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Understanding Farmers' Intention towards the Management and Conservation of Wetlands

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Abstract: The aim of the present research was to analyze the farmers' intention towards participation in the management and conservation of wetlands through the lens of the extended theory of planned behavior (TPB). To do this, a cross-sectional survey of Iranian farmers was carried out. To select the samples, a multi-stage random sampling process with a proportional assignment was employed. The research instrument was a researcher-made questionnaire whose validity and reliability were verified using various quantitative and qualitative indicators. The results of the extended TPB using structural equation modeling showed that four variables, namely moral norms of participation in management and conservation (MNPMC), attitude towards participation in management and conservation (APMC), subjective norms towards participation in management and conservation (SNPMC), and self-concept about participation in management and conservation (SCPMC) had positive and significant impacts on intention towards participation in management and conservation (IPMC). The results also revealed that that entering MNPMC and SCPMC into TPB could increase its explanatory power. Also, the fit indicators supported the extended TPB. From a practical point of view, the present study provides justifications and insights for the use of MNPMC, APMC, SNPMC, and SCPMC in policies and programs intended to encourage farmers and local communities to participate in wetlands management and conservation.

Keywords: wetlands ecosystems; moral norms; self-identity; theory of planned behavior; sustainability

1. Introduction

Wetlands are among the most valuable ecosystems on Earth [1]. There are about 1280 million hectares of wetlands around the world, which include inland and coastal wetlands such as lakes, rivers, swamps, and constructed wetlands such as rice fields and reservoirs [2]. Wetlands are actually water-saturated soils [3] that include flowing, fresh, brackish, and saline water bodies. In some cases, wetlands contain a part with marine water that has a depth not exceeding six meters at low tides [4,5]. Wetlands, with

their numerous plants, animals, and microorganisms, play a crucial role in conserving global biodiversity. Their sustainable conservation and management can also play a key role in achieving 17 goals of the Sustainable Development Agenda of the United Nations and directly or indirectly contribute to the sustainability of 75 SDG indicators (out of 230) [6–8]. This means that the importance of wetlands has been emphasized in 75 indicators of the 2030 Sustainable Development Agenda. Wetlands are of great importance from ecological, economic, and socio-cultural perspectives. In the ecological dimension, with the conservation of aquatic wildlife, mammals, native and migratory bird species, resident amphibians, reptiles, and various species of insects [2–9], wetlands are safe habitats for plants and animals [10,11] and thus help to preserve and develop biodiversity. Wetlands are natural filtration systems for runoffs and can improve water quality in an area [3]. Scientific evidence [12–14] shows that wetlands play a crucial role in reducing the risks of natural disasters such as storms and floods and preventing soil erosion. Ecosystem services provided by wetlands include the reduction of climate change impacts, pollutants treatment, nutrients and human waste recycling [14,15], the rehabilitation of degraded groundwater aquifers and increasing water use potential [2], and the conservation of watersheds, carbon sequestration, and storage [14].

The wetlands are economically important because they provide many essential ecosystem services for the welfare of human communities [15]. Wetlands are turned into pivotal sources in eradicating poverty via the provision of ecosystem services [16]. In this regard, the role of wetlands resources is especially important in the livelihood of the poor in developing countries [17]. Tourists' access to these places and the development of the tourism industry can be a good source of income for local communities. Normally, the economic conditions of an area are closely associated with the health and stability of wetlands. In general, wetlands have numerous commodities and services that have economic value not only for the local population but also for the people living outside the wetlands [2]. Major economic services of wetlands ecosystems are human habitation, water supply for various uses including plantation and seasonal agriculture, the production of fishery products, the grazing source of local livestock, the growth of wild and medicinal plants, energy production, the procurement of building raw materials, the protection of genetic resources, the supply of constructing raw materials, and industrial uses for individuals [2,17].

Rodrigues et al. [18] consider socio-cultural services of wetlands ecosystems to be very important. The researchers state that wetlands are a place for recreation that can be very inspiring due to their visual and aesthetic qualities. In addition, wetlands can represent cultural heritage and identity that have high scientific and educational potential [14]. The potential role of aquatic environments (wetlands) in improving health and reducing stress has rarely been investigated so far. However, there is evidence that natural habitat and biodiversity are effective therapies to reduce mental problems such as post-disaster stress and other psychological diseases [19]. In addition, wetlands reduce intensive and widespread population movements, as the loss of livelihood opportunities and migration of people living around wetlands who depend on the existence of wetlands is one of the main social outcomes of wetlands degradation [20]. This increase in migration has caused many issues and problems including cultural shocks, slum development, illegal jobs, hidden unemployment, and other similar things in migration destinations [21].

Despite the great importance of wetlands from an ecological, economic, and socio-cultural perspective, unfortunately, many of them are being destroyed. Such disasters can have various consequences such as reducing the capacity of ecosystems to provide services [14], increasing soil salinity, increasing salt storms, the occurrence of the dust phenomenon, population mobility, international conflicts, famine, desertification, etc. There are many reasons for wetlands degradation. Examples include high population density and urbanization pressure [22], drought, storm, and sea level changes [23]. However, it should be noted that human-induced factors are the main reasons for wetlands' degradation [17]. Failure to assess the impacts of industrial and tourism development, rapid urbanization and population growth, dam construction, and agriculture are among these factors [4,23,24].

