

Measuring the development level and ranking of countries of Ahvaz using human development index model

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ABSTRACT :Rural areas especially Ahvaz countries need serious studies to regulate and operate programs in line with potential facilities and abilities of these areas and countries. Different ranking of countries of Iran has been done. The present study measures development level and ranking of Ahvaz countries using human development index (HDI) regarding economic and cultural indicators. Human development index is regarded through per capita income, literacy and life hope. The results indicated that the highest level of development was found in South Esmailieh country with 0.680 score followed by Ghizanieh (0.603), Lami (0.560), Mashrahat (0.550), Elhaei (0.513) and north Esmailieh (0.504). It is concluded that these countries are among the second group and developing one and HDI model is a proper index for searching development level of rural areas especially in the studied areas.

Keywords: human development index, development level, ranking countries, HDI model.

INTRODUCTION

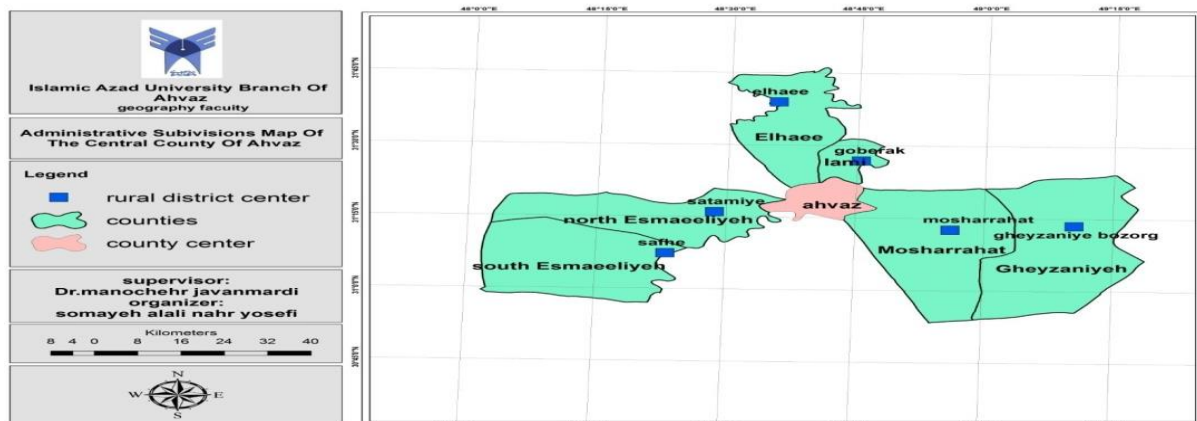
Development is among the issues which has preoccupied the mind of policy makers. Lots of countries seek sustainable level of development to improve all aspects of people's life. Every kind of ranking is done according to specified needs and goals. Ranking countries is usually done based on social-economic features. In developing countries, the root of regional development issues is found inside them. Compiling a human development index including per capita income, life hope and literacy can be a feature of HDI. This index which continuously finds more accurate information and calculation basics and improves annually is the base of ranking the countries of the world in human development. It is also a factor of raising analytical and critical issues among economists, sociologists, policy-makers, programmers and other practitioners of development.

In economy of Iran villages have had great importance in historical eras to play a significant social, economic and political role. Khuzestan province having lots of water and food resources, high productive agriculture lands and special positions needs to have a proper basic planning. Development ranking in the area has a special importance and planning for these villages should be based on their cultural-racial capabilities and environmental power. Providing the facilities and capabilities and ranking these areas to solve the problems of rural areas in terms of development especially human development is very important so that if the current plans do not achieve success, the future ones will face with failure. Every environment needs a special program and changing big villages to cities causes reduction of urban population, socio-economic, political and human development and reduction of urban pollution, reduction of migration, and other related factors such as poverty, marginalization and false employment. The main purpose of this study is considering the status quo of development level of Ahvaz countries and determining the homogeneity of these countries and ranking them. The countries are ranked based on the plans and operated programs in them. In a study titled "measuring development level of villages of Razan country using HDI model" Omidzadeh (2013) investigated Khorramabad slum. The 15 villages were ranked in terms of five indices including educational, cultural, health, foundational and welfare and it was shown that these villages have a low level of human development.

