

UDC 63.630.6

IRSTI 68.47

DOI: 10.52269/22266070_2023_2_112

ECONOMIC VALUATION OF FOREST ECOSYSTEM SERVICES IN THE NATIONAL PARK “BURABAY” USING CONTINGENT VALUATION METHOD

Kitaibekova S.O. – Master of Agricultural Sciences, S. Seifullin Kazakh Agrotechnical Research University.

Toktassynov Zh.N. – Candidate of Agricultural Sciences, S. Seifullin Kazakh Agrotechnical Research University.

Sarsekova D.N. – Doctor of Agricultural Sciences, Professor, S. Seifullin Kazakh Agrotechnical Research University.

The article considers Contingent Valuation Method (CVM) which is used to estimate economic values for all kinds of ecosystem and environmental services. The contingent valuation method involves directly asking people, in a survey, how much they would be willing to pay for specific environmental services.

This method was applied for visitors of the State National Nature Park “Burabay” where 350 respondents were asked. In some cases, people are asked for the amount of compensation they would be willing to accept to give up specific environmental services. Five steps of application of CVM were used: to define the valuation problem; to make preliminary decisions about the survey itself, including whether it will be conducted by mail, phone or in person, how large the sample size will be, who will be surveyed, and other related questions; the actual survey design; the actual survey implementation; to compile, analyze and report the results.

Key words: contingent valuation method, environmental services, recreation, survey, willingness to pay.

ЭКОНОМИЧЕСКАЯ ОЦЕНКА УСЛУГ ЛЕСНЫХ ЭКОСИСТЕМ В НАЦИОНАЛЬНОМ ПАРКЕ «БУРАБАЙ» С ИСПОЛЬЗОВАНИЕМ МЕТОДА УСЛОВНОЙ ОЦЕНКИ

Китайбекова С.О. – магистр сельскохозяйственных наук, Казахский агротехнический исследовательский университет имени Сакена Сейфуллина.

Токтасынов Ж.Н. – кандидат сельскохозяйственных наук, Казахский агротехнический исследовательский университет имени Сакена Сейфуллина.

Сарсекова Д.Н. – доктор сельскохозяйственных наук, профессор, Казахский агротехнический исследовательский университет имени Сакена Сейфуллина.

В статье рассматривается метод условной оценки (CVM), который используется для оценки экономической стоимости всех видов экосистем и экологических услуг. Метод условной оценки предполагает прямой опрос людей в ходе опроса, сколько они были бы готовы платить за конкретные экологические услуги.

Этот метод был применен к посетителям Государственного национального природного парка «Бурабай», где было опрошено 350 респондентов. В некоторых случаях у людей спрашивают сумму компенсации, которую они готовы принять за отказ от конкретных экологических услуг. Были использованы пять шагов применения CVM: определить задачу оценки; принять предварительные решения о самом опросе, в том числе о том, будет ли он проводиться по почте, телефону или лично, насколько велик будет размер выборки, кто будет опрошен и другие сопутствующие вопросы; фактический план обследования; фактическое выполнение обследования; собрать данные, проанализировать и сообщить о результатах.

Ключевые слова: метод условной оценки, экологические услуги, отдых, опрос, готовность платить.

ШАРТТЫ БАҒАЛАУ ӘДІСІМЕН БУРАБАЙ УЛЫТТЫҚ ПАРКІНДЕГІ ОРМАН ЭКОЖҮЙЕСІНІҢ ҚЫЗМЕТТЕРІН ЭКОНОМИКАЛЫҚ БАҒАЛАУ

Китайбекова С.О. – ауыл шаруашылық ғылымдарының магистрі, Сәкен Сейфуллин атындағы Қазақ агротехникалық зерттеу университеті.

Токтасынов Ж.Н. – ауыл шаруашылық ғылымдарының кандидаты, Сәкен Сейфуллин атындағы Қазақ агротехникалық зерттеу университеті.

Сарсекова Д.Н. – ауыл шаруашылық ғылымдарының докторы, профессор, Сәкен Сейфуллин атындағы Қазақ агротехникалық зерттеу университеті.