Although many factors such as climate change and the depletion of groundwater resources play a critical role in wetlands degradation around the world, the overdevelopment of agricultural activities is one of the most important factors in the destruction of most wetlands in some countries such as Iran. In this regard, paying more attention to the role of farmers as one of the influential stakeholders in the process of wetlands management, conservation, and rehabilitation is crucial [17]. Farmers can contribute to wetlands management and conservation in a variety of ways. Reducing the intensity of agricultural activities around the wetlands, launching non-agricultural businesses to prevent the destruction of wetlands ecosystems, using modern irrigation methods to reduce water consumption, and low use of chemicals in agricultural crops' production are among the contributions of farmers to the management and protection of the wetlands. Furthermore, respect for the rights of native and migratory animals of the wetlands, payment for wetlands ecosystem services, and participation in programs and projects can also be considered as the other roles and contributions for farmers in the field of wetlands management and conservation [25].

Despite the great importance of the participation of local communities (such as farmers living around wetlands) in the management and conservation of wetlands in Iran, managers, decision makers, and policy makers have not paid much attention to it. There are many wetlands that are drying for various reasons such as droughts, unbalanced agricultural development, population growth, climate change, and mismanagement in Iran. For example, Ghara Gheshlagh wetland is one of the large wetlands located in northwestern Iran near the shores of Lake Urmia. As the socio-behavioral dimensions are one of the main dimensions of sustainable wetlands management, many social intervention programs have been implemented for the rehabilitation and sustainable management of Ghara Gheshlagh wetland in this area. However, according to the Iranian Department of Environment [25], many of these social interventions have not been very successful. One of the main reasons for this is the low awareness of planners and intervention organizations about the factors determining farmers' participation and socio-psychological mechanisms of the intention to participate in the management and conservation programs of Ghara Gheshlagh wetland. Thus, identifying and analyzing the farmers' intentions to participate in the conservation and management of Ghara Gheshlagh wetland was selected as the main purpose of the current research. The main objectives included developing an appropriate theoretical framework based on the theory of planned behavior (TPB) to analyze farmers' intention to participate in the management and conservation of the wetlands, test the original version of TPB, test the extended version of TPB, and provide practical recommendations for improving the wetlands management and conservation. The present study is novel from four perspectives. First, no similar study has been conducted in the study area. Therefore, this study can provide a basis for further research on socio-psychological dimensions of wetlands conservation and management. The application of the theory of planned behavior (TPB) to analyze the farmers' intention to participate in the management and conservation of wetlands is the second novelty of the study. Furthermore, the present study extends the original version of TPB by adding the self-concept about participation in management and conservation (SCPMC) and moral norms of participation in management and conservation (MNPMC) to the analysis. This can be considered as the most important theoretical contribution of the study. The last novelty is that it provides the readers and end-users of the study with innovative results and insights about the mechanisms of the relationships among socio-psychological variables.

2. Theoretical Framework: TPB

TPB is a significant and well-known social-cognitive theory aiming at explaining the variance in volitional behaviors [26]. Fishbein and Ajzen [26] first conceptualized and presented the Theory of Reasoned Action (TRA) to describe individuals' thinking and predict their future intentions and behaviors. Attitude towards a specific behavior and subjective norm are the two main structures of TRA [27]. In 1988, Ajzen developed the TRA to overcome its limitations [28], and finally, TPB was first articulated and introduced by

Ajzen in 1991 [29]. Unlike TRA, TPB states that not all behaviors are completely voluntary and under one's control. A person may have a strong intention to perform a behavior, but in certain circumstances, this behavior is prevented. Thus, perceived or actual behavioral control may affect intention or the relationship between intention and behavior [28]. There are three main variables in TPB, including the attitude towards behavior, the subjective norm about behavior, and the perceived behavioral control [29]. Attitude is defined as the favorable or unfavorable appraisal towards the actual representation of a particular behavior [30,31]. In the present study, attitude refers to the degree of farmers' favorable or unfavorable evaluation towards participation in the management and conservation of wetlands. The subjective norm denotes "the perception of a person (farmer) that most people think that he/she must or must not perform a particular type of behavior", i.e., participating in wetlands conservation and management [26–31]. Perceived behavioral control indicates the perception of individuals about their control over the target behavior, which in this study is participation in the conservation and management of wetlands. Kolvereid [32] explains that in TPB, "attitudes or beliefs do not directly predict behaviors. Instead, these factors are completely or partially absorbed into intention" [33,34].

TPB is one of the most widely used behavior prediction theories due to its global recognition [35]. Despite the evolution of TPB over the past decades, there are still concerns about its comprehensiveness and efficiency. One of the limitations of this theory is the inadequate accuracy in prediction. Fishbein and Ajzen [26] stated that comparative importance may vary depending on the type of behavior and population. However, TPB has been criticized for being too focused on the individuals' behavior and paying insufficient attention to the respondent's identity [36,37].

It is also claimed that TPB underestimates the influence and role of social norms. Based on a study by Ajzen [30], in TPB, social-oriented norms are usually regarded as subjective-base norms [29]. Another critique of this theory is that TPB is based on individualism and all variables in it are rational predictors [29]. Some researchers [38] believe that environmentally-friendly behaviors are influenced by public-sphere and altruistic motives. Therefore, they argue that moral norms are important in perceiving individuals' behaviors and should be included in the TPB model [29]. Ajzen and Fishbein [39] also showed that when encountering behaviors with moral dimensions, moral criteria should be included in TPB to determine whether it helps to explain the intention and behavior or not. High personal or moral norms motivate individuals to follow social behaviors, while low moral norms prevent social and altruistic behaviors [29]. This theoretical approach is very useful for explaining the behaviors of farmers and other stakeholders in agriculture and natural resource management [38]. As the goal of TPB is to explain global behaviors (and not exclusively rational behaviors) [40], a variable of moral norm should be added to the extended version of TPB to improve its predictive power. Moral norms are internal moral rules or values that are motivated by predicted self-developed rewards or punishments [29–40]. In the present study, moral norms of participation in management and conservation of wetlands refer to the personal or moral justification of participation by farmers (farmers' personal beliefs about what it is right or wrong to do).