Stephen Mores (2014) studies human development index changes of 135 countries for more than 20 years and indicated that the changes and ranking has a meaningful difference in the table. Five countries of Romania, Jamaica, Botswana, Iran and Belize had a more considerable change. It was also shown that the change of ranking of HDI can lead to increase of global reports.

The present study measures development level and ranking of Ahvaz countries using HDI model in terms of literacy, income per-capita and life hope, poverty and sexual injustice. The problems of income, education and health of villagers is identified and provides strategies to improve them. Ahvaz city is the

center of kuzestan province located in 870 kilometers from Tehran. The area of this city is 6835 kilometers having three counties, two cities and six countries. This city is located between 48 degree and 2 minutes and 49 degree and 20 minutes east longitude and 30 degree and 35 minutes to 31 degree and 45 minutes north latitude (management and planning organization of Khuzestan). Central county of Ahvaz encompasses Elhaei and Anafcheh (Lami). Elhaei is located in 17 kilometers from north-west of Ahvaz, Lami in 13 kilometers from north-east of Ahvaz, Esmailieh (south and north Esmailieh) is located in 37 kilometers from south-west of Ahvaz and Mashrahat is located in 21 kilometers from south east of Ahvaz (Army force, 2006).



MATERIALS AND METHOD

Research can be divided to basic and applied research. Applied research which is based on the information and knowledge of basic research is done to improve the needs of human beings and optimizing tools, things and models to improve welfare, wellbeing and promotion of human life level. In this applied research, using the basic information from libraries, offices and organizations and surveys of these areas, HDI is measured.

Table 1: literacy and income level (dollar) of countries of Ahvaz in 2011 (Management and planning organization and general organization of personal status of Khuzestan)

Per-capita income (dollar)	2011										Country
	Total population of 6-18	%	6-18 years students	%	Educated population	%	6-year population and more	%	6-year literate population	Total population	
369	725	53/72	3895	0.19	425	0.84	18859	55/98	12535	22388	Elhaei
534	5397	61/14	330	0.21	3741	0.86	15435	64/46	11630	18042	Lami
423	3852	77/59	2989	0.20	2291	0.85	9902	61/96	7245	11692	Gheyzaniye
495	13313	56/98	7587	0.21	8504	0.85	34954	63/97	26155	40882	Mashrohat
332	1530	49/67	760	0.18	851	0.81	3761	56/75	2651	4671	North Esmaeeliye
7257	9501	59/64	5667	0.22	1761	0.83	6610	55/86	4426	7922	South Esmaeeliye

RESULTS AND DISCUSSION

Human development indices in the studied areas

The number of literate people in a 6-year period in urban and rural areas is 1234582 where 619763 men and 614819 women. The number of literate people in villages 161349 among which 90672 were men and 70677 were women. Urban income per-capita is 13030144 Rials and rural income per-capita was about 79726948 Rials. Income per-capita was calculated by dividing gross national income to population. Income per-capita is one of the important indices of HDI shown in the following table (center for statistics, 2011). The number of death in villages and cities of Khuzestan province is 3741 and the number of birth is 7516 among which 3521 men and 3965 women in 2011 (General organization of personal status of Khuzestan, 2011). Life hope of male villagers is 68.68% and female villagers is 73.69. Totally, life hope in Khuzestan villages is about 71 years (center for statistics, 2012).

Calcualtion of HDI

The minimum leve of adult literate peopel is 0% and maximum level is 100%. The minimum life hope is 25 years and maximum is 85 years. The least income is 100 dollars and highest income is 40000 dollars (the average global income is 5120 dollars). The mininmus include historical ones observed during the past 30 years and the maximum is the amonut which can be observed in next 30 years. The maximum life hope for the next 30 years is 85 years and 40000 dollars is the maximum income for the richest countries (report of human development, UN development plan).

