

DESERTIFICATION IN THE NEAR ARAL SEA REGION AND POPULATION MIGRATION

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DESERTIFICACIÓN EN LA REGIÓN DEL MAR DE ARAL Y MOVIMIENTOS MIGRATORIOS

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Resumen

Asia Central representa un territorio bastante homogéneo en términos orográficos y climáticos. Las características climáticas vienen marcadas por tres factores importantes: la radiación solar, la circulación de la atmósfera y la capa subyacente. La cantidad de energía solar que se recibe durante el verano en este territorio es considerable, debido a su situación en latitudes tropicales, lo que produce un calentamiento muy intenso del suelo y aire. Los desiertos de Karakum y Kiziljum que rodean el Mar de Aral son inmensas fuentes de transformación de masas de aire, que entran libremente en la llanura del territorio desde el oeste, noroeste y en ocasiones desde el noreste.

Los cambios antropogénicos y alteraciones en el medio ambiente en los últimos años han alcanzado una escala importante. En numerosas ocasiones, pueden compararse con grandes desastres naturales. Los impactos negativos de la actividad del hombre son específicos para una construcción gradual de valores críticos. Otro rasgo característico de estos impactos negativos de la intervención del hombre es que pueden aparecer en zonas donde no se han originado, a gran distancia de donde se provocaron. Es realmente difícil y costoso luchar contra tales desastres provocados por el hombre.

El problema de la desertificación está relacionado al cambio en las condiciones de abastecimiento de agua del territorio y la sequía del Mar de Aral. La desertificación es un proceso de degradación que se manifiesta en el medio ambiente y viene acompañado de un descenso de la productividad biológica, el desarrollo de la erosión, salinización y otros impactos negativos que influyen directamente en las condiciones de vida de la población y en el funcionamiento de la economía de la región. Y la influencia activa de la actividad humana en el medioambiente no sólo agrava este proceso sino que es a menudo una de las causas más importantes de este fenómeno. El ambiente desarrollado en la región requiere cambios notorios en el desarrollo de políticas y estrategias socio-económicas. El considerar las siguientes tendencias principales es uno de los aspectos específicos de desarrollo de las áreas que están en condiciones extremas medioambientales.

La emigración es uno de los factores que influyen en el comportamiento del número y la imagen de la población. En la actualidad, esto influye en la ralentización de la tasa de crecimiento. El balance de migraciones durante los últimos 12 años alcanzó la cifra de 45.500 personas. Las migraciones tanto de personas que viven en el campo como en la ciudad están decreciendo. La emigración actual varía según el grupo de edad. En los últimos años, predominaba la emigración para poder acceder al sistema educativo, por eso, prácticamente la mitad de la población emigrante estaba formada por jóvenes de menos de 30 años, y en su conjunto, el porcentaje de población activa ascendía al 85%. En las tendencias de emigración actual, el porcentaje de población activa ha disminuido, sin embargo, el porcentaje de jubilados ha aumentado lo que significa que la emigración es de naturaleza familiar. La mano de obra en el territorio de la región del Mar de Aral se basa en la reproducción natural y la migración de la población.

La disminución del nivel de vida de la población es un proceso habitual en los periodos de transición pero puede agravarse como resultado del impacto del deterioro del medio ambiente en el epicentro de la crisis del Mar de Aral.

DESERTIFICATION DANS LA REGION DE LA MER D'ARAL ET MOUVEMENTS MIGRATOIRES

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Résumé

L'Asie Centrale apparaît comme un territoire plutôt homogène en termes d'orographie et de climat. Les caractéristiques climatiques évoluent sous l'influence de trois facteurs majeurs: la radiation solaire, la circulation de l'atmosphère et le relief. La grande quantité d'énergie solaire accumulée en été par l'Asie Centrale, en raison de sa situation géographique (latitudes subtropicales), provoque un réchauffement

important des sols et de l'air. Les vastes déserts arides de Karakoum et de Kyzylkoum entourant la mer d'Aral constituent d'importantes sources de transformation des masses d'air, qui pénètre librement la partie plane du territoire par l'ouest, le nord-ouest et parfois par le nord-est.