Some studies [41] have also demonstrated that in addition to moral norms, personal self-image (self-concept) can also be useful in increasing the TPB's predictive power [42], but this variable is ignored in the original version of TPB. The self-image includes all the individual roles. Individual choices may also be determined by the degree to which a particular intention is compatible with his/her own feelings [43,44]. The concept of self can encompass a broader social context for the individuals and connect intention and action to certain personal characteristics. In the present study, self-image (self-concept) is defined as the label that farmers use to describe themselves in the field of participation in the management and conservation of wetlands. The idea of self-concept integration in TPB is not new, and many previous studies [43] have shown that self-concept is an important predictor and improves the standard TPB model. Even some researchers such as Carfora et al. [37] present self-concept as the strongest predictor of pro-environmental

behavioral intentions. Therefore, in order to eliminate the weaknesses of the original form of the theory, two variables of moral norms and self-concept were included in TPB, and the theoretical framework of the study was articulated as Figure 1. This method of extending a theory is not new and is one of the most widely used and effective methods for developing behavioral theories. There is strong support for this methodology in the literature see [43,45–47], and many researchers have used this method to develop the theory of planned behavior. In order to achieve the main purpose, five hypotheses were defined:

All the studied variables including the attitude towards participation in management and conservation (APMC) (hypothesis 1), subjective norms towards participation in management and conservation (SNPMC) (hypothesis 2), perceived behavioral control on participation management and conservation (PBCPMC) (hypothesis 3), self-concept about participation in management and conservation (SCPMC) (hypothesis 4), and moral norms of participation in management and conservation (MNPMC) (hypothesis 5) will have positive and significant effects on the intention towards participation in management and conservation (IPMC).
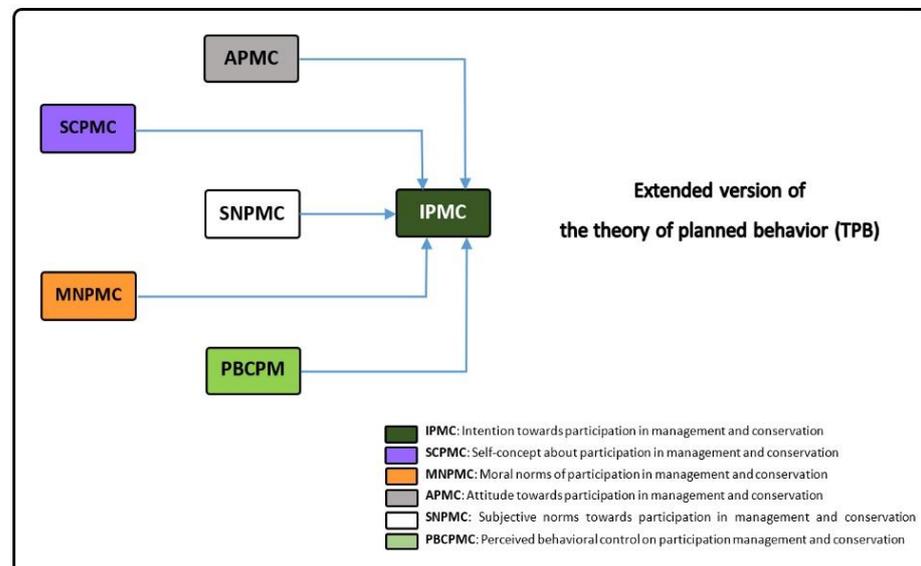
Figure 1. Theoretical framework of the research.

3. Materials and Methods

3.1. Research Design and Research Type

In terms of paradigm, this study is a quantitative one in which a non-experimental research design was used, and in terms of purpose, it is an applied one that was conducted using a cross-sectional survey among farmers.

3.2. Study Area

Ghara Gheshlagh wetland is located in the northwest of Iran and in the southeastern part of Lake Urmia (Figure 2). This wetland is located in the geographical area of the two provinces of West and East Azerbaijan and has an area of about 48 square kilometers. This means that the wetland is located on the border between the two provinces of West and East Azerbaijan in Iran. Its average height above the sea level is 1275.9 m. The water depth of this wetland is about 15 cm. It is noteworthy that its water depth varies in different seasons of the year due to many factors such as rainfall in wet seasons, evaporation in hot seasons, the consumption of water sources by different users, the extent of exploitation of underground resources in the wetland, and the decrease in the water level of Lake Urmia. The main livelihood and income sources of the villagers are agriculture and mobile/fixed livestock husbandry. The agricultural products of the farmers of the region are alfalfa, watermelon, wheat, barley, melon, tomato, beet, and orchards (apple and grape), among

which a significant proportion is allocated to the first four crops. Today, about three-quarters of the region's agricultural land is used for alfalfa, watermelon, wheat, and then barley. Only a quarter of the rest is allocated to other products. Alfalfa, meanwhile, is a crop that needs plenty of water, and wheat and barley are irrigated rather than rainfed [25]. Therefore, it can be said that the agriculture sector in this region is impressively water consuming. Handicrafts such as weaving kilims and carpets, hunting waterfowl, and fishing are other sources of income for local people. The presence of 185 species of native and migratory birds, numerous mammals, and rare plant and aquatic species indicates the richness of this habitat as one of the main and ecological reserves. Ghara Gheshlagh's biodiversity has made it one of the important habitats for natural vegetation and wildlife. This wetland is home to thousands of migratory birds (especially flamingos) that migrate to this area from distant areas every year during the cold season [25].

Figure 2. The study site.