HDI based on real per-capita income is based on PPP method. Life hope is considered from birth and access to education is considered in main and secondary levels. After calculating these indices, HDI can be measured by the following equation (Bakhshudeh, 2006):

$$= \frac{1}{3} \text{HDI (life hope index)} + \frac{1}{3} \text{ (general education index)} + \frac{1}{3} \text{ (per-capita income index)}$$

Table 2. Basic variables of HDI in countries of Ahvaz (management and planning organization-center for statistics)

Income (dollar)	Mean of years of education (gross rate of all levels)	Adult literate	Life hope (2011)	Country
۳۶۹	۵۳,۷۲	۵۵,۹۸	۷۱	Elhaee
۵۳۴	۶۱,۱۴	۶۴,۴۶	۷۱	Lami
۴۲۳	۷۷,۵۹	۶۱,۹۶	۷۱	Ghezaniye
۴۹۵	۵۶,۹۸	۶۳,۹۷	۷۱	Mashrohat
۳۳۲	۴۹,۶۷	۵۶,۷۵	۷۱	North
۷۲۵۷	۵۹,۶۴	۵۵,۸۶	۷۱	Esmaeeliye South Esmaeeliye

Life hope index

Life span is measured by life hope from birth. Life hope from birth is 25 and 85 years (minimum and maximum) obtained based on the highest and the lowest rank among 174 countries (Qanbari, 2012). This index measures life hope from birth in every country. The total formula of calculation of indices is used:

$$\frac{\text{minimum value} - \text{real value}}{\text{difference of minimum and maximum values}} = \text{index}$$

The follwonig equation shows how the minimum (25 years) and mAximum (85 years) of life hope is calculated:

$$\frac{x_i \text{real amonut} - x_i \text{minimum amount}}{x_i \text{maximum amount} - x_i \text{minimum amount}} = x_i$$

$$\frac{x_i \text{real amount} - x_i 25}{85 - 25} = \text{life hope}$$

The real amount of x_i for countries of Ahvaz using census in 2011 is 0.77 which is the same for all countries.

$$\text{life hope} = \frac{46/2}{60} = 0/77 = \frac{71/2 - 25}{85 - 25}$$

General education index

Access to education which includes adult literacy rate ($\frac{2}{3}$ weight ratio) and gross rate in all educational levels ($\frac{1}{3}$ weight ratio) (Qanbari, 2012). Adult literacy is 0 and 100% and the average of educational years is 15 years (report of human development, 1994). In this study the percent of literacy was calculated based on census (2011) which is shown in table 2.

$$R_i = \frac{R_{i-0}}{100 - 0}$$

$$\text{Adult literacy} = \text{Elhaee} = \frac{55/98}{100} = 55/98 \frac{55/98-0}{100-0}$$

$$\text{Adult literacy} = \text{Lami} = \frac{64/46}{100} = 64/46 \frac{64/46-0}{100-0}$$

$$\text{Adult literacy} = \text{Gheizaniye} = \frac{61/96}{100} = 61/96 \frac{61/96-0}{100-0}$$

$$\text{Adult literacy} = \text{Mashrohat} = \frac{63/97}{100} = 63/97 \frac{63/97-0}{100-0}$$

$$\text{Adult literacy} = \text{North Esmaeeliye} = \frac{56/75}{100} = 56/75 \frac{56/75-0}{100-0}$$

$$\text{Adult literacy} = \text{South Esmaeeliye} = \frac{55/86}{100} = 55/86 \frac{55/86-0}{100-0}$$

Gross registry rate includes the number of students in all educational levels from 6-18. This rate was extracted from management and planning organization and center for statistics and census in 2011 for countries of Ahvaz (table 2).

$$\text{gross registry rate} = \text{Elhaee} = \frac{53/72}{100} = 53/72 = \frac{53/72-0}{100-0}$$

$$\text{gross registry rate} = \text{Lami} = \frac{61/14}{100} = 61/14 = \frac{61/14-0}{100-0}$$

$$\text{gross registry rate} = \text{Gheizaniye} = \frac{77/59}{100} = 77/59 = \frac{77/59-0}{100-0}$$

$$\text{gross registry rate} = \text{Mashrohat} = \frac{56/98}{100} = 56/98 = \frac{56/98-0}{100-0}$$

$$\text{gross registry rate} = \text{North Esmaeeliye} = \frac{49/67}{100} = 49/67 = \frac{49/67-0}{100-0}$$

$$\text{gross registry rate} = \text{South Esmaeeliye} = \frac{59/64}{100} = 59/64 = \frac{59/64-0}{100-0}$$

Table 3: adult leteracy and registry rate

gross registry rate	Adult literate (2011)	Country
۵۳/۷۲	۵۵/۹۸	Elhaee
۶۱/۱۴	۶۴/۴۶	Lami
77.59	۶۱/۹۶	Gheizaniye
۵۶/۹۸	۶۳/۹۷	Mashrohat
۴۹/۶۷	۵۶/۷۵	North Esmaeeliye
۵۹/۶۴	۵۵/۸۶	South Esmaeeliye