Les transformations anthropogéniques et les bouleversements écologiques de ces dernières années y contribuent en grande partie. Dans de nombreux cas, ils s'apparentent à des catastrophes naturelles de grande envergure. Les effets néfastes de l'activité anthropogénique sont spécifiques au développement graduel des valeurs cruciales. L'autre particularité de ces effets s'illustre lorsque les conséquences néfastes de l'action anthropogénique apparaissent dans des lieux éloignés: à une distance importante de l'endroit où ces interférences ont eu lieu. Il s'avère extrêmement difficile et onéreux de combattre ces désastres résultant de l'action de l'homme.

Le changement survenu quant aux conditions d'approvisionnement en eau sur le territoire et l'assèchement de la mer d'Aral qui en découle a donné naissance au problème de désertification. La désertification est un processus de dégradation écologique accompagné d'une perte importante de productivité biologique, d'augmentation du phénomène d'érosion, de salinisation et d'autres conséquences néfastes qui affectent directement les conditions de vie de la population et le fonctionnement de l'économie régionale. L'influence active de l'activité humaine sur l'environnement aggrave non seulement ces processus, mais constitue souvent la cause principale de ce phénomène.

La situation écologique de la région requiert d'importants changements dans les politiques et stratégies de développement socioéconomique. La prise en compte des principales tendances mentionnées ci-après constitue l'aspect fondamental du développement des zones soumises à des conditions naturelles et écologiques extrêmes.

L'émigration est un des facteurs qui influence l'évolution du nombre et de la composition de la population. Actuellement, elle favorise le ralentissement du taux de croissance. Le bilan migratoire des 12 dernières années s'élève à 45000 personnes. La migration des populations rurales et de village diminue. La migration actuelle varie en fonction des tranches d'âge. Au cours des dernières années, la migration à but éducatif prédominait, quand la moitié des migrants était constituée de jeunes de moins de 30 ans, et dans l'ensemble, le pourcentage des personnes en âge de travailler atteignait 85%. Dans l'émigration actuelle, le pourcentage de personnes en âge de travailler a diminué, mais la part des retraités a augmenté, ce qui signifie que l'émigration possède un caractère familial. La main d'œuvre de la région de la mer d'Aral est basée sur la reproduction naturelle et la migration.

La baisse du niveau de vie de la population est un processus courant dans la période de transition mais l'impact de la dégradation de l'environnement sur l'épicentre de la crise de la mer d'Aral a aggravé ce phénomène.

Abstract

The territory of Central Asia represent quite a homogeneous territory in orographic and climatic terms. The climatic features develop under the influence of three major factors: solar radiation, circulation of atmosphere and underlying surface. The considerable amount of solar energy received in summer by the Central Asia territory, due to its location in subtropical latitudes, cause intensive heating of soil and air. Vast waterless Karakum and Kizilkum deserts surrounding the Aral Sea are huge sources of transformation of air masses, which freely enter the plain part of the territory from west, north-west and sometimes from north-east.

The anthropogenic changes and disturbances in environment in the last years ran up to large scales. In a number of cases, they can be compared to only large natural disasters. The negative impacts of anthropogenic activity are specific for gradual build-up to critical values. The other specific feature of these impacts is a situation when the negative outcomes of anthropogenic interference may come up in areas where they were not made: at a considerable distance from the place they were made. It is extremely difficult and expensive to fight such man-made disasters.

The change in water supply conditions of the territory and the drying of the Aral Sea related to it has caused the problem of desertification. Desertification means degradation process taking place in environment accompanied by a drop in the biologic productivity, development of erosion, salinization and other negative outcomes which directly influence the living conditions of the population and functioning of the region's economy. And the active influence of human activity on environment not only aggravates this process, but is often one of the major causes of its occurrence.