3.3. Population and Sampling

The population in the present cross-sectional survey was farmers around Ghara Gheshlagh wetland (Figure 2) (N = 9536). As this wetland is located in the West and East Azerbaijan provinces, we attempted to select a sample from farmers in both provinces. In order to obtain the required sample size of the population around the wetland, the Krejcie and Morgan table was used (n = 373). Once the population size is figured out, the Krejcie and Morgan table is a simple way to estimate the sample size. This sampling table is one of the most widely used methods for calculating a statistical sample size [44]. For logical distribution of the sample in the population and selection of a representative random sample, a multi-stage stratified method with proportional assignment was used. In this sampling method, the study area should be divided into several categories based on special criteria. Therefore, first, the area was divided into two categories/counties. In this classification, based on the Statistics Center of Iran, Bonab and Miandoab counties were considered as separate classes. In the second stage, the name and characteristics of the villages around Ghara Gheshlagh wetland were determined. To do this, the data and information provided by the Forests and Rangelands Organization of West Azerbaijan and East Azerbaijan provinces were used. Wetlands may directly and indirectly influence agricultural, livelihood, and industrial activities at a distance of 5 km. Therefore, the villages located within a 5 km radius of the wetland were included in the population (23 villages). Some other studies have used this approach in the past [48]. However, it should be noted that in some cases, the direct and indirect effects of wetlands may be felt at distances of more than 5 km [25]. In the third stage, the number of farmers in each village was estimated. For this purpose, the demographic statistics presented in the

agricultural reports of the Agricultural Jihad Administrations of Bonab and Miandoab counties were used. In the fourth step, the required sample size for each village was estimated by comparing its agricultural population with the total agricultural population and the selected sample. This made it possible to distribute the whole sample among different villages. Finally, farmers (samples) were randomly selected from the farmers of each of these villages in proportion to the volume.

3.4. Research Instrument

The study instrument was a researcher-made and close-ended questionnaire (Table S1). Different methods and indicators were used to verify the validity and reliability of the study device. In order to confirm the face and content validity, the opinions of the expert group were employed. These experts were either faculty members or field practitioners with extensive experience in socio-ecological interventions based on sustainable wetlands management.

The pilot study was conducted among farmers around Parishan wetland in Fars province in the Southeast of Iran. This area was selected for the pilot study because it was similar to Ghara Gheshlagh wetland in terms of its conditions. Alpha coefficients were used to verify the reliability. Table 1 shows the calculated reliability for the various variables. After the cross-sectional survey, other complementary methods were used to confirm the validity and reliability. At this stage, two indicators of composite reliability (CR) and loading factors of items in the first-order confirmatory factor analysis were used to appraise and examine the reliability of the research instrument.

Three other indicators (composite reliability, convergent validity (CV) or average variance extracted (AVE), and divergent validity) were also applied to confirm the validity indices of the research instrument. Divergent validity of the questionnaire was evaluated by the average shared squared variance (ASV) and the maximum shared squared variance (MSV). Finally, all the questionnaire items (see Table 1 for the complete list of items) were scored by means of a five-point Likert scale (1 = Strongly disagree to 5 = Strongly agree). In order to calculate the scores of the variables in the conceptual framework, the scores of the constituent items were added together.

Table 1. Items employed to measure the variables and alpha coefficients.

Var.	No.	Items
		Attitude towards participation in management and conservation (APMC): (α = 0. 78)
APMC	1	Usefulness of participation in wetlands conservation and management
	2	Prioritization of personal interests such as increasing products over wetlands conservation and management
	3	Necessity of wetlands conservation and management in water shortage conditions
	4	Necessity of cooperation and participation of all stakeholders in wetlands conservation and management
	5	The desirability of engagement in wetlands conservation and management
	6	Considering participation in wetland conservation and management as a wise behavior
	7	Trusting the wetlands conservation and management plans
		Perceived behavioral control on participation management and conservation (PBCPMC): (α = 0.75)
PBCPMC	1	Having the time and skills needed to participate in wetlands management and conservation
	2	Having the necessary economic capability to participate in wetlands conservation and management activities
	3	Ease of participation in wetlands conservation and management
	4	Having the knowledge needed to participate in wetlands conservation and management
		Moral norms of participation in management and conservation (MNPMC): (α = 0.84)
MNPMC	1	I feel that I am a good person if I help protect and revitalize the wetlands.
	2	I consider it a moral duty to participate in the better conservation and management of the wetlands.
	3	I feel that I have to do useful work for better conservation and management of wetlands.
	4	I have a sense of commitment to participate in wetlands conservation and management.

Table 1. *Cont.*

Var.	No.	Items
		Intention towards participation in management and conservation (IPMC): (α = 0.82)
IPMC	1	I want to pay for the rehabilitation and conservation of Ghara Gheshlagh wetland.
	2	I want to learn the necessary skills for the conservation and management of Ghara Gheshlagh wetland.
	3	I would like to participate in the management and conservation of Ghara Gheshlagh wetland.
	4	I would like to cooperate with the government, experts, and stakeholders involved in the rehabilitation of Ghara Gheshlagh wetland.
		Subjective norms towards participation in management and conservation (SNPMC): (α = 0.73)
SNPMC	1	Commitment to participate in the management and conservation of the wetlands will lead to my approval by those around me.
	2	I think my acquaintances and friends expect me to be as committed as I can to participate in the management and conservation of the wetlands.
	3	My acquaintances and friends think that I should be committed to participating in the management and conservation of the wetlands.
		Self-concept about participation in management and conservation (SCPMC): (α = 0.77)
SCPMC	1	I believe that I am a person with environmental concerns in Ghara Gheshlagh wetland.
	2	My self-image is a person committed to participating in the management and conservation of the wetlands.
	3	I think I am a person who participates in the management and conservation of the wetlands (water conservationist).

