for children in the nine-year compulsory education period is 10.78%.

From a health perspective, the result shows that the health dimensions of poverty incidence is highest, only has 4 poor households in which there is no disable member and chronic disease patient, beside this, up to 89.36% of the poorest households whose at least one member is suffering from a serious illness, chronic diseases, disability or has no any medical insurance. This reflects the characteristics of poverty in Heilongjiang province. The survey found that the poor households had large medical burden and chronic patients, and many poor families were unable to bear the medical expenses (Figure 2). This is closely related to the diet structure and bad living habits in the northeast, resulting in the more common chronic diseases such as cardiovascular and cerebral blood vessels and lungs. In addition, there are also some areas of endemic diseases due to the poor ecological environment, the lack of public medical facilities, the relative lack of disease prevention and control measurement, and the inadequate social and medical care. Compared with other causes of poverty, the poverty caused by disease and disability presents "persistent poverty", and it is causes the next generation to remain in poverty.

From the perspective of housing, there are 60.92% of the total sample are the poor households who have no house, insecured house or house constructed with straw or mud. There are 648 houses not include the homeless, houses that collapsed and houses under construction. Among these houses, 50.31% are constructed during 1980-2000, and 29.63% were constructed after 2000. In terms of housing structure, the research in Heilongjiang province on proportion of the building structure has shown in descending order: adobe > brick > brick with wood > other > steel, building structure ratio is 50.62:27.93:16.51:4.49:0.46. Base on the age of the poor households construction, the overall situation of the adobe houses in Heilongjiang province was decreasing and the rest of other structures were rising. According to the survey, before 2000 the poor households housing structure mainly was adobe and single structure, after 2000, poor households housing structure with brick and concrete, and the steel reinforced concrete, steel and other new building structure, the structure gradually diversified. In addition, in Heilongjiang province there are still existing of dangerous houses, most of them are adobe, which are in disrepair, collapsed and leaking. Because of Heilongjiang climate condition, comparing to brick construction or brick-wood construction, adobe construction is more firm, better in insulation effect and cost low expense.

4. CONCLUSION AND DISCUSSION
4.1 Conclusion
From the multidimensional point of view, the contribution rates of health; housing; income; clothing; eating and education are basically decreasing. Among these, the contribution rates of income; eating and
clothing are increasing, and the contribution rates of education; health and housing are decreasing. The Multidimensional Poverty Index in counties gradually decreases with the increase of dimensionality, and the degree of poverty also decreases. From the single dimensional perspective, the poor households in the sample area are mainly reflected in the poverty of health and housing dimensions.

4.2 Poverty reduction strategy analysis accurately

Based on the above analysis, we suggest strategy to deal with poverty from the aspect of the poverty dimensions: income, clothing, meal, education and health. Start with small coverage and low poverty population, according to the degree of poverty gradually descending process, reducing the difficulty of poverty alleviation. Second, the problem of "spending poverty" in Heilongjiang province is to reduce unnecessary expenditure so as to increase the per capita net income of rural poor households. The government can provide appropriate subsidies in keeping warm to the poor households and promote energy conservation, environmental protection, affordable new energy, and reduce heating expenses for the poor. We can also concentrate on building greenhouse shelters to address the needs of fresh fruits and vegetables in nearby towns and villages, and reduce food costs. Encourage the establishment of the old clothes recycling office in the town, the warm clothing can be sterilized, simple classification, distributed to the needy poor households, reduce the clothing expenditure. Third, it is recommended that the government strengthen education poverty alleviation efforts and crack down on the common problems existing in the poverty-stricken families. For example, in the poverty-stricken kindergarten, elementary school, junior high school, the cost of the bus and accommodation will be reduced through financial aid, and the conditional county can also carry out the nutrition lunch program. Reducing the phenomenon of returning to poverty, striving for the adoption of primary education for all poverty-stricken families and all school-age children, to alleviate the poverty of education dimension. Fourth, we will effectively use idle housing to address the housing problems of the poor. Suggestion raised the allowances for rural dangerous house renovation, the current subsidy funds 7500-8500 yuan per family standard raised to 25000 yuan or given a certain autonomy county government, the superior funds arranged by the government at the county level according to the actual situation as a whole. Government can also make financial subsidies to encourage repairing the dangerous house rent or buy a safe house, so can not only solve the problem of poor housing, also improve the production conditions of life, and make full use of the rural idle assets, give full play to the benefits. Fifth, in the face of the high medical burden of poor households and more chronic patients, most of the poor families cannot afford the patients' medical expenses, so they should solve the problem of poverty caused by diseases at the source. Winter "feline winter" the habits and characteristics of high oil and high salt diet is induced by chronic diseases such as cardiovascular disease, hemiplegia, such as the root cause of the disease, so need to change is the living state of the rural poor for a long time, adjust the oily and salty diet, pay attention to health. And it is suggested that the government should increase the coverage of medical treatment, so that the poor can reduce the concern on treatment.

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