The environment developed in the region requires considerable changes in the socio-economic development policies and strategies. Consideration of the following major trends is the specific aspect of development of areas that are under extreme natural and environmental conditions.

Emigration is one of the factors influencing the behavior of the number and make-up of the population. At present it facilitates deceleration of growth rate. The migration balance for the last 12 years made -45 500 people. Rural and town people migration is decreasing. The current migration differs in age group. In

the past years, migration for education purpose predominated, therefore, about half of the migrating people consisted of youth below 30 years old, and as a whole, the percentage of able-bodied people reached 85%. In current emigration, the percentage of able-bodied people has decreased, but the percentage of retired people has increased which means that emigration is of family nature. The labour force of Aral Sea region territory is formed based on natural reproduction and migration of population.

A drop in the living standards of population is a regular process of the transition period, but it became aggravated as a result of the impact of the deteriorating environment in the Aral Sea crisis epicenter.

1. Changes of environmental and climatic conditions

The territory of Central Asia represent quite a homogeneous territory in orographic and climatic terms. The climatic features develop under the influence of three major factors: solar radiation, circulation of atmosphere and underlying surface. The considerable amount of solar energy received in summer by the Central Asia territory, due to its location in subtropical latitudes, cause intensive heating of soil and air. Vast waterless Karakum and Kizilkum deserts surrounding the Aral Sea are huge sources of transformation of air masses, which freely enter the plain part of the territory from west, north-west and sometimes from north-east.

The current tendencies in steady development require complex and continuous attention to all environmental sites. The problem of conservation of biodiversity on the planet and monitoring become especially important when it comes to ecosystems formed and developing under extreme conditions.

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The Amudarya River is the largest of Central Asia, along with the Syrdarya River it provided with water the continental lake - the Aral Sea. Rapid development of irrigated lands started in the 1960s gradually led to the necessity of regulation of its channel with dams and withdrawal of a considerable part of its water resources for agricultural needs. As a result, of the total water amount constituting about 90% is used in agriculture, 4% in public utilities, about 2% in industry, 1.8% in rural water supply, 0.8% in fishery and less than 1% by other consumers.

Thus, to conserve and recover the resource potentials of vegetation in the South Aral Sea area it will be necessary to work out special actions which could facilitate stabilization of its condition and at the same time it will be necessary to maintain monitoring. The environment and prospects of socio-economic development of this region will depend on how soon and successfully this problem will be solved. The current vegetation of low part of Amudarya River is represented mainly by tugay, meadow, psammophilous and gallophilous types of plants.

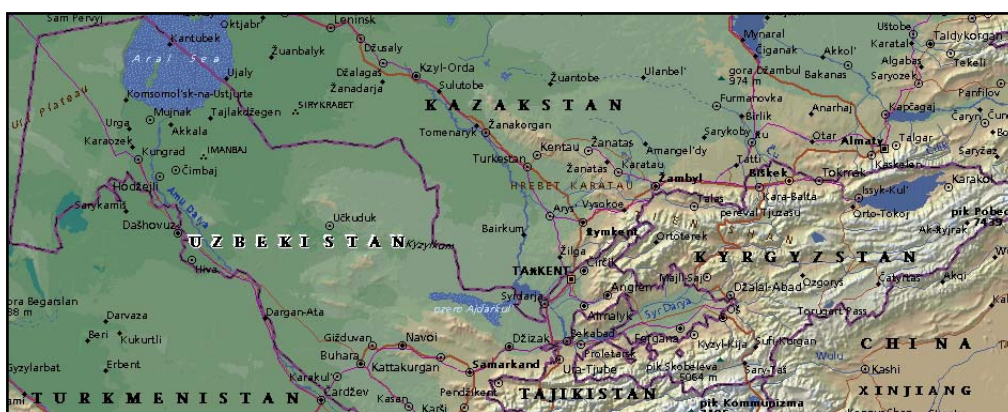


Figure 1: The Aral Sea drainage basin

Due to changes in habitat environment disturbances are observed in formation processes and in the behavior of associations in tugay type of vegetation. In all distinguished associations, various stages of desertification are observed. The anthropogenic impact has resulted in a decrease in tugay forest areas for the last 60 years more than 90%. At the current system of exploitation of tugay forests, they will come under the threat within the coming 10 to 15 years.