3.5. Data Collection and Data Analysis

The researchers used face-to-face interviews with farmers for data collection. Data collection was performed by the first author. To collect data, the first author used an experienced data collecting team. The number of members of the data collection team was 4 and they were engaged in data collection for two months. According to the estimated sample size, 373 farmers in different villages were selected and interviewed, but 33 of them refused to answer. Therefore, 340 questionnaires were collected. Then, 25 questionnaires were excluded due to high missing data. Finally, 315 questionnaires were analyzed. Data analysis was performed using SPSS24 and AMOS20 software. Data normality was tested using Mardia's skewness and kurtosis coefficients. The values of these coefficients were at the acceptable level (less than ±1.96). First-order confirmatory factor analysis models were applied to calculate the measuring models and analyze the structure of the extended TPB variables. Confirmatory factor analysis is a method to determine the power of a predefined factor model that has a set of observational data. In other words, this type of factor analysis tests the degree of conformity between the theoretical model and the experimental model of the research. In this method, first, the relevant variables and indicators are selected based on the initial theory and then, factor analysis is used to determine whether these variables and indicators are loaded on the predicted factors or not [49,50]. The maximum likelihood method was used to examine the measurement models. In this study, in addition to measurement models, total/direct structural model analysis was employed. The structural model examined the structural-oriented relationship between the original and extended versions of TPB. For this purpose, the original TPB was first tested by entering three independent variables, namely APMC, PBCPMC, and SNPMC. In The next step, the extended version was tested by adding MNPMC and SCPMC to the original TPB. This is one of the most common ways to develop behavioral patterns.

4. Results

4.1. Correlation Matrix between Independent and Dependent Variables

The correlation relationships of the variables showed that five variables of APMC (r = 0.670; p > 0.01), SNPMC (r = 0.465; p < 0.01), PBCPMC (r = 0.544; p < 0.01), SCPMC (r = 0.547; p < 0.01), and MNPMC (r = 0.709; p < 0.01) had positive and significant correlations with IPMC. These correlations mean that increasing or strengthening these five

variables can lead to enhancing the IPMC. By comparing the correlation values, it can be inferred that the intensity of the correlation of MNPMC and APMC with IPMC is higher than other variables (Table 2).

Table 2. The results of Pearson correlation for the study variables.

Variable Name	IPMC	APMC	SNPMC	PBCPMC	SCPMC	MNPMC
IPMC	1					
APMC	0.670 **	1				
SNPMC	0.465 **	0.461 **	1			
PBCPMC	0.544 **	0.694 **	0.387 **	1		
SCPMC	0.547 **	0.494 **	0.294 **	0.451 **	1	
MNPMC	0.709 **	0.680 **	0.425 **	0.591 **	0.549 **	1

Note: Abbreviations: Intention towards participation in management and conservation (IPMC), Attitude towards participation in management and conservation (APMC), Subjective norms towards participation in management and conservation (SNPMC), Perceived behavioral control on participation management and conservation (PBCPMC), Self-concept about participation in management and conservation (SCPMC), Moral norms of participation in management and conservation (MNPMC). ** Sig. level: 0.01.

4.2. Evaluating Validity and Reliability Results Using Measurement Models

The evaluation of the measurement models of the extended TPB variables showed that the values of the loading factors of all measurement items were greater than or equal to the acceptable value of 0.4 (Table 3). This means that the items having a loading factor less than 0.4 are not loaded on the specific factor and must be eliminated. In fact, the values of the loading factors represent the correlation of individual items with the main factors (variables). The recommendation presented by Nunnally [51] and Maleksaeidi et al. [52] was used to determine this acceptable threshold value. The obtained numerical coefficients for CR and AVE were greater than or equal to the cut off values of 0.7 and 0.5, respectively. It can be inferred that the questionnaire used in this study had composite reliability and convergent validity. Comparing divergent validity indicators (ASV and MSV) with AVE values also revealed that the values of these indicators were less than AVE values. Therefore, it can be concluded that the study instrument had divergent validity. Since Mardia's multivariate skewness and kurtosis coefficients were less than ± 1.96, it can be inferred that the research data had a normal distribution (Table 3).

Table 3. Measurement models' estimations and validity and reliability results.

Items/Variables/ Normality Measure	IPMC	APMC	SNPMC	PBCPMC	SCPMC	MNPMC	Skew	Kurtosis
IPMC1	0.75 *						1.302	0.765
IPMC2	0.75						0.625	0.969
IPMC3	0.60						0.374	0.751
IPMC4	0.57						1.502	−0.298
APMC1		0.52 *					0.881	0.531
APMC2		0.60					−1.449	1.123
APMC3		0.66					−0.460	0.741
APMC4		0.77					0.367	0.758
APMC5		0.72					0.811	0.298
APMC6		0.58					1.742	0.453
APMC7		0.70					−0.569	0.961
SNPMC1			0.78 *				0.276	−0.816
SNPMC2			0.78				0.704	0.316
SNPMC3			0.75				−0.557	0.098
PBCPMC1				0.69 *			0.472	−0.318
PBCPMC2				0.66			1.121	0.811
PBCPMC3				0.52			1.025	−0.591
PBCPMC4				0.62			0.745	0.637
SCPMC1					0.75 *		0.907	0.733

Items/Variables/ Normality Measure	IPMC	APMC	SNPMC	PBCPMC	SCPMC	MNPMC	Skew	Kurtosis
SCPMC2					0.80		0.282	−0.808
SCPMC3					0.40		−0.596	−0.652
MNPMC1						0.77 *	1.082	0.770
MNPMC2						0.67	1.602	1.238
MNPMC3						0.61	0.729	0.415
MNPMC4						0.75	0.361	−1.608
CR	0.73	0.71	0.78	0.70	0.72	0.74	-	-
AVE	0.62	0.58	0.71	0.54	0.59	0.63	-	-
MSV	0.45	0.32	0.52	0.24	0.38	0.49	-	-
ASV	0.31	0.41	0.36	0.08	0.27	0.44	-	-

* Fixed item in the confirmatory factor analysis.

