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SUSTAINABLE USE OF THE BUFFER ZONE OF EL ANGEL ECOLOGICAL RESERVE, ECUADOR

РАЦИОНАЛЬНОЕ ИСПОЛЬЗОВАНИЕ ТЕРРИТОРИИ БУФЕРНОЙ ЗОНЫ ЭКОЛОГИЧЕСКОГО ЗАПОВЕДНИКА «ЭЛЬ АНХЕЛЬ», ЭКВАДОР

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Abstract. The specifics of management of El Angel Ecological Reserve buffer zone in the Equatorial Andes have been investigated. The main aspects of the environmental impact have been identified. The authors give the recommendations on the sustainable use of the territory to insure employment and lessen the negative impact on the ecosystems such as reducing the use of agricultural chemicals, pasture field planning in accordance with natural environment, firefighting management, control over disboscation and hunting, natural systems monitoring. The creation of a Tourist Center would provide an opportunity to spur economic growth of the region, control and prevent the negative anthropogenic influence.

Аннотация. Исследованы особенности управления буферной зоной экологического заповедника «Эль Анхель» в экваториальных Андах. Выявлены основные проблемы воздействия на окружающую среду. Предложены рекомендации по рациональному использованию территории, которые позволят обеспечивать занятость населения с учетом минимизации негативного воздействия на экосистемы. Необходимо сокращение использования агрохимикатов в земледелии, формирование адекватных природной среде пастбищных участков, контроль за пожарами, вырубкой лесов, охотой и формирование мониторинга природных систем. Создание полноценного туристского центра даст возможность активизировать экономическую деятельность, и в то же время будет способствовать эффективному контролю и предотвращению негативного антропогенного воздействия.

Keywords: ecological reserve, Equatorial Andes, buffer zone, management, sustainable use of the territory.

Ключевые слова: экологический заповедник, экваториальные Анды, буферная зона заповедника, управление, рациональное использование территории.

El Ángel Environmental Reserve lies in the mountain zone of the northern part of Ecuador in the canton of Espejo, the province of Carchi (0°45' N, 77°54' W). It occupies an area of 15715 hectares. The reserve, created in 1992, is aimed to safe the unique mountain ecosystems, the flora

and fauna of the Equatorial Andes. The reserve territory plays an active part in the water resources formation process. The El Angel Ecological Reserve management program has been worked out [1].

The territories bordering the reserve are involved into economic activity. In general, the problem of the using of the surrounding area has certain peculiarities of its own. The neighboring area influences the reserve territories. The pollution sources located on the surrounding lands may negatively impact on the condition of the reserved territories. The risk of damage increases when the pollutants are transported with wind and water flows. Therefore, reserve planning should not avoid such aspects as the development and using of the surrounding territories, the reserve buffer zones. Obviously, complete terminating of the economic activity in the inhabited buffer zones is impossible. Thus, the economic activity in the reserve surrounding territories should provide employment opportunities and mitigate the negative impact on the area. Launching an environmental action plan should also be a part of the management program.

The article is focused on the problems of the buffer zone management in La Libertad, the region bordering the southern part of the reserve. Parroquia La Libertad, a region with population engaged in agriculture, occupies an area of 5530 hectares. The prevailing kinds of crops grown in La Libertad are potatoes, beans, corn, wheat and barley. Some parts of the land are used as pasture fields. Cattle breeding prevails in the regional stock-rearing. As for the other activities, the population is occupied with crafts and wool products making.

A great problem of the region is the damage to the reserved area caused by uncontrolled use of agricultural chemicals. The reserve territory and its buffer zone are attractive to tourists due to their unique landscapes. However, uncontrolled tourist activity may have negative effect on the reserved territory. It increases the risks of forest fires, garbage pollution, intrusion of plant and animal species untypical for the ecosystems of the reserve.

The management plan for La Libertad territory is supposed to minimize the negative effect of anthropogenic activity and provide the ecological security of El Angel Reserve [2-4].

Sustainable development, increasing effectiveness of the traditional economy, improving the quality of life are the factors of minimizing the negative impact of anthropogenic influence.

As for the forest compartment management, the following measures are relevant: compartment zoning; forest fire monitoring, introducing forest fire prevention and elimination system; ban on bush burning; preventing the intrusion of plant and animal species able to change the ecosystem; woodcutting permits or licenses for the local population and a strict ban on woodcutting for non-residents; founding a forest nursery for the purposes of local flora revision; total ban on hunting.

In the sphere of agriculture the following actions are offered to be taken: to select appropriate areas for the pasture fields; introduce a ban on burning pastures; forbid licensing cattle without veterinary certificates; use multi stage selection schemes for cattle genetic improvement to increase the productivity and reduce the pressure on pastures. It is important for the agrarian sector to create a soil quality control system for effective monitoring of the chemical use; to replace chemical fertilizers with organic manures and use biological methods of pest control for the crops and fields appropriate for that; support crop rotation policy and soil erosion protection actions. Within the legal framework, taking into consideration the conservation status of the territory, the authorities have to come to an agreement with the Ministry of Agriculture on the prices and promotion for the local agricultural products on the market so that the local producers could sell avoiding distributors.

For the region being attractive for tourists, it is important to provide an effective management program to support tourist activity alongside the measures taken to prevent soil degradation and environmental pollution. The main tourist sites must be defined on the territory; they should be of ecological interest first of all, focused on visiting unique ecosystems. However, the area has a great potential. It seems reasonable to exploit the specific of the local population such as culture, customs and cuisine to attract tourists. The approach would certainly stimulate the local market providing

the opportunity for the inhabitants to sell their handmade crafts. Archeological sites and such animals as lama, alpaca, and vicuna are promising tourist attractions as well.

The creation of a Tourist Center would not only increase the marketing effectiveness but also provide sufficient control of the environmental impact. There is a necessity of tourist maps publishing, collaboration with tourism agencies, organizing exhibitions and advertising.

The establishing of a system of ecological education and enlightenment is a valuable aspect of the program. Providing environmental awareness training to the population is vitally urgent.

Therefore, the offered actions would improve the economic activity of the population and minimize the negative impact on the environment in the buffer zone of El Ángel Ecological Reserve.

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