Only in the last twelve years, the area, occupied by vegetation associations which are capable to exist in flood plain habitat provided that they are flooded every year, has decreased from 40% to 30%. At the same time the number of associations confined to saline and desertified areas of the flood plain and delta has increased from 25% to 70%.

The areas of liquorice associations, which were once widely present in the Amudarya delta, have decreased from 12 000 to 1 500 ha. The areas of hay fields and pastures and their yield were also subject to a considerable decrease. For instance, of 420 000 ha of hay fields existed in 1960, by late 1990s only 70-75 000 ha remained. Their yield on fields which are subject to unperiodic flooding decreased from 1500-4000 kg per ha to 300-1600 kg per ha, and on unflooded desertifying areas to 70-80 kg per ha (dry period), i.e. 22 times less. The area of pasturelands in the flood plain and delta has decreased from 348 000 ha to 125 000 ha. For the last 30 years, the area of meadows in Aral Sea has decreased from 600 000 to 70 000 ha.

Kizilkum desert occupies a vast expanse of the Syrdarya and Amudarya inter-fluve, the second desert in area in Central Asia after Karakum. The Karakalpak Kizilkum is one of major pasturelands of distant-pasture animal husbandry. Monotonous sandy territories sometime extend to many kilometers, sometime ridge-like sand dunes uniformly alternating with takirs suddenly rise amidst flat expanse

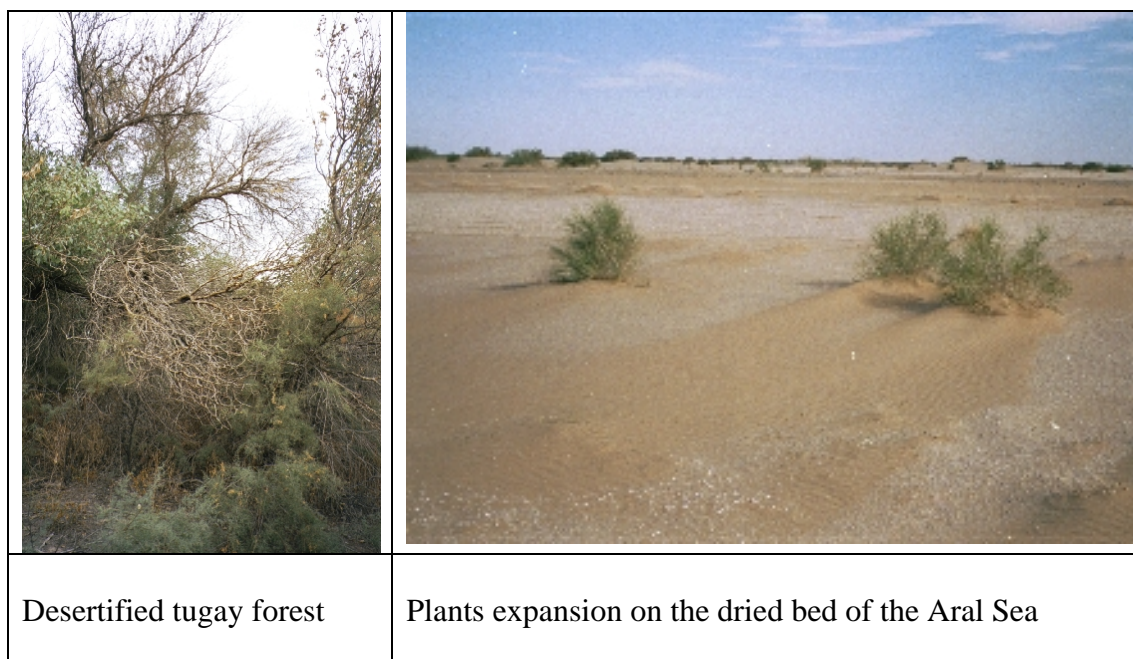


Figure 2: Types of Landscapes of Aral Sea Region

Taking into account the scale, sizes and consequences of environmental burden, ensuring steady development, the mechanism of its implementation in individual regions have their own specific aspects.