Мақалада экожүйе мен экологиялық қызметтердің барлық түрлері үшін экономикалық құндылықтарды бағалау үшін қолданылатын шартты бағалау әдісі (CVM) қарастырылады.

Шартты бағалау әдісі сауалнамада адамдардан нақты экологиялық қызметтер үшін қанша төлеуге дайын болатынын тікелей сұрауды қамтиды.

Бұл әдіс «Бурабай» мемлекеттік ұлттық табиғи паркінің келушілері үшін қолданылды, мұнда 350 респондент сұралды. Кейбір жағдайларда адамдардан белгілі бір экологиялық қызметтерден бас тарту үшін қабылдауға дайын болатын өтемақы сомасы сұралады. Ол «шартты» бағалау деп аталады, өйткені олардан белгілі бір гипотетикалық сценарийге және экологиялық қызметтің сипаттамасына байланысты төлеуге дайын екендіктерін айту сұралады. CVM қолданудың бес қадамы қолданылды: бағалау мәселесін анықтау; сауалнаманың өзі туралы алдын ала шешім қабылдау, оның ішінде пошта арқылы, телефон арқылы немесе қолма-қол жүргізілетінін, іріктеу көлемінің қаншалықты болатынын, кімнің сауалнама жүргізетінін және басқа да осыған байланысты сұрақтарды; нақты зерттеу жобасы; сауалнаманың нақты орындалуы; нәтижелерін құрастыру, талдау және есеп беру.

Түйінді сөздер: шартты бағалау әдісі, экологиялық қызметтер, демалыс, сауалнама, төлеуге дайын болу.

Introduction. Kazakhstan and foreign scientists have been studying the economic evaluation of forest ecosystem services for a long time, but the problem continues to be relevant. This is due to the fact that recreational resources are very diverse and not all of them can be estimated from the economic point of view, i.e. based on monetary value. Nowadays, the following methods for estimating recreational forest resources are known: costly, resultant, by use value, based on the exchange of values. Each type of evaluation has advantages and disadvantages. The cost method can be determined in two ways: by monetary costs for recreational resources and by the cost of substitutes.

The cost method includes all forestry costs associated with the organization of mass recreation in the forest, the costs of all parties involved in recreation, including recreants who visit the forest and, possibly, will cover the costs of the entrance fee. The entrance fee has its positive and negative sides as according to statistics, not everyone wants to pay for the use of the forest for recreation. The expenses of recreants for visiting the forest consist of the following elements: a) the price of free time (time for rest in the forest, for the road to the forest and back); b) transport costs for the road; c) other material expenses (food, accommodation, equipment, clothing, souvenirs).

Travel cost method, hedonic pricing, experiential markets, and imputed valuation are the most popular non-market valuation methods. Travel cost method was described by Kitaibekova S., where she considers that this method is a method of indirect assessment of the cost of environmental objects, where the population's travel costs for visiting recreational areas are used as a substitute for the cost of a recreational facility, and the frequency of visiting it expresses the number of purchased recreational "goods" [1, p.228-235]. These methods differ from each other.

Contingent valuation method is a research-based economic method for valuating non-market resources such as environmental protection or the impact of pollution. While these resources actually benefit people, some aspects of them do not have a market value because they are not sold directly. For example, most often people benefit from the beautiful nature in the park, enjoy the view of the mountains, breathe clean air, but it is difficult to evaluate everything using price models. In order to measure these aspects, a contingent valuation survey method was applied. Both models are based on utility. Usually in survey it is asked how much money people are willing to pay (or willing to accept) to maintain (or compensate for the loss of) an ecological asset such as biodiversity.

The contingent valuation method is used to measure all types of economic value. Zhiming Leng, Yihui Lei describe this method as a research method for determining the willingness to pay or accept compensation for various types of non-market natural and environmental resources. With the imputed valuation method, it is possible to determine the value of outdoor recreation, but this method is also the only method currently available to measure the value of other resources, such as benefits [2, p. 99-106].