The idex of education is calculated by the following formula:

$$(\text{education level}) \frac{2}{3} = \text{education index (adult index)} + \frac{1}{3} (\text{gross registry rate})$$

$$\text{Elhaee} = \text{education level} \left(\frac{55/98-0}{100-0} \right) \frac{2}{3} = + \left(\frac{53/72-0}{100-0} \right) \frac{1}{3} = .۵۵۵۲$$

$$\text{Lami} = \text{education level} \left(\frac{64/46-0}{100-0} \right) \frac{2}{3} = + \left(\frac{61/14-0}{100-0} \right) \frac{1}{3} = .۶۳۳$$

$$\text{Gheizaniye} = \text{education level} \left(\frac{61/96-0}{100-0} \right) \frac{2}{3} + \left(\frac{77/59-0}{100-0} \right) \frac{1}{3} = .۶۸۰۰$$

$$\text{Mashrohat} = \text{education level} \left(\frac{63/97-0}{100-0} \right) \frac{2}{3} + \left(\frac{56/98-0}{100-0} \right) \frac{1}{3} = .۶۶۱۶$$

$$\text{North Esmaeeliye} = \text{education level} \left(\frac{56/75-0}{100-0} \right) \frac{2}{3} + \left(\frac{49/67-0}{100-0} \right) \frac{1}{3} = .۵۴۳$$

$$\text{South Esmaeeliye} = \text{education level} \left(\frac{55/86-0}{100-0} \right) \frac{2}{3} + \left(\frac{59/64-0}{100-0} \right) \frac{1}{3} = .۵۷۷$$

Table 4. education level

education level	Country
۰/۵۲۲	Elhaee
۰/۶۳۳	Lami
۰/۸۰۰	Gheizaniye
۰/۶۱۶	Mashrohat
۰/۵۴۳	North Esmaeeliye
۰/۵۷۷	South Esmaeeliye

Calculation of income (GDP)

The standard and acceptable life level is measured by real per-capita domestic gross product. Gross domestic product (GDP) is one of economic measurement scales which measures the value of total final products and services in a country in a period of time according to the currency of that country (Qanbari, 2012). So, GDP is measured by parallel purchase power (PPP). This index is based on adjusted per-capita GDP and equality of purchase power using income logarithm. So, the minimum and maximum of adjusted per-capita income is considered as 100 and 40000 dollars (Bakhshudeh, 2009). This index for per-capita income of Ahvaz countries is:

$$\frac{\text{Log (per-capita income)} - \text{Log (minimum of adjusted per capita income)}}{\text{Log (maximum per-capita income)} - \text{Log (minimum per-capita income)}} = \text{GDP}$$

$$\text{Elhaee =GDP index} = \frac{\text{Log (369)} - \text{Log(100)}}{\text{Log (40000)} - \text{Log(100)}} = \frac{0/567}{2/602} = 0/217$$

$$\text{Lami =GDP index} = \frac{\text{Log (534)} - \text{Log(100)}}{\text{Log (40000)} - \text{Log(100)}} = \frac{0/727}{2/602} = 0/278$$

$$\text{Gheizaniye =GDP index} = \frac{\text{Log (423)} - \text{Log(100)}}{\text{Log (40000)} - \text{Log(100)}} = \frac{0/626}{2/602} = 0/240$$

$$\text{Mashrohat =GDP index} = \frac{0/694}{2/602} = 0/266 = \frac{\text{Log (495)} - \text{Log(100)}}{\text{Log (40000)} - \text{Log(100)}}$$

$$\text{North Esmaeeliye = GDP index} = \frac{\text{Log (332)} - \text{Log(100)}}{\text{Log (40000)} - \text{Log(100)}} = \frac{0/521}{2/602} = 0/200$$

$$\text{South Esmaeeliye= GDP index} = \frac{\text{Log (7257)} - \text{Log(100)}}{\text{Log (40000)} - \text{Log(100)}} = \frac{1/806}{2/602} = 0/694$$