The drying of the Aral Sea bottom has sharply changed the environment to worse with negative outcomes for the socio-economic development of the region. Before the Aral Sea had not only played the role of the factor influencing the coastal areas but the function that regulated as well the temperature and humidity in area of Aral Sea. In the last years, the number of dust-storm days has increased by more than 50% in the drying part of the Aral Sea. And lengths of dust-storms and their steadiness have increased. The contribution of the Aral Sea to the regional humidity transfer has decreased from 5-8% to 2.6-4%. The frostless period has decreased by 10-12 days. The total inundated area, which made in 1950 350 000 ha and of inundated lakes and water bodies 80 000-100 000 ha, has decreased almost two times.

2. Water supply and desertification

The change in water supply conditions of the territory and the drying of the Aral Sea related to it has caused the problem of desertification. Desertification means degradation process taking place in environment accompanied by a drop in the biologic productivity, development of erosion, salinization and other negative outcomes which directly influence the living conditions of the population and functioning of the region's economy. And the active influence of human activity on environment not only aggravates this process, but is often one of the major causes of its occurrence.

The environment developed in the region requires considerable changes in the socio-economic development policies and strategies. Consideration of the following major trends is the specific aspect of development of areas that are under extreme natural and environmental conditions.

3. Population: socio-economical situation and changes by desertification

Among the resource potentials of the republic the population and labour force are of especial significance. The demographic development of Aral Sea region has always been complex. The birth rate remaining high for a long time was not supported by adequate economic growth that negatively affected the living standard and health of the families having many children. The Aral Sea Region inherited an unfavourable demographic situation from the past: high infantile and maternal mortality rate, a large number of families with uncontrolled high birth rates, low social and territorial mobility of population, extremely uneven settlement of population concentrated in oases and long-irrigated areas. As of the beginning of 2002, in Aral Sea region there were 1 533 900 people, including in towns: 713 900, in rural areas: 764 900. Since early 1990s the growth rate of population started decreasing. While during 1991 to 1995, the yearly average growth rate of population amounted to 2.4%, including in towns: 2.5%, in rural areas: 2.2%, in the last four years it decreased and amounted to 1.5%, 1.5%, 1.6% respectively.

During these periods this drop in growth rate took place more slowly in Uzbekistan as a whole. While during 1991 to 1995, the population of Aral Sea region increased by 152 000 people, in the following 4 years by 86 300 people. During the years after independence, the slow demographic growth has been especially clearly noticeable. It is accounted for the influence of two most important factors: a drop in birth rate and a rise in emigration (in comparison to the 1980s). It has to be noted that the drop in birth rate occurs not only in towns, but in rural areas as well, and in rural areas more intensively (from 1990 to 1997, the aggregate coefficient decreased in towns 1.5 times, and in rural areas 1.8 times, while it decreased in Uzbekistan as a whole 1.3 and 1.5 times respectively). The mortality rate is relatively low, mainly due to age group features (high percentage of youth and relatively low percentage of retired people). A sharp drop in infantile mortality rate is the chief achievement of the Karakalpak republic. In the 1990s, it dropped 1.8 times.