Rahal Saeker and Dan McKenny, in "Measuring Invaluable Value in Ontario Forests: an Annotated Bibliography from an Economic Perspective", review the contingent valuation method (CVM) for questioning in identifying consumer willingness to pay (WTP) or consumer willingness to accept (WTA) for both goods, and for services without determining the cost. This approach assumes that people are able to answer questions to reveal their preferences for public goods or services (Mitchell and Carson, 1989). It is called conditional because the valuation questions are formulated in some hypothetical market conditions [3, p.19-29].

Bixia Chen and Xinhua Qi believe that citizens living closer to forest parks have scenic conditions, opportunities for recreation and interaction with nature. For an effective forest park maintenance strategy, it is important for visitors to understand the recreational qualities of green spaces, visitor behavior and preferences. The conditional valuation method considers the preferences of residents and makes it possible to study heterogeneous socio-demographic groups [4, p.68-76].

Alexander J. Smalley and Matthew P. White consider that the landscape can be active; many elements in the environment can change from one moment to the next. Features such as a bright sunrise or a sudden storm are often brief and unexpected; they are ephemeral and can significantly change how the environment is perceived [5, p. 1-12].

Typically, a contingent valuation interview consists of three parts. In the first part, the researcher plans and presents to the respondent a hypothetical market that describes the product or service to be evaluated, the reference level of supply, the range of acceptable alternatives, and the method of payment or compensation. This is followed by a series of assessment questions to identify the respondent's maximum willingness to pay for the product or service being assessed. Finally, a third set of questions can be asked to collect information about the respondent's characteristics (e.g., age, income, previous experience with the product or service being assessed, use of other related products or services, etc.). If the survey is carefully designed and pre-tested, individuals' responses to assessment questions will generate WTP or WTA scores that are consistent with theoretical measures of welfare change (Just et al., 1982 and Mitchell and Carson, 1989).

Contingent valuation method assumes that respondents have a clear understanding of the product/service being assessed, its current state and the expected degree of change in its quality or quantity, and the method of payment. It is also assumed that respondents understand that the amount of the payment should reflect the maximum willingness to pay for the product/service being valued, and not necessarily a fair price (Mitchell and Carson, 1989).

The purpose of the CVM survey is to obtain indicators of consumer surplus from respondents. This is the maximum amount that the respondent is willing to pay for good conditions before he decides to do without them. Initially, it was difficult for respondents to reveal their maximum willingness to pay for amenities, as everything depended on the nature of the product being valued or the conditions that were convenient for the respondents. To facilitate the process of interviewing respondents, the researchers developed various clarification methods that were intended to make it easier for respondents to evaluate and thereby reduce the number of "non-responses and/or zero responses".

Materials and methods. Here we can continue with some example applications of the Contingent Valuation Method which was used at SNNP (State National Nature Park) "Burabay" for defining economic evaluation of recreational functions on the case of this park. SNNP "Burabay" is located in the northern part of Kazakhstan, in one of the most beautiful places, on the territory of the Akmola region which had different transformation during the 100 years and it was established in 1935. SNNP "Burabay" is widely known as a geographical point with an original nature rarely found on earth. Total surface makes up 129,2 th, ha, flora – 754 varieties, fauna – 267 varieties. The surface of the Burabay tract is a low mountainous country, which is part of the Kazakh uplands.

The main tasks of the Burabay National Park:

- preservation of the integrity of ecosystems, reference and unique natural complexes and objects, monuments of history, culture and other objects of historical heritage, as well as their study;
- restoration of disturbed natural and historical-cultural complexes and objects.

The considered natural object provides users with various ecosystem services, among which a significant role is played by recreation, which has become noticeably more active in recent years. This is due to the increase in the effective demand of Kazakhstani citizens in the "Pearl of Kazakhstan" in Burabay. Also, there is an active flow of foreign tourists, in connection with the organization of EXPO-2017 in Astana. The tourist infrastructure, along with the satisfaction of mass demand, increasingly focuses on the provision of comfortable and relatively highly paid services (conditions and payment are close to the European standard).