4.3. Evaluation of Structural Models and Analyzing the Relationships among Latent Variables

The results of testing the total/direct structural model for the original TPB revealed that the variables such as APMC (β = 0.489; $p > 0.01$), SNPMC (β = 0.175; $p > 0.01$), and PBCPMC (β = 0.135; $p > 0.05$) had positive and significant effects on IPMC (Table 4). This means that the first, second, and third hypotheses were supported by the results of the original TPB. Comparing the standardized effects of these variables reveals that APMC had the strongest effect on IPMC. Independent variables in the original TPB could account for 47.4% of the variance changes in IPMC.

The estimation of the total/direct structural model for the extended TPB models showed that APMC (β = 0.260; $p > 0.01$), SNPMC (β = 0.120; $p > 0.01$), SCPMC (β = 0.169; $p > 0.01$), and MNPMC (β = 0.362; $p > 0.01$) had positive and significant effects on IPMC (Table 4; Figure 3). This means that the first, second, fourth, and fifth hypotheses were supported by the results of the extended TPB. By comparing the effects of these four significant variables, it can be said that both MNPMC and APMC variables had the strongest standardized effects in the extended version of TPB, respectively. This result indicates that these two variables can explain IPMC more than other variables. However, it should be mentioned that SCPMC and SNPMC also play a significant role in explaining variance and directing IPMC. In the total/direct structural model in the extended TPB, the effect of PBCPMC on IPMC was not significant. Therefore, the hypothesis or path of PBCPMC → IPMC was not supported (β = −0.027; n.s.). It should be noted that the independent variables of extended TPB could explain 58.1% of the variance changes in IPMC (Table 4 and Figure 3). The comparison of the total variances explained in original and extended versions of planned behavior demonstrates that the inclusion of the variables such as MNPMC and SCPMC in the original version can improve its explanatory power.

Table 4. The results of estimating standardized effects of independent variables on IPMC in original and extended versions of TPB using the structural model.

Model	Hypothesized Relationship	Unstandardized Coefficients	S.E.	Standardized Coefficients	Sig.	Hypothesis Test
Extended TPB	APMC→IPMC	0.175	0.041	0.260	0.001	Supported
	SNPMC→IPMC	0.177	0.064	0.120	0.006	Supported
	PBCPMC→IPMC	0.033	0.067	0.027	0.625	Un-supported
	SCPMC→IPMC	0.273	0.076	0.169	0.001	Supported
	MNPMC→IPMC	0.387	0.060	0.362	0.001	Supported
Original TPB	APMC→IPMC	0.329	0.041	0.489	0.001	Supported
	SNPMC→IPMC	0.258	0.071	0.175	0.001	Supported
	PBCPMC→IPMC	0.166	0.72	0.135	0.022	Supported

Note: Abbreviations: Intention towards participation in management and conservation (IPMC), Attitude towards participation in management and conservation (APMC), Subjective norms towards participation in management and conservation (SNPMC), Perceived behavioral control on participation management and conservation (PBCPMC), Self-concept about participation in management and conservation (SCPMC), Moral norms of participation in management and conservation (MNPMC).
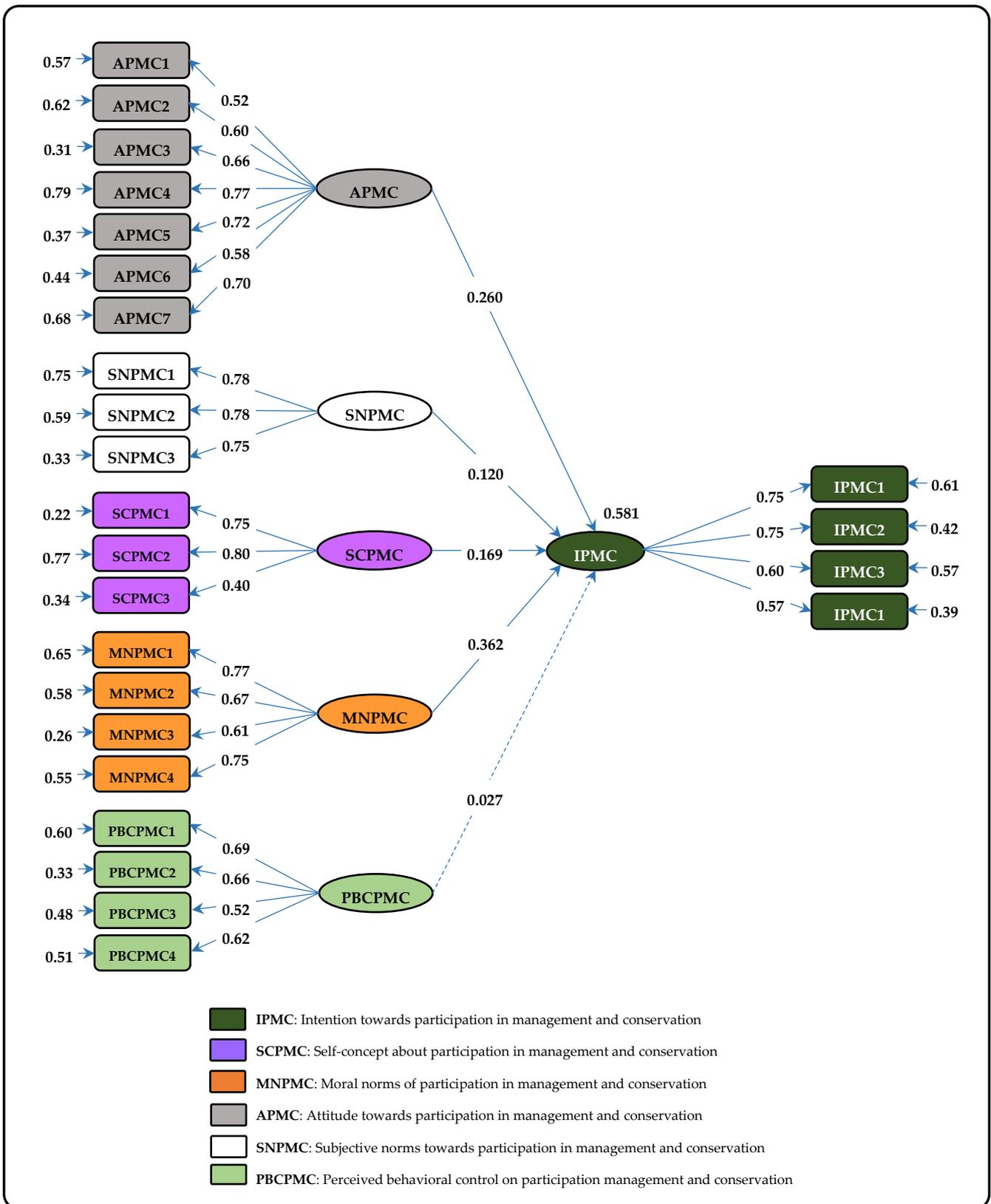
Figure 3. Direct structural model with standardized extended TPB.