Emigration is one of the factors influencing the behavior of the number and make-up of the population. At present it facilitates deceleration of growth rate. The migration balance for the last 12 years made -45 500 people. Rural and town people migration is decreasing. Not only qualitative, but also make-up changes occurred in migration. Among the emigrated are mainly Russian-speaking people. The current migration differs in age group. In the past years, migration for education purpose predominated, therefore, about half of the migrating people consisted of youth below 30 years old, and as a whole, the percentage of able-bodied people reached 85%. In current emigration, the percentage of able-bodied people has decreased, but the percentage of retired people has increased which means that emigration is of family nature. The labour force of Aral Sea region territory is formed based on natural reproduction and migration of population.



Figure 3: Map of population density of Karakalpakstan, persons per square kilometer, generalized on small rural communities.

By estimates, in 2000, the yearly average number of able-bodied labour force of Aral Sea region area amounted to 772 600 people against 690 900 in 1997, 657 900 in 1995 and 576 900 in 1990. In 1991 to 2001, the growth amounted to 195 700 people, i.e. 25.3%. About 50% of labour force is located in rural areas, against 55.8% in all Uzbekistan. The yearly average growth rate of able-bodied labour force in 1991 to 2001 is ahead of the country's indicator and amounts to 2.6%, against 2.2%, which creates additional difficulties in providing the population with employment. According the labour force balance data, of the total number of labour force of Aral Sea region 69.0% are employed in economy, against 74.4% in Uzbekistan, 10.4% and 8.0% respectively receive off-duty training, unemployed population amount to 19.5% and 17.2%.

The general situation is deteriorating in employment, as established production/economic ties are breaking up, the economy's balance is being disturbed and the major industry indicators are falling. All this is reflected on the ratio of labour force to employment rate, i.e. build-up of labour force is taking place. In rural areas, employment growth is maintained mainly due to subsistence farming. In villages, there are established few enterprises processing agricultural produce, small businesses, auxiliary enterprises and industries. Only 0.5 % of rural labour force is employed in industry (This figure for Uzbekistan is 1.9%), in transport and communication 0.3% and 0.7% respectively, in construction 0.9% and 2.2%, in trade and public catering 1.9% and 2.9%. At the same time, 10.8% work in the social sphere against 9.0%. Both in Uzbekistan and Republic of Karakalpakstan there is tendency in the decrease of employment rate in the sphere of off-duty training. The labour market is getting active. The number of unemployed registered with employment agencies is increasing. The number of people seeking employment has increased 2.3 times, of those registered 2.8 times against 1995. The redundancy processes are becoming increased due to staff retrenchments, closure of enterprises and organizations. For instance, in 1995 there were 4.9 people seeking employment per vacancy, in 1999 10.5 people.

The percentage of people provided with employment through employment agencies is decreasing. Unemployment rate is growing particularly in small towns, settlements and rural areas. Still little attention is being paid to off-duty training of people who applied to employment agencies. The number of people receiving unemployment benefits is increasing. According to estimates, by the beginning of 2005, the forecasted number of Karakalpakstan's population will make 1 606 700 people, including townspeople 766 700, and rural people 840 000, by the beginning of 2010: 1 708 700, 803 500, 905 200 respectively.

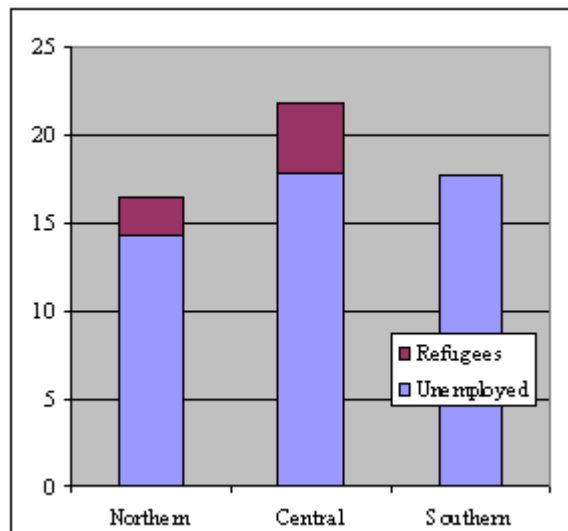


Figure 4: Percentage of unemployed and economical refugees in rural families, living in different zones of Karakalpakstan