The main problem of preserving this unique natural object of world importance is the need to comply with environmental standards and restrictions on socio-economic development in this area, where the tourism business has become increasingly profitable in recent years. According to world experience, in each national park it is necessary to develop active activities to attract additional financial resources for the professional implementation of the economic analysis of ecosystem services. Such activities should be based on economic assessments of natural resources and objects, a number of ecosystem services that correspond to market conditions and are based on the methodology used in world practice, recognized by leading international financial organizations. One of the methods, belonging to the group of direct non-market and based on the cost of environmental services in terms of the cost that visitors pay for visiting the site, was used to determine the cost of recreational services in the SNNP "Burabay".

Various approaches in economics are used to measure environmental values, i.e. methods of revealed and stated preferences. Revealed preference methods refer to how people actually behave, while stated preference methods refer to how people talk, how they would behave in a hypothetical situation (White and Lovett, 1999) [6, p.1-13]. This study used the imputed valuation method as one of the standard and flexible approaches to measuring economic value (Hanemann, 1994) [7, p. 89-124]. This method uses a questionnaire-based approach to estimating the economic value of non-market goods (Hanemann et al., 1991; Venkatachalam, 2003), various goods (WTP) based on information provided by them (Lee, 1997). The CVM conditional scoring method was originally proposed by Ciriacy-Wantrup, 1947 (in Venkatachalam,

2003); however, Davis, 1963 (in Venkatachalam, 2003), who used CVM empirically, i.e. he assessed the benefits of goose hunting through a survey of goose hunters. This method gained popularity after two main unused values, namely selection and existence values. CVM is the only approach to identify the benefits of being in the environment for both users and non-users (Hamid Amirnejad, 2005). [8, p.665-675].

J.K. Whitehead and T.S. Haab consider CVM to be the stated preferred approach for evaluating comfort, recreation, and other environmental and natural resource issues. Preferences "stated" means that survey respondents are asked hypothetical questions directly about their value to the environment. This is in contrast to revealed preference methods, such as the travel cost method and the hedonic pricing method, for environmental valuation, in which values are revealed based on the observed behavior of the individual and family person [9, p.68-75].

David A. Hennessy and Thomas L. Marsh consider that WTP values are monetary measures that can be included in cost-benefit estimates and can be used to estimate the value of private and public goods. [10, p.75-83].

As for Caroline Steigenberger, Magdalena Flatscher-Thoeni, Uwe Siebert & Andrea M. Leiter, they believe that stated preference surveys are a valuable tool for identifying respondents' willingness to pay (WTP) for goods or services, especially in situations where no market value exists. Conditional valuation (CV) is a widely used approach among stated preference methods to detect WTP when prices do not exist or do not reflect actual costs, such as when services are covered by insurance [11, p1455–1482].

A number of scientists from China as Nam Xuan Vo etc. consider that vaccines are recognized as the most effective strategy for long-term prevention of coronavirus disease 2019 (COVID-19) because they can reduce morbidity and mortality. The purpose of the present study was to evaluate willingness to pay (WTP) for a future COVID-19 vaccination among young adults in Southern Vietnam [12, p.240-246].

The interview questionnaire conducted by the researchers, using the contingent valuation method, consists of five sections, including a "personal profile"; "development" and "environment"; questions regarding WTP for the park's cost of existence. The direct face-to-face interview is the most commonly used approach (Forster, 1989). There were some difficulties with some questions regarding money, or there were too many questions that the respondents did not want to answer.

The experience of scientists from different countries was considered when interviewing respondents.

Results. The questionnaire survey was conducted in the summer period 2019-2021 in three stages: the first – in June, the second – in July and the third – in August

During this period 350 respondents aged 20 or more were interviewed and it was made statistical results of questionnaire analysis, shown in Table 1. The table was formed by Hamid Amirnejad's method (Iran, 2005).

Table 1 Attitude of respondents to recreational functions, n=350

Questions	Answer range				
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Question 1	119 (34%)	51 (15%)	63 (18%)	95 (27%)	22 (6%)
Question 2	201 (58%)	98 (28%)	19 (5%)	21 (6%)	11 (3%)
Question 3	195 (56%)	92 (26%)	53 (15%)	7 (2%)	3 (1%)
Question 4	203 (57%)	94 (27%)	37 (11%)	9 (3%)	7 (2%)

Question 1: We should not have to invest to the parks, sacrifice our income and standard of living so that the next generation may benefit from recreational functions of the parks as National Park "Burabay".