4.4. Fit Indices of the Structural Model

The fit of the direct structural models for the original and extended TPB was evaluated using some indices (e.g., CFI, GFI, AGFI, NFI, IFI, RMSEA, and CMIN/DF). In structural equation modeling, CFI, GFI, AGFI, NFI, IFI, RMSEA, and CMIN/DF fit indices are used as standards or criteria to compare the two models. As Table 5 shows, all fit indices are within a plausible range in both models. In other words, both original and extended TPBs had an acceptable fit. However, in deciding on the most appropriate model, each of these fit indices (standards/criteria) must be compared separately for both models. Considering the results in the table, all the reported values of fit indices for the extended TPB are more favorable than the fit indices for the original TPB. Therefore, the extended version of TPB fits better than the original TPB. Overall, it can be concluded that the extended TPB better predicts IPMC than the original TPB. The comparison of R2 values between the two models also confirms this result.

Table 5. Cut-offs and results for fit indices in the original and extended TPB.

Fit Index	Cut-Off	Results for the Present Study	
		Extended TPB	Original TPB
Comparative Fit Index (CFI)	$\geq$0.90	0.912	0.906
Goodness of Fit Index (GFI)	$\geq$0.90	0.953	0.924
Adjusted Goodness of Fit Index (AGFI)	$\geq$0.90	0.947	0.915
Normed Fit Index (NFI)	$\geq$0.90	0.933	0.908
Incremental Fit Index (IFI)	$\geq$0.90	0.984	0.937
Root Mean Square Error of Approximation (RMSEA)	$\leq$0.10	0.076	0.083
Chi-square Normalized by Degrees of Freedom (CMIN/DF)	$\leq$5	1.39	2.41

5. Discussion

The results highlighted that MNPMC had a positive and significant effect on IPMC and this variable has the highest explanatory power in the extended TPB. Based on this finding, it can be concluded that part of the issues related to the conservation and management of wetlands can be improved by creating moral norms among farmers. These findings are consistent with the findings of Yazdanpanah and Forouzani [46] and Han et al. [34]. In many cases, the degradation of wetlands, ecosystems, and natural resources is due to the fact that various stakeholders, such as farmers and local communities, do not consider participation in the management and conservation of wetlands as a moral action. In such conditions, collective interests, altruistic values, and intergenerational and intragenerational equality are not considered in the behavior of individuals. As a result, farmers attempt to maximize their personal profits by maximizing the use of wetlands services. Such anti-social and anti-environmental actions in the long term could lead to further wetlands degradation and natural resources.

According to the results, APMC had a positive and significant impact on IPMC. It can be concluded that having a favorable attitude towards the conservation and management of the wetlands can play a significant role in strengthening the IPMC of farmers. This result has been supported by Valizadeh et al. [53] and Han et al. [34]. The favorable attitude towards the management and conservation of the wetlands is influenced by various prerequisites such as the awareness of non-participation consequences, previous experiences of participation, and outcome expectancy in the field of participation in the conservation and management of the wetlands. Therefore, at this stage, they should be aware of the consequences of their participation or non-participation in the management and conservation of wetlands so that their attitude is based on solid awareness and understanding.

The results revealed that SNPMC had a significant positive effect on IPMC. Based on this finding, we can understand the key role and importance of farmers' social environments in directing farmers' IPMC. Similar findings can be found among the results of

Yazdanpanah and Forouzani [46] and Valizadeh et al. [48]. Such evidence proves that good subjective norms or positive social pressures about wetlands management and conservation increase farmers' intention to participate in wetlands conservation and management. SCPMC also had a positive and significant impact on IPMC. This result is in line with the findings of other researchers see [37–43]. SCPMC refers to a set of socially constructed roles and beliefs about farmers' participation in wetlands conservation and management. Despite the key role of SCPMC in encouraging farmers' behavioral intentions towards participation in wetlands management and conservation, in many conditions, SCPMC of farmers is not at the acceptable level. As a result, they are reluctant to actively participate in sustainable wetlands management activities. In order to strengthen the IPMC using SCPMC, this perspective must be institutionalized among farmers who do not necessarily have to accept and implement all the proposed guidelines for wetlands management and conservation at the same time and in a short period of time. Another strengthening strategy of SCPMC that may be used is self-regulation training in wetlands management and conservation activities. In other words, farmers are educated on how to monitor and direct their conservation activities. This can help strengthen the SCPMC and IPMC.