The yearly average growth rate of population in 2001 to 2005 will be in Karakalpakstan 1.3%, in towns 1.15% and in rural areas 1.45%, in 2006 to 2010 1.25%, 0.95%, and 1.5% respectively. In 2001 to 2005, the total population growth will make –99 700 people, and in 2006 to 2010 - 102 000, and in towns it will drop from 41 000 to 36 800, in rural areas it will increase from 58 700 to 65 700. The percentage of townspeople in the forecast period will decreasing on and in 2000 will amount to 48.1%, in 2005 47.7%, and in 2010. 47.0%. Thus, the researches show that in the republic attention should not be weakened to the issues of demographic development. Attention should be focused on conservation of reproductive set-up of population to average-sized families; it is necessary to continue taking effective steps to further decrease infantile mortality rate; to decrease mortality rate at able-bodied age, as its further rise may lead not only to a decrease in life expectancy, but also to considerable social losses in the society, etc. It is expected in the future that there will be an absolute and relative growth of people of able-bodied age in the make-up of population, on the basis of which labour force is formed. In 2001 to 2010, the number of labour force of Karakalpakstan will increase by 202 000, the yearly average growth rate will reach 2.2%. The growth of labour force in future will slow down. The highest growth is expected in the coming five years when the generation born in early 1980s will enter the able-bodied age group. In the forecast period, the growth of labour force will surpass the population growth, and due to this its percentage in the total number of population will be noticeably increasing and in 2010 it will reach 56%.

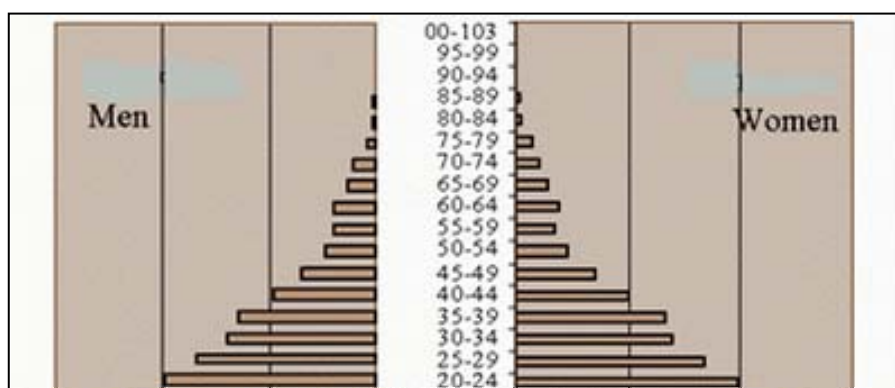


Figure 5: Age structure of population of Karakalpakstan

Such a growth of labour potentials will aggravate the problem of employment, which is at present, is not solved sufficiently. The forecast of employment by sectors of economy is based on the long-term development strategy of economy ensuring a considerable increase in potentials for creating additional employment. In 2000 to 2010, the number of employed people will increase from 508 700 to 676 600, the yearly average growth will reach 16 800, the number of trainees receiving off-duty training will increase from 71 700 to 102 500 i.e. by 39%. According to estimates, a considerable part of labour force growth will be provided with employment in economy and with off-duty training.

The problem of social development of the region must be first of all highlighted in the aggregate of problems. Since meeting the demand is of regional nature, the need arises in analysis of development of the infrastructure which will ensure establishment of services to population.

The condition of public housing/utilities is one of the most important indicators of social development. The level of supply of population with housing is the housing development indicator. Comparatively low level supply with housing is specific for Uzbekistan as a whole. Its per capita average for the Uzbekistan in 1999 made 13.3 square km. For Karakalpakstan this indicator is higher than for the whole country: 13.9 square km.