Table 5. HDI in countries of Ahvaz

Life hope index	education index	Income index	Country
۰/۷۷	۰/۵۲۲	۰/۲۱۷	Elhami
۰/۷۷	۰/۶۳۳	۰/۲۷۸	Lami
۰/۷۷	۰/۸۰۰	۰/۲۴۰	Gheizaniye
۰/۷۷	۰/۶۱۶	۰/۲۶۶	Mashrohat
۰/۷۷	۰/۵۴۳	۰/۲۰۰	North Esmaeeliye
۰/۷۷	۰/۵۷۷	۰/۶۹۴	South Esmaeeliye

Human development index for countries of Ahvaz is measured by the following equation.

$$= \frac{1}{3} \text{HDI}(\text{life hope index}) + \frac{1}{3} (\text{general education index}) + \frac{1}{3}(\text{per-capita income index})$$

$$\text{Elhami} = \frac{1}{3} \text{HDI}(۰/۷۷) + \frac{1}{3} (۰/۵۲۲) + \frac{1}{3}(۰/۲۱۷) = 0.513$$

$$\text{Lami} = \frac{1}{3} \text{HDI}(۰/۷۷) + \frac{1}{3} (۰/۶۳۳) + \frac{1}{3}(۰/۲۷۸) = 0.560$$

$$\text{Gheizaniye} = \frac{1}{3} \text{HDI}(۰/۷۷) + \frac{1}{3} (۰/۸۰۰) + \frac{1}{3}(۰/۲۴۰) = 0.603$$

$$\text{Mashrohat} = \frac{1}{3} \text{HDI}(۰/۷۷) + \frac{1}{3} (۰/۶۱۶) + \frac{1}{3}(۰/۲۶۶) = 0.550$$

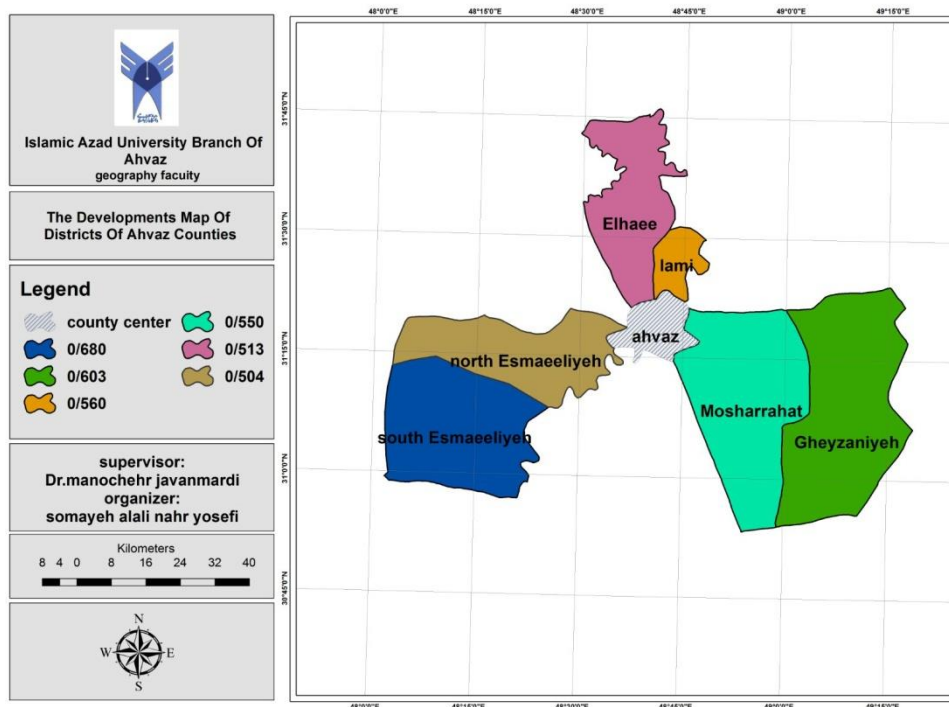
$$\text{North Esmaeeliye} = \frac{1}{3} \text{HDI}(۰/۷۷) + \frac{1}{3} (۰/۵۴۳) + \frac{1}{3}(۰/۲۰۰) = 0.504$$

$$\text{South Esmaeeliye} = \frac{1}{3}\text{HDI}(\cdot/\cdot\cdot) + \frac{1}{3}(\cdot/\cdot\cdot) + \frac{1}{3}(\cdot/\cdot\cdot) = 0/680$$

Table 6 shows HDI and ranking of countries of Ahvaz in 2011. South Esmailieh is the most developed followed by Ghizanieh and Lami.