From a practical point of view, this study provides justifications and insights into the use of the MNPMC, APMC, SNPMC, and SCPMC variables in the policies and programs that intend to encourage farmers and local communities to participate in wetlands management and conservation.

From a theoretical point of view, it should be emphasized that this study contributes to the development of the original TPB. The extended version of TPB has two new variables (MNPMC and SCPMC). However, the results showed that PBCPMC should be removed from the original version of TPB. Many studies deny the effect of PBCPMC on IPMC (see [46,54–57]). The non-significance of the effect of PBCPMC on IPMC in the extended TPB has various reasons for occurring. First, in structural equation modeling, independent variables compete with each other simultaneously to predict the independent variable (IPMC). In general, the greater the number of independent variables in a study is, the more likely that variables may not have a significant effect on the dependent variable. However, by reducing the predictor variables, the non-significant effects of some variables may become significant [58–61]. In this study, the inclusion of the two new variables in the extended TPB model has made the effect of PBCPMC on IPMC non-significant. Second, adding the two new variables to the original TPB can increase the non-causal effects since the introduction of the new variables into the original model will affect the mechanisms and relationships between independent and dependent variables [58,62]. As a result, in the extended TPB, the effect of the independent variables (such as PBCPMC) on the dependent variable (IPMC) may be mediated using new and unknown variables and factors. These modifications in the TPB could pave the way for further research to develop this theory. In addition, it provides new insights into the mechanisms of communication between the variables of TPB theory.

6. Conclusions and Recommendations

Institutions responsible for the planning and sustainable operation of wetlands, such as the Environmental Conservation Organization and the Ministry of Agriculture, must take prompt and purposeful interventions to establish and strengthen the MNPMC. These interventions can be done via participatory and face-to-face discussions with farmers in the farming communities. The executives of these participatory meetings should try to convince the farmers that participation in the management and conservation of the wetlands is a moral action and for the benefit of the agricultural community. This could ultimately lead to strengthening the IPMC. However, interveners should know that enhancing goodwill and trust is the first step in strengthening MNPMC and IPMC.

In order to strengthen the IPMC using attitudinal changes, it is necessary to precisely examine the social context of the farmers' community in participatory activities. In this process, behavioral and attitudinal change agents must first investigate the experiences of

the farmers in the field of participation in participatory programs and projects. In many cases, due to unsuccessful experiences of farmers' participation in previous development and partnership programs, they may be reluctant to participate in future programs. In such cases, it is necessary to provide them with tangible guarantees and motivation to ensure that the project will not have a similar fate.

It is also suggested that formal and non-formal farmers' networks, which are generally in the form of various organizations, are identified to be used as levers for the behavioral change of the individuals. In addition, leading, influential, and trusted farmers in the farming community have a high actual and potential ability to direct farmers' IPMC. These farmers can also be used as executive elements of programs to enhance farmers' desire to conserve the wetlands. If leading farmers are used, there is no need for one-to-one communication to strengthen the IPMC, and the social environment is strengthened via social pressures. Moreover, wetlands management programs should be community- and/or region-based. In this way, complex ecosystems can be managed collectively by the (complex) network of farmers.

It is recommended that planners, policy makers, and operators of the wetlands management program use strengthening strategies of SCPMC in the agricultural community. One of the best strategies in this field is to "avoid perfectionism" in participation in the conservation and management of wetlands. In order to strengthen IPMC using SCPMC, it is necessary that some of the easiest and most user-friendly measures of participation in the management and conservation of the wetlands should be adopted and implemented by farmers. After the implementation and completion by farmers, their actions should be encouraged by program supervisors to lead to the repetition and development of behavior.

This study led to four general conclusions. First, extending the TPB by including MNPMC and SCPMC can increase its explanatory power. It seems that these two variables have a positive effect on predicting farmers' intention to participate in wetlands management and conservation. Second, PBCPMC had no impact on IPMC in the extended TPB. Third, MNPMC and APMC variables were the strongest predictors of IPMC in the extended TPB. Fourth, the results of the fitness indices supported the extended TPB.

Directions for Future Research

It should be emphasized that the extended TPB is open for further development in the future. Therefore, researchers can extend this version by including other variables such as knowledge, information, and environmental concern, as well as individual (self) identities and relationships with other farmers and communities. The collected data in this study were analyzed for the whole study area. However, future studies can cluster the results with respect to the geographical division of the study area. This can make it possible to identify the determinants of farmers' intention in areas close to and away from the wetlands more precisely. In this way, the wetlands managers and extension workers can strategize to adjust their plans based on stratified classes or clusters of respondents. In addition, it is worth mentioning that the final validation of the extended TPB requires a cross-validation analysis, which should be addressed in future studies. Overall, due to budget and time constraints, performing such an analysis was not feasible in the current study. Accordingly, this issue is recognized as a limitation for this research which should be addressed by future studies. In the end, it is worth mentioning that the present study focused on analyzing and understanding farmers' intention towards the conservation and management of the wetlands. Futures studies can investigate the intention of other stakeholders including the experts of the Department of Environment, project managers, agricultural extension agents, etc.

Abbreviations

Intention towards participation in management and conservation (IPMC), Attitude towards par-
ticipation in management and conservation (APMC), Subjective norms towards participation in
management and conservation (SNPMC), Perceived behavioral control on participation management
and conservation (PBCPMC), Self-concept about participation in management and conservation
(SCPMC), Moral norms of participation in management and conservation (MNPMC).

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