Solving the housing problem depends on many factors and first of all on potentials of financing the construction, tempos and scale of construction of new flats, renovation of the available housing. In 2001, in Karakalpakstan, the total new housing area made available for living financed by all sources of financing amounted to 341 700 square km., i.e. 99.3% against the 2000 figure, including 336 100 square km., i.e. 98.0% which was financed by the population's savings. It has to be noted that the equipment level of homes with centralized water supply, sewer, heating, hot water supply, bath-tubs, gas, electric ranges is not sufficient. For instance, housing equipped with centralized water supply for the republic averaged 70.2%.

4. Social-economic condition and changes of the Karakalpakstan as Desertification area

The problem of supply of rural population with quality drinking water remains one of the acutest social problems. This situation is aggravated by intensifying environmental crisis of the Aral Sea and the area, pollution, depletion and degradation of water supply sources.

The gas supply level of houses in Uzbekistan is 85%. This indicator looks better in the Republic of Karakalpakstan than in other regions of the country, i.e. 99%. In 1991 to

2001, over 55 000 km of gas pipe-lines had been installed which was financed by all sources of financing. And supply of rural areas with piped gas is carried out at a much higher tempo: during this period over 40 000 km of pipe-lines had been put into operation.

While in 1996 15 private institutions, 1 small business, 8 cooperatives, 10 businesses of other forms of ownership functioned in the Republic of Karakalpakstan, in 1999 these figures made respectively 49, 2, 12 è 41. And in 2001, 84 non-government sector health institutions functioned making 10.4% of the total number of health institutions.

In spite of the increase in the number of health institutions, during this period the number of hospitals had decreased (from 102 to 90) and the number of hospital beds (respectively 9 100 to 7 200). Giving characteristics of the territorial aspect of the development of health service, considerable variation of population's health level is observed in Amudarya, Beruny, Bozatau districts of the republic, and the highest in Kegeyly (6.3) and Khodjeily (6.2) districts.

At present, there function 764 general education day schools in the republic, in which 377 800 children receive education. Out of these schools 537 function in two shifts, i.e. 70.3% of the total number of general education day schools. 129 200 pupils receive education in the second shift, i.e. 34.2% of the total number of pupils. Beside this, 2 700 pupils receive education in the third shift. In settlements, 23.3% of day schools function in two and three shifts.

3 high schools provide education to students in Karakalpakstan, in which 9 200 students receive education in day courses. In 20013 354 students were taken in by the high schools, of which 2 799 students were taken in by the day courses. As of the beginning of the 2001/2002 academic year, 3 academic lyceums and 64 professional-orientation colleges with the total number of students 886 and 20 458 students respectively function in the republic.

Along with this, no considerable changes took place in the level of supply of the general education schools with materials and equipment. There is still shortage of teaching staff in educational institutions, first of all in general education schools, teaching staff, teaching aids and methodic books on newly introduced subjects.

Conclusion

By the living standards and income level the Karakalpakstan holds one of the lowest places in Uzbekistan. The growth in the cost of living and in prices is ahead of the population's income growth. The inflationary processes are leading to a drop in population's living standard; the continuing growth in incomes is leading to the social differentiation processes, development of new income-to-expenditure proportions. The growth in real incomes is mainly achieved by raising the salaries. In the production sectors, a gap is observed between the average salary in Karakalpakstan and in Uzbekistan as a whole in agriculture (by 55.6%); there is a considerable growth in salaries 1.4-1.5 times in industry, construction, communication and transport.

A drop in the living standards of population is a regular process of the transition period, but it became aggravated as a result of the impact of the deteriorating environment in the Aral Sea crisis epicenter. In the transition period, the government regulates the social processes, raises the minimum salary level, pensions, allowances and in spite of these the living wage drops. Therefore, improvement of social protection of population considering the environmental situation, which has developed in the Aral Sea area, is one of the priority aspects of further reformations in the Republic of Karakalpakstan.

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