Question 2: The arrival here to some extent contributed to the fact that places such as National Park "Burabay" can exist even when I could come here again.

Question 3: If I do not even come here again, it is important for me that such park will exist.

Question 4: For me it is important that the park will exist before the time of my grandchildren thanks to the money that we are spending now to be here.

More than 40% of respondents among 350 were female and others 60% were male. As for the occupation point of view 78 (22%) respondents were professionals, 71 (20%) businessmen and governmental employees, 65 (19%) retired, 67 (19%) housewives, 28 (8%) workers and foreigners 41 (12%). Among all respondents 199 (57%) had visited SNNP "Burabay" once or some of them twice and 151 (43%) visited park frequently. As for the education of respondents among 350, BSc- 138 (40%), MSc and higher – 57 (16%), vocational training – 53 (15%), secondary school – 54 (15%) and 48 (14%) with primary education (most of all retired old people or workers).

Results of the investigation from recreational assessment of respondents that were derived from five different items including "strongly agree", "agree", "neutral", "disagree", to "strongly disagree" are shown in Table 1. In this table it is shown the number and percent of respondents who evaluated different environmental issues in range of "strongly agree" to "strongly disagree". From the results of the survey we can argue that recreational functions of the forests on the case of the National Park of "Burabay" is very important for

our future generation and the Government should pay great attention to the preservation and further sustainable development of such places.

Compared to the results of the same surveys conducted three years earlier, there is a tendency to increase the proportion of women by 7%, the number of professionals has decreased (5%), the category of vacationers has increased, i.e. more citizens of the country became interested in outdoor recreation and its condition.

Discussions. Studies were conducted at SNNP “Burabay” among visitors of the park where we wanted to know whether people would be willing to pay towards forests conservation. The Contingent Valuation Method was used as a questionnaire-based approach to estimate the economic value of non-market goods. After investigating questionnaires, it is considered that Kazakhstan citizens in spite of their medium income are willing to pay for preserving environmental amenities, in which 55,5% (111 respondents) have the will to pay on the existence of SNNP “Burabay”, while about 10% (20 respondents) have not yet visited and 34,5% (69 respondents) of them visited SNNP “Burabay” once or twice.

According to the studies there are more people who are interested in supporting SNNP “Burabay”. Results of the studies show that citizens of Kazakhstan are very interested in developing and protecting especially protected territories such as SNNP “Burabay”, i.e. 90% of respondents who answered to questionnaires were concerned on the situation and asking for much attention to the government, programmers and related organizations and the people should pay to SNNP “Burabay” as a national and valuable asset. From the forest management point of view, questionnaires SNNP “Burabay” studies have had such results as the people of Kazakhstan were aware of the SNNP “Burabay” and its importance and as Hamid Amirnejad (Iran, 2005) told it was clear that a high willingness to pay in terms of both cash and kind exists in Kazakhstan for contributing towards the upkeep and improvement of SNNP “Burabay”.

The practical application of the concept of ecosystem services can significantly increase the efficiency of management decisions and the allocation of budgetary funds and improve the quality of life in Kazakhstan regions.

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Сведения об авторах:

Китайбекова Сара Оразбековна* – магистр сельскохозяйственных наук, старший преподаватель кафедры лесные ресурсы и лесного хозяйства, факультет лесного хозяйства, дикой природы и окружающей среды, Казахский агротехнический исследовательский университет имени Сакена Сейфуллина, 010011, г. Астана, проспект Женис, 62, тел. 87014579319, e-mail: saraorazbek@mail.ru.

Токтасынов Жайлау Нурмухамедович – кандидат сельскохозяйственных наук, доцент кафедры лесные ресурсы и лесного хозяйства, факультет лесного хозяйства, дикой природы и окружающей среды, Казахский агротехнический исследовательский университет имени Сакена Сейфуллина, 010011, г. Астана, проспект Женис, 62, тел. 87017881617, e-mail: tzhailau@mail.ru.