Table 6. HDI and ranking of countries of Ahvaz in 2011

grad	(HDI)	Country
1	0/680	South Esmaeeliye
2	0/603	Gheizaniye
3	0/560	Lami
4	0/550	Mashrohat
5	0/513	Lami
6	0/504	North Esmaeeliye



Development map of the studied countries

Testing the hypotheses:

1. There is a meaningful difference between HDI of countries of Ahvaz based on their distance from the city.

Regarding the advancement of facilities especially roads and communication ways and technology progress and new vehicles, the role of distance making barriers to advancement and development of the areas has been reduced. Nowadays the roads and location of villages close to main roads and vehicles has provided an easier communication for villagers. The time and cost spent on reaching to cities was 15-60 minutes (table 6). Human development in elhaei country which is 13 kilometers away from Ahvaz is about 0.513 and 0.560 in Lami which is 13 kilometers away from Ahvaz, 0.550 in Mashrahat which is 21 kilometers away from Ahvaz and 0.504 in north Esmailieh which is 15 kilometers away from Ahvaz. These countries have a less distance to Ahvaz in comparison with south Esmailieh and Ghizanieh. Human development index in south Esmailieh located 17 kilometers away from Ahvaz is 0.680 which is considered the most developed country. Ghizanieh located at 36 kilometers away from Ahvaz has development index of 0.603. so, this hypothesis is rejected.

2. Countries of Ahvaz are parallel and equal regarding development level.

The most developed country of Ahvaz was south Esmailieh with score of 0.680 followed by Ghizanieh (0.603), Lami (0.560), Mashrahat (0.550), elhaei (0.513) and north Esmailieh (0.504). so, the six countries of Ahvaz have human development index but they are not equal since north Esmailieh placed

the least developed country. The distance between the first and the second developed country is 77 stairs which is high, distance between the first and the third developed country is 120 stairs which is high and distance between the the second and the third country is 43 stairs which is high. The distance of HDI between the first and the last developed country is 176 stairs. So, this hypothesis is also rejected.

3. Human development index is the best index in determining development level of countries of Ahvaz.

Human development index is the newest method of determining development level countries and regions. In 1990, it took the place per-capita income on behalf of United Nations. Before that per-capita income was the most important index of development of countries and regions. Per-capita income is considered an index for measuring the development and progress of a country. According to many economists, this index is not adequate to state the development and advancement of a society because development is not considered only by income. development refers to the process of expansion and extension of human choices and the needed condition for a better life is human mind capacities not more consumption of goods and services. Expansion and development of

Mental capacities through education and health are among the main elements of human development. Considering health indices like life hope and literacy and per-capita income was purpose of the present study. According to table 5 and 6, human development index in Elhaei was 0.513 , Ghizanieh (0.603), Lami (0.560), Mashrahat (0.550), elhaei (0.513) and north Esmailieh (0.504). south Esmailieh, ghizanieh and Lami placed the first, second and the third most developed countries. so, this hypothesis is supported.

CONCLUSION

Development is a fundamental change and human development is the purpose of human and fulfillment of human talents implemented by proper planning in villages and performing investment plans to develop these areas and improving the life quality, knowledge and higher well-fare. The results indicated that human development index in Ghizanieh was 0.800 (first), Lami was 0.633 (second) and Mashrahat was 0.616 (third). Life hope index for all countries was 0.77. in income index, south Esmailieh was the first (0.694) followed by Lami (0.278) and Mashrahat (0.266). south Esmailieh was the most developed country of Ahvaz with human development index of 0.680. the guiding plan was operated in 10 out of 13 villages of south Esmailieh. According to last division of United Nation for development, the index of 0.8-1 is considered developed, 0.5-0.799 developing and 0.499 undeveloped and less developed. So, the countries studied in this research place among developing ones but they are considered developed in terms of development level.

ACKNOWLEDGMENTS

Governmental planning to operate village plans and building them with cooperation of private sector is necessary. Moreover, cooperative firms can operate village development plans and villagers can participate in these plans. Development plans are accessible but they need investment, economic growth, production capacities and employment. Farmers should be supported to gain higher income to improve economic status of rural areas. Educational and health facilities should be provided to train the talents and capabilities of villagers especially women to gain higher income.

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