Сарсекова Дани Нургисаевна – доктор сельскохозяйственных наук, профессор кафедры лесные ресурсы и лесного хозяйства, декан факультета лесного хозяйства, дикой природы и окружающей среды, Казахский агротехнический исследовательский университет имени Сакена Сейфуллина, 010011, г. Астана, проспект Женис, 62, тел. 87013161442, e-mail: Dani999@mail.ru.

Kitaipekova Sara Orazbekovna – Master of Agricultural Sciences, Senior lecturer of Forest Resources and Forestry Department, For*estry, Wildlife and Environment Faculty, Saken Seifullin Kazakh Agrotechnical Research University, 010011, Astana, 62, Zhenis Avenue, tel.: 87014579319, e-mail: saraorazbek@mail.ru.

Toktassynov Zhailau Nurmuhamedovich – Candidate of Agricultural Sciences, Associate Professor of Forest Resources and Forestry Department, Forestry, Wildlife and Environment Faculty, Saken Seifullin Kazakh Agrotechnical Research University, 010011, Astana, 62, Zhenis Avenue, tel.: 87017881617, e-mail: tzhailau@mail.ru.

Sarsekova Dani Nurgisayevna – Doctor of Agricultural Sciences, Professor of Forest Resources and Forestry Department, Forestry, Wildlife and Environment Faculty, Saken Seifullin Kazakh Agrotechnical Research University, 010011, Astana, 62, Zhenis Avenue, tel.: 87013161442, e-mail: Dani999@mail.ru.

Китайбекова Сара Оразбекқызы* – ауыл шаруашылық ғылымдарының магистрі, орман ресурстары және орман шаруашылығы кафедрасының аға оқытушысы, орман шаруашылығы, жабайы табиғат және қоршаған орта факультеті, Сәкен Сейфуллин атындағы Қазақ агротехникалық зерттеу университеті, 010011, Астана қаласы, Жеңіс даңғылы, 62, тел. 87014579319, e-mail: saraorazbek@mail.ru.

Токтасынов Жайлау Нұрмухамедұлы – ауыл шаруашылық ғылымдарының кандидаты, орман ресурстары және орман шаруашылығы кафедрасының доценті, орман шаруашылығы, жабайы табиғат және қоршаған орта факультеті, Сәкен Сейфуллин атындағы Қазақ агротехникалық зерттеу университеті, 010011, Астана қ., Жеңіс даңғылы, 62, тел. 87017881617, e-mail: tzhailau@mail.ru.

Сарсекова Дани Нургисаевна – Орман ресурстары және орман шаруашылығы кафедрасының профессоры, орман шаруашылығы, жабайы табиғат және қоршаған орта факультетінің деканы, Сәкен Сейфуллин атындағы Қазақ агротехникалық зерттеу университеті 010011, Астана қаласы, Жеңіс даңғылы, 62, тел. 87013161442, e-mail: Dani999@mail.ru.

УДК 633.12:577.1:574.2

МРНТИ 68.03.03

DOI: 10.52269/22266070_2023_2_117

ГРЕЧИХА ПОСЕВНАЯ (*Fagopirum esculentum*) КАК ИСТОЧНИК РУТИНА НА СЕВЕРЕ КАЗАХСТАНА

Коберницкий В.И.* – кандидат сельскохозяйственных наук, зав. лабораторией крупяных и зернофуражных культур, ТОО «Научно-производственный центр зернового хозяйства им. А.И. Бараева», п. Шортанды.

Волобаева В.А. – младший научный сотрудник лаборатории крупяных и зернофуражных культур, ТОО «Научно-производственный центр зернового хозяйства им. А.И. Бараева», п. Шортанды.

Музыка О.В. – младший научный сотрудник лаборатории крупяных и зернофуражных культур, ТОО «Научно-производственный центр зернового хозяйства им. А.И. Бараева», п. Шортанды.

В статье представлены результаты исследований растений гречихи посевной (*Fagopirum esculentum* Moench) как источника суммы биофлавоноидов – биологически активных соединений